The Australian National University

1982 Report

Part 1

Report of the Council for the period
1 January 1982 to 31 December 1982
The Australian National University
Report of the Council for the period
1 January 1982 to 31 December 1982


We have the honour to transmit to Your Excellency Part 1 of the Report of the Council of the Australian National University for the period 1 January 1982 to 31 December 1982 furnished in compliance with Section 33 of the Australian National University Act 1946. This Part of the Report covers the activities of the University.

Part 2 of the Report containing the Auditor-General's Report and Financial Statements will be presented to you separately.

J.G. Crawford
Chancellor

P.H. Karmel
Vice-Chancellor
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.

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(vi)
The Australian National University was established under the Australian National University Act 1946 as a research and postgraduate institution. In 1960, it gained an undergraduate responsibility through amalgamation with the Canberra University College. The original Australian National University is now identified as the Institute of Advanced Studies, and comprises seven research schools. The teaching departments have become The Faculties; there are five faculties.

Spanning the two halves of the University are the Library, the Computer Services Centre, one research centre, and a group of essentially separate entities which in 1980 were drawn together to form the Division of Educational Services. The central administration of the University is also structured along lines designed to serve the Institute and The Faculties equally.

Within the Institute of Advanced Studies, The Faculties and the Division of Educational Services are further Centres and Units. The majority have functions wider than, or different from, those of the regular academic schools or departments, though for administrative purposes they are associated with a larger parent.

The statutory functions of the University, specified in the Australian National University Act 1946, include —

(a) the encouragement, and provision of facilities for postgraduate research and study, both generally and in relation to subjects of national importance to Australia;
(b) the provision of facilities for university education for persons who elect to avail themselves of those facilities and are eligible to do so.

The first of these broadly describes the functions of the Institute of Advanced Studies, and the second describes one of the main functions of The Faculties. However, The Faculties have a commitment to research and postgraduate training of the same order as that in other Australian universities with undergraduate enrolments.

**Enrolments**

Total enrolments in 1982 were down by 98 on the previous year. The following table places this decline in context. Over the past seven years total enrolments have hovered around the 6000 mark. For several years undergraduate enrolments have been declining but this has been offset by increases in postgraduate numbers. Postgraduate enrolments now constitute 20 per cent of enrolments having grown from 17 per cent in 1975.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>4887</td>
<td>5058</td>
<td>4858</td>
<td>4831</td>
<td>4949</td>
<td>5028</td>
<td>4785</td>
<td>4692</td>
</tr>
<tr>
<td>Postgraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IAS</td>
<td>341</td>
<td>390</td>
<td>412</td>
<td>424</td>
<td>399</td>
<td>365</td>
<td>360</td>
<td>377</td>
</tr>
<tr>
<td>Faculties</td>
<td>682</td>
<td>673</td>
<td>626</td>
<td>581</td>
<td>634</td>
<td>708</td>
<td>781</td>
<td>769</td>
</tr>
<tr>
<td>Centres</td>
<td>7</td>
<td>13</td>
<td>29</td>
<td>28</td>
<td>31</td>
<td>23</td>
<td>34</td>
<td>24</td>
</tr>
<tr>
<td>Total postgraduate</td>
<td>1030</td>
<td>1076</td>
<td>1067</td>
<td>1033</td>
<td>1064</td>
<td>1096</td>
<td>1175</td>
<td>1170</td>
</tr>
<tr>
<td>Total enrolments</td>
<td>5917</td>
<td>6134</td>
<td>5925</td>
<td>5864</td>
<td>6013</td>
<td>6124</td>
<td>5960</td>
<td>5862</td>
</tr>
</tbody>
</table>
New undergraduate enrolments have continued to decline. In 1982 the decline was concentrated among male students and part-time students. Females constituted more than one-half of the undergraduate intake for the first time. New part-time undergraduates, whose number had been rising steeply up to 1979, fell sharply; for the first time for some years there was an increase in new full-time undergraduates. The decline in numbers from outside the ACT continued, as did the decline in those coming direct from school. There was also a sharp fall in the number of new undergraduates whose occupation was Australian Public Servant: a reflection of the tightening of provisions for study leave for public servants.

The above trends for new undergraduates were reflected in the figures for all undergraduates. The proportion of female undergraduates continued to increase and now stands at almost 48 per cent in contrast to 39 per cent in 1975. The increasing proportion of part-time students which had been evident up to 1980 reversed in 1981 and the downward movement continued in 1982; notwithstanding this the proportion of part-time students (40 per cent) was higher than that of the mid-1970s. The number of undergraduates with home residence in the ACT or Queanbeyan has been more or less maintained but since 1976 there has been a substantial fall in those coming from other States. In 1982 the number was 26 per cent of the total enrolments compared with 42 per cent in 1975. In the same period there has been an increase in overseas undergraduate enrolments from 3.3 per cent to 4.5 per cent.

The undergraduate population continued to get older: the proportion aged 30 years and over has increased every year since the mid-1970s and now makes up more than one-quarter of the student population — more than twice as great a proportion as in the mid-1970s. Over the same period full-time undergraduates have become increasingly dependent on parents or spouses for financial support, the number being supported by TEAS allowances or other awards being half of what it was in the mid-1970s.

Some of the trends noted above are to be welcomed. In particular the increasing representation of women among the students is an indication of a growing equalisation of educational opportunities between the sexes. However, women are still comparatively under-represented in the Faculty of Economics and, to a lesser extent, Law. Also the proportion of women enrolled for postgraduate work is much lower than would be expected from the proportion of enrolments of women in undergraduate courses. Nor is the increasing representation of older people to be regretted. Enrolments of people aged 30 years and over have more than doubled since 1975. This trend reflects the growing interest by older people in undertaking a higher education that they missed when younger, retraining or refreshment.

On the other hand, the reduction in the participation of young people in higher education is much to be deplored. In 1982, only 500 new undergraduates came direct from school; this constituted less than 40 per cent of the new intake and was less than two-thirds of the number coming direct from school in 1975. The decline in the participation of the young in higher education in Australia, of which the ANU experience is an example, is particularly marked among males. This decline has come at a time when full-time job opportunities for the young are diminishing and when, for the benefit of Australian society at a time of rapid technological and social change, young people should be as well qualified as possible. This is a matter for grave public concern; the issues are discussed in the Commonwealth Tertiary Education Commission's recent publication Learning and Earning.

The trend in enrolments for honours degrees at the bachelor level is also a matter of concern. The number enrolled for honours declined again in 1982 and now stands at less than two-thirds of the number six years ago. The decline applies to both sexes, although it has been more severe for males than females. An explanation probably lies with the job market — some bright students are inclined to enter employment after graduating with a pass degree, on the bird-in-the-hand principle. It is highly desirable that the most able students be encouraged to undertake honours work; they are most unlikely to miss out on job opportunities through the delay of one year.
The University has continued to maintain its entry standards. Since 1975, the minimum level of admission to the University has remained at or slightly above the 50th percentile of the tertiary education scores of school-leavers who were eligible to be considered. Entry to the Faculty of Law is more selective; the minimum admission level in 1982 being the 13th percentile. While the threshold for entry has been maintained, the general quality assessed on tertiary entrance scores of those entering appears to have deteriorated slightly compared with the mid-1970s.

The number of degrees conferred in 1982 was almost the same as for the previous year. The following table sets out trends in graduations over past years. There has been a decline in the number of bachelor degrees awarded, reflecting the decline in undergraduate enrolments. This has been offset to some extent by the establishment of graduate diplomas and the degree of Bachelor of Letters, which are now being awarded in some numbers.

<table>
<thead>
<tr>
<th>Degrees Conferred 1975-1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Bachelor degree</td>
</tr>
<tr>
<td>811</td>
</tr>
<tr>
<td>Graduate diploma, LittB</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>Master degree</td>
</tr>
<tr>
<td>53</td>
</tr>
<tr>
<td>PhD</td>
</tr>
<tr>
<td>120</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>984</td>
</tr>
</tbody>
</table>

Graduate employment

The University's annual survey of graduate destination trends showed a continuing decline in the proportion of first-degree graduates proceeding directly to further full-time study. The largest group of first-degree graduates, those who completed a pass degree on a full-time basis, dropped from 48 per cent to 45 per cent between 1981 and 1982. Fifteen per cent of first-degree graduates found employment in the private sector, a rise of 3 per cent over 1981, while those working in the public sector fell from 23 per cent to 20 per cent.

Graduates whose major studies were in computer science, accounting and economics continued to have little or no difficulty obtaining positions, although there is evidence of increasing competition for those with mediocre qualifications. The proportion of ANU graduates entering the private sector continues to be smaller than the national average. The year saw a continuing decline in the demand for graduates in the mining and manufacturing sectors but steady demand in commerce, particularly from large financial institutions. The Australian Public Service which has in the past sought generalist graduates has moved more towards the deliberate seeking of specialists such as economists and accountants.

The proportion of unemployed first-degree graduates increased from 5 per cent in 1981 to 9 per cent in 1982. Many graduates who began their first postgraduate year out of work were employed before the end of the year. But there is evidence that an increasing proportion of generalists are still unemployed at the end of that first year after their graduation.

A study of graduates between 1980 and 1982 being completed by the ANU Careers and Appointments Service suggests that humanities and behavioural science graduates acknowledge that it is increasingly difficult to obtain work of their choice. They see the need to be prepared to accept employment for which they have not trained specifically. It appears that women are having more difficulty than men in obtain-
ing work, and substantially fewer women than men saw their qualifications as being relevant to the work they were doing. More than two-thirds of honours graduates saw their qualifications as relevant to their work, compared with only half of pass graduates.

In spite of the depressed level of jobs available there is no evidence that employers have lost their enthusiasm for graduates. In fact, some large organisations are introducing or expanding graduate selection and development programs. Small and medium-sized organisations, however, offer jobs to inexperienced graduates much less frequently. This may be explained in part by the lack of capacity of such firms to have on-the-job training arrangements.

PhD graduates continue to face a tightening market for their specialised skills, although actual unemployment figures remain low. As with all other graduates, they are more likely to gain employment if they take a wider view of their possible job opportunities.

The University is concerned about this. A decision was made late in 1982 to double the number of 10 national undergraduate awards available in 1982. For 1983 this will restore the number to the level of the mid-1970s and will assist in raising the general quality of the undergraduates and increasing the number of students in first-degree honours courses.

Resources

**Funds from Commonwealth Tertiary Education Commission**

In 1982, the University received recurrent grants, including equipment grants, from the Commonwealth Government through the Commonwealth Tertiary Education Commission amounting to almost $115 million. In money terms this was an increase of some $9 million over 1981 but when account is taken of the effects of inflation it constituted a decrease of a little under 2 per cent. The following table sets out recurrent grants over the past eight years in both money and real terms.

### Recurrent Grants*(a), 1975-1982

<table>
<thead>
<tr>
<th>Recurrent Grants</th>
<th>Cost Index*(b)</th>
<th>Recurrent Grants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(June Qr 1975 = 100)</td>
<td>(June Qr 1975 Cost levels)</td>
</tr>
<tr>
<td>1975</td>
<td>$000</td>
<td>$</td>
</tr>
<tr>
<td>1976</td>
<td>59,590</td>
<td>102</td>
</tr>
<tr>
<td>1977</td>
<td>65,660</td>
<td>116</td>
</tr>
<tr>
<td>1978</td>
<td>73,921</td>
<td>127</td>
</tr>
<tr>
<td>1979</td>
<td>78,687</td>
<td>136</td>
</tr>
<tr>
<td>1980</td>
<td>84,062</td>
<td>146</td>
</tr>
<tr>
<td>1981</td>
<td>92,576</td>
<td>162</td>
</tr>
<tr>
<td>1982</td>
<td>105,697</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>114,660</td>
<td>203</td>
</tr>
</tbody>
</table>

*(a) Including equipment  

Since 1977, recurrent grants have decreased in real terms by about 3 per cent. This, together with the increasing seniority of staff on incremental salary scales, the substantially increased contributions to the Commonwealth Superannuation Scheme required of the University, and abnormally high energy costs, have reduced the level of real activities that the University has been able to fund from Commonwealth grants by a total of about 8 per cent. This is illustrated in the next table which sets out full-time equivalent staff funded from Commonwealth grants over the past eight years.
### Full-time Equivalent Staff, 1975-1982

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic(^{(a)})</td>
<td>538</td>
<td>539</td>
<td>518</td>
<td>517</td>
<td>508</td>
<td>520</td>
<td>526</td>
<td>546</td>
</tr>
<tr>
<td>Non-Academic</td>
<td>1241</td>
<td>1213</td>
<td>1225</td>
<td>1221</td>
<td>1179</td>
<td>1142</td>
<td>1119</td>
<td>1128</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1779</td>
<td>1752</td>
<td>1743</td>
<td>1738</td>
<td>1687</td>
<td>1662</td>
<td>1645</td>
<td>1674</td>
</tr>
<tr>
<td>Teaching and Research</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic(^{(a)})</td>
<td>426</td>
<td>418</td>
<td>436</td>
<td>451</td>
<td>440</td>
<td>432</td>
<td>421</td>
<td>400</td>
</tr>
<tr>
<td>Non-Academic</td>
<td>363</td>
<td>365</td>
<td>355</td>
<td>338</td>
<td>342</td>
<td>326</td>
<td>326</td>
<td>301</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>789</td>
<td>783</td>
<td>791</td>
<td>789</td>
<td>782</td>
<td>758</td>
<td>747</td>
<td>701</td>
</tr>
<tr>
<td><strong>Academic activities</strong></td>
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<td></td>
</tr>
<tr>
<td>Library</td>
<td>184</td>
<td>177</td>
<td>204</td>
<td>197</td>
<td>181</td>
<td>177</td>
<td>180</td>
<td>181</td>
</tr>
<tr>
<td>Computing(^{(b)})</td>
<td>74</td>
<td>75</td>
<td>76</td>
<td>82</td>
<td>83</td>
<td>70</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Other(^{(c)})</td>
<td>16</td>
<td>21</td>
<td>24</td>
<td>22</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>274</td>
<td>273</td>
<td>304</td>
<td>301</td>
<td>287</td>
<td>270</td>
<td>275</td>
<td>273</td>
</tr>
<tr>
<td><strong>Student services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>347</td>
<td>353</td>
<td>362</td>
<td>323</td>
<td>324</td>
<td>335</td>
<td>329</td>
<td>336</td>
</tr>
<tr>
<td>Buildings &amp; Grounds</td>
<td>209</td>
<td>200</td>
<td>200</td>
<td>176</td>
<td>186</td>
<td>171</td>
<td>157</td>
<td>158</td>
</tr>
<tr>
<td><strong>General services</strong></td>
<td>556</td>
<td>553</td>
<td>562</td>
<td>499</td>
<td>510</td>
<td>506</td>
<td>486</td>
<td>494</td>
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<tr>
<td><strong>Public services</strong></td>
<td>18</td>
<td>32</td>
<td>34</td>
<td>31</td>
<td>34</td>
<td>36</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3436</td>
<td>3413</td>
<td>3456</td>
<td>3381</td>
<td>3318</td>
<td>3252</td>
<td>3196</td>
<td>3183</td>
</tr>
</tbody>
</table>

\(^{(a)}\) Excludes visiting staff and staff paid from outside funds; includes part-time expressed as full-time equivalent.

\(^{(b)}\) Includes Management Services Group and Data Processing Unit; in 1980 some academic support staff originally appointed to the Computer Centre were transferred to other areas.

\(^{(c)}\) Audio-visual and language laboratories.

Staff numbers reached their maximum in 1977, since when they have declined by 8 per cent. In 1982, the decline in overall staffing numbers continued but was relatively small in magnitude. However, the total conceals a significant decline in the staff of The Faculties. Teaching and research staff declined by 6 per cent between 1981 and 1982. This was the result of a deliberate policy decision taken in accordance with advice from the Universities Council of the Commonwealth Tertiary Education Commission in order to bring staffing in The Faculties more in line with staffing in a comparable State university. Some further decline may be expected for 1983. Staff numbers in the Institute of Advanced Studies were increased, a reflection also of advice from the Universities Council to expand research activities. Accordingly, within the overall decline in staff numbers over the past five years, there has been a switch of resources from The Faculties to the Institute.

### Outside sources

The decline in resources available through recommendations of the Commonwealth Tertiary Education Commission has been approximately offset by the University's capacity to attract additional funds from other sources. These funds are, however, generally received for specific projects. The following table sets these out for the last seven years in both money and real terms. The figures do not include interest earned on the University's recurrent funds or income of a trading nature.
Non-CTEC Funds, 1975-1982

<table>
<thead>
<tr>
<th>Year</th>
<th>At current Cost Levels</th>
<th>At June Qr 1975 Cost Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>1975</td>
<td>1801</td>
<td>1800</td>
</tr>
<tr>
<td>1976</td>
<td>2381</td>
<td>2100</td>
</tr>
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<td>1977</td>
<td>2112</td>
<td>1700</td>
</tr>
<tr>
<td>1978</td>
<td>2730</td>
<td>2000</td>
</tr>
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<td>1979</td>
<td>3479</td>
<td>2400</td>
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<td>1980</td>
<td>8352</td>
<td>5200</td>
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<td>1981</td>
<td>9395</td>
<td>5100</td>
</tr>
<tr>
<td>1982</td>
<td>9468</td>
<td>4200</td>
</tr>
</tbody>
</table>

In the last three years, outside funds have been augmented by substantial grants in connection with the Australia-Japan Research Centre, The ASEAN-Australian Economic Research Project, The United Nations program for training demographers in Indonesia and the Nepal-Australia Forestry project. Details of grants and gifts are set out later in this Report.

Outside funds have supported a significant number of staff, as indicated in the table below.

Full-time Equivalent Staff Funded from Outside Funds, 1975-1982

<table>
<thead>
<tr>
<th>Year</th>
<th>Academic</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>22</td>
<td>64</td>
<td>86</td>
</tr>
<tr>
<td>1976</td>
<td>14</td>
<td>62</td>
<td>76</td>
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<tr>
<td>1977</td>
<td>4</td>
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<td>1978</td>
<td>9</td>
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<td>1979</td>
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<td>89</td>
<td>123</td>
</tr>
<tr>
<td>1982</td>
<td>40</td>
<td>91</td>
<td>131</td>
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The University also has a substantial program under which visiting academics and others are appointed for varying periods. Although the University provides some funds to support visitors, their contribution to the work of the University far exceeds the costs involved. Moreover, all Australian universities gain from the program: academics from other Australian universities visit the ANU and have the benefit of contact with other Australian and overseas scholars and international scholars are brought to Australia under the scheme. In addition to the scholars already at the ANU under existing arrangements with learned academics in China, the first two scholars under a new exchange agreement with the University of Beijing and the University of Xiamen came to the University in 1982.

During the last two years the University has become involved in several major enterprises with industrial implications. In negotiating the terms and conditions of contracts, the University generally aims to secure some benefit from patent rights both for itself and the researchers involved, as well as freedom to publish the results of the research and to continue with the research after the expiry of the contract. The University is aware of the problems that may arise when a University enters into a contract for the provision of services to an industrial concern. Nevertheless, it believes that the transfer of research findings into developed applications is important and that the University should be willing to explore relationships with industrial sponsors.

In 1982, a Centre for Recombinant DNA Research was officially opened in the Research School of Biological Sciences. The facility is available to visiting scientists for research and for training in the techniques of research in molecular genetics. Significant impetus to the Centre has been realised through research contracts, of which the most substantial was a contract entered into with Agrigenetics Research Corporation of the USA for research on nitrogen fixation in plants. The contract provides for $US2.125 million over four years. Expenditure for this contract commenced in 1982. Several other smaller contracts have been concluded.

The University is also involved in the construction of a full-scale demonstration plant to produce SYNROC — a ceramic developed in the Research School of Earth Sciences, for the safe and cost-effective disposal of radioactive nuclear waste. The project, which will be carried out jointly with the Australian Atomic Energy Commission, commenced in 1982 and will proceed for the next four years; $2.8 million is available. In addition the Commission will spend more than $5 million on the project.

In the latter part of the year the ANU contracted with the Commonwealth Government for work in connection with
the design and development of the instrument package of STARLAB, a joint Australian/Canadian/USA project to place a one metre UV-optical wide-field telescope in orbit via the space shuttle in 1989.

The execution of the contract is the responsibility of the Mt Stromlo and Siding Spring Observatories where the STARLAB project group has been formed. The heart of the instrument package is the large area ultra-sensitive light detector system which was developed at Mt Stromlo Observatory. Other parts of the package — the structure, the mechanisms, optics, electronics and software, have been contracted out to Australian industry.

The ANU has received $3.337 million from the Australian Industrial Research and Development Board to carry out this work. An additional $100,000 has been granted to the ANU to undertake an industrial and aerospace development study to determine the economic and social benefits which will accrue to the community from Australia's participation in the STARLAB project.

The Research School of Physical Sciences has been involved in the development of a solar power station for the New South Wales Government at White Cliffs, since 1979. The project was almost completed by the end of 1982. The University established a wholly-owned company, Anutech Pty Ltd, for the purpose of managing the project. In 1982, the company was reorganised with its own premises and small full-time staff with the intention that it should be able to support itself from the management fees it will receive. The company will be involved in the administration of academic consultancies and in the conduct of negotiations directed towards the development of research discoveries with commercial potential. It is intended that the company will develop experience in the complex and sensitive matters relating to the greater commercial use of intellectual property.

**Academic priorities**

The decline in resources available to the University has made it difficult to respond to shifts in priorities and to accommodate new developments. Nevertheless the research schools have continued to modify the distribution of their resources in accordance with internal priorities and in both the Institute and The Faculties, the University has been able to achieve or plan a number of new developments. However, the University's capacity to make adjustments is strictly limited since 82 per cent of its annual expenditure is on salaries and related costs. Most of its staff are on permanent or medium-term appointments, and research projects and teaching programs cannot be discontinued without notice. The situation is most inflexible in The Faculties. The established policy in the Institute has been to maintain a balance (at present 50/50) between long-term and short-term appointments.

**Research Schools**

In the Research School of Biological Sciences the Protein Chemistry Unit has been closed and the continuing staff redeployed.

In the Research School of Chemistry a second Chair of Organic Chemistry has been established and Liquid State Chemical Physics has been developed as a new research area.

In the Research School of Earth Sciences, Economic Geology, in its present form, has been discontinued as a research activity, and the commitment to palaeomagnetism has been greatly reduced with the resources released being directed to a new activity in tectonophysics.

In the John Curtin School of Medical Research the Departments of Medicine and Clinical Science and of Experimental Pathology, both of which are closely related to medical practice, have been reconstructed, and an Experimental Neurology Unit, established in 1981, was in full operation.

In the Research School of Pacific Studies there has been an increase in the resources devoted to the Development Studies Centre and a reorientation of research emphasis towards China. The latter has been reinforced by signing academic agreements with three Chinese universities.

In the Research School of Physical Sciences, the Department of Systems Engineering has been established with six academic staff, certain small units have
been reorganised as the Atomic and Molecular Physics Laboratories, and an advanced molecular beam facility has been brought into operation. Considerable progress has been made on the 2.3-metre telescope currently under construction at Siding Spring. The University has also established a Mathematical Sciences Research Centre, which is administratively associated with the Research School. The Centre spans the Institute and The Faculties and is intended to facilitate increased contact among mathematicians. A number of departments of both the Institute and The Faculties is associated in the Centre and funding is available for visitors and non-tenured staff.

In the Research School of Social Sciences, the Survey Research Centre has been disestablished, the Archives of Business and Labour have been relocated and reorganised, and three limited-life units have been established to manage School-wide projects — Ageing and the Family; Law and Politics of Industrial Relations; Social Justice in Australia.

The Faculties
In May 1982 the Minister for Education announced the establishment of eleven special research centres to be funded for a period of years under the Commonwealth Program for Promotion of Excellence in Research. The program was not applicable to the Institute of Advanced Studies but the University successfully proposed the establishment of a Centre for Mathematical Analysis under the leadership of Professor N.S. Trudinger, FAA, of the Department of Mathematics, Faculty of Science. This will enable the further development of the University's already patent strengths in the mathematical sciences.

The University has decided to establish the William Dobell Chair in Fine Art. This has been facilitated by generous support from The Sir William Dobell Art Foundation. The Faculty of Arts already has a small Fine Art program which attracts significant enrolments. The further development of this program with the appointment of a full professor is an appropriate move in the year in which the Australian National Gallery was opened. The University looks forward to co-operation with the Australian National Gallery and the Canberra School of Art.

During 1981, the Commonwealth Government made available funds for the development of community languages in universities and colleges of advanced education. The University proposed that it should teach Vietnamese. Funds were made available for this purpose and teaching commenced in 1982.

The University has decided to establish a program in Public Policy which will lead to a graduate diploma and, for more advanced work, to a degree of master. The program will place emphasis on policy analysis and will draw on the extensive resources in this field that are available in the research schools and in the faculties. The propinquity of the University to the national Parliament and the Commonwealth Public Service is an important reason for the University's interest in such a program. The University expects to appoint a professor in 1983 to develop the program.

A neuroscience course, which may be taken in the honours year of a Bachelor of Science degree or as a graduate diploma, has been established and will be introduced in 1983. It is being conducted jointly by the Faculty of Science and the Research School of Biological Sciences. It is understood that no coherently structured undergraduate instruction in neuroscience has hitherto been established outside the USA. Work in forensic science is also being undertaken in the Faculty of Science.

As a result of the recommendations of the Review of the Faculty of Asian Studies conducted in 1978-1979 a restructuring of the Faculty was undertaken to come into effect in 1983. The purpose of the restructuring is to replace the departmental nature of the Faculty with five centres under the direction of the Dean.

Centre for Resource and Environmental Studies
During this year the Director of the Centre was appointed to the Executive of CSIRO and a new Director was appointed. The University took the opportunity to reformulate the Centre's mandate. The mandate states that the Centre's concern should be with policy options related to important national resources and environmental issues. Its research results should be
evaluated in terms with real policy significance, and so should include economic and social issues prominently.

Other major matters

Student accommodation
In 1982, just over 2000 residential places were available for students. For several years both colleges and halls have been experiencing difficulties in filling all places. Indeed during the course of this year only 70-75 per cent of places were filled by ANU students; the remaining places were filled by students of other institutions, by people who were not students, or the places were vacant. In this climate, the management of colleges and halls has become increasingly difficult and the financial viability of some of them has been at risk.

During the year the University undertook a searching inquiry into the lack of demand for residential places, particularly for full-board places. The inquiry showed that there were both an overall shortage of demand for places and a clear preference for self-service places over full-board places. As a result the University decided to merge Burton Hall and Garran Hall into one hall to be known as Burton and Garran Hall, to provide for Burton and Garran Hall to offer self-service accommodation only and to take out of commission about one-half of the places of Burton Hall. In addition, the number of full-board places offering at Bruce Hall was reduced. The net effect will be to reduce the number of full-board places by about 260 and to increase the number of self-service places by about 120. The new arrangements will be in place for the beginning of the 1983 academic year.

Industrial and staff matters
Until the middle of 1982 the University adopted a stance in negotiations with the various unions and associations that it would not take initiatives with respect to salary movements, that it would consider claims in the context of broad community movements rather than try to follow movements of a particular external group and that it would generally oppose retrospectivity.

This approach created considerable resentment among the general staff. Although in some cases staff received arbitrated salary increases a little beyond those awarded in the Australian Public Service, the vast majority felt themselves to be disadvantaged compared to similar staff in the Public Service. Increases of approximately the same size as in the Public Service were eventually granted but because of the policy against retrospectivity there were delays, in some cases of several months, before the increases were applied.

In mid-1982 industrial unrest on campus increased and culminated in a three-week strike by building maintenance and related workers.

In subsequent negotiations and arrangements with the unions and associations the University has taken into account the historical relationships between university and comparable jobs in the Australian Public Service. There are indications that this modification in approach has resulted in more harmonious relations.

Other staffing policies
In the last two years the University implemented further programs and activities aimed at training and developing its general staff. These have ranged from the provision of in-house courses through to offering, for the first time in 1982, a year-long training program for junior to middle-level administrative staff.

Superannuation Scheme for Australian Universities
During 1982 the Commonwealth Government indicated its support for the proposed Superannuation Scheme for Australian Universities (SSAU) sponsored by the Australian Vice-Chancellors' Committee and the Federation of Australian Universities Staff Associations. The University decided to join the new scheme from 1 April 1983 subject to acceptable negotiation of the terms of entrance. All new members of staff will be required to join the new scheme; existing members of staff will have the option. It is expected that virtually all members of staff who at present belong to the University Superannuation Scheme will transfer; only small numbers are expected to transfer from the Commonwealth Superannuation Scheme. Before the decision to join the
scheme was taken there were extensive consultations with staff associations. The benefits from the new scheme have been judged to be at reasonable levels and membership of the scheme will have the advantage of portability among Australian universities. From the University's point of view, its annual contribution as employer will be reduced significantly.

**Reviews**

During the year reviews were conducted or commenced of the following research schools, faculties and departments: the Research School of Chemistry; the Faculties of Economics and Arts; the Departments of Political Science, and Sociology in the Faculty of Arts; the Department of Psychology in the Faculty of Science; the Legal Workshop in the Faculty of Law.

The University believes that all segments of the University should be subject to review on a more or less regular basis. Indeed over the past seven or eight years almost all academic elements of the University have been reviewed. The process of review itself stimulates change and acts to maintain the quality of the work of the University. However, it is important that reviews should lead to action on the recommendations of the review team. The University does not necessarily accept all the recommendations of review teams but a procedure has been instituted whereby, after two or three years, departments or research schools which have been reviewed are expected to indicate the extent to which they have implemented review recommendations and, where they have not done so, the reasons.

**Triennial submission**

The University's submission for the 1985-1987 triennium to the Universities Council of the Commonwealth Tertiary Education Commission was prepared during 1982. The submission, which is publicly available, analyses the resources available to the University and the level of enrolments in the University. It indicates the University's responses to the Commonwealth Tertiary Education Report for the 1982-1984 triennium and describes the academic developments which have or will take place over the period 1980-1984. Proposed developments for 1985-1987 are set out, as are the University's requests for funds for recurrent purposes, for equipment and for buildings. The submission draws attention to the reduction in the resources available to the University from funds recommended by the Commonwealth Tertiary Education Commission and emphasises the manner in which the University has attempted to ensure flexible responses to changing requirements in a regime of slowly declining resources.

**Freedom of Information Act**

In 1982 administrative arrangements were completed to respond to requests arising under this Act when it became effective. In addition to a wide distribution of the relevant guidelines, over 30 officers participated in in-service training. In the first month of its operation no requests were made for access to documents under the relevant provisions of the Act.

**Tenure of academics**

In September 1982 the Senate Standing Committee on Education and the Arts reported on the tenure of academics. The report recognised the purpose of academic tenure, but was critical of certain aspects of practice, such as the absence of overt procedures to monitor, record and maintain the quality of individual performance. The Report proposed that a certain proportion of academic staff should be non-tenured. The University awaits the response of the Commonwealth Government. Meanwhile careful consideration is being given by the Board of the Institute of Advanced Studies, the Board of The Faculties and the Academic Staff Association to the many recommendations of the Report.

**Other activities and personal notes**

In May 1982 Professor D.A. Low's seven-year term as Vice-Chancellor came to an end. Shortly afterwards, it was announced that he would take up the Smuts Chair of History of the British Commonwealth at Cambridge University in 1983. Professor Low was succeeded as Vice-Chancellor by Emeritus Professor Peter Karmel, whose most recent position had been chairman of the Commonwealth Tertiary Education Commission.
Commission. In the latter part of the year, Professor Ian Ross was re-appointed Deputy Vice-Chancellor for a further five-year term.

The University continued, in 1982, in its tradition of providing assistance to Government and other bodies in a wide range of fields, details of which can be found elsewhere in this Report.

Many of the University's scholars were the recipients of honours and awards for their outstanding work. Among them was the election of Emeritus Professor Arthur Birch to Presidency of the Australian Academy of Science and the naming of the Chancellor, Sir John Crawford, as Australian of the Year.

Recipients of academic awards included:

Dr John Shine, Research School of Biological Sciences, the 1982 Gottschalk Medal of the Australian Academy of Science.

Dr Michael Dopita, Research School of Physical Sciences, The Pawsey Medal of the Australian Academy of Science.

Professor Rodney Baxter, Research School of Physical Sciences, the Lyle Medal of the Australian Academy of Science.

Dr M.R. Badger, Research School of Biological Sciences, the P.L. Goldace Medal of the Australian Society of Plant Physiologists.

Dr Andrzej Walicki, Research School of Social Sciences, the Alfred Jurzkowski Foundation (New York) Award for outstanding creative achievement in the field of the history of ideas.

Dr Pierre Ryckmans, Faculty of Asian Studies, the Grand Prix Quinquennal de la critique et de l'essai (Belgium).

The following were elected Fellows of the Royal Society of London: Professor R.J. Baxter, Research School of Physical Sciences; Dr W.R. Levick, John Curtin School of Medical Research; Professor J.S. Turner, Research School of Earth Sciences.

The following were elected Fellows of the Australian Academy of Science: Professor R.P. Brent, Faculty of Science; Dr J.N. Israelachvili, Research School of Physical Sciences.

The following were elected Fellows of the Academy of Social Sciences: Professor S.F. Harris, Centre for Resource and Environmental Studies; Dr A.S. Henderson, NHMRC Social Psychiatry Unit; Dr T.B. Millar, Research School of Pacific Studies.

The following were elected Fellows of the Academy of the Humanities: Professor R.M.W. Dixon, Faculty of Arts; Dr R.M. Jones, Research School of Pacific Studies; Dr R.K. Meyer, Research School of Social Sciences.

Other honours included — Professor R.O. Slatyer, Research School of Biological Sciences, AO; Professor D.J. Mulvaney, Faculty of Arts, CMG; Dr John Stephen Harper, Research School of Chemistry, MBE; Dr H.H.E. Loofs-Wissowa, Faculty of Asian Studies, Chevalier dans l'Ordre National a la Legion d'Honneur (France); Professor Hans Kuhn, Faculty of Arts, Order of the Polar Star, 1st Class (Sweden).

The National Rhodes Scholarship for 1982 was awarded to Peter Kanowski an ANU Science Honours (Forestry) graduate in 1981.

Honorary degrees were conferred on — Emeritus Professor Geoffrey Sawer, Doctor of Letters, ANU and Doctor of Laws, Monash University; Emeritus Professor B.H. Neumann, Doctor of Science, Monash University; Professor O. MacDonagh, Doctor of Laws, Flinders University; Emeritus Professor W.D. Borrie, Doctor of Letters, ANU; Dr Saburo Okita, former Japanese Foreign Minister, Doctor of Laws, ANU; Mr Hugh Stretton, Doctor of Letters, ANU.

A wide range of activities in the University in 1982 included a visit by Their Excellencies the Governor-General, Sir Ninian Stephen and Lady Stephen, in December; Open Days at John Curtin School of Medical Research, Research School of Earth Sciences, Research School of Physical Sciences and the Computer Services Centre; two major scientific conferences, the National Physics Congress and the National Chemistry Congress; a visit by 100 foreign diplomats and their families to see work being done in The Faculties and Research Schools. Among major conferences was a symposium in August on Human Evolution, Bones, Molecules and Man, which brought some of the world's leading evolutionary biologists to the ANU. A conference on International Co-operation in Chinese Bibliographic Automation was attended by
Among senior appointments were — Professor Peter Charles Doherty who joined the Department of Experimental Pathology, JCSMR in June, Professor Harold Chillingworth Brookfield, who joined the Department of Human Geography, RSPacS in August, and Professor Kenton Stewart Campbell who assumed the chair of Geology, Faculty of Science in April.

Senior academic staff who retired in 1982 included, Peter Bishop, Professor and Head, Department of Physiology, JCSMR; Archibald Brown, Department of Mathematics, Faculty of Science; Liu Ts'un-yan, Department of Chinese, Faculty of Asian Studies; Patrick Moran, Professor and Head of Department of Statistics, RSSS; Professor Stephen Turnovsky departed mid-1982 from the Department of Economics, Faculty of Economics; Professor Geoffrey Taylor departed mid-1982 from CRES; Emeritus Professors Fenner and Passmore completed their appointment as University Fellows.

The University won the 1982 National Industrial Energy Management Scheme award for outstanding achievement in the efficient use of energy by a public institution. The award was given in recognition of the work done in 1981-1982 in converting from oil to electricity and the installation of the computer-based energy-management system.
Biological research is concerned with questions of three kinds. First, the nature of the mechanisms which living things use to sustain and reproduce themselves. Second, the manner in which these mechanisms are developed anew in each generation. Third, the way in which these mechanisms change and evolve in response to the long-term environmental changes with which living organisms inevitably have to contend. The Research School of Biological Sciences carries out fundamental research on all three questions.

At the mechanistic level the School is involved in basic studies of the vertebrate brain in relation to behaviour (Department of Behavioural Biology) and the structure and function of nervous systems in insects (Department of Neurobiology) by analysing the way in which animals native to Australia perceive and interpret the visual and auditory stimuli they receive from the environment. In plants the emphasis is on the integration of the molecular, biochemical and physiological processes which govern plant structure, plant performance and plant survival. Here we place major emphasis on an understanding of photosynthetic mechanisms (Department of Environmental Biology) both in normal conditions and in relation to water stress, a topic that receives greater attention in the accompanying research report. Parallel to these are studies on the way in which plant hormones regulate plant growth (Department of Developmental Biology).

At the developmental level interests range from the study of the fine structure of the genetic material that controls developmental processes and the manner in which individual genes are regulated (Department of Genetics and the Molecular Biology Unit) to an understanding of how gene products are assembled into the macromolecular aggregates involved in basic cell and organ structure (Department of Developmental Biology).

The third major research theme within the School relates to the question of evolution. This involves an examination of the ecological events which underlie the structural and functional relationships of plant communities and ecosystems native to Australia (Department of Environmental Biology). Complementary studies aim to define the nature of the variation present in natural populations of native animals and plants and their viruses (see accompanying research report) and the manner in which this variation is used as a basis for evolutionary change (Department of Population Biology, Virus Ecology Research Unit, Taxonomy Unit).

Significant events during the year include the official opening of the Centre for Recombinant DNA Research foreshadowed in last year's report and the introduction of two new research projects supported by outside funds. First a program on the response of sorghum, maize and some tropical grasses to soil inoculation with nitrogen-fixing bacteria sponsored by Agrigenetics Research Associates Limited, USA. Second, a study on the effects of salinity on plant growth under the auspices of the Reserve Bank of Australia Rural Credit Development Fund.
Research School of Chemistry

The Research School of Chemistry does not have a departmental structure but consists of 16 research groups which bridge the classical divisions of the discipline. The areas of chemistry embraced by these groups include theoretical, analytical, structural, synthetic, and biological chemistry. There are also strong interests in spectroscopy, photochemistry, photophysics and reaction mechanisms. The School was created with the prime purpose of conducting fundamental chemical research, but with due regard to potential applications, especially those concerned with the national interest. Thus, several significant developments in 1982 have provided interesting prospects for a diverse range of applications in synthetic chemicals, energy, minerals, agriculture, and medicine.

RECENT ACHIEVEMENTS

One such development, for example, began with an investigation into the pathways by which a group of antibiotics were formed in certain micro-organisms. After identifying a new amino acid as an intermediate in one biosynthetic pathway, it was found by radiotracer techniques to be involved in the formation of a surprisingly wide variety of metabolites, some of which are in current clinical use as anti-tremor and anti-tuberculosis agents. Arising out of these studies has been the development of a simple laboratory preparation of this amino acid. Significantly, when this synthetic material is added to the micro-organism culture, the amount of antibiotic produced is increased several-fold, a result which has important potential for commercial exploitation.

In a similar vein, an investigation into the molecular basis of the biological activity of the agriculturally-important gibberellin plant hormones led tangentially to the development of efficient processes for effecting desirable structural modifications to materials which are produced commercially from micro-organisms. In many horticultural applications it is important that the effect of the applied gibberellin should last for only a brief period. This is achieved in one of the new procedures by activating the gibberellin towards metabolic deactivation by the host plant species. The other development has produced a much improved preparation of a synthetic gibberellin with 10-500 times the potency of the most active natural materials.

NEW DEVELOPMENT IN FREE RADICAL CHEMISTRY

The School established a research group under the direction of Professor A.L.J. Beckwith to study the physical and chemical properties of organic molecules containing an odd number of electrons. Although such species, called free radicals, are usually very short-lived (less than 1/1000 second under ordinary conditions), they play a key role in many chemical processes of industrial or biological importance. Fortunately, the presence of an odd number of electrons bestows on free-radicals unique magnetic properties which allow them to be detected at extremely low concentration (less than one part in one hundred million) by the use of an electron spin resonance spectrometer. Such an instrument has recently been installed in the School, and is used, together with more conventional chemical techniques, to study the shapes of free radicals, and the intimate details of the ways in which they interact with each other and with other molecules.

A number of projects involving free-radical chemistry are under active investigation. The aim of one of them is to design new catalysts for polymer production. Most well-known polymers, e.g. polyvinyl chloride (PVC), polyvinyl acetate (PVA), polymethyl methacrylate (perspex), are manufactured by reactions involving free radicals. New catalysts are required to lower the temperature of the process, to allow continuous rather than batch production, and to give products with improved properties.

The chemistry of molecular oxygen is another area of interest. Oxygen reacts with
most organic compounds to form free radicals. The result of such processes may be either beneficial, e.g. the hardening of paints, or deleterious, e.g. the deterioration of fats and oils in foodstuffs. Reactions of molecular oxygen have been implicated in many biological phenomena, including the ageing process. Preliminary to studying reactions of oxygen in more complex systems the group is attempting to make very accurate determinations of the rate at which oxygen reacts with a few selected simple organic species.

Free radicals are thought to be involved in other important biological processes including the inception of cancer, arthritis, various types of poisoning, and the formation of hormones and other biologically-active materials. Projects under investigation by the group include the mechanism by which some anaesthetics induce liver damage (in collaboration with Flinders Medical School), and an attempt to mimic in the laboratory the way in which the penicillin nucleus is formed in nature.

Research School of Earth Sciences

The Research School of Earth Sciences is the smallest and youngest of the research schools. Nevertheless, it has achieved an impressive research record, judged by the highest international standards. The School has a non-departmental structure, consisting of a number of small, semi-autonomous research groups working in strategic areas of geophysics and geochemistry, most of which are not strongly developed in other Australian universities. The non-departmental structure provides the School with considerable flexibility in the organisation of its research programs. Individual research groups do not have separate budgets or permanent establishments. This arrangement is most effective in channelling the available funds to focus on research in the most exciting and rewarding scientific fields. Currently, the School consists of the following research groups: Earth Physics, Petrophysics, Geophysical Fluid Dynamics, Geomagnetism, Environmental Geochemistry, Trace Element Geochemistry, Petrochemistry, and Geochronology and Isotope Geochemistry. 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. Examples of these are the SYNROC project and the investigations of solitary waves and their bearing on aircraft safety (described elsewhere in this report).

The Earth Physics Group studies the response of the earth to forces acting on it over a broad spectrum of frequencies, wavelengths and amplitudes. These studies provide information on the internal structure and rheology of the earth's interior. Much work is concentrated in the field of seismology and during this year important results were obtained on the structure of the earth’s mantle beneath the Australian continent. At the other extreme in the frequency domain, studies of the deformation of the oceanic crust under the loads imposed by volcanic seamounts provided key information on the strength and rheological behaviour of the oceanic lithosphere.

Although the earth’s crust and mantle are composed of silicate rocks which are strong and brittle at ordinary temperatures and pressures, geologic observational evidence implies that these rocks undergo extensive plastic deformation and flow under the high temperatures and pressures existing in the earth’s interior. It is essential to determine the flow-laws followed by rocks if the large-scale dynamical and kinematic behaviour of the earth’s interior is to be understood. This is a major objective of the Petrophysics Group. It poses formidable experimental problems because of the need to carry out highly accurate measurements at very high
pressures and temperatures. Research highlights during 1982 were demonstrations of the dramatic effect which minute amounts of water have on the flow of mantle rocks and the mechanism by which this effect is achieved.

Research in the Geophysical Fluid Dynamics Group has continued to concentrate on two closely-related fields — the modelling of mixing and convection in the ocean, and the study of dynamical processes which occur in crystallising liquid magmas. Both of these are based on laboratory experiments and the central theme of the work is 'double-diffusive' convection, which is important in liquids when the density is affected oppositely by two variables, e.g. composition and temperature. These studies have elucidated several hitherto puzzling aspects of the way magmas solidify and differentiate in nature, and have attracted considerable international interest.

The future of the Geomagnetism Group is currently under review as a result of the resignation of a senior staff member. It has already been decided to transfer resources from the group to support a new appointment in the field of tectonophysics. This will fill an important gap in research activities within the School and will also provide a further link between the Earth Physics and Petrophysics Groups. The Environmental Geochemistry Group is the latest to have been established. It is primarily concerned with the palaeoclimatology of the Australian continent and with studies of the carbon cycle in the southern hemisphere. Extensive laboratory facilities including stable isotope mass spectrometers and radioactive dating techniques for young rocks have been established and are expected to achieve high productivity during 1983. A major project aimed at studying the isotopic and geochemical record contained in the sediments of Australian inland lakes is well under way.

Research activities of the Petrochemistry Group cover a wide range, including phase transformations and equations of state at ultra-high pressures and temperatures, the constitution and composition of the deep mantle and core, the constitution and redox state of the upper mantle and broader geochemical and genetic relationships between the earth, moon, terrestrial planets and meteorites. The problems of safe disposal of high level radioactive wastes have also become of direct concern to this group in connection with the SYNROC project. Emphasis in this project has now passed from product characterisation to engineering production technology. A new method of hot-pressing SYNROC powder to yield fully-dense SYNROC monoliths has been developed. This will be employed in a new commercial-scale demonstration plant for the production of SYNROC which will be constructed at Lucas Heights and conducted as a joint project between the Australian National University and the Australian Atomic Energy Commission.

The research work carried out by the Trace Element Geochemistry Group uses the abundances and distribution of trace elements as a tool to understand planetary evolution and development. Two principal analytical techniques, spark source mass spectrometry and inductively coupled argon plasma spectrometry are employed. A major scientific objective of the group is to understand the geochemical evolution of the continental crust of the Earth. This problem is tackled by studying the chemical record preserved in sedimentary rocks of all ages. It has recently shown that a major change in the chemical evolution of crustal rocks occurred between the ancient Archaean era and the younger Proterozoic.

The Geochronology and Isotope Geochemistry Group utilises mass-spectrometry and isotope analyses to elucidate the geochemical evolution of igneous and metamorphic rock systems and the ages of these systems. This kind of information is essential to understanding the geology and evolution of the older regions of Australia and other continents where fossils are absent. Most of the age-dating of old rocks on the Australian continent has in fact been carried out at the ANU laboratory which is one of the largest in the world operating in this field. One of the major studies is the development of Archaean crust in several parts of the world as traced by a wide range of isotopic techniques. This program has been strongly expanded during the year by intensive application of the RSES-built ion-microprobe to uranium-lead dating within single grains of zircon, a project which is described elsewhere in this report.
The scientific work of a national institute for medical research of the sort envisaged by Florey in 1946 will be continuously changing if new understandings and new technologies are to be effectively exploited in the pursuit of major objectives in biomedical science. It is therefore of some interest to identify the internal innovations within the School which have revealed this dynamic process for the unfolding of new knowledge as it has continued to occur during 1982.

Redevelopment of two departments allowed the establishment of significant new areas of research endeavour and has also extended other work into important medical fields. Closer relationships with the local medical community and the health-care services of Canberra were developed with the collaboration and full support of the Capital Territory Health Commission, its hospitals and its staff. Full operation of the Experimental Neurology Unit was achieved, introducing a new activity to the School. A Transplantation Biology Unit was formed within the School, allowing for extension of the highly regarded scientific work on transplantation immunology to be associated with potential clinical applications and further research in clinical endocrinology and oncology at Woden Valley Hospital.

INNOVATIONS

The Department of Medicine and Clinical Science (previously Clinical Science) was redeveloped during the year with its major base in the Central Health Laboratories associated with Woden Valley Hospital. Under the leadership of its new Head of Department, Professor William Doe, the Department is becoming established as a major Australian centre for the study of disease processes which occur during tissue injury in the human gastro-intestinal tract and of the immune mechanisms which protect the digestive surfaces.

The work of the Department of Experimental Pathology was also extended under the guidance of Professor Peter Doherty who took up his post as Head of Department in mid-1982. These extensions and major re-orientations of the scientific effort of the Department involve significant collaboration between Experimental Pathology staff and other scientists within the School and outside it. The specific cellular mechanisms involved in a number of important disease processes, but particularly in the invasion and metastasis of cancers, is now a major area of intensive research.

Since the excellent start given to its Department of Physiology by Sir John Eccles from 1952 to 1966, the School has always produced outstanding work on the physiology and pharmacology of the nervous system. This area of study is now being expanded, through work in the re-oriented Department of Experimental Pathology, to examine the causative processes involved in a number of neurological diseases, including multiple sclerosis.

The combined interests of the Departments of Medicine and Clinical Science, and Experimental Pathology are being associated in studies of parasitic diseases and possible methods of control of these. This report contains elsewhere an account of the scientific studies, supported by the World Health Organization, that is extending our knowledge of the disease produced by infestation with malaria parasites.

In recent years there has been an explosion of information on the fine structure of the genetic material in man. With recombinant DNA technologies it will be possible to provide detailed mapping of each human chromosome and to determine the structure of individual genes. Such new approaches could make possible the detection of genetic disorders in cases where this is not possible at present. Ultimately the develop-
ment of strategies for the correction of genetic defects at a DNA level may be able to be explored. Collaborative studies using these new approaches are now well developed in the School, and the last year has seen a number of very significant developments from these cross-department scientific associations involving Biochemistry, Human Biology, Medicine and Clinical Science and the Transplantation Biology Unit.

Other innovations also occurred within the School. In addition to the main directions of the work of the Department of Pharmacology on nervous system transmitters, nerve growth and regeneration and the mechanisms of pain and analgesia, a small research group has been established to study the biophysics of autonomic control of blood vessels and autonomic neurotransmitter function.

**ACHIEVEMENTS**

Meanwhile the ‘traditional’ work of all the departments continued to provide important contributions to the accumulation of knowledge which is essential to the progress of medicine.

**COLLABORATIVE RESEARCH IN AUSTRALIA**

Every department in the School, and a high proportion of the academic staff members of the School, are involved in collaboration, at some level, with groups elsewhere in Australia or overseas. Scientific interactions between this School and CSIRO, the other Australian universities, hospital staff in many parts of the country, international organisations such as WHO, and research groups in other countries are a major feature of our work. A long-term program of collaborative research between members of the Department of Physical Biochemistry and the University of Queensland has resulted in the publication of two books and 41 scientific papers in international journals. Through the network of co-operation which has been built up, PhD students and research scientists in both institutions benefit substantially.

Other collaborative research activities involve the Department of Physiology and the National Vision Research Institute in Melbourne; the Department of Medicine and Clinical Science, and the Baker Medical Research Institute in Melbourne; the Medical Chemistry Group, and the Royal Children's Hospital in Melbourne; and the Department of Physical Biochemistry, and the Department of Chemical Pathology at the Adelaide Children's Hospital. Through interactions such as these the School contributes in a major way to the total Australian medical research effort and is not limited in its functions to local in-house research. Details of these collaborative efforts are listed elsewhere in this report.

**INTERNATIONAL COLLABORATION**

Some departments in the School are engaged in full collaborative research endeavours with groups in other countries. About 30 per cent of the research time of the Department of Pharmacology involves studies of the biological activities of newly synthesised chemical agents which could mimic or antagonise the actions of important natural transmitter substances in the brain and nervous system. The Department of Chemistry B.C. of the Royal Danish School of Pharmacy in Copenhagen collaborates with the Department of Pharmacology in this scientific work. As a result, more specific compounds for use in research on the chemical messengers of the brain's function have been identified and some substances of therapeutic significance in treatment of nervous diseases have been produced.
Research School of Pacific Studies

In carrying out its role of undertaking basic research on the societies, cultures and economies of the countries of the Western Pacific (the South-West Pacific, much of South and South-East Asia, South Asia and Australia), the School is very conscious that its task includes making the results of its studies available to as wide and as appropriate an audience as possible. This audience is found not only in Australia, but throughout the world. In particular it is of great importance for the School to make the results of its work, and its expertise, available to the countries of its study region.

The School’s research activities continued apace in 1982, building on the work reported in previous years. Linguistic studies were extended into the 'extra-Pacific' languages of the region (for example, the forms of English used in the area) while the first of the Department of Anthropology’s two-year ‘working group’ programs (on language in its social context) was completed successfully. The elucidation of Australia’s environmental and human history remained the goal of much of the work in Prehistory and in Biogeography and Geomorphology, but both these departments were also involved in studies of China and Indonesia, as were the Departments of Far Eastern History, Economics, Pacific and South-East Asian History, the Contemporary China Centre, Linguistics, Human Geography, and Political and Social Change. This list demonstrates the breadth of expertise which the School can bring to bear on major parts of its study region. In the ANU Research section of this report two examples are cited in more detail.

The Department of International Relations, the only department in this field in an Australian university, has played a national role in both research and training. Most teachers of international politics in Australian universities are former members of the Department. The world’s international system is ultimately one system and thus, in order to understand clearly the international events and trends in the School’s study region, the Department must give attention to world-wide political and strategic issues such as the east-west balance of power and the rise of major economic and political alliances outside the immediate region.

New directions were also set as the School developed its plan to put more of its resources into a series of finite projects. A project on China-Southeast Asia Relations was begun and initially will involve economists and historians, although other disciplines are likely to be added. A larger multi-disciplinary project on the course and consequences of industrialisation in Asia is being planned and basic data studies which will lead into it are already well in train. These include the establishment of a major economic data base (with the co-operation of the World Bank) under the auspices of the Australia-Japan Research Centre and the ASEAN-Australia Economic Relations Project, and the preparation of an economic atlas of the Pacific Basin by the Department of Human Geography.

The continuing need to assess the efficiency of activities within the School is acknowledged and a review of the Master of Agricultural Development Economics was started in November.

Several changes in senior staff positions occurred during the year. Dr R.J. O’Neill, Professorial Fellow in International Relations and Head of the Strategic and Defence Studies Centre (SDSC), resigned to take up the post of Director of the International Institute for Strategic Studies in London. Dr T.B. Miller was appointed Head of the SDSC from August. Mr E.K. Fisk, Professorial Fellow in Economics and Dr Wang Ling Professorial Fellow in Far Eastern History retired at the end of the year. Professor H.C. Brookfield, formerly of the University of Melbourne, took up the post of Professor of Human Geography, and at the end of his term as Vice-Chancellor, Professor D.A. Low returned to the School to continue his work in South Asian History.
Mindful of the problem of maintaining appropriate levels of non-salary expenditure, the School decided not to refill two of the senior positions which became vacant at the end of the year. The funds thus freed have been directed to restoring some of the School's field-work capacity which had been seriously eroded by the financial cuts of recent years.

As noted above, dissemination of the School's research findings is an important task. Most of the results of studies are published as books, monographs and journal papers. Apart from books and papers published and distributed from outside the School, over 300 research reports are published and distributed from within the School in its various monograph journal, and working-paper series. However, the majority of people in the School's study region do not speak English and do not read academic books or journals. One means of widening the audience is through film and the School was delighted when the film Angels of War was awarded the prize for the Best Documentary Film at the Australian Film Awards, and shared the Grand Prix (Goldern Sesterce) at the Nyon Film Festival in Switzerland. The film, which deals with the second world war in Papua New Guinea and its impact on the people of that country, has been prepared for showing in Japan, and a pidgin-language version has been completed for distribution in Papua New Guinea. Another film The Water of Words which deals with the people of Roti in East Indonesia has been completed by the Department of Anthropology. Other efforts to make scholarly work more widely available include the School's scheme of sending multiple copies of PhD theses to appropriate libraries and institutions in the countries studied. The three volumes of papers based on the School seminar Indonesia: Australian Perspectives, is being translated into Indonesian and the Australia-Japan Research Centre was jointly responsible for the preparation of a volume of essays in Japanese on Australia and Japan: Similarities and Differences. These direct efforts to widen the dissemination of research results are supplemented by the conferences and workshops which the School organises each year, and in which scholars, businessmen and government officials and politicians from throughout the region participate. That the value of the School’s expertise is widely recognised is demonstrated by requests for advice and assistance not only from a variety of Australian government departments and instrumentalities, but also from their equivalents (in 1982) in Fiji, Malaysia, Palau, Papua New Guinea, and Singapore and international agencies such as the Asian Development Bank, Economic and Social Commission for Asia and the Pacific, UNDAT, UNESCO, South Pacific Bureau for Economic Cooperation, South Pacific Commission, and the World Bank.

Research School of Physical Sciences

The Research School of Physical Sciences carries out fundamental research in selected branches of the mathematical, physical and engineering sciences including astronomy, mathematics, applied mathematics, atomic and molecular physics, engineering physics, nuclear physics, plasma physics, solid state physics, systems engineering and theoretical physics. With its extensive laboratory, computing, library and workshop facilities, the School is well-equipped for postgraduate and postdoctoral training in its chosen fields of expertise and 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.

The Department of Systems Engineering completed its first full year of operation in December 1982. During the year Professor Moore, formerly of the University of Newcastle, joined Professor Anderson, the Foundation Head of Department, and major limeses
of research were developed in control systems and signal processing. In establishing this new department, it was recognised that the Institute of Advanced Studies needed to give greater attention to information science with its broad applications to so many technological areas of importance to Australia. Further development of research facilities in the broad field of information engineering is highly desirable.

The Mathematical Sciences Research Centre was formally established in 1982 and has led to increased collaboration between mathematicians throughout the campus and an enhanced visitors program. The Centre, under the Chairmanship of Professor Robinson, brings together mathematicians from the Research School of Physical Sciences, The Faculties and the Research School of Social Sciences.

Significant progress has been made on STARLAB, the joint Australian-Canadian-United States UV-optical space telescope which is planned to be launched by the United States space shuttle. In the August 1982 budget, the Australian Government announced that $3.337 million would be provided for phase B2 studies of the STARLAB instrument package with the ANU as prime contractor and Professor Mathewson of the Mt Stromlo and Siding Spring Observatories (MSSSO) as Project Director. Development of the STARLAB space project will enable Australian astronomers to make observations at UV wavelengths which are inaccessible from ground-based telescopes owing to absorption of the radiation in the Earth’s atmosphere. Construction of the ANU 2.3-metre telescope at Siding Spring is proceeding according to plan. The rotating building is nearing completion, the primary mirror is undergoing tests and a contract has been let for construction of the telescope mount. The Observatories have continued to conduct fundamental research in galactic and extragalactic astronomy. Particularly notable recent contributions include the discovery of the most distant object known in the Universe (the QSO PKS 2000-330) and the discovery in the Large Magellanic Cloud of a very young (perhaps only 200-year-old) supernova remnant which may have been seen by early Australian explorers as a very bright new southern star.

The 14UD accelerator in the Department of Nuclear Physics continues to provide an outstanding facility for nuclear structure research despite some recent breakages of the charging chains. These breakages result from chemical attacks by SF₆ fragmentation products and will be remedied by additional cleaning of the insulating gas. A notable recent accelerator development has been the installation and successful commissioning of the beam pulsing system which now provides nanosecond wide bursts of particles for nuclear experiments. The pulsing system has been used to study the properties of short-lived neutron-deficient actinide nuclei. Much of the work of the laboratory has been concerned with studies of nuclear matter under extreme conditions, for example, so-called ‘exotic’ nuclei which are far from the normal line of nuclear stability and nuclei which are spinning at very fast rates so that they are subjected to enormous rotational forces. Studies of the competition between fission and evaporation in nuclei at high angular momentum have been extended. The techniques of nuclear physics are also being applied in the department to develop new methods for studying matter in the solid state and for determining isotope ratios in meteorites. Collaborative nuclear research with the University of Melbourne has been strengthened by the joint appointment of a Research Fellow. Other groups regularly using the 14UD accelerator include staff from the University of Auckland and from The Faculties.

Much of the work of the Research School of Physical Sciences is concerned with atomic and molecular collision processes, ionisation and plasmas. The molecular beam facility in the Atomic and Molecular Physics Laboratories (AMPL) has now completed its first year of operation and is providing new information about the quantum mechanics of molecular collisions. Other groups in AMPL have continued their studies of slow electron collision processes in gases and the absorption of ultraviolet radiation by gases of importance for theories of planetary atmospheres. The refurbished laser laboratory of the Department of Engineering Physics with its intense laser radiation provides excellent facilities for studying plasmas under extreme tempera-
ture and density conditions. In the Plasma Research Laboratory the very precise plasma position control developed for the LT-4 Tokamak has enabled new studies to be made of the behaviour of energetic 'runaway' electrons. LT-4 is also particularly well suited for studying the complex behaviour associated with magnetohydrodynamic disruption of the current-carrying plasma ring and work on this phenomenon, which is of great concern for large reactor-size plasma machines, is continuing.

The Department of Theoretical Physics continued to work on fundamental aspects of particles and fields, statistical mechanics, nuclear physics, plasma physics and solid state physics. A substantial part of this theoretical work relates to the experimental interests of the Research School. Members of the Department of Applied Mathematics have made significant theoretical advances in colloid science, vision and the propagation of light in optical waveguides and glass optical fibres. These optical devices are basic components of new communication systems and there is active collaboration in these studies between ANU and Telecom Research Laboratories. The Department of Engineering Physics, operating through ANUTECH, continued its developmental and commissioning work on the White Cliffs solar power station using funds provided by the NSW Government.

Dr J.N. Israelachvili and his group in the Department of Applied Mathematics have developed a surface force apparatus capable of measuring the force between smooth macroscopic surfaces separated by molecular distances. As an example of a wide range of studies the surface force apparatus has been used to obtain a new understanding of the so-called 'hydrophobic interaction' occurring with oil and other molecules that do not mix with water. Another branch of surface physics is being developed in the Department of Solid State Physics where a melt-spinning furnace is being used to study the properties of ribbons of amorphous, or 'glassy' metals, materials of great current technological interest.

Dr R. Mills retired at the end of 1982. Under his leadership the Diffusion Research Unit, which he founded, acquired an outstanding international reputation as a centre for experimental research on the liquid state. The Research School is greatly indebted to Dr Mills for his distinguished and unselfish service.

Research School of Social Sciences

The aim of the Research School is to advance knowledge in selected areas of social sciences. The field is broadly conceived to include disciplines such as history, philosophy, law and statistics as well as the core disciplines of economics, sociology and political science and more applied areas such as economic history, urban research, demography and the history of ideas. There are a number of useful ways of categorising the School's research. Theoretical research is concentrated in philosophy and statistics but also occurs in other departments and units. The majority of the School's research is empirical and aims to improve our understanding of the social, political and economic situation in Australia and some other countries, often during selected periods.

A better understanding of the reasons for and consequences of social changes and for the existence and emergence of social phenomena is the core objective of the School. This research often gives members of the School insight into the issues which face those in Government responsible for making policy. This part of its work helps the School contribute to the University's obligation under its Act to study subjects of national importance, and results in members of the School being requested to carry out studies for government authorities.
and to serve as members of government committees. The extent of this activity is reflected elsewhere in this report.

MAJOR ACHIEVEMENTS

The main output of the School takes the form of publications. A number of notable books and articles have emerged during the year, including Professor J.C. Caldwell’s *Theory of Fertility Decline* which distinguishes the conditions in which fertility in low-income countries is likely to experience a sustained fall. Professor N.G. Butlin, Dr J.J. Pincus and Dr J.A. Barnard published *Government and Capitalism* a study of the role of governments in the Australian economy during the 20th century. Dr A. Walicki was honoured by the Alfred Jurzykowski Foundation for his *Philosophy and Romantic Nationalism: the Case of Poland*. Dr F.B. Smith’s biography *Florence Nightingale* contributed further to the study of health in 19th-century England.

Two periodicals have been initiated from within the School — *Australian Cultural History*, edited by Dr F.B. Smith and Mr S.L. Goldberg, and the *Urban Studies Yearbook* edited by Dr P.R. Williams. Two books from the Public/Private Dichotomy project are in the press — Dr G.F. Gaus’ *The Modern Theory of Liberal Man* and the main volume from the project, *Public and Private in Social Life* edited by Dr Gaus and Mr S.I. Benn. Other notable research has been the new light thrown on the nature of unemployment by Dr R.G. Gregory and his colleagues and Dr L.T. Ruzicka’s research on the slow-down in mortality decline in Asia.

The School has increasingly become a centre for conferences and seminars which draw participants from throughout Australia, often focused on an area of research in the School. They are a further vehicle through which research results are disseminated and discussed. A notable example in 1982 was a three-day conference to discuss the philosophy of John Passmore, previously in the School’s Department of Philosophy and more recently University Fellow. Other conferences, seminars and workshops during the year covered the following topics: federalism, ethnic politics, Pacific constitutions, institutions and culture in Australia, ‘making sense of lies’, logic, an Australian/German perspective on urban problems, social theory and the city, social philosophy, health policy/health equity, the welfare state and its administration, understanding Australian labour markets, the international economy in the medium term, and the National Income Forecasting model.

NEW DIRECTIONS AND DEVELOPMENTS

Although many areas of the School’s research continue over a number of years some areas have been discontinued and new areas developed. Thus the Public/Private Dichotomy project came to an end in 1982. A major survey of aged persons completed by the School in late 1981 and an Australian Social survey in which the School is cooperating with the Faculty of Arts and Melbourne University in early 1983 will in due course be lodged in the Social Science Data Archive. The Archive will help social scientists throughout Australia make use of information collected in sample surveys. Arrangements were completed during the year for a survey of the Australian economy in which the School is cooperating with the Brookings Institution, Washington DC. Work began on a study of Australian living standards and income distribution in the 20th century. Smaller new areas of work are on fire and water services in urban areas, the concept of an ‘island industry’ (coal mining) in industrial relations, methods of sampling in solids and in vegetation transects, and stoic ethics. A large number of members of the School contributed to a School seminar on the broad topic of ‘conflict and consensus’.
The Faculties

Faculty of Arts

In 1982 the Faculty of Arts maintained teaching and research in its twelve departments, spanning the Humanities and Social Sciences. Reduced staffing led to some narrowing of the range of undergraduate units offered, but it also provided motivation for more joint teaching across departments.

There are few departments which now do not co-operate with another department in teaching or cross-fertilising at least one unit. Some of the co-operation spans Faculties; e.g., Geography (Arts) and Geology (Science), together offer Earth Sciences AO2; the unit History 1J (Japan in the Pacific and Asia 1580-1980) involves the Faculties of Arts and Asian Studies; the Department of Linguistics (Arts) co-operates with the Faculty of Asian Studies in the master degree program in Applied Japanese Linguistics.

There was an increase in the number of students graduating with combined honours. First-class honours were achieved in Political Science/Russian, Political Science/Philosophy, English/History, Geography/Prehistory. A master degree program in Public Policy has been approved by the three Faculties which would initially be involved in it, i.e., Arts, Economics and Law. Political Science (Arts) will be the Department most involved in the program in its early stages.

To extend further the range of subjects available to Arts students, at a time when new developments within the Faculty are severely restricted, the Faculty approved inclusion in the BA of some units from other institutions, e.g., Musicology units (Canberra School of Music) and Spanish (CCAE).

The development of Fine Art entered a new phase with the approval of the establishment of a William Dobell Chair in Fine Art, thanks to the generosity of the Sir William Dobell Art Foundation. An honours program in Fine Art was also approved. It was gratifying that the Faculty’s commitment to the development of Fine Art should be strengthened in the year of the opening of the Australian National Gallery. Cooperation with the Gallery continued, and a Liaison Committee was established with the Canberra School of Art.

A series of Faculty staff seminars began in 1982. Senior members of Faculty gave papers aimed at improving colleagues’ awareness of research being undertaken in different parts of the Faculty and at stimulating interaction between various disciplines. Members of the Faculty of Arts were prominent among those giving papers at 1982 conferences of the Humanities Research Centre (which is associated with the Faculty of Arts), and Professor P. Herbst of the Department of Philosophy was general convener for the year’s theme ‘Insight and Interpretation’.

Although there was a moratorium on appointments of Faculty Visitors in 1982 because of reduced funds, the Humanities Research Centre attracted a variety of distinguished visitors. Discussions were held on ways of increasing joint appointments of Visiting Fellows of interest to both the Faculty and the Centre. The Faculty decided to revive its visitors program in 1983, because of the value it sets on the stimulation and freshness which outsiders can bring to staff and students in a no-growth Faculty. However, due to the considerable lead-time involved in organising overseas visitors, the effects of the 1982
moratorium may extend well beyond that year.

Staff exchanges provide another avenue to academic stimulation and refreshment. Personal and academic factors make exchanges difficult to arrange, but the Department of Philosophy exchanged a member of staff with Temple University, USA, in 1982 and has two more exchanges in hand for 1983. The Department of Classics has also arranged an exchange with the University of Leicester, UK.

Reviews of departments continued. The Review Committee Report for the Department of Political Science was submitted to the Vice-Chancellor late in 1982 and the Review of the Department of Sociology was near completion. At the end of the year this left only two departments in the Faculty unreviewed. Departmental reviews are protracted affairs, with large committees comprising group representatives and individuals from inside and outside the ANU. They try to examine all aspects of a department's activities. The two 1982 reviews looked more closely than usual at the Faculty implications of these activities.

In June the Faculty decided that it wanted a review of its overall structure, a decision it came to in view of the changes which had resulted in recent years from smaller student numbers and reduced resources. Some of these changes had been brought about by ad hoc decisions resulting from last-minute budget pressures. Faculty recognised the need to re-think its priorities and adapt its structures as the basis for rational decision-making over at least the next five years. A small committee of four external members and the Dean was set up to review the allocation of resources in the Faculty, consider possible amalgamations or closures, cessation of particular academic activities, and introduction of new activities. It is taking account of resources available at other tertiary institutions in Canberra. It is hoped that the Faculty Review Committee will report in the first half of 1983.

The Faculty continued to maintain a variety of contacts with the wider community. Another part of the University's report gives examples of co-operation with government and other public institutions. Most departments are represented on that list. In addition, there is considerable interaction with the schools and colleges of the ACT and beyond. The Department of History organised a Schools Conference for the third year in succession. This has become something of a Faculty activity now, with 1000 students and teachers attending in one week in July to learn something not only about history but about university life.

Outside research grants are a valuable supplement to university resources for staff with appropriate research projects. The major source for Faculty staff is the Australian Research Grants Scheme, from which 16 members received grants for 1983. Other projects in the Humanities may be comparatively inexpensive to do, but funds are needed to publish the results. The Faculty Publications Committee assisted in the publication of three books by Faculty authors. Fifteen others were also published during 1982, in addition to many articles.

Faculty of Asian Studies

The Faculty of Asian Studies has as its special aim to develop teaching and research in the wide field of Asian Studies, solidly based on language competence and discipline training. To this end it continues to direct all its efforts. The major achievement of the year in this regard was the organisational restructuring of the Faculty. Following six months of intensive discussion the Faculty proposed a new structure that was approved by the Board of The Faculties and the Council of the University and which will come into effect from 1 January 1983. The fundamental change is that the Faculty will no longer be divided into departmental segments, but will be a unitary organisation.
directed by the Dean acting in consultation with his Advisory Committee.

Henceforth, the staff will be appointed to the Faculty, and assigned by the Dean to various centres. These centres are five in number — Asian History Centre, China Centre, Japan Centre, Southeast Asia Centre, and South and West Asia Centre. They will each be managed by an appointed Head, and will take responsibility for the various teaching programs. The five Area Committees (China, Japan, South Asia, Southeast Asia, West Asia), including in their membership scholars from other Faculties and from the Research Schools, will have the task of promoting the study of Asia across the University and developing appropriate courses. Postgraduate work in the Faculty will be administered by the new Postgraduate Committee, while the Undergraduate Committee will administer the unified Faculty Honours School and the intermediate awards, as well as individual cases of undergraduate course variations.

The main purposes of this reorganisation were to create a structure that would provide maximum flexibility in the use of the human and financial resources of the Faculty, and to increase its active interaction with other sections of the University. Even before the implementation of the new structure, these purposes already had significant effects. Cross-departmental teaching has markedly increased in the Faculty. Also Dr A.J.S. Reid of RSPacS changed places with our Faculty member Dr A.L. Kumar for a semester and taught her courses. Professor Wang Gungwu, from the same school, offered a full new semester course in the Faculty, and Dr D.G. Marr undertook heavy responsibilities in our new Vietnamese language program. There is growing collaboration with the Faculty of Arts in the LittB and postgraduate supervision area and in the planning of joint courses. A member of that Faculty, Dr C.C. Macknight, was Chairman of the Southeast Asia Area Committee, and a member of the Student Matters Committee.

UNDERGRADUATE COURSES

Supported by special funds from the Commonwealth Department of Education, the Faculty offered for the first time a course in Vietnamese language which over the next two years will be developed into a full three-year sequence. The Korean language program, funded by a generous grant from the Korean Traders Association, has offered Korean I and II and is planning Korean III for 1983. Classical Hebrew I was this year followed by Classical Hebrew II. Our Philippine Fellow, funded by a grant from the Australia-Philippines Business Co-operation Committee and the Philippines-Australia Business Co-operation Committee, successfully integrated study of Philippines history into the Introduction to Southeast Asia course, and will collaborate next year in a course comparing Indonesia and the Philippines, offered jointly with the Department of History in the Faculty of Arts. Two other new courses deserve mention because they evidence the increasing flexibility in use of resources. The course 'The Chinese in Southeast Asia' became an option bringing together students interested in China and those interested in South-East Asia. The course 'Religions of India' served both as an advanced course in the South Asia major and in the Religious Studies program of the Faculty of Arts.

POSTGRADUATE DEVELOPMENTS

The major new venture in 1982 was the introduction of an MA by course work and thesis in Japanese Applied Linguistics, funded by the Australia-Japan Foundation. In its first year this course attracted four students from Japan. The Faculty has also approved a change in its working rules for the LittB so that students may include some language work in the part A of their course. It is hoped that this innovation will attract students who have finished a degree, but have later developed an interest in the study of an area of Asia. The Faculty continues to attract a fair number of high-quality students for postgraduate studies both from within Australia and from Asian countries.

RESEARCH AND FELLOWSHIP PROGRAM

A high point this year was the publication of Indological and Buddhist Studies, a volume in honour of Professor J.W. de Jong on his
60th birthday, edited by L.A. Hercus in collaboration with other members of the Faculty, and with Professor F.B.J. Kuiper of Leiden University. The volume contains contributions from 35 scholars from around the world. Dr P. Ryckmans, Reader in Chinese, has won Belgium's most prestigious cultural prize, the Grand Prix Quinquennal de la critique et de l'essai, for his three works on modern China which were published both in French and in English. Two members of our staff, Dr. S.A.A. Rizvi and Dr. L.A. Hercus were awarded ARGS grants for special research. Dr H. Loofs-Wissowa was awarded the Legion d'Honneur by the President of France for his long-standing services to the development of French language and culture in Australia.

The visiting fellowship program of the Faculty managed to survive, notwithstanding financial constraints. Dr Gustav Roth, eminent scholar of Buddhism, and currently Director of the Buddhist Research Institute at Nalanda in India, delivered the second A.L. Basham lecture on 'The Structure and meaning of the Buddhist stupa and caitya according to Indian Traditions' which will be published by the Faculty in the near future.

Professors J.W. de Jong and Liu Ts'un-yan were part of a small delegation of Australian specialists in the study of religion to visit Chinese institutions at the invitation of the Chinese Academy of Social Sciences. At the end of this year the Faculty and the University paid special tribute to Professor Liu on his retirement. Professor Liu has served this Faculty with great distinction, shedding lustre on it by his fine, internationally-acclaimed scholarship. His contribution as Dean of the Faculty and as Professorial Member of Council has been outstanding.

Notwithstanding continuing financial constraints, the Faculty is more than ever prepared for the future, thanks to the restructuring of its degree courses and internal reorganisation. Its heavy demand in the study of Asian languages still limits the student numbers, but it is hoped that the quality of its graduates and of its staff will gradually have the effect of increasing the enrolment figures.

Faculty of Economics

The Faculty of Economics consists of four departments — Accounting and Public Finance, Economic History, Economics, and Statistics, together with the Centre for Research on Federal Financial Relations.

In 1982 enrolments in the Faculty declined leaving total enrolments just above those which existed in 1979. A major contributing factor to this loss of two years growth was the substantial decline in part-time enrolments which affected both undergraduate numbers and a previous area of rapid growth, the diploma courses. The proportion of part-time students in the Faculty is now approaching one in three and approximately one-quarter of all enrolments arise from those part-time students.

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 Reader in the Department resigned in July to take up a Chair in Accounting at the Victoria University of Wellington. However, it is hoped that senior appointments will be made in early 1983 which will make good the recent staff losses.

The course structure in both Accounting I and Accounting II has been redesigned to integrate Electronic Data Processing. The planning of these changes has taken place in 1982 and most of these proposed changes will be implemented in 1983.

The graduate diploma programs in accounting and public economic policy introduced in 1981 have small but satisfactory enrolments at this stage.

Economics offers a range of courses in macro, micro and international economics, covering both theoretical analysis and policy issues. Although there was a lower number of new students enrolled in 1982 for the Graduate Diploma in Economics there is now a well-established program to update the training of economists employed in the Public Service. It is also most gratifying that those students completing the Diploma program with excellent results have been offered Postgraduate Scholarships to proceed with their studies at the master level.

Professor S.J. Turnovsky resigned his Chair and took up an appointment as Professor of Economics at the University of Illinois, USA. This Chair has been advertised and it is expected that an appointment will be made early in 1983. The high degree of mobility of economists can lead to difficulties in maintaining proper staffing levels in stringent times.

The 1982 Economics I failure rate showed a substantial decline in comparison with the rather high failure and wastage rates of the two previous years and was more consistent with traditional levels. This improvement was most likely due to a number of factors including changes in the conduct of the course and the employment of more full-time tutors.

Economic History provides courses in economic development in selected countries from the mid-eighteenth century. The first-year course, Economics for Historians, which was introduced in 1981 is now well-established and the Department has conducted a series of discussions to prepare for a new first-year course, The Australian Economy, in 1983. The Chair of Economic History remained frozen in 1982.

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 diploma in statistics and in econometrics based on course work which offers a valuable program for statisticians employed by the Australian Bureau of Statistics, CSIRO and other government departments.

The introduction of the full-year unit, Economic Statistics, for students enrolled for the degree of Bachelor of Economics and the semester units Statistical Techniques 1 and 2, designed for Arts and Science students, marks the abandonment of the earlier philosophy of offering generalist service courses to all students.

Previous Faculty Reports have drawn attention to a particular staffing shortage in the area of applied econometrics and it is therefore gratifying to report that it is expected the staff of the Faculty will be strengthened in 1983 by two appointments in this area.

Master of Public Policy Program. The Faculty welcomes Council's approval, in principle, for the introduction of a Graduate Program in Public Policy and awaits with interest the decisions on the location, staffing and administrative arrangements for the program.

Centre for Research on Federal Financial Relations examines in particular the major issues affecting inter-governmental financial relations in the fields of expenditure responsibilities, financial powers (both taxation and loan), grants arrangements and the scope for inter-governmental co-operation. 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. It was again a most active year for the Centre in terms of visiting fellows, seminars and conferences, and publications. The Centre arranged a conference of the International Seminar in Public Economics. The participants included 18 distinguished overseas visitors and nine Australians.
REVIEWS

The Faculty Review was completed and placed before the Vice-Chancellor in the latter part of the year. The recommendations contained therein will be considered by the Board of the Faculties and the Faculty of Economics early in 1983.

RESEARCH AND PUBLICATIONS

Faculty staff continued to be most active in their research efforts over the year. The books, monographs, and articles published include work in theoretical areas and also on policy issues. Faculty members actively participated in conferences in Australia and overseas and in seminar programs at other universities and for professional groups.

PRIZES

The Faculty received an additional endowment from an anonymous donor to support a prize in the area of National Economic Accounting.

Faculty of Law

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 per cent 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. As is noted below, it is proposed to offer a similar program in public law from 1983.

The Faculty is obliged to restrict undergraduate enrolments. Competition for admission is intense. In 1982, around 1000 applications were received for 185 places.

NOTABLE EVENTS

The Faculty has always been conscious of its isolation from the main body of the judiciary. The Law Schools in the State capitals have frequent contact with judges both formally and informally. The Australian National University Law School has three judges among its Faculty membership but their presence in Canberra is necessarily fleeting. To overcome this problem the Faculty in 1982 commenced a program of visits by judges to the Law School for two-week periods. Two judges attended this year; a third who had intended to come had to cancel his visit because of serious illness. The judges gave lectures to students, conducted staff seminars and generally took part in the Law School's day-to-day activities while on campus. It is hoped that this will become a regular activity in the Faculty.

A decision was taken to duplicate the Faculty's very successful graduate program in international law with a similar program in public law. The program will commence in 1983. Ultimately it is expected that courses leading to the degree of master and to a graduate diploma will be offered. However, because of staffing constraints, the Faculty will initially be able to offer only diploma courses to persons pursuing part-time studies. The principal object of the program will be to provide specialist training in public law for persons with or without prior legal training who have a professional interest in the agencies of public government in Australia at Federal or State level. While designed to provide a strong grounding in administrative law and constitutional law in particular, the program will also provide interdisciplinary studies in areas of public administration and will allow candidates the opportunity to undertake some optional courses in public law
During July and August, the Faculty conducted a series of three seminars on the topic, 'Aboriginal Land Rights: Law and Policy'. The seminars were co-ordinated by Mr M.L. Barker and attended by an audience with a broad governmental, research and teaching interest in the topic. The seminars had two main aims: firstly, to recount and review the operation of the common law and statutory law dealing with land rights and secondly, to continue to focus attention on the nationally important issues of land rights and Makarrata. Papers presented at the seminars dealt specifically with common law and legislative recognition of land rights; the ideology of land rights and a Makarrata; and the legislative power of the Commonwealth to implement a Makarrata.

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 1982 Sawer's Australian Constitutional Cases by Professor L.R. Zines and Mr. G.J. Lindell was published. Books on Juvenile Justice in South Australia by Dr J.A. Seymour and on Safety Legislation at Work by Mr N.A. Gunningham were accepted for publication.

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. Some are consultants to law reform commissions, the Australian Constitutional Convention and parliamentary committees. Notable among these are Professor D.C. Pearce who advises the Senate Standing Committee on Scrutiny of Bills and Professor D.J. Whalan who advises the Senate Standing Committee on Regulations and Ordinances. 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

At the undergraduate level, the Faculty of Science aims to give students a basic background in science followed by opportunities to specialise in specific areas of interest.

The Faculty consists of 11 departments, which will be reduced to 10 when Physics and Theoretical Physics amalgamate in January 1984. Currently the Departments are Biochemistry, Botany, Chemistry, Computer Science, Forestry, Geology, Mathematics, Physics, Psychology, Theoretical Physics and Zoology. During 1982, it had a
total of 116 academic staff posts. An additional 10 posts were reserved for part-time teaching but only a little over $100,000 was available for this purpose.

At the instigation of the Deputy Vice-Chancellor, the Departments of Botany and Zoology considered the possibility of amalgamation. After examination of the academic and financial implications of amalgamation it was agreed that no marked purpose would be served by such a change.

In spite of staffing restrictions, some welcome initiatives proved possible during the year. The Chair of Geology was filled by the appointment of Professor K.S.W. Campbell and a lectureship in Basin Analysis was on offer. This is an exciting development which should help the Department of Geology to achieve a unique academic emphasis in Australia. Chairs in Zoology and Mathematics (to replace Professor A. Brown) were advertised and the electoral committee recommended an appointment of a Reader in Forestry. The short-term (three-year) appointment in Microbiology was filled as was a position in Zoology occasioned by the death of Dr J.R.T. Short.

UNDERGRADUATE TEACHING

The undergraduate student load in the Faculty as a whole remained constant (1001 WSU compared with 1003 in 1981) but varied between departments. Increases in some departments, e.g. Mathematics, Botany were balanced by decreases in others, e.g. Forestry.

Changes in course structures continued in almost all departments in response to reduced resources. The introduction of terminating first-year courses in Computer Science, although attracting only 20 per cent of the total first-year enrolments, were judged successful in imparting a broad knowledge of computing to students who do not intend to study second-year Computer Science.

Late in 1982, the Department of Chemistry held an Open Day for academics interested in the development of their Computer Assisted Learning (CAL) program and a detailed evaluation of the project will be undertaken next year. Although the project experienced teething problems, impressive progress was made and it is likely to prove a valuable contribution to teaching. The Department of Mathematics has appointed a programmer (for one year in the first instance) to develop computer packages to assist students acquire basic skills. This could prove of great assistance in overcoming staff constraints.

In the Faculty as a whole (excluding Theoretical Physics where the numbers are small) a total of 169 courses or half-courses were offered requiring 5150 individual examinations.

POSTGRADUATES

Postgraduate student numbers continued to increase in 1982. The Faculty had 100 PhD scholars, 47 MSc by research or course work, 52 Graduate Diploma and 49 Honours students giving a total of 248 students, full and part-time, who required individual supervision.

The Graduate Diploma course is fulfilling its promise in attracting both full-time and part-time students and all departments in the Faculty (excluding Theoretical Physics) have at least one student undertaking this course.

The Master of Clinical Psychology course which commenced in 1981 with nine students increased this number to 17 in 1982. The reduction in the teaching load in psychology as a result of reorganisation of its undergraduate courses has been more than taken up by the increase in postgraduate enrolments leading to professional qualifications.

RESEARCH

The Faculty maintained its research output during the year and outstanding features of this research include —

- continued outside support for research projects, including $340,000 to members of the Department of Biochemistry, and a continuation of Australian Federal Police funding ($75,000) for 1983 of the Department of Chemistry's Forensic Science Unit
• the Department of Chemistry, being ranked third in a 'Comparative Evaluation of the Research Performance of the Australian University Chemistry Departments' published in May 1982
• Professor N.S. Trudinger, Mathematics, assumed his position as Director of the Centre of Mathematical Analysis, funded from a Commonwealth Centre of Excellence grant
• the Department of Computer Science was short-listed in the competition for Centres of Excellence and participated in Australia's first multi-chip project organised by the CSIRO VLSIF program
• Professor R.P. Brent, Computer Science, was elected a Fellow of the Australian Academy of Science
• the Questacon, so successfully established by Dr M.M. Gore, Physics, continued to expand and attracted 20,000 visitors during 1982, 25 per cent of whom came from interstate. This initiative is now receiving national attention and Dr Gore, in addition to being awarded a Churchill Fellowship for 1982, acted as scientific advisor to the ABC TV program Towards 2000 and was invited to be the Australian representative at a UNESCO conference in Bangkok on Out-of-School Science Activities.

OUTSIDE ACTIVITIES

A great variety of outside activities have been undertaken by academics in all departments. At the school level, for example, members of the Department of Biochemistry organised and presented an in-service training workshop on 'Microbiology and Disease' for science teachers from the South Coast Region of the NSW Department of Education, and the department hosted chemistry students from Hawker College to view experimental work in progress. Several departments co-operated with the Commonwealth Scheme to provide work experience for final-year school students, Dr M.J. Howell, Zoology, supplied material to three local high schools and two colleges to assist with biology lessons, and the Department of Zoology, in collaboration with IRU, began production on a videotape to explain the work of the department to prospective students.

MAJOR CONCERNS

Several matters relating to staffing, building, funds for equipment and the provision of ancillary services are of particular concern to the Faculty. Problems of staffing, including part-time teaching must be faced during 1983.

The most pressing problems in buildings occur in Computer Science and in the provision of animal housing. The Department of Computer Science is extremely crowded for office, teaching and laboratory space. With the animal house much was done in 1982 within the available financial resources. The animal holding and breeding facilities in the Department of Zoology were renovated and reorganised to upgrade them and to assist in partially meeting the requirements of Biochemistry and Psychology. Additionally, approval from the NCDC to use some University land adjacent to Burgmann College for holding native animals was very welcome. These measures have helped greatly but the long-term solution will require funds to construct a Faculty of Science animal house and facilities.
In May, Professor G.H. Taylor resigned as Director of CRES to join the Executive of CSIRO. In December Professor Stuart Harris, Professor of Resource Economics in CRES, became the new Director.

The major aim of the Centre is to undertake research into important national resource and environment issues and to provide objective information and analyses on social and public policy issues in these fields. The major theme of the Centre’s work continued to be ‘energy in Australia’s future’. Work within this theme was carried on in a number of directions.

A major research activity during the year has been the three-year study entitled ‘Factors limiting coal production’ which commenced in 1981. This project is looking at the social and economic (including environmental) impacts of the expansion of mining and the associated uses of coal at the local, state and national levels. It involves a detailed study of the dominantly open-cut coal mining in the Hunter Valley, centred on the shires of Singleton and Muswellbrook. From this regional study it is hoped to develop principles which will be of value to the planning and development of other large-scale resource developments elsewhere in Australia. The project, partly funded by the National Energy Research, Development and Demonstration Council (NERDDC) and the University’s new initiative scheme, will continue throughout 1983 with the aim of producing the final report in 1984.

In addition, the Centre continued its work in relation to the south-west Tasmanian hydro-electricity proposals. It followed up some of the analyses in its earlier report on the subject Public Choice in Tasmania with more detailed research into the demand for electricity in Tasmania. The results of this work were presented in a submission to the Senate Select Committee on South-West Tasmania.

Work was also maintained on more general energy analyses assessing the effects of price and income changes on energy use, and the wider social and economic effects of energy price and supply changes. Further major studies were undertaken into the analysis of Australia’s future coal markets and of the impact on Australia of conflicts and co-operation on energy in the Asian and Pacific regions.

Apart from the energy area, CRES gave its attention to a number of other areas where the interaction between resource and other environmental objectives may be in conflict and where analyses could be useful in looking at ways of minimising such conflicts and in illustrating the nature of the social policy choices involved. These include studies in the Australian water resource area, including assistance to a number of government departments with surface and groundwater pollution problems. The pro-
duction of a manual and associated computer package for the assessment of urban flood damage has been taken to an advanced stage. Work in human ecology which has continued on a theoretical level, has as its ultimate intention the application of these theoretical concepts to important environmental and societal issues in Australia.

CRES has continued to host a number of visiting research workers, including two long-term Visiting Fellows, Dr. H.C. Coombs and Dr A.B. Costin. The former is currently involved with Aboriginal issues, including advising on the restructuring of the Central Land Council, and with broad social issues; the latter is undertaking research into water yield and rural land use, and problems of marginal or degrading lands. A number of visiting research workers have undertaken research in relation to the 'factors limiting coal production' project. These include — Professor Joy Tivy (University of Glasgow) on recreation; Professor A. Keast (Queen's University, Ontario) on ecological assessment; Dr N.J. Daly (Chemistry, The Faculties, ANU) and Dr R.W. Simpson (Griffith University) on atmospheric pollution and modelling; and Mr V. Gleeson (Canberra CAE) on water resources law. In addition, Dr R.A. Britten has been seconded from the Joint Coal Board for work on coal resources, and officers from the Department of Home Affairs and Environment have been resident in CRES.

To contribute to more effective communication between academia, government organisations and the public, CRES has expanded its program of workshops and seminars. Two major workshops were held during the year, one 'Phosphorus in Australia' organised jointly with CSIRO and one on 'Economics and Environmental Policy: the role of cost-benefit analysis', in association with the Department of Home Affairs and Environment. The Centre also published, after revision, papers given earlier to a conference on resource development in Australia.

The 21 lunch-time seminars were well attended with a large proportion of the audience coming from off-campus. Overseas speakers included Professor K. Boulding (Colorado, USA) on social economics, Professor B. Sorenson (Denmark) on renewable energy resources, Dr P. Duffy (Canada) on cumulative environment impact assessment, and Professor W.B. Stapp (USA) on environmental education.

Since its inception the Centre has produced a range of publications varying from specialised working papers to substantial monographs. Three major monographs are — An Economic Evaluation of National Parks, Environmental Water Quality, a Systems Study in Tuggeranong Creek and Kambah Pool, and Resource Development and the Future of Australian Society.

There are currently seven PhD students in CRES and 10 students studying full or part-time for the course-work degree of Master of Resource and Environmental Studies. Assistance with course-work teaching has been generously provided by the Research Schools of Social Sciences, and Biological Sciences, and by the Faculty of Law. There are also three students studying for the degree of master by thesis, all three funded by scholarships from CSIRO to the University.

Humanities Research Centre

In 1982, this Centre devoted much of its resources to its theme for the year — 'Insight and Interpretation'. However, as usual, a program of diverse activities, unrelated to that annual theme, was also supported.

The Centre was host to 14 visiting fellows of whom 11 were working in fields closely related to the theme. Others were engaged in research in fields such as Atheism in Early Modern England, The Pacific in the Age of Exploration, and Baudelaire.

Of this year's visiting fellows three were Australians (one domiciled overseas). Those from overseas came from universities or
museums in the United States of America, the United Kingdom, New Zealand and West Germany. 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. In addition, the Centre sponsored a colloquium series of 14 papers on Asian Literatures in a Comparative Perspective in conjunction with the Faculty of Asian Studies. 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. Scholars supported in this way came from the United States of America, the United Kingdom and from within Australia.

The Centre also brought to Australia two conference visitors, one from West Germany and the other from 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 1982, three conferences were organised around the annual theme. The first concentrated on ‘Understanding Texts: Texts for What?’, the second on ‘Interpreting and Understanding’ and the third on ‘Creativity and the Idea of a Culture’. In all some 100 papers were read in the Centre.

During the year the Deputy Director served temporarily on the Australian Research Grants Scheme for the Department of Science and Technology and as the representative of the Academy of the Humanities on the Advisory Committee in the Humanities of the National Library of Australia.

### National Health and Medical Research Council Health Economics Research Unit

The Unit which was first established as the Health Research Project in 1978, was extended under its present name in 1982. It operates as an independent research unit within the University, through an Advisory Committee reporting to the Vice-Chancellor. The main financial support is from the University and the National Health and Medical Research Council, supplemented by special project grants from other bodies.

The Unit's research program during the year continued to be directed towards health economics and health statistics, with particular emphasis on health service expenditures and their financing, cost and price movements in the health services, health manpower studies, and studies of health service utilisation. However, research was also conducted into Aboriginal health statistics and an expansion of work in general health statistics is planned.

In addition to publishing the results of its own work, the Unit sponsors an annual conference of health economists and publishes the proceedings of that conference, now in its fourth year. In July, the Unit organised, in conjunction with the Centre for Continuing Education, a major Public Affairs Conference on Health Policy. Papers are being prepared for publication. Reports of other research are published in a series of research reports, research monographs and technical papers.

Unit staff acted as advisers to the Victorian Government and the Commonwealth Grants Commission during the 1982 inquiry into the distribution of funds under the States (Tax Sharing and Health Grants) Act 1981. The Unit is also advising the Commonwealth Bureau of Industry Economics in an inquiry into retail pharmacy and the distribution of prescribed drugs.
National Health and Medical Research Council Social Psychiatry Research Unit

The Unit pursues epidemiological research into two groups of mental disorders — the neuroses and mental illness of old age.

Currently, a large prospective longitudinal study is being conducted on a community sample. This will throw some light on the course of neurotic symptoms and on the role played by vulnerability factors within the individual.

Because of the demographic shift in the population of all developed and many developing countries, mental disorder in the elderly is becoming an important area for psychiatric research. In particular, brain failure or senile dementia is now 'one of the most pervasive social health problems of our generation' according to the Royal College of Physicians. The Unit is engaged in a number of studies in Canberra and in Hobart to examine the pattern of old age mental disorder. A complementary study is of those who care for elderly family members at home, and how they cope.

The World Health Organisation has identified the Unit as one which is contributing substantially to its international goals, along with other collaborating centres in Europe, America and Asia. The Unit is preparing for a prospective longitudinal study of old age mental disorders in a number of Australian population samples.
Other University activities

The Library

As indicated in the previous Annual Report, the Vice-Chancellor established a committee in 1981 to review the Library’s operations. This committee of review, which was chaired by the Deputy Vice-Chancellor, Professor I.G. Ross, reported in May 1982. The publication of its Report aroused interest, not only within the University but also in library circles elsewhere in Australia and overseas. Considerable debate took place within the University on the recommendations. Most of these received general acceptance. Those relating to the distribution of collections and collection rationalisation received particular comment.

The Report of the Review Committee and its background documents will clearly provide the basis for the Library’s policies in the 1980s.

One of the Library Review’s analyses related to Library space and the problems arising from the lack of capital expenditure for additions to Library buildings. The Library Review concluded that in the ANU’s context, e.g. the availability of space on campus, the most cost-effective way to deal with the Library’s continuing intake was to add extensions to existing Library buildings. Such extensions, and the first would be to the R. G. Menzies Building, would largely be dedicated to the storage of books. Following analyses of usage patterns such extensions should contain as much compactus shelving as possible to allow density of storage of books and periodicals, while retaining open access by readers to the material.

In the meantime, during 1982 further material had to be removed from the Library buildings to be placed in the Library Store in the basement of the A.D. Hope Building. Some material in the sciences was removed from the Chifley and Menzies buildings and placed in the J.G. Crawford Building. Such moves allow a concentration of related material in one place but have significant staffing implications in terms of the physical movement of stock and in record changing.

In the area of Library computing, refinement of the acquisitions system continued and a beginning was made to convert the card shelf list into a machine-readable catalogue base. This will have considerable benefit to users as copies of the catalogue will be available at the various Library buildings and in academic departments. The production of a union serials list was largely completed and is expected to be available early in 1983.

In the sphere of co-operative acquisition, the existing arrangements with the CSIRO libraries in Canberra continue to be effective while a start was made in discussions with the National Library of Australia on ways of achieving more effective co-operation in acquisitions from the Pacific and Asian regions.

A major international co-operative undertaking was the Conference on International Co-operation in Chinese Bibliographical Automation, held at the ANU from 29 August to 1 September, 1982, which was organised by the ANU, the National Library of Australia and the University of Hong Kong. This Conference was attended by computer specialists, librarians and linguists from eight overseas countries and Australia, and was organised for the purpose of pro-
motivating international standards in Chinese bibliographical automation. This was the first time that representatives of all Chinese-speaking areas of the world, as well as those where major research efforts in the field have been taking place, such as Japan and the United States, had met to discuss the problems of international interchange of machine-readable information in the Chinese language. As a major collector of Chinese material, the ANU Library has a strong interest in the development of international standards for Chinese information interchange.

In 1981 the University Library entered into an agreement with the National Library of China to take two middle-level professional librarians from the National Library in Beijing to assist in their professional development, particularly in the area of library automation. This was continued in 1982 when two Chinese Librarians were attached to the ANU Library.

Computer Services Centre

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 mini-computers.

The current year has seen some staff reorganisation and installation of new equipment. The Centre now has an integrated systems support group supporting the UNIVAC and FACOM computers which cater for academic and administrative users respectively. The Network Group has contributed to the installation of the FACOM network, phase one of which is complete with most major buildings now having a connection to the FACOM.

The UNIVAC 1100/82 has received a memory upgrade and the FACOM has had an upgrade in the areas of memory, discs, channels and communications. Planning is well advanced for a new UNIVAC communications controller early in 1983. The major enhancement to the University’s computing facilities has been the purchase and installation of a new Digital Equipment DEC System 10 in The Faculties. This is a major commitment on behalf of the University to modernise the equipment in this area and provide improved facilities for undergraduate courses which are incorporating computing techniques at an ever-accelerating rate.

Due to financial constraints, the Centre had to reduce the hours of weekend and public holiday operation. Fortunately this has not resulted in any significant change in the pattern of utilisation of the equipment. All machines under the control of the Centre have continued to perform to a high level of reliability and availability to the users.

With regard to administrative data processing steady progress has been made in the development of new systems and the extension of the terminal network. With few exceptions, users from all parts of the campus and Mount Stromlo can access a growing data base of financial accounting, payroll and stores information. The FACOM M160F computer systems which support this activity continues to perform reliably. In order to fully utilise this resource the system is made available for academic processing at night.

The use of the MSA General Ledger System has been suspended pending a review of its suitability for University needs. The current system, an enhanced version of the previous batch system, is being well received.
Division of Educational Services

In its second year of operation the Division of Educational Services continued to provide a broad spectrum of academic service functions to the University.

Communication and Study Skills Unit

The Communication and Study Skills Unit has highlighted the academic problems of the University's increasing population of overseas, refugee and migrant students. The need for specialist language and cultural programs was far greater than the Unit was able to satisfy.

The general economic recession has been a salient factor in many of the issues brought to the Counselling Centre by students and staff in 1982. Uncertainty about the value of study for future employment motivated or heightened anxiety. The inadequacy of TEAS, both in value and availability, made part-time employment necessary for many students. Part-time jobs have been hard to find, and sometimes have left students lacking in energy for study. Job insecurity among academic staff has affected personal lives and family relationships. Counsellors have been fully extended in meeting these issues and attempting to be sources of energy and optimism in situations of depression and low morale.

Careers and Appointments Service

The Careers and Appointments Service continued to assist in the transition from study to employment and continued also to give counselling on the career implications of course choices. An increased effort was made on employer liaison.

Health Services

The notion that prevention is better than cure and that there is more to good health than the avoidance and management of illness seems to have wide acceptance in the community. Responsibility for one's own health is becoming increasingly relevant in the face of the escalating costs of medical technology in general and hospital treatment in particular.

The present organisation and funding of the ANU Health Service is well suited to the provision of primary health care. During the year there were around 10,000 consultations in the Health Centre, including visits from two-thirds of all full-time undergraduate students and three-quarters of all graduate students. In addition, a community nurse located in one of the Halls of Residence provided valuable out-of-hours cover for students with physical and emotional problems.

Office for Research in Academic Methods

Among the 30 or more course evaluations conducted by the Office for Research in Academic Methods (ORAM) during the year was a detailed investigation of all aspects of teaching and assessment in a department concerned about high wastage rates of first-year students. Changes made in 1982 resulted in improved student performance and satisfaction and changes planned for 1983 are expected to improve these results even further. ORAM staff were also heavily involved in research on learning and in gathering information designed to assist the University in its planning.

Instructional Resources Unit

The Instructional Resources Unit (IRU) continued to be the main source of photographic, audio and television services on campus and was well utilised by most areas of the University. It is difficult for individual departments to evaluate and assess the rapidly changing technology and IRU is frequently asked for advice on the sensible application of technology to teaching and research. Growing numbers of undergraduate and graduate students also call upon IRU's specialised skills and equipment.
to assist in the preparation and presentation of their research work.

**The Centre for Continuing Education**

The 1982 program of extension courses and conferences continued to reflect two aspects of the Centre's brief — the requirement that it arrange non-credit short courses of a professional and other occupational refresher kind, and conferences on issues of public importance, whether social, economic, political, scientific or cultural. The program contained a mix of regular annual courses, such as intensive summer languages, and courses for Public Service assistant research officers, as well as one-off and new activities, notably an Indonesian businessmen's course and a political exchange program.

The Centre continued to serve as the administrative arm of the Public Affairs Committee, and in this capacity organised the Health Policy conference in July. Other conferences dealt with international themes: Australia and the South Pacific, the Middle East and Australasia, and the Soviet Union.

The Centre continued to conduct intensive summer courses in a number of European and Asian languages, in association with relevant areas of the University and the Canberra College of Advanced Education. Chinese, Japanese, Spanish, French, German, and Italian were offered.

The Centre arranged briefing sessions as part of the *Australia-USA Political Exchange Program* in the form of a three-day seminar for Australian delegates — young political leaders — going to the United States, with a shorter reciprocal session for US visitors in November.

Through the Continuing Education Programme (CEP) residents in Canberra and nearby had opportunities to study 79 subjects available within the University through non-credit short courses. These ranged in length from a term or a semester to a full year.

Members of academic staff contributed to some of the Centre's activities as speakers, chairmen and session leaders. Among the many workshops, conferences, search conferences, courses, consultations and seminars some were specifically for adult education of different kinds, generalist or specialist, while others concerned rather the learning or educative potential of different work and community settings. Some of these took place on the ANU campus and others were conducted in various parts of Australia or overseas in accordance with the regional as well as national brief of the Centre in respect of such work.

The University Preparation Scheme (UPS) continued quite smoothly at a modest level to provide an educationally and institutionally satisfactory means of special adult entry to the University.

**Buildings and Grounds**

During 1982 the only capital building funds were those granted in the minor works category. These funds were concentrated on improvement of animal facilities in three areas — the John Curtin School of Medical Research; the old hospital building known as Block M, occupied by a department of the Research School of Biological Sciences and a group from the Department of Psychology (Faculty of Science), and the Faculty of Science shared animal facilities. Block M and the Faculty of Science shared facilities are now in sound condition judged by the standards of the current views on animal welfare.

In September the Chancellor officially opened the first stage of the permanent headquarters of the North Australia Research Unit in Darwin on a site adjacent to the Darwin Community College. The Unit had for a number of years been housed partly in temporary buildings on a site in the
Darwin suburb of Marrara and partly in accommodation made available to the Unit from time to time by departments of the Northern Territory and Federal Governments.

The opening of the new headquarters was the culmination of a long period of planning and negotiation during which the University agreed to accept an offer by the Northern Territory Government to exchange the original site for what was deemed to be a more suitable one.

The first stage buildings, designed to serve eventually as living accommodation for visiting research workers, serve at present as the office accommodation for the Unit.

During the year work has progressed on extending computer control of the energy network throughout the University and all important buildings are now within the control of this system. Other energy conservation endeavours have been pursued vigorously. The University's efforts in the field of energy conservation were recognised by the presentation of the National Energy Management Award for outstanding achievement in the efficient use of energy in public institutions.

The University has 19 kilometres of roads on its main site and at Mt Stromlo and Siding Spring Observatories, many of which pre-date the University's ownership of the land. The first stage of a program of rehabilitative work was carried out during 1982. It is believed that similar programs repeated in 1983 and 1984 will bring all of the roads to a state where they have a life expectancy of some 15 to 20 years before another cycle of major rehabilitation will be needed.

Efforts continued during the year to meet the needs of the disabled, which the University sees as an ongoing responsibility as identified problems arise. Considerable work has been done to cater for wheelchairs in the Arts/Economics area, in the Faculty of Law building and the J.B. Chifley Building of the University Library. Bruce Hall now has some suites suitable for disabled people and the University is funding a disabled toilet in the Union Building.

In the Library, a number of services have been provided for the handicapped including a Special Aids Room in the Chifley Building. In addition, a Visulatex machine (closed circuit print enlarger), on permanent loan from the Blindness Resource Centre, is available in the Chifley Building for anyone who could benefit from its use. One student with a visual handicap used special study areas in the Chifley Building and the Law Library throughout the year. These areas are furnished with desk and reading lamp.

In 1982, the Year of the Tree, efforts continued, as in previous years, with a program of planting and replanting trees and shrubs which began when the University was first established.

## Division of Publishing and Printing

In November 1981 the Council resolved to combine the activities of ANU Press, ANU Printing Service, ANU Duplicating Service and the Graphic Design Unit into a Division of Publishing and Printing. Late in 1982 the Official Publications Unit was also included as part of the Division, thus centralising publishing, production and dissemination services for a full range of University publishing activities.

The ANU Press was converted from a trading to a service organisation. It will continue its role as a publisher, but emphasis is being given to the distribution of materials published by other parts of the University. In 1982 ANU Press published 20 new titles including A.D. Hope's version of Marlowe's *The Tragical History of Doctur Faustus*, a second edition of Don Aitkin's *Stability and Change in Australian Politics*, Klaus Hueneke's *Huts of the High Country* and *Poetry of the Stewart Court* by J. Hughes and W.S. Ramson. ANU Press also distributed 366 titles on behalf of other
bodies of the University. During the year 47 new titles were distributed on behalf of departments.

The ANU Printing Service and the ANU Duplicating Service have undergone considerable administrative reorganisation and improvements in production, equipment and methodology.

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The Graphic Design Unit provides a wide range of production, design and art work services for ANU users. During 1982 it designed a major permanent exhibition in the Research School of Earth Sciences.

The Official Publications Unit produces the University's main administrative and information publications.

University House

University House serves the University and the Canberra community in several ways, as a collegiate residence for staff and postgraduate students, as an academic hostelry for visitors to the University, as a centre for conferences and seminars, and as a graduate and professional club for town and gown. Among its 1600 club members are members of Parliament, the Public Service, the High Court, the Armed Services, the Diplomatic Corps, CSIRO, and other tertiary institutions in Canberra and elsewhere.

During 1982, the House was host to 134 conferences and seminars of an academic and professional nature and was visited by scholars, scientists, artists, and public figures from more than 20 countries. The House arranged a variety of social and cultural activities throughout the year, some of them for members only, others open to the general public, including regular lunch-time concerts given in conjunction with the Canberra School of Music.

Major capital improvements undertaken during the year included the installation of a new telephone exchange, considerable alterations and improvements in the South Wing, and replanting of the central Quadrangle. University House is responsible for the costs of such works from its own income, for all regular maintenance, and for staff wages and related costs.

Among its academic activities in 1982 were the award of a University House Visiting Fellowship to Dr Earle Hackett, an inaugural residential English course for Japanese visitors, and active collaboration in the University's Convocation program.

Student activities

There are many opportunities in the University for students to participate in activities apart from those of the classroom or laboratory. In recent years the pressure of academic work, and in particular continuous assessment, has meant that compared with the relatively high level of extra-curricular activity by students during the early to mid-1970s, recent activity in social, political, economic and educational matters has been quiet and almost entirely concerned with those arising from within the University. The year 1982 was no exception.

Among the wider issues, students were concerned about the deterioration of employment opportunities for graduates, the continuing erosion of the purchasing power of student allowances (both graduate and undergraduate) and the declared intention of the Government that it would introduce a student loans scheme to supplement allowances under the Tertiary Education Assistance Scheme.

Within the University, student bodies had begun to accustom themselves to the effect of the 1980 amendments to the ANU Act relating to membership of student associa-
tions and their expenditure. In spite of this inflation, the University Council did not approve an increase for 1982 in the level of the General Services Fee paid by students. Consequently, the funds allocated to the various student associations from this source were not increased. This called for careful budgeting by the associations to maintain the extent and standard of services and amenities for students.

ANU Students' Association

The ANU Students' Association had a difficult year. Due to a dispute about the validity of the election for the Presidency it had no President for most of the year. An administrator acted from late 1981 to October 1982.

Three important questions were put to members of the Association by way of referendum. The results were that the Association should remain affiliated with the Australian Union of Students, that any future action to change that status should be subject to a referendum, and that the constitution of the Association be amended to provide for an executive body for the Association, over the past seven years the Association has functioned without an executive.

ANU Research Students' Association

During the course of 1982, the ANU Research Students' Association indicated concern that, as a result of a decrease in real funds directed towards graduate scholarships both by the University and by the Commonwealth Government, the level and quality of research in the University might be adversely affected.

The quality of postgraduate research is sensitive to the extent and quality of academic supervision. For some years now the Association has been co-operating with the University in efforts to improve the academic procedures relating to graduate study programs.

The Association and the University welcomed the increases in the stipends and allowances for Commonwealth Post-

graduate Awards announced for 1983. However, the Association is continuing to seek, in co-operation with the Council of Australian Postgraduate Associations, indexation of the stipends and their exemption from taxation.

ANU Union

Low student incomes together with large increases in operating cost combined to make 1982 another difficult year financially for the Union.

Several new services were introduced including a sandwich bar, a bistro-type facility and an evening meal service. Part-time students now represent 40 per cent of the undergraduate student body and their needs have to be met.

The relationship between the Union and the University is governed by the Union's constitution which is approved by the University Council. This constitution was adopted in the early 1960s. During 1982, the Union examined the constitution with a view to its modification in response to changing circumstances.

ANU Sports Union

The ANU Sports Union also had a difficult year primarily because of the static level of funds available to it, and the need to make greater contributions to cover the costs of electricity and water. It was not possible for the Sports Union to proceed with plans it had to expand the size and number of its sporting and recreational facilities. However, it was possible to increase the range of its activities within existing facilities.

Child care

The University's four child-care centres catered for over 300 pre-school-age children during 1982. A school holiday program provided day-care activities for an additional 85 school-age children during school vacations.
ANU research

The seven research schools of the University together make up the Institute of Advanced Studies. All the work in the Institute is research oriented, some of it with direct application and some of it pure research which often can have relevance to industry, medicine and other fields. The Faculties, while being responsible for teaching a large number of undergraduate and postgraduate students, also undertake a considerable amount of research work. The collection of articles in this section is not comprehensive but has been selected to provide a view of the breadth and range of ANU research. Further examples can be found in the Annual Reports of the individual Research Schools and Faculties.

How plants cope with drought

Some plants, such as cacti and salt bushes, are obviously resistant to drought, but work in the Department of Environmental Biology, Research School of Biological Sciences, has shown that practically all plants have a common strategy to minimise the effects of drought.

The mechanism is linked to the stomatal pores in the plant’s leaves which open and close in response to changes in light, temperature, humidity, and the amount of water in the soil. These pores enable carbon dioxide, necessary for photosynthesis and plant growth, to pass into the leaf. At the same time they allow water vapour to escape, with the result that the reserves of water in the soil are depleted.

Dr Ian Cowan and his colleagues have shown that the movements of the stomata are programmed to provide the optimum compromise between fixation of carbon and risk that the plant will become drought affected. The strategy is a complex one, for it has to contend not only with fluctuations in weather, but also with the irregularity and unpredictability of rainfall. The compromise differs amongst plant species, because the penalties of drought in terms of loss of growth and reduction of reproductive capacity depends on the genetic make up and life history of the plant.

The Department is also looking at the way in which the development of plants is modified by different rainfall patterns. This is part of a broader study aimed at understanding the adaptive advantages of different life forms and histories. Of particular interest is the contrast between annual and perennial, and herbaceous and woody species.

Work is also under way into the effects of rising carbon dioxide levels in the atmosphere and future climatic changes on growth and water relationships in plants. Dr Chin Wong using sophisticated controlled environment chambers provided by a special University grant has found that plants grow more rapidly when carbon dioxide is increased. Also because the stomata partially close, they lose less water per unit area of leaf.

But Dr Wong has found species differ markedly in the magnitude of the responses. After 40 days, the size of cotton plants grown at twice normal carbon dioxide concentrations was twice that of the control plants. However, the response of corn plants was smaller, but, because of marked stomatal closure, they used much less water than plants grown at normal atmospheric concentration.
Mr Brian Weir and Dr Ian Cowan, with equipment designed to measure rates of carbon dioxide uptake and water loss from leaves of french beans and cockleburr.

Dr Wong believes these results could partially offset some of the more deleterious effects of climatic change, such as higher temperature and increased aridity. However, he has found that not all plants respond favourably to carbon dioxide as the increased carbon production can lead to the leaves becoming loaded with starch which is not broken down and transferred to other parts of the plant.

Such effects emphasise the practical importance of the investigations. The Department aims not only to understand the physiology of plants in their present environment, but to predict the changes in ecology and agriculture of the future.

Virus data bank

A computerised plant virus data bank — the first in the world — is being developed by the Virus Ecology Group within the Research School of Biological Sciences.

Until now information on plant viruses has been incomplete and widely spread making it difficult to identify virus diseases and determine which plants are susceptible to them.

Now Dr Adrian Gibbs and research assistant, Katherine Boswell, are gathering information from around the world to develop a comprehensive database holding information on a wide range of viruses and their hosts.

Initially they are collecting information on legume viruses of which there are about 150, less than 30 of which are known to be
present in Australia. In the next year or two the database will be expanded to cover viruses of tropical plants, grasses and members of the tobacco/potato family, Solanaceae.

The project has received a $152,000 grant from the new Australian Centre for International Agricultural Research — one of the first awarded by the centre — which will enable the project to continue for the next three years. It will also enable a number of virologists from developed and developing countries to visit the School.

Since 1980 the researchers have been developing standards to describe each virus and setting up the computerised system to handle the information. With the help of specially designed questionnaires they are now gathering information from over 100 virologists world-wide.

The information will then be made available in variety of forms including microfiche and punch cards and should be an enormous help to researchers and quarantine officials in identifying viruses.

The group is also interested in viruses of native Australian plants. These studies are important in pinpointing viruses that could spread to crop plants and also, by comparing the wild viruses with their domesticated relatives, in examining the types of change that occur in the evolution of a damaging plant virus.

One region of Australia which has been particularly neglected in this respect has been northern Australia where very little plant virus identification work has been done.

This is an area that could provide the most accessible point of entry for pathogens from South-East Asia which then could move rapidly into the more intensively farmed areas of southern Australia.

Development of a computer base on tropical plant viruses should prove invaluable, not only to Australian quarantine officials but to researchers in developing countries.

Virions of Cassia yellow blotch virus, a newly described bromovirus from the native legume Cassia pleurocarpa from central west Queensland. Studies on this virus are part of collaborative work between the Virus Ecology Research Group of RSBS, and the Plant Pathology Branch of the Department of Primary Industries, Indooroopilly, Queensland.
Updating international fisheries law

Major changes to the Law of the Sea in recent years have led many countries around the world to review and revise their fisheries legislation, in particular to give effect to the new 200-mile exclusive economic zone that coastal states may claim under the recently concluded Law of the Sea Convention of 1982.

Many countries have experts of their own to deal with the complex legal problems that have emerged but some of the smaller nations of the Caribbean, Pacific and Asia have turned to outside experts for advice.

One of these is Mr W. R. Edeson of the Faculty of Law who has helped a number of countries draft new legislation over the last two to three years.

Most recently he has helped the Malaysian Government redraft its fisheries legislation. Working directly with officials of the Malaysian Government he has given advice on the preparation of regulations dealing with foreign fishermen, in particular the possibility of controlling the passage of unlicensed vessels through the Malaysian Exclusive Economic Zone.

This work followed on from previous assistance given to the governments of Bangladesh, St Lucia, Cayman Islands, Trinidad and Tobago, and Panama.

Mr Edeson has also been helping a number of Pacific countries to redraft fisheries legislation through seminars and workshops.

He wrote a number of papers for a workshop in Suva in February 1982 which looked at the management of fisheries in the 200-mile zones of some of the small states of the Pacific. Issues included the nationality of fishing vessels and procedures for naval enforcement of fisheries laws at sea.

Later in the year Mr Edeson organised and presented a seminar at the University of the South Pacific on the Law of the Sea and related topics such as the delimitation of maritime zones, the deep seabed regime enforcement powers of a coastal state, with particular reference to international straits and mid-ocean archipelagos. The seminar was attended by government officials from the region.

One of his latest major projects is the preparation of a study of national legislation on fisheries law in the South Pacific Region for the Food and Agricultural Organisation (FAO). He has also completed a monograph on the modern International Law of Fisheries and the Caribbean Region which should be published soon and has begun research into the legal regime of Australian fisheries.

Chemists discover new molecule in space

Traditionally interstellar space was thought to be empty but in more recent years this has proved not to be the case.

A growing number of interstellar molecules have been observed and since 1968 about 50 have been identified. Some are common on earth but others, which are much more exotic species, are too unstable to be found under normal terrestrial conditions.

They are able to exist, however, at the extremely low pressures and temperatures of outer space where, because of the relatively large distances between molecules, collisions are rare and intermolecular reactions are unlikely.

This means that normally unstable molecules can exist in space but cannot be readily observed in the laboratory providing chemists with a major challenge to identify
The region of the sky containing the constellation Sagittarius in which the new molecule HOC⁺ was observed.

them theoretically and to help subsequent detection of them in the laboratory and in space.

Scientists at the Research School of Chemistry have been working on this problem for some time and most recently predicted the existence of a totally new molecule in space — the isoformyl ion HOC⁺.

They showed through state of the art computer calculations and a complex theory of molecular chemistry known as ab initio molecular orbital theory that the molecule could easily be formed in space from carbon monoxide (CO) and an ion of hydrogen (H₃⁺) — both of which are abundant in the interstellar environment.
They also predicted that once the new molecule was formed it would not decompose but be sufficiently stable to be detectable and it would emit a distinctive fingerprint or radio emission.

The researchers, Dr Leo Radom and Mr Ross Nobes, of the Shool determined theoretically this fingerprint which radioastronomers could then use to look for the molecule in space.

Using this method they predicted that the ion HOC* would emit a microwave emission somewhere within the range of 88.2 and 89.8 gigahertz.

They published the prediction in the journal *Chemical Physics* early in 1981 which excited the interest of spectroscopists at the University of Wisconsin, led by Professor Claude Woods.

The US scientists attempted to prepare the molecule in the laboratory by passing an electrical discharge through a mixture of hydrogen, carbon monoxide and argon and after several weeks of search they were successful in finding an emission line at 89.487 gigahertz, which they were able to attribute to the HOC* molecule.

The search was then taken up by a team of radioastronomers from the University of Massachusetts, led by Professor William Irvine who within months were able to observe an interstellar emission line at 89.487 gigahertz emanating from Sagittarius B2.

This meant that the Nobes-Radom prediction had been proved both in the laboratory and in outer space and a new interstellar molecule had been found.

The changing face of child welfare legislation

Over the last 200 years or so Australia's child welfare laws have developed along different lines in each of the seven States and the ACT. All have arisen from the same English model but have gradually been adapted to each State's peculiar needs so that now there are marked differences between legislation from State to State.

Dr John Seymour of the Faculty of Law, who was Commissioner in Charge of the Australian Law Reform Commission's inquiry into child welfare in the ACT, is closely examining these differences as well as looking at their historical roots and significance.

His aim is to publish a comprehensive book dealing with the treatment of young offenders in Australia.

He is looking closely at the history and development of the law in each State tracing its development from the original British industrial and reformatory school legislation of the 19th century and in particular analysing the development of the Children's Court in Australia and the distinctive features of this Court today.

He is also studying the different police procedures for juvenile offenders in each State, the range of penalties and treatment measures available to the courts, and the legal problems posed by juveniles who commit very serious crimes.

He is also examining the role of the special panels which only operate in South Australia and Western Australia.

As background for the book Dr Seymour has closely analysed the procedures in each State and he plans to produce a series of individual studies on each of the jurisdictions. The first, entitled 'Juvenile Justice in South Australia', has already been published.

Each of these studies is intended as a basic handbook of information on each system which can be used by magistrates, lawyers, police, social workers and others who work with young offenders in Australia.

The overall aim of the major work, which should be published in 1984, is to provide an analysis of the more important issues that Australian society must confront in determining how best to deal with its young offenders.
Urban flood damage assessed

Urban flood damage in Australia can be extremely costly both in terms of physical damage and the health and psychological well-being of flood victims.

It is estimated that 150,000 homes in Australia are at risk from floods along with an unknown, but substantial, number of commercial and industrial premises.

Many towns such as Lismore and Maitland are built on the flood plains and costs for instance for residential damage after a one-in-100-year flood in Maitland could easily range up to $4 million or for commercial and retailing sector damage in Lismore up to $8 million.

The problem for the authorities is to determine the potential flood damage and assess the effectiveness and overall benefit of various flood mitigation methods such as levee banks, raising houses or even permanently moving homes and people out of flood prone areas.

Work in the Centre for Resource and Environmental Studies over the last five years has concentrated on developing a standardised method of assessing the extent of this damage, the costs and, in particular, comparing the benefits of different mitigation strategies in different situations.

The researchers, so far, have concentrated on the tangible or physical damage caused by floods and much of the initial work has been based on studies in Lismore, which is extremely flood prone. Subsequently it has been extended to all the major flood-prone communities in the Hunter Valley.

They have worked out reliable estimates of flood damage for different types of houses and commercial and industrial pro-

Houses raised on stilts in Lismore to avoid the flood hazard. (Photo: John Handmer)
property, as well as the extent of damage likely with different sizes of flood.

From this they have developed a manual which can be used to estimate tangible urban flood damage. It can be combined with a computer program to give a rapid estimate of damages and an assessment of the likely benefits of various mitigation options. An initial field survey to obtain information on all residential and commercial property in the flood plain area is combined with river flood data to assess the likely flood damage.

Computer-drawn maps can be produced to show the damage to different sectors of a town using different mitigation options. From this costs can be assessed and the cost effectiveness of mitigation methods determined.

An interactive computer program for tangible damage assessment is being developed and has already been successfully field trialled.

Very shortly it should be marketed by ANUTECH and will be widely available to local, state and federal government authorities, consultants and others interested in urban flood damage.

The program is suitable for assessing the costs and benefits of flood mitigation methods at all flood-prone towns in Australia and should be an invaluable tool in developing urban flood policies by state and federal authorities.

It is hoped to extend the study to produce guidelines to assess the intangible as well as tangible damage and also to develop a method of assessing the benefits of flood warning systems.

Much of the work has been undertaken in co-operation with the NSW Public Works Department, the NSW Water Resources Commission and the NSW Department of Environment and Planning.

The Hunter Valley project

The Hunter Valley Region of New South Wales is expected to undergo a major transformation in the next decade as more mining projects get under way, existing towns and hamlets expand and the population increases.

It is forecast that coal production in the region could increase from the present 26 million tonnes a year to around 90 million tonnes a year by the 1990s raising potential major infrastructure, water resource, labour and environmental problems.

These social, economic and environmental effects of the planned development have been the subject of a major study by researchers from the Centre for Resource and Environmental Studies (CRES) over the last two years.

The work involves a substantial proportion of the Centre's staff plus many visiting fellows and scientists from outside the University and covers a wide range of issues including subjects as diverse as the extent of the coal resource to potential housing problems.

Its major aims are to delineate the technical, geological and mining constraints on development: establish the impact of the expansion on natural resources and the environment; determine the likely impact on the local and state economy and the extent of possible social problems and assess the implications of various options for dealing with the social and economic problems that could emerge.

On the mining and extraction side an overview of the geology of the region has been completed, along with details of coal quality and the quantity that can be mined.

Optimum methods of extraction have been investigated and environmental guidelines on coal port development and transport systems are being developed.

A major study of the international black coal market involving an econometric model of the global market and an overview of world coal trade also has been completed.

Another aspect is the physical impact of development on the region, such as increased air and water pollution, problems
Dragline mining in the Hunter Valley.

of mine rehabilitation, effects on native flora and fauna and issues of water availability and allocation.

An air pollution model has been developed and investigations have been completed into the amount of dust and particulates that would be generated by expansion of surface mining and power generation. A study is under way into the health and agricultural losses caused by sulphur dioxide and fluoride emissions from power stations and aluminium smelters.

A major study into mine rehabilitation has been completed and the potential effects on the natural environment and ecosystems is under investigation.

Some 30 different sites in the region have been visited, the structure and diversity of vegetation defined and data collected on plant populations.

Information has also been collected on bird populations in different areas in an effort to show how natural groups respond to change.

Studies are also under way into the social effects and implications of such a massive increase in population on the region. The Centre has estimated that direct labour needs will rise from 6000 in 1982 to around 11,000 in 1983 and to over 12,000 by the end of the decade.

The impact of such a large influx of people on the labour and housing markets and general social structure of existing communities is of particular interest and studies are under way on the effects of the expansion of the quality of life and the pressures likely to arise on housing, community and recreation facilities.

A comparison of the overall costs and benefits of developments in the region to the Australian community is also being completed. Capital cost of mines, smelters and infrastructure facilities plus the extra costs of labour, land, water and other resource, along with indirect costs of air and water pollution are being compared with the direct benefits in terms of increased coal, aluminium and electricity output and increased employment.

One aim is to determine who will benefit most from the development and who will pay — the Australian taxpayer, residents, ratepayers and workers in the region or shareholders in development companies. Another aim is to determine how to increase
the net benefits to the Australian community.

Residents' attitudes to development have also been canvassed and investigations are under way into housing problems and potential shortfalls.

An offshoot of the project is a Directory of Resource and Environment Research in the Hunter Valley which lists organisations and individuals involved in research in the region, information sources and needs and priorities for future research in the region.

The study should be substantially completed by the end of 1983 and although at this stage it has concentrated on the Hunter Valley, it is hoped that the methodology can be used as a model for future studies of the effects of major energy and industrial developments on different regions.

**Exact models explain critical behaviour**

We are used to seeing water boil into steam, or freeze into ice. These are everyday examples of phase transitions: a phenomenon of great interest to physicists, and one that is the particular concern of Professor Rodney Baxter of the Department of Theoretical Physics within the Research School of Physical Sciences.

During changes from gas to liquid, or liquid to solid, the individual molecules of the substance remain the same but their collective behaviour changes dramatically. For instance, water molecules take up 1600 times as much space when they are heated from liquid water at 99°C to steam at 101°C. It is as though a crowd filling the Melbourne Cricket Ground suddenly refused to stay so closely packed, and surged out to occupy the whole of central Melbourne and its inner suburbs.

This expansion factor (1600 for water to steam at atmospheric pressure) reduces as the pressure is increased, until one reaches the 'critical point' at which it is just unity. Quite strange effects then occur. For instance, a liquid, such as water, has infinite compressibility, so that minute changes in pressure cause large fluctuations in density. This makes a fluid look milky — a phenomenon known as critical opalescence.

In such critical situations all the molecules are highly correlated, so that two molecules affect one another even when they are comparatively far apart. This cooperative behaviour is particularly interesting to both theoretical and experimental physicists who are seeking to understand why such behaviour occurs and how to predict it. It is known to be 'universal' in the sense that it does not depend on the details of the individual molecules. This means that one can make quite simple mathematical models that should accurately predict the behaviour of real substances.

However, even such simplified models are still very difficult to solve. Professor Baxter is one of the few scientists around the world who has been able to solve any exactly. His most notable success has been the solution of the 'eight-vertex' model which has caused modifications to existing theories and cast new light on universality. His work on this model won him the Boltzmann Award, a major international physics prize.

Professor Baxter's work in statistical mechanics is theoretical but the subject does of course have practical applications, for instance in the design of oil refineries and other large-scale plants where fluids are held under pressure and critical point phenomena can occur.

He is now continuing his work on the properties of these models and is constantly searching for new ones.
The many faces of Buddhism

The many different traditions of Buddhism around the world have fascinated scholars for centuries provoking much research and debate.

Now the Faculty of Asian Studies has added a new, comprehensive source of material with the publication of a special volume covering almost all aspects of Buddhist studies.

It is a highly technical volume which discusses no generalities but details various aspects of Buddhism which are in the forefront of current research.

Entitled *Indological and Buddhist Studies, Volume in Honour of Professor J.W. de Jong on his Sixtieth Birthday*, it was published in honour of the Foundation Professor of South Asian and Buddhist Studies.

It brings together the work of many of the world's leading Buddhist scholars and examines Buddhism in its various forms from Central Asia, through Tibet, China and Japan.

Topics such as the grammatical traditions of Tibet and an examination of early definitions of yoga are among the contributions which use written sources in many Asian languages.

In all 35 scholars from countries such as Japan, the United States, Britain, the Soviet Union, Germany, Holland, Sweden, Canada, Denmark, France, New Zealand and Australia have contributed to a 692-page volume.

The book, published in 1982, is now an essential resource for anyone carrying out research in the field of Buddhist studies and has been well received world-wide.

It was edited over 18 months by three members of the Faculty, Dr L.A. Hercus, Dr T. Rajapatirana and Mr E.R. Skrzypczak, in collaboration with Professor F.B.J. Kuiper, Emeritus Professor of Sanskrit, University of Leiden in Holland.

Solitary waves could explain why some planes crash

Aircraft around the world could sometimes be at risk from an often unrecognised, but widespread, phenomenon called solitary waves.

One of the most spectacular examples of these in Australia is the Morning Glory, a roll cloud formation often seen near Burketown on the Gulf of Carpentaria, however, normally the waves are invisible.

Work in the Research School of Earth Sciences has shown that these waves when encountered by aircraft can buffet and divert them from their path and be the cause of a number of accidents at take-off and landing.

For example, in a head-on encounter during landing, a plane could experience an increase in lift due to the sudden onset of horizontal wind shear and the vertical updraught. The opposite effect would occur if the plane encountered the trailing edge of the wave and it would be thrust down.

The danger is that the pilot will respond by reducing thrust, which can force the plane dangerously close to the ground after it has passed through the centre of the wave.

According to the research team, led by Professor Kurt Lambeck and including Mr Doug Christie and Dr Ken Muirhead, the risk is as great for a jet aircraft as for a small plane.

Solitary waves were first noted in 1834 on the surface of a canal in Scotland but for the next 130 years were regarded as a curiosity. The first definitive observation of
In the last few years malaria has re-emerged as a major killer in Third World countries mainly because many strains of the disease have become resistant to conventional drugs.

Pharmaceutical companies are constantly seeking new drugs capable of combating the malaria parasite but a major problem preventing specific treatment of the disease itself, as distinct from killing the
parasite, has been the lack of any real knowledge of how the parasite actually causes the disease.

However, work in the John Curtin School of Medical Research and the Department of Zoology is giving new insight into how malaria causes illness, how the body reacts and consequently how new drugs to treat the illness and kill the parasite could be developed.

About four years ago Dr Ian Clark developed a radically new theory on how the body reacted to the malaria parasite, and how this response, as well as causing the characteristic bouts of sweating, fever and chills, might also help by killing the parasite before the more traditional immune response began to work.

In conjunction with Dr N. Hunt, he put forward the idea that as part of the host reaction, certain white blood cells released molecules known as free oxygen radicals. These are extremely reactive forms of oxygen well-known in science but not previously associated with infectious diseases such as malaria. They suggested that these radicals could damage both the parasites inside the red blood cells and certain host tissues.

To test the theory Dr Clark used a simple chemical alloxan, which releases free oxygen radicals, to treat malaria-infected mice and found that the parasites rapidly died inside the red blood cells. Some tissue damage similar to that seen in malaria also occurred and desferrioxamine, a drug which prevents alloxan producing free oxygen radicals, was found to stop both parasite death and tissue damage.

However, further evidence was needed that it was the release of the free oxygen radicals rather than some other property of this chemical which was causing the recovery. Dr Bill Cowden of the Medical Chemistry Group in the School joined the team and carried out a number of experiments using chemicals known only to produce free oxygen radicals.

These and other experiments provided strong evidence that the radicals were the cause of recovery of the mice from malaria and this, along with other evidence, intimated that this mechanism was being used by the body’s own immune system to combat the parasite during the acute phase of the illness.

It is believed that chemicals, such as alloxan, probably cross through the wall of the red blood cells and the free oxygen radicals released attack the malaria parasite inside, blowing it apart without necessarily destroying the cell at the same time. The action is so rapid that the malaria parasites are killed within hours.

Alloxan is only an experimental tool, with side effects such as diabetes. However, Dr Cowden has now developed a number of new, but similar drugs, which, while they require further study, are equally effective but do not cause diabetes.
Using these, he and Dr Clark have carried out a number of experiments on mice infected with a lethal strain of malaria. These have lost their parasites rapidly, though with some side effects at the time, and lived for long periods in apparently perfect health.

The research also throws fresh light on why genes that carry the traits for sickle cell anaemia, thalassaemia, G-6-PD deficiency, Haemoglobin E and persistent foetal haemoglobin are common in historical malaria areas, but are rare elsewhere. These conditions all involve red blood cell abnormalities that would normally be expected to remain rare because they limit expectancy, sometimes severely.

The researchers suggest that if these red cells were subjected to the stress of free oxygen radicals any malaria parasite inside them would be more severely harmed than if they were inside normal red cells. The evidence does suggest that this occurs and so helps to explain why malaria apparently allows these normally harmful genes to survive in many people in the historical malaria areas of the world.

Overall the researchers findings open up the possibility of developing new anti-malarial drugs for human use and also the possibility of preventing tissue damage caused by malaria by using drugs that stop free oxygen radicals being formed.

Casuarinas — a potential Third World crop

Australia's casuarinas share, with the legumes such as clovers, peas and acacias, the remarkable ability to act as hosts to nitrogen-fixing bacteria which become localised in root nodules. At the 1981 International Casuarina Workshop in Canberra it was concluded that the potential of the casuarinas far outstrips their current usage for shelter belts, dune stabilisation, and in some areas of the world, the provision of essential fuel and timber. One of the major research priorities noted at the meeting was the need for more intensive study of the symbiotic relationship between casuarinas and their bacteria because the nitrogen-fixing ability of this association has undoubtedly been largely responsible for making the casuarinas as useful as they are. Very little is known about these bacteria, which are grouped with the genus Frankia, but recently they have become the focus of international research that could lead to an increase in nitrogen fixation by the casuarina/bacterium association for the particular benefit of agroforestry.

While the casuarinas have little commercial value in Australia, they have been planted widely in some Third World countries in areas with low-fertility soils and harsh climates; they are a common sight in southern India and Egypt and an immense belt of many hundreds of kilometres has been planted along the South China Sea coast to stabilise dunes. Their value could be increased if these kinds of plantations could be infected with superior, selected strains of nitrogen-fixing bacteria.

The problem is that very little is known about the bacteria because of the inability of researchers to grow them in pure culture. Collaborative work by ANU (Professor David Griffin of the Department of Forestry in the Faculty of Science and PhD student, Mr Tony Fleming) and CSIRO (Dr Alan Gibson of the Division of Plant Industry) hopes to overcome this. A bacterium that closely resembles Frankia has been isolated by Mr Fleming but so far it has been impossible to reinfect casuarinas with it. Other groups in the CSIRO’s Division of Soils in Adelaide, and in America and Senegal, are also attempting similar work. Fortunately, research can continue, even if in a less well-controlled manner, because infection of roots occurs if crushed root nodules are added to growing seedlings. Using these nodules, it is possible to test whether the bacteria vary in their ability to fix nitrogen and whether bacteria from one host species differ from those of another.
Exploring the unemployment gap

It is often thought that high unemployment levels automatically dampen wage demands, but studies at the Research School of Social Sciences are showing that this is incorrect.

They have found that even at times when unemployment levels are rising beyond 10 per cent the workforce is split between a vast majority of employees who consider their jobs safe and a minority who are unemployed or in danger of joining them.

Most employees who have had their jobs for a reasonable length of time have a low chance of becoming unemployed, while the minority trying to find work, who recently left jobs or who have been in a job for a short time face a much higher probability of joining the unemployed.

The Australian workforce suffered an upheaval while unemployment levels rose from 5 per cent to 10 per cent but attitudes to unemployment stabilised once the higher level was reached. Employees who considered themselves the safest were in the public sector, had job tenure or were other white collar workers.

The studies by Dr Bob Gregory, a professorial fellow in the Department of Economics, also showed that during a typical week in 1981 the average worker was on the way to completing a job tenure of 12 years and therefore not seriously threatened by unemployment.

By comparison the average unemployed person was on the way to completing a spell out of work of 70 weeks. Among the unemployed a small group experienced most of the weeks of unemployment. Two per cent who were in the labour force at some time during 1981 accounted for about 50 per cent of all weeks spent in unemployment. Most unemployment was concentrated among new entrants to the labour force or those whose jobs were of short duration.

Meanwhile, Dr Paul Miller, also of the Department of Economics, has found a strong relationship between the unemployed and early school-leavers. Even among 40 and 45 year-olds those who left school early are most likely to face unemployment.

The evidence was strongest among teenagers. For example, the difference in unemployment rates between males who left school at 13 and 17 years old was 29.4 per cent points. The difference between female school-leavers was even wider at 34 per cent points between the age groups.

Other economists at the Research School are looking at the pressures that increasing unemployment are placing on welfare spending.

Over the past decade, Australia's share of gross domestic expenditure on social security and welfare has approximately doubled and Professor Fred Gruen is examining the adequacy of the country's welfare system relative to those in other OECD countries.

Rock crystal changes may hold key to earthquakes

Every year earthquakes cost lives and wreak havoc throughout the world and their causes are of considerable interest. One cause is the mechanical failure of rocks under the influence of stresses in the transition zone between the upper and lower mantles of the earth — between about 400 and 900 kilometres beneath the crust.

A possible source of this stress is transformations on a massive scale of the structures of crystals in the rocks under these extreme conditions. For instance, parti-
icularly at higher levels, 'olivine' crystal structures change to the more compact 'spinel' crystal form.

However, the transformation is not direct and probably involves several stages of atomic rearrangement. The likelihood of an intermediate structure between olivine and spinel crystals (known as the 'beta structure') was shown about 25 years ago by Professor Ted Ringwood of the Research School of Earth Sciences. While this was synthesised in the laboratory, it was recently discovered to occur naturally — in a meteorite.

Four more intermediate crystal structures have since been reported and their similarity to the 'beta structure' have been immediately obvious.

Now research by Professor Bruce Hyde's group in the Research School of Chemistry, in collaboration with the Research School of Earth Sciences and the CSIRO, is investigating experimentally a likely seventh intermediate phase in the transformation called the 'omega structure'. This has not yet been discovered, but is the missing link between olivine and spinel structures in rocks.

The researchers believe that the 'omega structure' has atomic layers in one direction exactly like those in spinel and, in another direction, they would have exactly the structure of olivine crystals.

Under one theory, slipping the layers in olivine will transform it to the 'omega structure' and slipping the other layers in the 'omega structure' would then transform it (via 'beta structure' and the other four intermediate forms) to spinel. In another theory, the atomic rearrangement would be far more random.

The implications of the work go much further than rock crystal changes. It is a
fundamental study of the factors affecting the relative stability of possible crystal structures and, therefore, their chance of change under different conditions like high pressure.

For example, the present belief is that the oxygen atoms in minerals are the controlling factor in high pressure transformation since they are more compressible than the metal atoms (which are also assumed to be much smaller).

However, a more coherent explanation of many phenomena now emerging from the work at the research school suggests that it is more likely that metal atom contact is the controlling factor.

This has a number of important implications for the crystal chemist and the geologist. One of the most striking is that, if true, metal alloys of appropriate structures (corresponding to the metal atom arrays in oxides) should show the same high-pressure transformations as the corresponding oxides — the oxygen atoms being, in a sense, irrelevant.

Multi project silicon chip developed

One of the major constraints on the design of new silicon chips has been the high cost of fabrication which could easily exceed $50,000.

This has held back many researchers and small research companies from developing new prototype designs but in 1982 CSIRO developed its first multi project chip cutting costs enormously.

The multi project chip incorporated 46 designs and one of these came from the Department of Computer Science within the Faculty of Science.

The design, by Professor Richard Brent and Mr Robert Ewin, was a prototype for a fast addition unit for computers. Most computers are limited by the relatively slow speed of this unit which is a fundamental building block for more complex arithmetic and logical operations.

The design was based on earlier work by researchers in the Department and at Carnegie Mellon University in the United States and incorporated several important improvements to speed up operation of the addition unit.

The design, along with 45 others, all Australian produced and including designs for a bionic ear processor, an insulin diffuser for diabetics and a bore hole logger, were combined on the multi project chip by a team from CSIRO’s Division of Computing Research.

The chip was then fabricated in the United States, cutting costs considerably as the mask-making and fabrication costs were shared. A typically multi project chip with over 40 designs can now be made for about $50,000 allowing small industries or research groups to develop prototype chips for a little over $1000 each.

All the chips were designed using a method developed in the United States and pioneered in Australia by Dr Craig Mudge, the leader of CSIRO’s newly established VLSI (Very Large Scale Integrated Circuit) program in Adelaide.

This involves computer design of the chip and can be learnt within months by computer scientists and engineers.

The idea was pioneered by Professor Carver Mead of the California Institute of Technology and Dr Lynn Conway of Xerox, who taught the first VLSI design course at the Massachusetts Institute of Technology.

The ANU prototype design was tested after fabrication and found to work as predicted by theory and simulation, opening up the possibility of manufacturing much better performance commercial chips in the future.

The prototype was part of a continuing research project in the Department on algorithms and computer architecture. Current research has potential applications in real time image processing and underwater detection.
Die type A of the first Australian Multi-Project Chip. The chip is approximately 6mm square, and the ANU project occupies the top right-hand corner.

Food supply and security in Asia and the Pacific Rim

Research work in the Faculty of Economics has shown that man, not nature, is responsible for a large part of the instability of world market food prices. On one hand, developed countries have government controls that keep domestic food prices above world market prices; the result is that this places a net economic cost on their own peoples and causes world market prices to be lower and more unstable.

On the other hand, the developing countries have policies that bring domestic prices below world market prices; these policies also impose a net economic cost on their own peoples and increase the instability of world market prices.
A computer model has been developed by Dr A.H. Chisholm of the Faculty and Dr R. Tyers of the Research School of Pacific Studies to measure the economic effects of agricultural trade policies. The model is global in coverage, distinguishing 18 countries and country groups in Asia and the Pacific Rim and dividing the rest of the world into five-country aggregates.

The major finding of the research is that if all countries discarded all forms of government intervention in cereal and meat markets the annual net economic gain from free trade would be about $US100,000 million. The main beneficiaries would be the developed countries of the Organization for Economic Cooperation and Development.

However, in the developing countries, while higher free trade prices would provide incentives to increase domestic production of staple foods, poor consumers would suffer considerable food insecurity. One solution proposed by the researchers has been that if only 20 per cent of the net gains from food trade liberalisation was used to maintain a wedge between producer and consumer prices in developing countries, producer incentives would be restored while low and stable consumer food prices would be retained.

Much international economic research into the price fluctuations in primary commodity markets since the 1972-74 world food crisis fails to take account of the role of stockpiling by private firms and futures markets. The ANU research, however, analysed two potential areas of market failure that could lead to excessive market instability. It looked at the risks to firms of holding large commodity stockpiles and whether speculative commodity markets were efficient in handling information on the forces affecting supply and demand.

The study showed no compelling evidence of poor information or risk aversion among private stockpiles in the developed countries major commodity markets contributing to world price instability.

In the developing countries, however, where capital markets are less sophisticated and futures markets rare, the study showed some justification for publicly-held stockpiles of food or subsidisation of private stockpiling. Significant benefits would also be gained if the quality of their domestic crop forecasts could be improved.

It was proposed that the selective creation of regional futures markets on the fringes of major developing country areas could contribute toward greater food security by stimulating investment in size-of-harvest forecasts and other commodity market information.

New light on the Eureka Stockade

The crippling budget suffered by the colony of Victoria in the mid-19th century caused far more than embarrassment for a succession of Governors. It may have been a direct cause of the uprising at the Eureka Stockade on 3 December 1854.

This is one of the main findings of Professor John Molony, the Manning Clark Professor of Australian History in the Department of History within the Faculty of Arts, who is researching a book to be entitled Eureka.

Professor Molony has found that when Victoria was separated from New South Wales as a colony in 1851 it was severely deprived of financial resources and this coincided with the massive pressures on the government of the Gold Rush.

Victoria was suddenly swamped with immigrants and had to find means to build roads, post offices, hospitals, schools, docks and other services. Of course, it could not keep pace with the demand and this led to an outcry by the colonial population.

Governor Sir Charles Hotham, a naval man used to stern discipline, inherited the colony’s shattered treasury with direct orders from the Colonial Secretary, Sir George Grey, to balance the budget.

Professor Molony has found that in 1854 the Victorian deficit amounted to more than two million pounds. One remedy tried by the
Detail of a map exhibited at the Eureka state trials in March 1855 showing the stockade. Thirty rebels were killed in the attack.
Victorian administration was the continued imposition of a licence fee for gold diggers — at once immensely unpopular. Some diggers were wealthy, while the majority worked poor shafts; known as 'shicers', and could not afford the fee of 30 shillings a month.

The situation was aggravated by the Gold Commission in Ballarat — a separately recruited body of 30 men who were frequently young, inexperienced, overbearing and jealous of the spending power of the more successful miners.

Professor Molony says his research will prove that the uprising at the Eureka Stockade was welcomed by Ballarat's Gold Commissioner, Robert Rede, and his authoritarian Governor.

One of the catch cries of the diggers at Ballarat was 'democracy' as many had come from the goldfields of the United States, while others had participated in the continental uprisings of 1848. They considered the licence fee undemocratic and unfair and furthermore that it was a form of taxation without representation.

Professor Molony has found that the legend of the Stockade uprising was passed around Australia in the form of poetry (while the legend of the Kelly gang was sung around the country in ballads). This he says shows that the rebellion was a middle-class movement, rather than a lower-class attack on authority like that of the Kellys. In fact, he has found that the level of education of the diggers was far higher than that of the general level in England and Ireland.

During the early stages of the uprising at Ballarat, Gold Commissioner Rede wrote to Governor Hotham that this gave him the opportunity 'to crush this democratic agitation with one blow' — which it did.

Of the goldfields population of 25,000 about 1000 diggers began the uprising. However, by the time the authorities moved in, it was a Saturday night and only 150 diggers remained — an easy number for the 400 police and military men to engage with.

Professor Molony's research for Eureka has been carried out under Australian Research Grants Scheme funding and its publication is timed to coincide with Victoria's 150th anniversary celebrations in 1984.

Supernovas hold key to stellar evolution

Theories of stellar evolution are being directly investigated for the first time following the discovery by astronomers from Mount Stromlo and Siding Spring Observatories of the youngest supernova yet found.

The remnant is the result of the explosion of a very young, massive star — 50 times bigger than the Sun — which about 200 years ago suffered an energy crisis and blew itself to pieces.

This released all the heavy elements inside the star and created so much energy that the star would have been the brightest in the southern skies for about six months.

For the first time, because the supernova is still so young, the astronomers have been able to observe the innards of the star totally uncontaminated or diluted by the usual galactic gases.

This has given them a unique chance to look at the interior of the star where the fusion process builds up the elements important to the origin of life and enabled them to test various theories of stellar evolution.

Normally only the surface of a star can be studied and astronomers must speculate about its central core.

The supernova is one of the 26 observed by the astronomers in our nearest galaxy, the Large Magellanic Cloud, using various optical, X-ray and radio techniques.

Analysis of the complete sample has shown that they evolve quite differently from that predicted by theory.
Supernovas appear to be in free expansion, in marked contrast to the rapid deceleration expected as the shockwaves from the explosion interact with the galactic gases.

Observations have shown that the thermal energy of expansion of the supernova is continually increased by the transformation of the kinetic energy of the stellar debris into thermal energy as the debris overtakes the hot blastwave and is evaporated.

This energy input maintains the apparent 'free expansion' of the supernovas until quite large diameters are reached.

Much of the work has been done using the Anglo-Australian telescope at Siding Spring and the team, led by Professor Don Mathewson, Director of the Observatories, believes that the discovery of this youngest supernova, uncontaminated by galactic gases, will be the subject of intense study by southern hemisphere astronomers.

One of the supernova remnants discovered in the Large Magellanic Cloud taken in the light of oxygen by the Anglo-Australian Telescope. This object is the source of intense radio, X-ray and gamma radiation.
Genetic factors and diabetes in Nauru

Nauru, one of the most westernised of the Pacific Islands, has one of the highest incident rates of mature onset diabetes in the world — with 30% of the adult population suffering from the disease. The high rate has only occurred in recent years as the island has become more westernised and eating and social habits have changed. This leads to the obvious conclusion that the western lifestyle must in some way be responsible for the increase.

But why is this? Could the high incident rate spread to other Pacific Islands as they become more westernised? Or is there some genetic factor unique to the population that predisposes them to the disease?

A research team led by Dr Sue Serjeantson of the Department of Human Biology in the John Curtin School of Medical Research has been trying to answer these questions over the past two years by investigating the links between genetic factors and the susceptibility of the islanders to the disease.

Through field studies on the island that established pedigrees and involved tissue typing a proportion of the adult population the researchers have found that genetic factors play a major role in their susceptibility to diabetes.

In particular they have found that full-blooded Nauruans are much more susceptible and have a much higher incidence of the disease than those with mixed blood. For instance, in people aged 60 years and older, 83% of full-blooded Nauruans are diabetic compared with only 17% of those with Caucasian blood.

In addition, when both parents are diabetic, 40% of the children have diabetes, compared with only 6% if neither parent is affected.

However, the researchers still do not know which gene or genes are responsible for diabetes in the Pacific nor do they understand what exactly triggers off the susceptibility to the disease in Nauruans as they become more westernised.

The researchers, though, have found indications that one specific human leucocyte antigen, known as HLA-Bw22, could be
associated with diabetes in the Nauruans. Similar studies are now being carried out in India as susceptibility to mature onset diabetes among Indians in Fiji has previously been linked with an HLA antigen.

Indians in Fiji have a much higher rate of diabetes than Fijians and work in Madras by Dr Robert Kirk of the same Department is investigating the links further with genetic marker studies and family investigations.

Dr Serjeantson is also studying juvenile-onset diabetes where the gene responsible for the susceptibility to the disease has been identified by both ANU researchers and other workers overseas.

Many healthy people also have this gene but never develop insulin-dependent diabetes and the researchers believe that an environmental factor, such as a viral infection, may be needed to react with the immune response antigens and trigger the disease.

The researchers are now trying to identify this environmental factor and newly diagnosed juvenile diabetes sufferers are being tested for evidence of recent and past viral infections by measuring certain antibodies and correlating these with high and low risk white cell antigens.

If the team can identify a viral agent it could lead to a long-term disease control strategy and immunisation of children against the viral disease which could trigger diabetes.

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**Ion probe reveals Australia’s ancient past**

For many years geologists believed that eastern Australia was a relatively recent addition to the continent, but this theory is now being challenged with the help of a unique ion probe microanalyser designed and built by the Research School of Earth Sciences.

Researchers are using the microanalyser to determine the original age of rock formation and to investigate the evolution of the earliest continental crust of Australia.

The key to this work is the analysis of zircon crystals in the rocks. These have an atomic memory of their earlier forms before they underwent metamorphosis into their present rock types.

Zircon crystals have been taken from the widespread and relatively young — 300 to 500 million-year-old — Palaeozoic granites of south-east Australia for investigation.

Analysis with the probe has shown that some of these granites are derived from rocks much older than previously believed. They have been formed by the remelting of pre-existing metamorphosed sedimentary and igneous rocks which must be at least 1100 million years old.

These findings mean that south-eastern Australia must be underlain by a Precambrian terrain three times older than eastern Australia was previously thought to be.

The instrument has also been used in Western Australia to establish the ages of granites and gneisses in the Pilbara and the north-west Yilgarn regions. It has revealed that the rocks in the Pilbara are 3.4 to 3.5 billion years old and those from Yilgarn 3.6 billion years old. This compares with the oldest known rocks which come from Greenland and are over 3.8 billion years old.

The zircon dating technique has also been used to shatter previous estimates of the age of Antarctic rocks which were previously thought to be 2.5 billion years old using conventional isotopic dating methods. Instead the ion probe microanalyser has dated the rocks at 3.8 billion years old to put them in a class with the oldest known rocks.

The technique has also been used to date lunar rocks brought back by the Apollo missions and their ages have been found to be close to 4.4 billion years. This is close to
Mortality, recession and the energy crisis in Asia

While death rates in South and East Asia declined dramatically in the 1950s and early 1960s, the energy crisis and international recession, aided by substantial population increases, has now considerably slowed the trend.

Researchers in the Department of Demography, Research School of Social Sciences, say that this slowdown was to be expected in countries such as China, Malaysia and Sri Lanka which had achieved low mortality rates but in other countries, such as Bangladesh and India, the slowdown has been premature.

Here mortality decreased at a much slower rate and when the decline began to slacken in the 1970s death rates were still extremely high. For instance, in Bangladesh and India infant mortality is now about 130 per 1000 live births, compared with 12 to 14...
in Australia and less than 10 in Japan.

Dr Ladislav Ruzicka of the Department, and World Health Organisation researcher, Dr Harald Hansluwka, have analysed the cause of this premature retardation and concluded that it is due to stagnating economic growth, aggravated by the energy crisis, food shortages and poverty, lack of rural health services, illiteracy and a continuing explosion in population growth.

The slowdown in economic growth in some countries, particularly those dependent on imported fuel, has exposed larger numbers of the population to greater risk of mortality. This has been aggravated by the return of food shortages and famine to a number of areas. Crop failures have created unemployment among agricultural labourers and peasant farmers and at the same time food shortages have stimulated rapid increases in price.

On top of this there has been a continuing rapid increase in population growth with high fertility levels leading to populations composed of vulnerable groups such as children and women of child-bearing age. This means that a larger proportion of the community is at risk and death rates rise.

Inadequate and inaccessible health care is another factor but Dr Ruzicka does not believe that improved primary health care alone could solve the problem.

Instead Asian countries should introduce programs to narrow the gap between the 'haves' and the 'have nots' and help eliminate malnutrition and illiteracy. The status of women should also be upgraded.

He says that if these complex problems are neglected, unsatisfactory mortality rates will probably continue and could even worsen.

He says that in most countries the population is expected to increase by 75 per cent over the next two decades, with much of the increase in rural and the poorer socio-economic groups.

To reach a level of life expectancy of 60 years by the year 2000 will need radical improvement in living conditions and health in these countries.

He says that life expectancy at birth could be raised by about 20 years if maternal mortality, infectious and parasitic diseases, influenza, pneumonia, bronchitis and diarrhoea could be eliminated as a cause of death.

Health planners and policy makers in the region will need to plan carefully so as to develop policies which strike a balance between the costs and returns of preventive strategies between rural and urban services and between the 'haves' and 'have nots' in these countries.

Computer revolution changes face of accounting

The computer revolution in the business world is causing massive change to the training of accountants, who once concentrated on learning the centuries-old techniques of book-keeping. In the next few years it will become almost essential for graduates in accounting to be able to use the small computers that have become common tools in business management and are having a similar impact on national, or public accounting.

In the Department of Accounting and Public Finance, Faculty of Economics, an Electronic Data Processing (EDP) development program is under way to teach students the main uses of computers in management and to make them aware of the essentials of business-oriented, high-level computer languages and computer-based management information systems.

First-year students will develop keyboard skills and use a small 'general ledger' package for assignments. The Accounting I course in 1983 will see the introduction of a computer-assisted instruction package known as 'ACCHELP' to expose students to
a large number of revision problems and improve keyboard skills.

They will take 14 ACCHelp sessions during the academic year using the DEC-10 computer and a large bank of multiple-choice and short-answer questions created by the Department of Accountancy at the University of Auckland. Staff and senior students at ANU are adding to the question bank. One of the advantages of the package is that it provides students with full explanations of why incorrect answers are wrong.

At the same time, student performance, comments and incorrect answers are automatically recorded for lecturers. This will enable them to give students leaving ACCHelp sessions an analysis of their results.

In Accounting II, the BASIC language (COBOL from 1984) and an introduction to management information systems will be taught. Students will work in teams of three or four on a major programming exercise directly related to the management accounting content of the course. As well, they will use a sophisticated corporate modelling package for budgeting and decision-making assignments.

In the third year, in the auditing course, a package will be introduced to teach the essentials of EDP audit.

The Department has also bought a suite of quantitative analysis and financial programs, known as FITS, for use in the Accounting II and in two third-year and diploma courses. It is intended to modify this for use in the DEC-10 computer.

The next phase in the development of the program will be to set up a third-year course, Computers in Accounting. This would be the ultimate stage of the EDP integration program for students and provide specialist teaching of computer-based management information systems. Much of the course will have a practical content, using commercial accounting packages and business-oriented systems analysis and programming exercises. The Department also hopes to buy a small business computer to help create a 'business environment' for accountancy students.

Indonesia's economic success story

Many Australians know about problems of poverty in their large and populous northern neighbour, Indonesia, not realising that the country overcame a disastrous economic slump in the mid-1960s to become an economic success story.

Unlike rich, western countries, which suffered setbacks during the period, Indonesia managed to achieve an average economic growth rate of 8 per cent throughout the 1970s. Some of the factors accounting for this success are being studied by the Indonesia Project of the Department of Economics in the Research School of Pacific Studies, headed by Dr Peter McCawley.

A major factor has been found to be the dramatic improvement in Indonesia's balance of payments, largely due to sharp increases in oil prices in 1973-74 and in 1979. This helped Indonesia's exports jump in value from $US1.2 billion in 1970 to $US7.3 billion just two years later and then to almost $US16 billion in 1979.

At the same time the Indonesian Government took advantage of the foreign exchange that flooded into the country to rebuild its schools, roads, ports, transport systems and communications. For example, in the mid-1970s, Indonesia launched 'Palapa', a domestic communications satellite — about a decade before Australia's is due.

The researchers found that because of this, trade and business became easier. Banks could send telegraphic transfers from one end of the country to another in minutes, the mails began to move quickly as soon as the airline Garuda was modernised and living conditions for many Indonesians improved considerably.

Meanwhile, there was a heavy emphasis on improving rice production. Public money
was spent heavily on irrigation projects, new 'miracle' seeds were imported and the supply of fertilisers to farmers was greatly improved.

By the end of the 1970s per capita rice production in Indonesia was about 40 per cent higher than it had been in 1966-67 which the researchers believe is a remarkable achievement.

Another factor behind Indonesia's economic success is the improvements in health with the creation of 'Puskesmas' clinics in rural areas. Although rural health still lags behind that in the cities it has improved considerably. Birth control programs have also won popular support and the birth rate in Java in the 1970s fell, though this may not have been due solely to the family planning program.

Another boost to the economy may have come from the country's transmigration program. Almost two-thirds of Indonesia's population of 155 million live in Java — in a space just over half the size of Victoria — and the population on the island is growing by two million a year.

While the transmigration program only managed to resettle 50,000 or 60,000 each year from Java to Sumatra and Sulawesi during the 1960s, 500,000 have been moved annually in recent years to develop new agricultural areas and industries on outer islands.

The researchers say another reason for Indonesia's success has been its willingness to adopt new technologies in industry, transport, on the rice paddies and in its once low-yielding rubber plantations.

Ducks play a small but important role in rice production and flocks of them are a common sight in the mornings as they are driven to nearby rice fields to scavenge for snails and other food, thus helping keep pests under control. (Photo: Hedda Morrison)
New wealth brings new problems to Northern Territory Aborigines

Uranium, natural gas and bauxite mining have meant a new-found wealth and social transformation for the Aborigines of the Northern Territory.

Since the passing of the *Aboriginal Land Rights (Northern Territory) Act* 1976, royalties have grown rapidly with the opening of uranium mines in the north of the Territory and the tapping of gas reserves west of Alice Springs. In 1982-83, a predicted minimum of $13 million will be paid to Aboriginal groups.

These royalties are not only important for the Territory's 27,000 Aborigines in increased personal income, but because they help fund the three Aboriginal Land Councils that help the traditional owners of the land look after their interests in it and make new investments. The promised level of income could help reverse the position of Aborigines in the Territory's social, economic and political system.

Research in the Department of Prehistory and Anthropology in the Faculty of Arts is investigating the historical and legal framework in which royalties are paid and attempting to find ways to rationalise the present complex situation to achieve the greatest benefits for Aborigines.

Researchers, Dr John Altman and Dr Nicholas Peterson, believe that the central problem posed by royalties is not economic but organisational. There are no traditional structures to receive and manage the

A land claim hearing on Mt Allan pastoral lease before Mr Justice Kearney. Successful claims resulted in the conversion of land to Aboriginal freehold with the right to royalties from mining and other projects on such land.
royalties so it is essential to investigate the cultural, social, economic and legal aspects of the kinds of new structures best suited to Aboriginal social organisation and needed to achieve maximum social benefit. Eventually they plan to publish a book and probably hold workshops with land councils on their recommendations.

However, the study does raise ethical problems as it can be argued that because land rights money is Aboriginal it should be handled entirely by local groups.

There are, though, legal safeguards to ensure that the royalties are spread throughout the Aboriginal population in the Territory and the Federal Minister for Aboriginal Affairs does have a statutory role in allocating money from royalties paid into the Aboriginal Benefits Trust Account and has to approve land council budgets.

This means there is a legitimate public interest and responsibility to ensure maximum benefits for Aborigines and the Territory as a whole from the funds.

Nevertheless, the researchers say that any attempt to directly influence or pre-empt Aboriginal decision-making in the actual use of the funds could be unethical and it would be directly against one of the main purposes of providing royalties — to assist Aborigines to become less dependent.

Future royalty payments are expected to be substantially larger than at present and Aborigines themselves are planning to spend the money on improving education and other community benefits, on trucks, equipment and investments like tourist facilities and pastoral land bought on the open market.
Appendices
Organisation to administer the
Australian National University Act
1946

Functions

The Australian National University Act 1946
determines that "the functions of the Univer-
sity 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 educa-
tion for persons who elect to avail them-
selves 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

University Centres (1)
University Library
Residential Halls and Affiliated
Colleges

Student and Staff Associations
Convocation (2)

Administration

(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
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, University Health Service,
Communication and Study Skills
Unit, and Careers and
Appointments Service; and the
Division of Publishing and
Printing.

(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.
The Council

Members of the Council as at 31 December 1982

Members Ex Officio
Sir John (Grenfell) Crawford, AC, CBE, MEc Syd., HonDSc NcLe(NSW) & Orissa, HonDEc NE, HonDScEcon Syd., HonLLD Tas., PNG & ANU, FAIA, FASSA — Chancellor
The Honourable Mr Justice Richard Arthur Blackburn, OBE, CStJ, BA Adel. & Oxf., BCL Oxf. — Pro-Chancellor
Peter Henry Karmel, AC, CBE, BA, Melb., PhD Camb. & Adel., HonLLD PNG & Melb., HonDLitt Flin. & Murd., DUniv NcLe(NSW), FASSA, FACE — 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
William Mark Redpath, BA — President of the Australian National University Students’ Association

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

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

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., FIMMM Aust.
Duncan Robert Steele Craik, CB, OBE, BEd 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
Arthur John Russel Yencken, MA Camb.

Members chosen by Heads of the Research Schools in the Institute of Advanced Studies
Bernard John, MSc PhD Wales, DSc Birm., FIBiol
Ralph Gerard Ward, MA NZ, PhD Lond., 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
William Alan Runciman, DSc Edin., FIP, FAIP, FGA
Member elected by the Professors in The Faculties
Liu Ts'un-yan, BA Peking, BA PhD DLit Lond., DipEd HK, HonDLitt Yeung-Nam, FAHA

Members elected by the non-professorial academic staff in the Institute of Advanced Studies
Adrian John Gibbs, BSc ARCS PhD Lond. Alexander William Rodgers, BSc Syd., PhD, FRAS

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
Joyce Elsie Campion, AAIST Margaret Honor Evans, BA NZ, DipPsych Lond.

Member elected by the research students
Philip Ronald Anderson, BSc

Members elected by the undergraduate students
Jeffrey Timothy Michael Dalton Philip Anthony Walker

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

Members appointed by the Council

Secretary to the Council
The Registrar
University Officers

Chancellor
CRAWFORD, Emeritus Professor Sir John (Grenfell), AC, CBE, MEc Syd., Hon DSc Ncle (NSW) & Orissa, HonDSc NE, HonDScEcon Syd., HonLLD Tas., PNG & ANU, FAIAAS, FASSA

Pro-Chancellor

Vice-Chancellor
KARMEL, Emeritus Professor Peter Henry, AC, CBE, BA Melb., PhD Camb. & Adel., HonLLD PNG & Melb., HonDLitt Flin. & Murd., DUniv Ncle (NSW), FASSA, FACE

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, Emeritus Professor Ralph Warren Victor, MA StAnd. & Adel., FAHA

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

Registrar
DICKER, George Edgar, BA DipEd Syd.

Director, Computer Services
LANDFORD, Robert Russell, BCom Qld, AAUQ

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, Emeritus Professor Ralph Warren Victor, MA StAnd. & Adel., FAHA

Esquire Bedell
PACKARD, William Percival, MA NZ
### University statistics

#### Full-time staff as at 30 April 1982

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<td>junior research staff</td>
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<table>
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<tr>
<td><strong>Total</strong></td>
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<td>tradesmen</td>
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<td><strong>Total</strong></td>
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<td><strong>Other services (b)</strong></td>
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<td><strong>Grand total all staff</strong></td>
<td>2140</td>
<td>1291</td>
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(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, Employment Services and Appointment boards, the Centre for Continuing Education and ORAM.

* Includes 33 equivalent full-time casual relief typists/stenographers formerly specified under schools/departments.
<table>
<thead>
<tr>
<th>Academic activities</th>
<th>Research only staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre for Resource and Environmental Studies</td>
<td>Professor: 1 Reader: 1 Senior Fellow: 1 Research Fellow: 9 Post-doctoral Fellow: 10 Visitor: 2 Total: 24</td>
</tr>
<tr>
<td>Humanities Research Centre</td>
<td>Professor: 2 Reader: — Senior Fellow: — Research Fellow: — Post-doctoral Fellow: 1 Visitor: — Total: 3</td>
</tr>
<tr>
<td>Social Psychiatry Research Unit</td>
<td>Professor: 1 Reader: — Senior Fellow: — Research Fellow: 1 Post-doctoral Fellow: 1 Visitor: 2 Total: 5</td>
</tr>
<tr>
<td>Centre for Research in Federal Financial Relations</td>
<td>Professor: 1 Reader: — Senior Fellow: — Research Fellow: — Post-doctoral Fellow: 2 Visitor: 2 Total: 3</td>
</tr>
<tr>
<td>Office for Research in Academic Methods</td>
<td>Professor: — Reader: 1 Senior Fellow: — Research Fellow: — Post-doctoral Fellow: 2 Visitor: — Total: 5</td>
</tr>
<tr>
<td>National NMR Centre</td>
<td>Professor: — Reader: 1 Senior Fellow: — Research Fellow: — Post-doctoral Fellow: 1 Visitor: 1 Total: 2</td>
</tr>
<tr>
<td>Analytical Services Unit</td>
<td>Professor: — Reader: — Senior Fellow: 2 Research Fellow: — Post-doctoral Fellow: 1 Visitor: — Total: 3</td>
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<tr>
<td>The Faculties</td>
<td>Professor: — Reader: 1 Senior Fellow: — Research Fellow: 7 Post-doctoral Fellow: 51 Visitor: 3 Total: 62</td>
</tr>
<tr>
<td>The Research School of Biological Sciences</td>
<td>Professor: 7 Reader: 3 Senior Fellow: 7 Research Fellow: 10 Post-doctoral Fellow: 33 Visitor: 13 Total: 5 Total: 79</td>
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<tr>
<td>The Research School of Chemistry</td>
<td>Professor: 5 Reader: 3 Senior Fellow: 4 Research Fellow: 2 Post-doctoral Fellow: 47 Visitor: 4 Total: 2 Total: 67</td>
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<tr>
<td>The Research School of Earth Sciences</td>
<td>Professor: 3 Reader: 3 Senior Fellow: 2 Research Fellow: 5 Post-doctoral Fellow: 15 Visitor: 15 Total: 2 Total: 49</td>
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<tr>
<td>The John Curtin School of Medical Research</td>
<td>Professor: 8 Reader: 8 Senior Fellow: 24 Research Fellow: 7 Post-doctoral Fellow: 46 Visitor: 15 Total: 109</td>
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<tr>
<td>The Research School of Pacific Studies</td>
<td>Professor: 11 Reader: 13 Senior Fellow: 25 Research Fellow: 11 Post-doctoral Fellow: 15 Visitor: 2 Total: 2 Total: 146</td>
</tr>
<tr>
<td>The Research School of Physical Sciences</td>
<td>Professor: 13 Reader: 9 Senior Fellow: 29 Research Fellow: 12 Post-doctoral Fellow: 7 Visitor: 4 Total: 4 Total: 126</td>
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<tr>
<td>The Research School of Social Sciences</td>
<td>Professor: 13 Reader: 13 Senior Fellow: 16 Research Fellow: 5 Post-doctoral Fellow: 11 Visitor: 2 Total: 2 Total: 152</td>
</tr>
</tbody>
</table>

Total research only | 65 54 110 54 40 265 222 22 832
| Associate Professor, Reader Lecturer Lecturer Fellow Tutor Visitor Total |
|-------------------------------------------------|-----------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| **Teaching and research staff**                | **Academic activities** |
| Faculty of Arts                                | 13   | 17   | 42   | 42   | 2   | 12   | 8   | —   | 135 |
| Faculty of Asian Studies                       | 4    | 6    | 13   | 8    | —   | 2    | 4   | 3   | 40  |
| Faculty of Economics                           | 5    | 5    | 15   | 15   | —   | 3    | 6   | 1   | 49  |
| Faculty of Law                                 | 5    | 6    | 14   | 10   | —   | 2    | 1   | —   | 37  |
| Faculty of Science                             | 12   | 25   | 47   | 14   | 2   | 14   | 5   | —   | 118 |
| **Total for academic activities**              | 39   | 59   | 131  | 88   | 4   | 32   | 23  | 4   | 379 |
| Centre for Continuing Education                | 1    | 1    | 2    | 2    | —   | —    | —   | —   | 6   |
| **Total teaching and research**                | 40   | 60   | 133  | 90   | 4   | 32   | 23  | 4   | 385 |
## Enrolments 1982

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<th>part-time</th>
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## Assisted students

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## Degrees conferred

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<td>Doctor of Laws (honoris causa)</td>
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<td>Doctor of Philosophy</td>
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<td>Master of Arts (honoris causa)</td>
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<tr>
<td>Bachelor-honours</td>
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<td>153</td>
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<tr>
<td>Bachelor-pass</td>
<td>396</td>
<td>264</td>
<td>660</td>
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<td><strong>Total</strong></td>
<td>633</td>
<td>384</td>
<td>1017</td>
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* Adjusted by 11 students counted in more than one course.
Co-operation with government and other public institutions

The Australian National University 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. The following list records such co-operation for 1982. This is not necessarily comprehensive.

**Chancelery**

**Professor D.A. Low**, member of executive of Association of Commonwealth Universities; Chairman, Education Advisory Committee, ADAB; President, Asian Studies Association of Australia; President, African Studies Association of Australia and the Pacific; member, Council of the University of Papua New Guinea; Australian member, London University’s Australian Studies Centre committee.

**Mr C.G. Plowman**, President, Australian Institute of Tertiary Education Administrators.

**Professor I.G. Ross**, Chairman, Inquiry into Commonwealth Laboratories.


**Mr E.R. Boardman**, member, Committee of Review: Administrative Arrangements, CSIRO; member, TAFE Council.

**Research School of Biological Sciences**

**Professor R.F. Mark**, member, Commission on psychophysiology 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 Subcommittee of Recombinant DNA Monitoring Committee, Department of Science and Technology.

**Professor R.O. Slatyer**, Chairman, Advisory Committee for the Australian Biological Resources Committee; member, Board of Management and Policy Advisory Council of Australian Centre for International Agricultural Research; Chairman, World Heritage Committee; President, Scientific Committee on problems of the Environment; member, National Commission for UNESCO.

**Research School of Chemistry**

**Professor D.P. Craig**, Chairman, Queen Elizabeth II Fellowships Committee; part-time member, CSIRO Executive.
Professor Ada was a member of the Scientific and Technical Advisory Committee (STAC), World Bank/UNDP/WHO Special Program for Research and Training in Tropical Diseases. He served on the Global Advisory Council for Medical Research of WHO and was also a member of the Australian Recombinant-DNA Monitoring Committee and Chairman of its Scientific Sub-Committee as well as being on the Consultative Committee for Research and Development (CCRDI) of ADAB.

Dr Ardlie was a member of the Diet and Heart Disease Committee of the National Heart Foundation of Australia, a special adviser to the National Medical and Scientific Advisory Committee of the National Heart Foundation of Australia, and a member of the ACT Committee of the Royal Australasian College of Physicians.

Dr Barlin was a local representative for the Royal Society of Chemistry.

Professor Bishop was a member of the Central Council of the International Brain Research Organisation.

Dr Brown was a member of the advisory board for the International Society of Heterocyclic Chemistry.

Dr Cooper was Deputy Chairman of the ACT Cancer Society.

Professor Curtis was a member of the Research Advisory Board, National Multiple Sclerosis Society of Australia.

Professor Doe was a Censor of the Royal Australasian College of Physicians, Chairman of the Written Examinations Committee and a member of the ACT Committee of the Royal Australasian College of Physicians. He was a member of the Board of Examiners for the Australian Medical Examination Council and member of Joint Specialist Advisory Committee, Clinical Immunology and Allergy for the Royal Australasian College of Physicians.

Professor Doherty was a member of the scientific advisory committee of the International Laboratory for Research on Animal Diseases (ILRAD) in Nairobi, Kenya.

Professor Gibson was a member of the Sydney Committee of the Ludwig Institutes of Cancer Research and the Clive and Vera Ramaciotti Foundations’ Advisory Committee.

Dr Henry served on the Optometrist Registration Board of the ACT.

Dr Kirk was a member of the Publications Committee of the Australian Institute of Aboriginal Studies.

Professor Morris was Treasurer of the Australian Academy of Science, and Chairman of the National Committee for Animal and Veterinary Sciences. He was a member of the Committee of the Rural Credits Development Fund and a number of other committees including the Queen Elizabeth II and Fogarty Fellowship Committees, the Therapeutic Goods Standards Committee, the Department of Science and Technology India/Australia/United States/Federal Republic of West Germany Bilateral Agreements.

Professor Nicol was Chairman of the National Committee for Biophysics, Australian Academy of Science.

Dr Perrin was a member of the Commission V6 on Equilibrium Data on the International Union of Pure and Applied Chemistry and national representative on the IUPAC Commission V5.

Professor Porter served on the Council of The Australian Academy of Science and was Secretary, Biological Sciences of the Academy till May 1982. He was a member of the Council of NH&MRC and Chairman of NH&MRC’s Medical Research Advisory Committee. He was a member of the Medical Board of the ACT, of the Baker Medical Research Institute (Alfred Hospital, Melbourne), the Science Policy Committee of the Australian Academy of Science, and the National Committee for Medicine. He was President of the Australian Neuroscience Society, an editor of Neuroscience Letters and of Trends in Neuroscience, and a member of the IUPS Commission on Motor Control.
Dr Rosenberg was Chairman of the Australian-American Education Foundation Committee and member of the Minister for Health's Therapeutic Goods Advisory Committee.

Many people were members of the NH&MRC assignment and assessor's panels and served on visiting committees for the NH&MRC Project Grants Committee (Regional Grants Interviewing Committees).

Research School of Earth Sciences

The Petrochemistry Research Group continued its large co-operative research program with the Australian Atomic Energy Commission in development of the SYNROC method of radioactive waste immobilisation.

The Geomagnetism Research Group continued its long-standing co-operation with the Bureau of Mineral Resources in operation of a palaeomagnetic laboratory in Canberra.

Dr S.R. Taylor and Dr M.R. Perfit worked extensively in the South Pacific Marine Geoscientific Research Program sponsored by ADAB (Geochemical work on deep-sea samples of sediments and igneous rocks).

Dr A.R. Chivas and Dr J. Chappell (Research School of Pacific Studies) are carrying out a long-term stable-isotope study of palaeoclimate and environmental geochemistry of the Great Barrier Reef with funding provided under the Marine Sciences and Technology Grants Scheme of the Department of Science and Technology. The ANU team co-operates closely with the Australian Institute of Marine Sciences in this work.

Professor J.S. Turner is a member of the Australian Marine Sciences and Technologies Advisory Committee (Commonwealth Department of Science and Technology).

Emeritus Professor A.L. Hales is a member of the Australian Science and Technology Council's sub-Committee for advice to Cabinet on the future of seismic crustal reflection work in Australia.

Dr A.R. Chivas and Dr T. Torgersen were involved with the Baas Becking Laboratories in a study of the environmental geochemistry of stromatolites in Shark Bay, Western Australia.

Dr T. Torgersen was in March involved in preliminary investigations with CSIRO and the Geological Survey of Queensland relating to the sedimentary and seismic history of the Gulf of Carpentaria. In October the Australian Marine and Sciences and Technologies Advisory Council sponsored, with the Geological Survey of Queensland, an intensive coring, seismic and sedimentological investigation in the Gulf. The coring equipment used in this research was designed and built with the co-operation of the Australian Institute of Marine Sciences, Townsville. Dr Torgersen was also closely involved (with researchers from the Bureau of Mineral Resources, Australian Atomic Energy Commission, the University of Arizona and the National Science Foundation of the United States) in a sampling investigation in the Great Artesian Basin using a number of new and novel radio-isotopes to date ground waters.

Dr W. Compston worked in co-operation with the Geological Survey of Western Australia in analysis of the oldest known Australian rocks, using the RSES ion microprobe; consultant on research funding to the Natural Environment Research Council of the United Kingdom; co-operated with Dr C. Meyer of the (United States) National Aeronautics and Space Administration in ion microprobe analyses of lunar zircons and other uranium-rich minerals; collaborated with C. Naser and Ruben Ross of the United States Geological Survey in the dating of British stratotypes, using the ion microprobe, and with the Academy of Geological Sciences, Peking, on dating the Cambrian/pre-Cambrian boundary in China. He was also involved with researchers from the Bureau of Mineral resources on several zircon dating studies.

Dr I. Jackson collaborated with CSIRO Mineral Chemistry Laboratories, Melbourne, in high-temperature X-ray dif-
fraction studies for measurement of thermal expansion in high-pressure phases.

**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 D.A. Low, President, Asian Studies Association of Australia; Chairman, ADAB Education Advisory Committee.

Professor J.D. Miller, Treasurer, Academy of the Social Sciences in Australia; member, Australian National Committee for UNESCO.

Professor Wang Gungwu, President, Australian Academy of the Humanities; member, Consultative Committee on Relations with Japan.

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

Professor S.A. Wurm, member, Executive, International Committee of Linguistics; delegate, UNESCO Counsell International de Philosophic et des Sciences Humaine.

**Research School of Physical Sciences**

Professor J.H. Carver, Chairman, United Nations Scientific and Technical Sub-Committee on the Peaceful Uses of Outer Space; Deputy Chairman, Australian Science and Technology Council (ASTEC); Deputy Chairman, Anglo-Australian Telescope Board.

Professor B.D.O. Anderson, member, Radio Research Board.

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

**Mount Stromlo and Siding Spring Observatories**

Assistance by the Department of Industry and Commerce to establish for MATRA, the French Space Company, $2 million off-set credits for their transfer of technology to the STARLAB project. (STARLAB is the Australia-Canada-USE UV-optical Space Telescope).

Assistance by the Technology Development Branch of the Department of Science and Technology to commence the Phase B Studies of STARLAB.

The use of the Oddie Telescope at Mount Stromlo Observatory by senior college students in the ACT.

Lectures on astronomy for the Centre for Continuing Education at the ANU.

Assistance by the Defence Research Centre, Salisbury, on specific problems in the STARLAB project.

Assistance by the CSIRO, Division of Chemical Physics, on optical design problems of STARLAB's spectrograph.

Providing the services of the Observatories' vacuum coating facility to the Government Munitions Factory.

**Research School of Social Sciences**

Dr C. Adrian, lecturer and adviser to NSW Board of Fire Commissioners on fire station location and fire service deployment strategies.

Professor D.A. Aitkin prepared a survey of Australian Political Science for UNESCO.

Professor Aitkin and Professor F.L. Jones were members of the Queen Elizabeth II Fellowship and Australian Research Grants Committee.

Dr D.S. Anderson provided a National Clearing House on Transition from School to Work for the Departments of Education and Employment and Youth Affairs; consultant to the Commonwealth Tertiary Education Committee inquiry into post-secondary education; consultant to the Department of Education in its review of TEAS.
Dr S.I. Benn, consultant to the Australian Law Reform Commission in respect of its Privacy Reference.

Professor J.C. Caldwell and Professor M. Neutz, members, Australian Council on Population and Ethnic Affairs.

Professor J.C. Caldwell, Dr L.T. Ruzicka and Dr P.F. McDonald assisted with the World Fertility Survey.

Dr L.H. Day lectured to students at Australian Federal Police Training College.

Dr D.M. Gibson, consultant to the National Women's Advisory Council in their study of elderly women; co-ordinated a Report to the Commonwealth Department of Health on the health and policy-related aspects of data from a survey carried out by the Ageing and the Family Project.

Dr M.R. Gray with members of the Centre for Economic Policy Research, with the Commonwealth Treasury, convened a conference on the National Income Forecasting model.

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

Professor F.H. Gruen, member, National Accounts Advisory Group, Australian Bureau of Statistics; consultant to UNCTAD, Geneva; joint Arbitrator in the triennial price arbitration on the natural gas price between the Cooper Basin Producers and the Australian Gaslight Company.

Mr B.D. Haig, consultant, Ministry for Economic Development, Victoria.

Mr P.F. Harrison, member of National Capital Planning Committee; Commissioner, New South Wales Land Commission.

Mr J.M. Hemer, member of the ACT Health Services Council; assistant to the Victorian Social Security Consultative Committee.

Dr C.A. Hughes, member of the Commonwealth Parliamentary History Project of the Commonwealth Parliament.

Dr T.H. Hull, Dr G.L. Dasvarma, Dr R. Kirkland, Dr J. Conroy, Dr M.G. Santow and Dr R. Steele assisted the Indonesian population program through assignment to the International Population Dynamics Program, financed by the UN Fund for Population Activities and the Australian Development Assistance Bureau.

Dr T.H. Hull and Dr V.J. Hull completed a report for the World Health Organisation on health-related variables in the Indonesian part of the World Fertility Survey.

Dr V.J. Hull, Treasurer, Family Planning Association of the ACT; consultant, International Development Research Centre, Ottawa (Indonesian project).

Professor E. Kamenka, consultant and part co-author for a critical bibliography of Australian research and material on human rights for the Australian Human Rights Commission.

Dr H.L. Kendig, member, Steering Committee, Family Support Network Study by the Institute of Family Studies; Vice-Chairman, ACT Council on the Ageing; member of the Policy and Research Committees, Australian Council on the Ageing.

Dr H.L. Kendig and Ms J. Halton provided data from the 1981 survey by the Ageing and the Family Project to the Bureau of Labour Market Research for a study of labour force participation by older workers.

Dr P.W. Miller, consultant to the Bureau of Labour Market Research for Ministerial Directive on Youth Wages and employment.

Professor P.A. Moran, member of a working party of the Australian Science and Technology Council to advise on the importation of live animal virus by the Australian National Animal Health Laboratory.

Mr N.B. Nairn, member until July 1982, archives Authority of New South Wales.

Professor M. Neutze, member, Committee of Review of the National Capital Development Commission.

Mr C.T. Paris and Dr P.R. Williams, study of impact of market rents for South Australian Housing Trust.

Emeritus Professor J.A. Passmore, member of an advisory committee for the NSW Higher Education Board on creative work on the arts.
Dr J. Pincus gave evidence to the Davidson Committee of Enquiry into Telecom.

Dr C.A. Price, Chairman, Migrant Settlement Council for the Canberra region; member, Australian Institute on Multicultural Affairs; commenced study for Australian Institute of Multicultural Affairs on aged immigrant population.

Dr D.T. Rowland wrote a report on 'Census Mapping in Australia' with officers from the Bureau of Statistics and the Division of National Mapping; adviser to the ACT Council on the Ageing for a study of the ethnic aged in Canberra; writing a report on aged migrants for the Australian Institute of Multicultural Affairs (based on a 1981 survey by the Ageing and the Family Project).

Dr L.T. Ruzicka, co-ordinator, WHO/ESCAP project on mortality trends and differentials in selected South and East Asian countries; chairman, International Union for the Scientific Study of Population Committee on Biological and Social Correlates of Mortality; member of the preparatory World Health Organization committee of a review of mortality for 1984 Population Conference.

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

Dr S. Sax, member of the Advisory Council on the Handicapped; Deputy Leader of the Australian Delegation to the UN World Assembly on the Ageing, Vienna; Chairman, Independent Committee on Hospital Consolidation (NSW); Special Adviser to the NT Government on accommodation and services for the handicapped.

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

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

Mr P.N. Troy, adviser to New South Wales and Victorian Governments on urban administration; study at request of New South Wales Government on low-income housing.

Professor P. Wilenski, Commissioner of NSW Government Administration, wrote the final report of the Review (Unfinished Agenda); consultant to OECD, Paris, on youth employment policies; undertook an assignment on Papua New Guinea administration for the Australian Development Assistance Bureau.

Dr P.R. Williams, consultant to the Department of Environment, UK, on low income home ownership and local housing markets.

Dr G.A. Withers, adviser to the Bureau of Labour Market Research especially in relation to the Ministerial Reference on Youth Wages and Employment.

**Faculty of Arts**

Dr R. Attenborough, Advisory Workshops of Interim Council of Museum of Australia.

Dr R. Campbell, Chairman, ACT Schools Authority.

Mr E.C. Chapman, consultant to UN University (Japan) and Chiangmai University (Thailand) for UNU – CMU joint project on highland-lowland interaction in north Thailand.

Dr H. Collins, member, Fulbright Program ACT Selection Committee.

Dr O. Dent, consultant to RAAF and Royal Australasian College of Dental Surgeons; adviser to Royal Australasian College of Physicians; working group of Gastroenterological Society; consultant to Gippsland CAE.

Professor A. Forge advised and lectured at Australian Museum, Sydney; lectured at Australian National Gallery.

Professor J.P. Hardy, Secretary, Australian Academy of the Humanities.

Dr G. Hope, report for prehistory consultancy, Kakadu National Park; expert witness for Australian National Parks and Wildlife Service.

Professor D. Howlett, invited to Tokyo by Japan's Ministry of Foreign Affairs to present paper on South Pacific.

Mr R. Ireland, member, Russian Syllabus Committee, NSW Board of Senior School Studies; member, Russian language panel, National Accreditation Authority for Translators and Interpreters.
Mr K. Johnson and Dr N. McDonald, project leaders for Australian Water Resources Council project 'The utility of property acquisition and settlement relocation in flood damage programs'.

Professor R. StC. Johnson, Chairman, Commonwealth Accreditation Committee for Advanced Education; member, Australian Council on Awards in Advanced Education; reporter on academic staff development units and on external studies for the Tertiary Education Commission.

Dr D.H. Kelly lectured to Macquarie University conference on Teaching the HSC Syllabus in Ancient History.

Dr I. McBryde conducted teacher training sessions for ACT Schools Authority.

Dr H. Morphy advised Aboriginal Arts Board of Australia Council; advised Film Australia and Deakin University; lectured at Canberra School of Art and Sydney College of the Arts.

Professor J. Mulvaney made submissions to Senate Select Committee on SW Tasmania; conducted teacher training sessions for ACT Schools Authority; lectured at National Museum of Victoria and Macquarie University.

Dr N. Peterson, Land Claim adviser to Central Land Council.

Dr W.S. Ramson, member, ABC's Standing Committee on Spoken English; member, Council of Canberra School of Art.

Dr B.M. Rawson, member, Commonwealth Government Student Assistance Review Tribunal; member, Ancient History Syllabus Committee, NSW Board of Senior School Studies.

Dr A. Saikal lectured to Joint Services Staff College.

Professor D. Scales, University's representative on the ACT Planning Committee for Galbally Report Recommendation 14 (promotion of language skills among professionals dealing with migrants).

Mr W. Shawcross, expert witness at Killarney Swamp (NSW) Commission of Inquiry.

Dr R. Tonkinson, consultant, Northern Territory Aboriginal Land Commissioner.

Ms 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 P. Weller lectured to a range of Public Service bodies and to Joint Services Staff College; gave evidence to Public Accounts Committee, Senate Committee on Finance and Government Operations, and Reid Committee; member, Parliament's Bicentennial Publications Project Advisory Board.

Mr I. Wilson lectured to Royal Australian Naval Staff College, Sydney.

Professor J. Zubrzycki, member, Council of the Australian Institute for Multicultural Affairs; Chairman, Ethnic Affairs Task Force of the Australian Council for Population and Ethnic Affairs; member, Interim Council of the Australian Museum.

Faculty of Economics

Dr M. Aiken was Senior Consultant to the Joint Parliamentary Committee on Public Accounts.

Dr S. Bambrick was on secondment as Director of Studies, with the Commonwealth Public Service Board, from February to October 1982.

Professor A.D. Barton prepared a major submission to the National Companies and Security Commission on Public Company Reporting Requirements; and was also External Examiner, University of South Pacific, Fiji.

Dr A.H. Chisholm prepared a consulting report for the Australian Environmental Council in February 1982, entitled 'Fiscal Measures to Reduce Road Vehicle Emissions'.

Mr R.B. Cunningham was involved in a research project for the Department of The Capital Territory in collaboration with the CSIRO Division of Soils and Water and Land Resources, to assess the impact of lime-stabilised sludge on the yield of rye grass, barley and pine.
seedlings and on soil chemical properties.

Dr P.G. Hall was involved in joint research with Mr C. van der Klashorst, Plant Quarantine Research Station, Commonwealth Department of Health, into statistical methods for handling censored quality control data, and was a member of a Working Party on Chlorinated Chemicals and Soft Tissue Sarcomas, National Health and Medical Research Foundation.

Mrs J. Selby-Smith received a grant of $5,000 from the Canadian Department of Labour Women's Bureau for 'A Comparative Study of Women in Paid Work in Australia and Canada'; and was also a consultant and invited participant to the meeting of the OECD Working Party No. 6 on 'The Role of Women in the Economy', and adviser to the Australian Delegation, Paris, June 1982.

Mr D. Shand has been on Leave Without Pay during 1982 to allow him to take up the position of Director of Research for the Public Accounts and Expenditure Review Committee of The Parliament of Victoria.

Faculty of Law

Mr M.L. Barker, member, reference panel for Australian Water Resources Council research project on flood damage.


Dr R.J. Cranston, consultant, Institute of Judicial Administration.

Mr J.L. Davies, member of various Student Assistance Review Tribunals; member, Legal Studies Accreditation Panel of ACT Schools Authority; prepared a Memorandum of Advice to the Tasmanian Law Reform Commission and Tasmanian Solicitor-General on survival of causes of action; consultant, NSW Law Reform Commission’s Reference on Accident Compensation; assisted the shadow Federal Attorney-General on aspects of accident compensation.

Dr P.D. Finn, member, Consumer Affairs Council of ACT; adviser, Senate Standing Committee on Finance and Government Operations; Consultant, Australian Law Reform Commission (privacy reference).

Miss H. Gamble conducted seminar for in-service training program of ACT School Counsellors on School Counsellors and confidentiality, Yarralumla Education Office; lectured to members of Dr Barnado's Community Boarding Program; member, executive, Richmond Fellowship, ACT Branch; adviser, Canberra Community Legal Service.

Mr S. Gates, member, Legal Advisory Committee of the Australian Federation of Consumer Organisations; Director, University Co-operative Credit Society Ltd.

Mr N. Gunningham, adviser, Canberra Community Legal Service.

Professor A.D. Hambly, member, Family Law Council; member of two committees dealing with law reform matters established by the Family Law Council; member, Parole Board of the ACT; addressed the triennial conference of the National Council of Women of Australia.

Mr G.J. Lindell, adviser to Senate Standing Committee on Finance and Government Operations on the constitutional aspects of establishing federal statutory authorities; member, ACT Consumer Affairs Council; consultations with senior officials of the Commonwealth Attorney-General's Department (at the request of the Federal Attorney-General) regarding the Constitution Alteration (Fixed Term Parliaments) Bill 1981; lectured to RAAF Staff College.

Professor D.C. Pearce, Legal Counsel to Senate Standing Committee on Scrutiny of Bills; Chairman, Committee of Australian Educational Institutions to organise copyright test case; member, AVCC Copyright Committee; Public Officer, Copyright Society of Australia; lecturer, Public Service Board; submissions to, and witness before, Common-
wealth Parliamentary Joint Committee on Parliamentary Privilege.

Mr C.J. Rowland, lecturer, 'Wills and Estate Planning' to various community organisations; Chairman, Retirement Planning Sub-Committee of the ACT Council for the Ageing; ex-officio member, Executive Committee, Council for the Ageing.

Mr G.A. Rumble, written and oral submissions to the Australian Senate Standing Committee on Constitutional and Legal Affairs for the reference on the Legal Feasibility of Makarrata.

Professor G. Sawer, seminar at Beijing with Chinese Academy of Social Sciences; Speaker, Institute of Public Administration annual conference, Melbourne, on 'Quangos'; submission to Commonwealth Parliament Joint Committee on Parliamentary Privilege; 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; Chairman, Australian Press Council.

Mr N. Seddon, adviser to ACT magistrates on consumer protection law; assisted the shadow Attorney-General on reform of the ASIO Act 1979; consultant, NSW Law Reform Commission inquiry into accident compensation; co-ordinator Canberra Community Legal Service; adviser, student Legal Referral Service; Chairman, seminar on civil liberties in the ACT; Public Officer, Tenant's Advice Service.

Dr J.A. Seymour, adviser, Department of the Capital Territory on the implementation of the ALRC recommendations on child welfare law reform; consultant to the Northern Territory Department of Community Development in its review of child welfare legislation; advised the New Zealand and Race Relations Conciliator on the reform of New Zealand's child welfare laws; prepared a submission to the Human Rights Commission on the law relating to child destruction; member of the Council of Bruce College of Technical and Further Education; adviser, Canberra Community Legal Service; consultant to the Canberra Social Security Advocacy Service.

Mr D.W. Smith, President, Industrial Relations Society of ACT; [with Dr Rawson (RSSSJ)] Director, residential schools in industrial law for government, management and union representatives.

Mr C.J.H. Thomson, paper presented at conference on new techniques in medicine, organised by Foundation Genesis; workshops on Applied and Professional Ethics and on Human Subjects Research organised by the Hastings Centre (USA); paper presented to Seminar on Bioethics organised by the Newman Society; staff convener, Students-in-Practice Scheme; adviser, Canberra Community Legal Service.

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 ANZAAAS; AVCC member, Australian Nominating Committee, Commonwealth Scholarships and Fellowships Plan; member inter-University Committee on Research; external consultant, Faculty of Law, Papua New Guinea; addressed Australian Institute of Management, Institute of Energy, Federal Conference of Society of Hospital Pharmacists; legal adviser to Australian Senate Standing Committee on Regulations and Ordinances; member of Federal Government's Recombinant DNA Monitoring Committee.

Faculty of Science

Many members of the Faculty of Science are involved in a number of co-operative research ventures and are executive officers on national and international scientific bodies. As well, many advise local organisations on a range of educational matters.

Examples of their involvement in research activities include a Centre of Excellence grant to the Department of Mathematics (the only one in Australia in the 'natural sciences'), and a research project in collaboration with NASA on aerocapture experiments for Orbital Transfer Vehicles.
and the Saturn Mission Probe as part of the Australia/US Scientific and Technical Cooperation Program. Another important initiative has been the participation of the Department of Computer Science in the first multi-project chip which was organised by the CSIRO VLSI program.

Some members of the Faculty are involved in advising groups in the South-East Asian region. These include the Nepal-Australia Forestry Project and the Federation of Asian and Oceanian Biochemists. As well, there are advisers to the National Health and Medical Research Council and other bodies involved in secondary and tertiary education in and around the ACT.

In relation to each of these and to many other activities, numerous members of the Faculty are also on the executive committees of a number of national and international scientific organisations such as the Australian Cancer Society and National Heart Foundation.

The Questacon, which now consists of 70 exhibits, continues to expand. It has had many visitors during 1982 and is now attracting nation-wide attention. There is increased participation by outside organisations like OTC, Kodak and Mitsubishi as well as financial support from the Department of the Capital Territory, Canberra Rotary Clubs and Commonwealth Industrial Gases.

Centre for Resource and Environmental Studies

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

Dr H.C. Coombs, co-operation with the Central Land Council in advising on its re-organisation, procedure and staffing. The study is undertaken in conjunction with ANUTECH.

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, United National Expert panel on Environmental Aspects of Energy; member, World Food Council High Level Group on World Food Security.

Professor G.H. Taylor, member, National Energy Research, Development and Demonstration Council and Chairman of its Technical Standing Committee on social environmental matters; acting member, ARGC; member, Advisory Committee, Diploma of Coal Geology, Universities of Newcastle and Wollongong.
Joint research projects undertaken with other universities & CSIRO

**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.

Impact of grazing in arid ecosystems, undertaken by Dr I. Noble with Dr R.T. Lange, University of Adelaide.

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 Chara 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.

Studies of regeneration of whole plants from tissue cultures of cereals, undertaken by Dr W. Wernicke with Dr W.G. Scowcroft, Division of Plant Industry, CSIRO.

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 N.G. Martin, Dr J.B. Gibson and Dr J.G. Oakeshott
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.

Research on population structure, undertaken by Dr J.B. Gibson with Professor G.A. Harrison and Dr R.W. Hiorns, Oxford University.

Research on geographic variation in Tpi gene frequencies in Drosophila melanogaster, undertaken by Dr J.G. Oakeshott with Dr S.J. McKechnie, Monash University.

Research on genetic systems of hybrid parthenogenetic stick insects undertaken by Dr M.J.D. White with Professor L. Bullini and other members of the Istituto di Genetica, University of Rome.

Research on morphological variation among native and introduced populations of the giant toad, Bufo marinus, undertaken by Dr S. Easteal with Dr R. Thomas, Department of Biology, University of Puerto Rico.

Studies of patterns of behavioural variation between sub-species of grasshoppers undertaken by Dr D.D. Shaw with Mr P. Harrison and Dr M. Littlejohn, Department of Zoology, University of Melbourne.

Isolation and characterisation of viruses in the Australian biota, undertaken by Dr A.J. Gibbs with Dr G. Behncken and Dr J. Dale, Department of Primary Industry, Queensland.

Virus identification data exchange project, undertaken by Dr A.J. Gibbs and Ms K. Boswell with members of the International Legume Virus Working Group.

Preparation of bilingual descriptions and identificatory facilities for Canadian grasses, undertaken by Mr L. Watson and Dr S. Alken, Department of Agriculture, Canada, Ottawa.

Automation of taxonomic descriptions and identificatory facilities, undertaken by Mr L. Watson and Dr M.J. Dallwitz, CSIRO, Canberra.

Classificatory work on grasses, undertaken by Mr L. Watson with Dr H.T. Clifford, University of Queensland.

Studies of variations in grass leaf digestibilities, undertaken by Dr P.W. Hattersley with Dr J.R. Wilson, CSIRO, Brisbane.

Research School of Chemistry

Professor L.N. Mander and Dr J.V. Turner with Dr B.G. Coombe, Waite Agricultural Research Institute, University of Adelaide, Molecular Basis of Gibberellin Bioactivity.

Professor L.N. Mander and Dr J.V. Turner with Dr J.M. Sasse, School of Botany, University of Melbourne, Molecular Basis of Gibberellin Bioactivity.

Professor A.L.J. Beckwith and Dr P. Barker, CSIRO Division of Chemical Technology and University of Adelaide, Structure and Properties of Resins for the Sirotherm Desalination Process.

Professor A.L.J. Beckwith and Dr P. Barker, Flinders Medical School, South Australia, Metabolism of Fluorethane and other Halogenated Hydrocarbons commonly used as Anaesthetics.

Professor A.L.J. Beckwith and Dr P. Barker, ICI Australia Ltd, Polyvinyl chloride manufacture.

Professor A.L.J. Beckwith and Dr P. Barker, CSIRO Division of Forest Products, Chemical Taxonomy.

Mr R.W. Rickards, Department of Plant Pathology and Agricultural Entomology, University of Sydney, Phytoalexins in Wheat.

Professor B.G. Hyde and Mr T.J. White with Dr A.W.S. Johnson, CSIRO Chemical Physics, The Mechanism of the olivine spinel transformation.

Professor B.G. Hyde with Professor D.J.M. Bevan, Flinders University, South Australia, Structures of rare earth sulphides.

Dr J.K. MacLeod with Dr P.B. Oelrichs, Animal Research Institute, Department of Primary Industries, Queensland, Isolation and chemical structures of toxins from plant spines in Queensland which cause stock losses.
Dr L. Radom with Professor N.V. Riggs, University of New England, Continuing study of the conformations of simple amides.

Dr L. Radom with Dr M.N. Paddon-Row, NSW Institute of Technology, Study of through-bond interaction in [2.2.2] bicyclo-octanes.

Dr L. Radom with Dr G. Moad, CSIRO Division of Applied Organic Chemistry, Melbourne, Mechanistic studies of radical addition relations.

Dr L. Radom with Dr W. Adcock, Flinders University, South Australia, Study of trifluoromethyl substituent.

Dr J. Ferguson, Dr F. Herren and Mr G. Wilson with Dr W.H.F. Sasse and Dr A.W.-H. Mau, CSIRO Division of Applied Organic Chemistry, Melbourne, Spectroscopic studies of potential solar energy compounds.

Dr D. Evans with Dr I.K. Snook, Royal Melbourne Institute of Technology and Dr D.J. Isbister, Chemistry Department, Royal Military College, Theory of Self-Diffusion in Simple Liquids.

Professor A.M. Sargeson, Dr G.A. Lawrance and Mr P.A. Lay with Professor A.M. Bond, Deakin University, Electrochemistry of Macrobicyclic Cobalt (III) Complexes.

Professor A.M. Sargeson, Dr G.A. Lawrance and Dr P. Comba with Dr D.F. Sangster, CSIRO Chemical Physics and Australian Atomic Energy Commission, Pulse Radiolysis Studies of Co-ordination Complexes.

Professor A.M. Sargeson, Dr L.R. Gahan, Dr P. Comba, Dr G.A. Lawrance, Miss L.L. Martin and Dr I. Creaser with Dr J. Harrowfield and Associate Professor A. White, University of Western Australia, Syntheses and Structural Studies of Macrobicyclic Complexes of Transition Metals.

Professor A.M. Sargeson and Dr N.J. Curtis with Associate Professor A. White, University of Western Australia, Structural Studies of Chiral Cobalt Complexes of Penicilloic Acid.

Professor A.M. Sargeson and Dr P. Comba with Dr W.G. Jackson, Royal Military College, University of New South Wales, Reaction Mechanisms in Amine Cobalt (III) Chemistry.

Professor A.M. Sargeson, Dr L.R. Gahan, Dr P. Comba and Dr G.A. Lawrance with Dr W. Sasse and Dr A. Mau, CSIRO Division of Applied Organic Chemistry, Melbourne, Photochemistry of Macrobicyclic Metal Complexes.

Professor A.M. Sargeson and Dr L.R. Gahan with Dr M.R. Snow, University of Adelaide, Structural Studies of Mixed N,S Macrobicyclic Complexes.

Professor A.M. Sargeson with Dr L.R. Lindoy, James Cook University of North Queensland, Chemistry of Phosphates and Phosphate Esters bound to Cobalt.

Professor A.M. Sargeson, Dr P. Comba, Miss L.L. Martin and Dr G.A. Lawrance with Dr K. Murray, Monash University, Magnetic Properties of Macrobicyclic Metal Complexes.

Professor A.M. Sargeson with Professor B. Zerner, University of Queensland, Carboxyglutamate in Corals.

Professor A.M. Sargeson and Mr M. McCarthy with Dr P.J. Lawson, Capricornia College of Advanced Education, Proline Synthesis about Cobalt.

Professor A.M. Sargeson and Dr R. Geue with Dr M. Dwyer, University of Adelaide, Energy Minimisation of Solvent Spheres about Metal Complexes.

Professor A.M. Sargeson, Dr R. Geue and Mr M. McCarthy with Associate Professor A. White, University of Western Australia, Structural Studies of Encapsulated Metal Ions.

Dr M.J. Gunter with Dr K.S. Murray and Dr P.E. Clark, Monash University, Synthetic Models for Cytochrome Oxidase.

Research School of Earth Sciences

The Geophysical Fluid Dynamics Research Group (Professor J.S. Turner) works in close collaboration and continuing interchange with the Department of Applied Mathematics and Theoretical Physics of the University of Cambridge, UK.
The Earth Physics Research Group (Professor K. Lambeck) works in crustal motion studies in close collaboration with the Department of Geodesy of the University of New South Wales.

Dr S-i. Karato and colleagues at the University of Tokyo, Properties of the oceanic lithosphere.

Dr P.L. McFadden and Professor R.T. Merrill, University of Washington, Seattle, Core dynamics and lower mantle processes.

Dr P.L. McFadden and Dr R.M. Clark, Monash University, Data analysis techniques in palaeomagnetism.

Dr A.R. Chivas, Dr T. Torgersen and Dr J. Lupton, University of California, Santa Barbara and Dr I. Barnes, United States Geological Survey, Bicarbonate-rich mineral springs of Eastern Australia.

Dr W. Compston, Dr M.T. McCulloch and researchers from Flinders University, Banda arc volcanics.

Dr W. Compston and Dr R.T. Pidgeon, Western Australian Institute of Technology, Ion probe studies on zircons from British Caledonides and from Western Australian archaean.

Dr J.D. Fitzgerald and researchers from Monash University, Chemical composition of very small grains by analytical electron microscopy.

Australia-Japan economic relations. Research co-operation between the Australia-Japan Research Centre and several Australian and Japanese universities.

Australia's transport/land use system. Work in the Department of Human Geography with the Department of Transport and Engineering, University of New South Wales.

Language studies of Melanesia. Co-operation between Department of Linguistics and Universities of Papua New Guinea, South Pacific (Honiara Centre), Indonesia and Leiden.

Social change in rural Java. Collaboration between Department of Political and Social Change and Gadjah Mada University, Yogyakarta.

Population movement and political change. Joint research between North Australia Research Unit and Flinders University.

Research School of Physical Sciences

Department of Theoretical Physics
Dr. R. Smith engaged in joint research with the Physics Department, University of Melbourne on Nuclear Reaction problems.

Dr Hamer has joint research projects with Ass. Professor M.N. Barber of the University of New South Wales.

Dr Woolcock is in a continuing collaboration with Professor Jaus and Professor Rasche of the University of Zurich.

Department of Nuclear Physics
Two joint projects with the University of Melbourne: one on Hyperfine Interactions and their applications to nuclear structure measurements and the other on nuclear spectroscopy.

Joint project with the University of Auckland on states of high angular momenta in neutron deficient nuclei above the $^{208}$Pb closed shell.

Joint project with the University of Adelaide on quantitative estimation of bromine in microlitre blood samples.
Consultations with CSIRO Division of Mineral Physics in North Ryde regarding the setting up of their new accelerator facility.

Department of Solid State Physics

Faculty of Military Studies, University of New South Wales, Metal Physics.

Physics Department, Monash University, Neutron scattering and Mossbauer spectroscopy.

Australian Radiation Laboratory, Radiation dosimeters.

CSIRO Division of Applied Physics, Infrared and Mossbauer spectroscopy.

Department of Physics, The Faculties, ANU, Laser spectroscopy.

IBM Research Laboratory, San Jose, USA, High resolution laser spectroscopy.

Department of Physics, Salford University, Neutron scattering and Mossbauer spectroscopy.

Department of Physics, Indian Institute of Science, Bangalore, Specific heats.

Chisholm Institute of Technology, Caulfield, Neutron scattering.

Diffusion Research Unit
University of Karlsruhe, Germany, Joint experimental and theoretical work.

University Pierre et Marie Curie, Paris, Collaboration on application of normal mode analysis to multicomponent electrolytes.

University of Glasgow, Collaboration on transport properties of fluids under high pressures.

Electron and Ion Diffusion Unit
CSIRO-ANU Collaborative Project 'Electron Transport and Attachment in Gases'.

Joint research project with the University of Oklahoma on low energy electron-molecule scattering.

Collaboration with the Universities of Parma, Pittsburgh, Stirling and Trondheim on Monte Carlo benchmarking of analytical solutions of Boltzmann's equation for electron transport.

Plasma Research Laboratory
University of Sydney, Tokamak studies.

University of Orleans, RF spectroscopy (BASIL).

University of Newcastle, Reactive ion etching of silicon wafers.

CSIRO, Development of sub-millimetre wave techniques, calibrations, etc.

Mount Stromlo and Siding Spring Observatories
A team of astronomers from MSSSO, Royal Observatory, Edinburgh, and CSIRO discovered the most distant object in the known universe with a redshift of 3.78.

The neutral hydrogen in four southern objects has been surveyed by MSSSO and CSIRO astronomers at high resolution and high sensitivity using a new aperture synthesis radio telescope, TEST, a joint project between MSSSO and the CSIRO Division of Radio-physics.

MSSSO and Columbia University astronomers collaborated in a search for new supernova remnants in the Magellanic Clouds. MSSSO astronomers provided optical images obtained with the Anglo-Australian Telescope and Columbia astronomers provided the X-ray data from the Einstein satellite.

For two years Dr Tuohy, MSSSO, operated a ground station at Mount Stromlo to send telemetry commands to the British Ariel-6 satellite. This southern hemisphere operation significantly increased the quantity of astrophysical data obtained by the spacecraft.

MSSSO and Asiago astronomers collaborated on several programs using the International Ultraviolet Explorer satellite to use supernova remnants in other galaxies as probes to determine chemical abundances.

MSSSO and UK astronomers undertook joint infrared observations with both the UKIRT 3.9m telescope and the NASA IRTF 3.0m telescope at Mauna Kea Observatory to investigate star formation in our own and other galaxies.
MSSSO astronomers observed southern radio galaxies with National Radio Astronomy Observatory astronomers on the Very Large Array at Socorro, New Mexico.

MSSSO and Anglo-Australian Observatory astronomers and engineers have joined together to build a unique Fabry-Perot infra-red grating spectrometer for the Anglo-Australian Telescope. This will enable high resolution, high sensitivity infra-red spectra to be obtained.

MSSSO astronomers are on advisory and scientific committees helping to plan the construction of the Australia Telescope by the CSIRO Division of Radiophysics.

Planning is in progress for a joint John Hopkins University/MSSSO rocket test flight of the STARLAB photon counting array detector system.

MSSSO have provided their 30cm telescope at Siding Spring to Leeds University for two years for observations with their new CCD photometer.

MSSSO and UK SRC Schmidt Unit astronomers collaborate on a number of projects. The current project is searching for planetary nebulae in the Large Magellanic Cloud on the Schmidt Telescope plates and then observing them in more detail on the ANU telescopes.

MSSSO collaborates with Uppsala Observatory in using their Schmidt Telescope at Siding Spring Observatory for observations of the southern sky.

MSSSO and Durham University astronomers make joint observations with the Anglo-Australian Telescope for studies of the astrophysics of galaxy formation.

**Research School of Social Sciences**

Study on the mass media in Australia by Dr C.A. Hughes with Professor J.S. Western of the University of Queensland.

Research on Liberal-National Party relations by Dr C.A. Hughes with members of the Departments of Government and Sociology, University of Queensland.

Work on electoral behaviour and politics in the Northern Territory by Dr P. Loveday with Dr Jaensch of Flinders University.

Establishment of a network of researchers in all Australian universities interested in federalism, by Dr J. Warhurst.

The Australian Dictionary of Biography is a co-operative effort between Australian universities.

Australia 1788-1988: A Bicentennial History, is a co-operative venture involving most universities. One of the two sections is based in the Research School of Social Sciences.

The Centre for Economic Policy Research ran a technical seminar on 'Understanding Labour Markets in Australia' with the National Institute of Labour Studies, Flinders University and the Bureau of Labour Market Research.

Techniques for model evaluation by Dr A.R. Pagan with Dr W. Kramer, Institute of Advanced Studies, Vienna, and Professor G.E. Mizon, Department of Economics, University of Southampton.

Australian Wages: An Analysis of the 1976 Census by Dr P.W. Miller with Mr B.J. Chapman, University of Adelaide.

School Retention Rate by Dr P.W. Miller with the Centre for Policy Studies, Monash University.

The Impact of Immigration on the South Australian Labour Market by Dr P.W. Miller with the National Institute of Labour Studies, Flinders University.

Unemployment Duration by Dr R.G. Gregory with Mr W.F. Foster, Institute of Applied Economics and Social Research, University of Melbourne.

Dr P.R. Williams and Mr C.T. Paris collaborated with Dr R.J. Stimson, Centre for Applied Social and Survey Research, Flinders University on their study of the impact of market rents for public housing in South Australia.

The Australian Consortium for Social and Political Research Incorporated is a co-operative venture for the sharing of survey data produced in Australia and overseas. The secretariat and services are provided by the School's Social Science Data Archive.
Authors from Australia and overseas contributed to the research on the public and private in social life co-ordinated by Mr S.I. Benn and Dr G.F. Gaus.

Work on Australian cultural history by the History of Ideas Unit in collaboration with the Australian Academy of the Humanities and scholars in all other Australian universities, being published in the journal Australian Cultural History edited from the School by Mr S.L. Goldberg and Dr F.B. Smith.

Research on Marxist legal theory and the development of law and legal theory in the USSR, Eastern Europe and China, by Professor E. Kamenka with Professor A.E.-S. Tay of the University of Sydney.

Research on the roots of Jewish nationalism by Professor E. Kamenka in collaboration with an international group of scholars headed by Professor S. Ettinger of the Hebrew University of Jerusalem.

Study on point processes by Dr D.J. Daley with Professor D. Vere-Jones of the Victoria University of Wellington.

Research on optimal harvesting policies for seasonally-dependent populations by Dr D.J. Daley with Dr M.S. Boyce of the University of Wyoming.

Dr J. Marceau and Dr P.R. Williams were principal organisers of the inaugural meeting of the Australian and Pacific Researchers in Organisational Studies.

Research on occupational prestige by Dr J.L. Kelley with Professor Wade Pendleton of San Diego State University.

Research on United Kingdom politics by Dr I. McAllister with Dr A. Mughan, University College, Cardiff, and Peter Mair, European University Institute, Florence.

Research on professional socialisation by Dr D.S. Anderson with Professor J.S. Western, University of Queensland.

The Australian General Social Survey by Dr J.L. Kelley and Dr R.G. Cushing with Dr B.W. Headey of the University of Melbourne.

Faculty of Arts

The Australian Malalas Project (an annotated translation of Chronographia), undertaken by Dr D.H. Kelly with Ms E. Jeffreys (Macquarie University) and Dr R. Scott (University of Melbourne) et al.

National general social survey on political and social issues, undertaken by Dr R. Cushing and Dr B. Headey of the University of Melbourne and Dr J. Kelley of RSSS.

Faculty of Economics

Dr S. Bambrick was Visiting Research Fellow, Raw Materials Project, Resource Systems Institute, East-West Center, Honolulu, December 1981 to January 1982.

Dr A.H. Chisholm completed a research project on Food Security undertaken jointly with Mr R. Tyers of the University of Hawaii.

Mr R. Debreceny conducted research on the operations of the Office of the Auditor-General and was also involved in research for the Victoria University of Wellington, on New Zealand Parliamentary Reporting on Financial Matters.

Mr J.G. Logan, on leave at the University of Newcastle during 1982, worked in association with the Population Research Group in the Faculty of Medicine in income and wealth of medical practitioners.

Dr T. O'Neill with Dr G.M. Thllis of the University of Adelaide, undertook a project to develop proper methods of analysis of the data in the South Australian Cancer Registry.

Dr M. McAleer has been involved in joint research projects during 1982 with Professor G.R. Fisher, Queen's University, Canada, Dr Diana Whistler, London School of Economics, Professor A.W. Gregory, University of Western Ontario, Canada, and Mr N.K. Dastoor, University of Liverpool.

Mr E. Sieper spent approximately six weeks at the Centre for Policy Studies, Monash University. He was involved in several projects during that time including a monograph on regulation in the farm sector entitled 'Rationalising Rustic Regulation.'
Dr P. Swan prepared a paper entitled 'Tax Reform Issues for Australia' for the Centre for Policy Studies, Monash University.

Faculty of Science

A large number of academics in the Faculty co-operate and collaborate with workers from other institutions within and outside the ACT. Specific examples of these include —

Collaborative projects (active or planned) using the shock tube in Physics under the direction of Dr R.J. Sandeman involve workers from the University of New South Wales (Duntroon); University of Queensland; Material Research Laboratory, Department of Defence, Melbourne; Jet Propulsion Laboratory and NASA, USA; Institute of Astronomy, ETH, Zurich, Switzerland; University of Hanover; Ballistic Research Laboratory, Maryland and the Defence Nuclear Agency, Washington DC, USA; University of Southampton, UK.

Thermoluminescence research with Dr A. Mortlock (Physics) and Dr F.M. Scollard, University of Hong Kong.

In Mathematics, collaborative projects are being undertaken by Dr N. Smythe and Dr G. Davis, La Trobe University and Dr B. Davies with Dr A.L. McCarthy, Physics Department, Flinders University.

Dr A. Howells (Biochemistry) was successful in attracting a grant for a collaborative project with Dr M. Whitten (CSIRO, Division of Entomology) from funds established jointly by CSIRO and ANU.

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.

Mr D.I. Smith, work on groundwater movement and pollution studies with Bureau of Mineral Resources and Department of Transport and Construction. Urban flood damage studies with various government agencies in New South Wales.

NH&MRC Social Psychiatry Research Unit

Collaborative work on mental disorder in the elderly is being conducted between Dr A.S. Henderson and Professor D.W.K. Kay, Department of Psychiatry, University of Tasmania. This work is funded by the Commonwealth Department of Health. The inquiry is into the prevalence of mental illness in persons aged 70 and over living in the community. The field work is being conducted in Tasmania. A particular focus of the research is on dementia or brain failure. The study was conducted during 1982 and will continue for most of 1983.

Dr A.S. Henderson is one of two Australian representatives on the Western Pacific Advisory Committee for Medical Research, World Health Organisation, Regional Office for the Western Pacific, Manila. He is also a member of the World Health Organisation Scientific Group on Senile Dementia, established by the WHO Regional Office for Europe, Copenhagen.
The University values arrangements that exist to enable members of its academic staff to have the opportunity periodically to carry out sustained research or scholarly activity outside the University. For many staff the opportunity allows them to make use of research facilities and resource materials that are not available within the University and to establish and keep current contact with scholars and research workers elsewhere in the world.

To gain approval, programs must be approved in advance and a report from the recipient on the work undertaken is required.

In 1978 the Commonwealth Government introduced guidelines, developed by the Universities Council, to govern the approval of outside studies programs. The University has operated its programs within those guidelines.

In 1982, 137 members of the academic staff participated in the outside studies program. Forty-six used their program primarily to further their own research; 69 were primarily engaged in visiting other institutions in order to assess recent developments in research and scholarship; and six used their time to teach at other institutions.

For 84 members of staff the length of the program was less than 12 weeks; for 20 the program was greater than 12 weeks, but less than 24 weeks; for 30 the program was greater than 24 and less than 36 weeks; and only three took a period that exceeded 36 weeks. These figures illustrate an increasing tendency for programs to be of short duration; this may be contrasted with the situation a decade ago when the majority of staff took much longer periods of study leave.

Only two members carried out their program entirely within Australia. This is in line with past experience. There is a greater tendency for academic staff from other Australian universities to carry out their programs in this University — particularly in the Institute of Advanced Studies — than for our own staff to carry out their programs in other Australian universities.

The participation in programs by full-time academic staff measured in person-years was 36.35 in 1982 compared with 35.05 in 1981. The incidence of that participation is 4.25 per cent of full-time academic staff, lecturer and above. This is well within the guideline of 7 per cent set by the Commonwealth Tertiary Education Commission.

Of the 137 persons, 114 received financial assistance; the total of assistance was $248,751.
Degrees and diplomas conferred

Bachelor of Arts

Agnew, H.J.
Aldridge, J.M.
Allatson, P.V.
Andrew, M.
Anthon, R.S.
Arthur, N.W.
Aston, J.I.
Baker, C.M.
Banks, G.R.
Barbara, D.M.
Barney, J.C.
Barrett, K.C.
Barton, P.A.
Beale, P.W.
Bell, J.M.
Bettis, K.
Betuel, H.T.O.
Blackmore, D.S.
Blair, S.J.B.
Boden, S.E.
Bollard, A.L.
Bottomley, L.
Bussmann, K.
Butt, R.J.C.
Butterfield, B.
Byrnes, B.G.
Campbell, K.A.
Carter, M.G.
Case, D.L.
Clark, N.
Clark, P.R.
Clery, C.A.
Cliff, M.T.I.
Cluley, J.A.
Cocks, D.E.
Collins, P.J.
Cook, M.A.
Cooper, D.M.
Cornioley, C.L.S.
Cotterell, M.A.
Criscuolo, A.L.
Crocket, G.C.
Cross, F.J.-A.
Cumpton, P.M.
Currie, S.E.
Curtis, C.M.F.
d'Amico, A.
D'Angelo, L.
Davies, W.F.
Deane, J.P.
Desmond, G.P.
DeWan, T.R.
Dexter, T.C.
Dicker, M.C.
Dickson, P.L.
Dillon, K.A.
Dimitriadis, A.
Dowse, J.J.W.
Doyle, T.J.
Dutta, R.
Edwards, C.A.
Ehrlich, M.P.
Elliott, S.J.
Epstein, E.J.
Evans, R.E.
Evermore, C.
Falk, G.E.M.
Falkland, A.C.
Fisher, M.A.
Fisher, W.R.
Fletcher, C.G.
Flynn, J.M.
Fosler, E.P.
France, S.M.
Fraser, R.S.
Fruin, T.A.
Fulton, J.C.
Fury, P.A.
Gardini, R.C.
Geasly, P.J.-M.
Georgakopoulos, A.
Gilding, S.M.
Goodacre, T.
Graham, K.B.
Granger, S.M.
Grant, D.A.
Griffiths, A.M.
Grigg, K.E.
Grishin, C.M.J.
Hackett, A.J.
Hall, L.C.
Hall, S.R.V.
Handley, J.
Hannigan, B.M.
Haralovic, R.
Harris, A.J.
Hatch, B.
Hayes, M.R.
Henderson, R.A.
Hetherington, M.B.
Hewitt, M.J.
Heyko-Porebska, H.E.J.
Hill, K.F.
Hiscock, N.V.
Hocking, C.N.
Holt, V.
Hooke, A.W.
Hooper, L.H.H.R.
Hurdle, J.M.
Hribar, P.K.
Johns, L.F.
Johnson, G.E.J.
Johnston, R.A.
Jones, L.R.
Jordan, M.J.
Jose, M.I.
Junker, R.I.
Kamarul, A.-M.L.A.
Kavunenko, A.E.
Kears, J.F.
Kears, J.A.
Keeffe, L.A.
Kelly, P.C.
Ker, P.M.
Kite, L.M.
Kleinert, S.J.
Knowles, J.J.S.
Kurtze, M.W.
Landford, J.M.
Lattimore-Horridge, A.M.
Layland, J.E.
Leary, F.R.
Lee, C.M.
Lee, M.J.
Lees, A.M.
Le Gassick, J.A.
Le Lec, F.N.
Leske, C.J.
Leslie, G.I.
Lavender, V.D.
Lewis, M.M.
Linsen, C.S.
Lucas, J.E.
McCay, D.T.G.
MacDonagh, E.A.M.
McIntosh, L.A.
McKeown, J.K.D.
McLoughlin, P.A.
McNamara, S.A.
Mahl, P.A.
Mann, R.V.
Marshall, J.J.
Martin, J.A.
Mason, A.L.
Mason, M.L.
Matheson, G.
Matrahaizi, Z.
Miley, D.E.
Mitchell, J.C.H.
Moffat, D.E.
Moloney, K.T.
Moncrieff, J.L.
Montoro, B.
Morella, A.M.M.
Morgan, R.A.
Morton, C.A.
Mottley, J.L.
Mullins, R.T.
Murphy, B.
Murphy, K.M.
Murphy, S.E.
Needham, M.W.
Newman, K.M.
O'Dea, J.F.
Oldfield, P.J.
O'Neill, P.M.
Oriolo, G.I.
Paisley, J.
Parker, C.M.
Passant, P.A.
Pech, C.F.
Peters, D.J.
Petherbridge, A.L.
Phomdouangdy, S.
Preeo, T.P.
Prescott, T.E.
Rafferty, F.N.
Read, C.J.
Reid, J.A.
Rice, J.A.
Rice, S.D.
Richards, C.E.
Riggs, H.A.
Robinson, L.K.
Robinson, P.J.
Rogers, H.M.
Ross, K.A.
Roy, S.E.
Russell, A.M.
Russo, R.N.
Ryan, S.J.
Schmedding, R.A.
Seymour, C.M.
Sheedy, J.I.
Shelton, J.I.
Shevlin, C.M.
Sirkka, M.O.
Bachelor of Arts degree with honours

Anderson, M.E.
Antioch, K.M.
Armstrong, J.F.
Baker, R.M.
Ball, J.
Bartos, M.R.
Bartos, S.A.
Baxter, J.H.
Bennett, K.D.
Beresford-Wylie, A.F.V.P.
Bosser, C.E.
Brady, S.C.
Buchanan, J.D.A.
Chalmers, A.B.
Clarke, K.L.
Cohen, R.D.
Connor, T.G.
Cooper, B.
Coppel, P.A.
Cornwall, F.I.
Doherty, C.A.
Duggan, K.J.
Elvin, R.
F weary, S.A.
Flood, L.M.
Gallagher, R.M.
Gath, S.C.
Green, S.R.
Halton, S.J.
Harding, R.H.J.
Higgins, G.N.B.
Hla Mya Thien, P.M.
Hogan, E.M.
Jennaway, N.R.
Johnstone, S.P.
Kruger, K.M.
Lattimore, R.S.
Lazar, D.C.L.
Laney, M.J.
Macdonald, L.
Mclnnes, E.C.
McManus, C.A.
McRae, J.S.
Moody, J.-D. R.
Morison, J.J.
Morrow, S.J.
Moszenin, E.
Naim, C.A.
O'Callaghan, P.V.
Osborne, M.K.
Parker, S.A.
Parnell, N.
Pinson, L.A.
Redpath, W.M.
Reid, N.L.L.
Richards, A.B.
Roberts, P.R.
Rosenberg, J.M.
Smith, B.R.
Smith, I.
Smith, W.M.
Smyth, C.M.
Snow, C.A.
Sparker, E.G.
Spillman, L.P.
Stacey, B.R.
Stearman, A.P.
Sutton, T.M.
Wagner, H.K.M.
Wallace, S.M.
Watkins, B.A.
Webb, S.G.
Zakharov, J.

Bachelor of Letters

Akiyama, N.
Anderson, R.C.
Blain, H.D.
Brett, B.C.
Devlin, B.
Douglas, R.G.
Forbes, S.M.
Francis, T.W.
Fry, K.L.
Hamblin, W.J.
Hodges, G.G.M.
Jiggins, S.G.
John, S.A.
Joske, M.A.
Korvisianos, A.
Lacey, A.T.
Laycock, K.G.
Lee, R.V.
Ly, J.M.
Mendham, D.L.
Mills, H.S.
Nicholson, D.M.
Parkes, G.J.
Scollay, M.J.
Spahr, J.F.
Tamura, K.
Vlatkovic, B.S.
Ward, M.B.
Ward, T.M.F.
Whiteford, P.B.

Master of Arts

Adam, A.Y.
Adioetomo, S.M.
Al Haddar, Y.S.
Bulbeck, F.D.
Chapman, V.C.
Cook, N.M.
Edwards, A.M.
Evans, N.R.D.
Furniss, P.
Gardiner-Garden, J.R.
Hill, M.C.
Hudson, A.J.
Kadarusman, J.
Khan, L.I.
Maia, I.A.
Maley, M.C.
Marwood, S.J.
Naim, S.R.
Nakamura, H.
Neal, S.J.
Paez, P.A.V.
Parke, A.L.
Pukini, M.M.
Rieschild, V.R.
Robinson, J.G.
Ruikmo, J.E.
Schaefer, H.U.
Taha, A.H.
Thein-Tun, S.P.
Tomagola, T.A.
Warner, N.P.A.
Widarti, D.
Winston-Gregson, J.H.

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Bachelor of Arts (Asian Studies)

Bassett, M.S.
Berryman, C.
Binks, C.E.
Blackwell, J.C.
Bridges, D.M.
Brooks, L.E.E.
Brownbill, A.P.
Buckland, K.A.
Butler, K.M.
Dyste, C.
Eaves, V.L.
Eldred, H.E.
Fisher, J.L.
Fool, M.H.
Ford, V.E.
Forrest, P.J.
Gillard, N.E.
Hollingworth, R.S.
Johnstone, M.A.
Larsen, J.A.
Low, P.L.
McVinish, M.A.
Malone, P.E.
Matthews, J.L.
Moore, D.
Moore D.J.
Pearce, S.-A.
Robertson, R.J.
Robey, S.L.
Shaw, J.M.

Bachelor of Arts (Asian Studies) degree with honours

Adb-Ul-Wahid, X.I.
Abey, A.K.
Bamber, S.D.
Lennard, P.R.
McInnis, J.L.
Neville, A.V.
Power, H.M.
Woo, G. L.-C.
Wilson, R.S.

Master of Arts (Asian Studies)

Theam, B.S.

Bachelor of Economics

Abey, A.K.
Akhurst, S.L.
Anderson, C.J.
Anderson, J.E.
Armarego, P.R.
Armour, C.A.
Arthur, T.B.
Barclay, P.E.
Barker, D.L.
Barnett, J.M.
Bennett, S.T.
Biglia, L.G.
Brooke, A.J.
Brownbill, A.P.
Candlin, G.M.
Ceramidas, R.A.
Cheng, C.C.
Coen, R.D.
Colebatch, E.S.
Conners, D.M.
Corkhill, T.A.
Devere, S.R.
Dickins, A.A.
Digby, Q.
Doherty, D.J.P.
Done, R.P.
Dwyer, P.J.
Dwyer, P.J.
East, D.S.L.
East, M.G.L.
Edgar, S.M.
Eiamboonsert, N.
Eldridge, W.J.
Eiser, D.M.
Evans, K.W.
Field, C.N.
Fielding, D.M.
Fisher, J.L.
Flaton, P.J.
Gallacher, C.
Garrett, S.J.
Gerathy, I.D.B.
Geron, G.W.
Goryachev, V.
Grant, M.
Gray, G.
Hamilton, S.A.
Hassan, J.
Healey, P.F.
Heggen, S.A.
Honneyman, I.M.
Howes, T.A.
Iglesias, J.C.
Johnston, R.
Kljaic, B.M.
Korber, M.K.
Lejins, Z.
Lewis, H.T.
Lionis, P.
Lira Coria, M.del C.
McCleary, A.
McCutcheon, P.M.
Macfarlane, B.A.
MacLeod, G.I.
Matheson, I.
Mitchell, B.J.
Mitchell, P.
Monckton, D.C.
Morris, J.A.
Morris, T.A.
Overington, P.J.
Paine, B.A.
Parsons, N.R.
Patch, R.G.
Pekkarinen, V.O.
Pekki, L.A.
Perkins, R.J.
Pietrucha, N.
Piko, G.P.
Plath, G.D.
Purcell, N.J.
Qureshi, A.Q.
Ridgway, B.R.D.
Rizvi, A.K.A.
Robertson, A.J.
Rolfe, D.O.
Ross, J.A.
Sham, K.C.
Sheehan, M.R.J.
Shields, G.J.
Simpson, M.M.
Smith, S.M.
Stewart, C.L.
Swan, D.L.
Taylor, R.J.
Teh, L.G.
Thongphakdi, T.
Val, L.F.
Van Leest, A.
Verner, A.J.
Walters, C.J.
Westbrook, K.F.
White, K.A.
White, S.
Willis, P.J. de L.
Wilson, R.O.
Windle, J.P.
Winn, P.G.N.

Bachelor of Economics degree with honours

Fairbairn, K.J.
Kralikas, E.O.
Kralikas, E.O.
Kralikas, E.O.
Kralikas, E.O.
Kralikas, E.O.
Murray, J.E.
Murray, J.E.
Murray, J.E.
Monage, J.
Monage, J.
Monage, J.
Parsons, A.C.
Parsons, A.C.
Parsons, A.C.
Rombouts, M.G.
Rombouts, M.G.
Rombouts, M.G.
Sutton, M.J.
Sutton, M.J.
Graduate Diploma in Economics

Bayes, A.M.
Butterworth, R.G.
Campbell, R.W.
Clarke, D.J.
Cox, A.J.
Davison, C.

Geeves, W.D.
Hitchcock, B.J.
Jacobs, M.J.
Kaleski, M.J.
Kapuscinski, C.A.
Konovalov, V.

Kyloh, R.H.
McDougall, T.J.
Madigan, K.A.
Papandrea, F.G.
Perry, N.R.F.
Sayers, C.R.

Snashall, B.E.
Sutton, J.M.
Urbanski, A.
Wiafe, O.

Master of Economics

Baker, G.M.
Daniel, J.A.

Dolan, A.G.W.
Horton, J.F.

Hui, W.T.
Ryu, J.C.

Walker, A.E.G.

Master of Agricultural Development Economics

Chan, A.I.
Mahendrarajah, S.

Malik, S.J.
Roxas, N.M.

Sefanaia, S.
Shrestha, T.B.

Temu, I.
Waqar, A.

Bachelor of Laws

Anning, J.R.
Anthon, R.S.
Anthony, J.S.
Atkinson, M.J.
Bates, A.E.
Beech-Jones, D.M.
Bennett, R.D.
Berveling, S.M.
Bloombfield, J.R.
Boysman, L.M.
Bradshaw, M.I.
Bunyan, G.M.
Burton, J.R.
Byrne, P.F.
Ceramidas, R.A.
Chan, S.H.
Cullen, M.C.
Dalton, J.R.
Douglas, R.G.S.

Doyle, S.G.
Drummond, D.E.
Epstein, E.J.
Everingham, P.M.
Fabricius, C.P.
Farrands, D.J.
Finley, P.F.
Frost, P.E.
Garnett, R.T.
Hassett, J.F.
Hockridge, M.R.
Hopkins, F.L.
Howe, T.M.
Johnson, T.W.
Jones, K.F.
King, L.M.D.
Kobetsky, M.J.
Lee, M.E.
Leyshon, K.A.

McKeown, C.P.
McMahon, M.P.
McNiven, J.A.C.
Maley, W.L.
Mazengarb, G.C.
Metcalf, D.C.
Mihalopoulos, A.
Moore, M.-A.
O'Connell, A.J.
O'Donovan, J.B.
O'Kane, K.A.
Patrick, R.J.
Rae, A.C.
Rees, G.P.
Rice, S.D.
Richards, P.A.
Richardson, M.E.
Salsone, C.
Shaw, G.J.

Sing, M.D.
Spence, P.J.
Spence, S.M.
Stapledon, N.D.
Sugrim, V.-M.
Tallarita, J.
Towers, S.W.
Tuckwell, G.J.
Vale, P.A.
Vukmirica, M.
Wah, M.L.
Waters, P.F.
Webeck, C.S.
Webster, C.
White, P.N.
Wilkinson, C.J.
Willett, E.C.
Withchard, G.E.
Zwar, M.J.

Bachelor of Laws degree with honours

Buckle, J.M.
Buscombe, M.
Byrnes, A.C.
Clay, M.A.

Clayton, G.T.
Colwell, E.A.
Dempsey, M.
Faulks, R.P.

Faunce, T.A.
Gageler, S.J.
Horner, P.M.B.
Mahoney, K.

Virs, H.V.

Graduate Diploma in International Law

Adzoxornu, I.K.
Doran, B.F.

Gupta, V.
Harrison-Smith, M.J.

Manathat, R.
Passingan, B.B.

Photo, M.S.
Quinn, A.G.

Master of International Law

Wallace-Bruce, N.L.

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Bachelor of Science


Bachelor of Science degree with honours


Bachelor of Science (Forestry)


Bachelor of Science (Forestry) degree with honours

| Grasso, S.R. | Hawkins, K.M. | Kanowski, P.J. |
Graduate Diploma in Science

Ahearn, J.A.
Bond, B.C.
Dircks, S.J.
Heaume, P.E.
Herlt, A.J.
Holani, T.K.
Kakudidi, E.K.Z.
Kilahama, F.B.R.
Kyin, A.
Pavlovic, N.B.
Salehe, J.Y.
Shaharuddin, B.M.I.
Shimada, T.
Warner, A.J.
Wilkes, J.F.

Master of Science

Elgueta, A.S.
Frances, M.
Gross, W.F.
Henderson, C.N.
Lee, H.S.
Liew, T.C.
Muller, W.J.
Price, G.D.
Schoppers, M.J.
Stevenson, C.E.
Tahir, M.I.

Doctor of Philosophy

Alaudeen, S.
Alexander, I.C.
Alman, J.C.
Al-Yaman, F.M.
Ashmore, S.E.
Ball, M.C.
Banks, J.C.G.
Bennet, E.-M.
Bennett, J.W.
Bhatta, K.K.
Bhatta, M.R.
Blok, J.
Bob, T.S.
Bongoma, K.B.
Bonyhady, R.E.
Bowen, K.M.
Braithwaite, A.W.
Britten, R.M.
Campbell, M.C.W.
Chandrashekar, M.
Cheetham, B.F.
Churchill, B.R.
Collins, J.G.
Conley, D.
Constable, G.A.
Couch, W.J.
Creese, H.M.
Cromwell, L.G.
Divakar, S.
Dry, P.J.
Dubs, A.
Dunbar, A.C.
Ehrlich, D.
Evans, B.A.
Evans, D.A.C.
Evans, T.
Ferguson, B.S.
Findlay, C.C.
Firestone, B.M.
Fisher, P.R.
Frazer, I.L.
Galeotti, C.L.
Gardiner, P.
Gardner, D.S.
Girling, J.L.S.
Gollan, J.K.
Gorrell, M.D.
Griffiths, K.M.
Guinness, P.H.
Gust, D.A.
Guy, P.L.
Harper, J.R.
Harris, P.R.
Harrison, P.A.
Harrison, S.J.
Hendrajaya, L.
Hibberd, M.F.
Hinde, D.J.
Hooper, B.
Hort, L.K.
Hughes, J.E.
Hussey, C.D.
Iino, M.
Jarvis, B.J.
Johnston, B.B.
Juvik, S.P.
Kane, H.J.
Kenny, M.J.
Knott, J.W.
Langmore, D.L.
Lay, P.A.
Littlejohn, R.P.
McGregor, P.J.
Mackay, E.M.
McKinley, M.
McLennan, S.M.
McLeod, R.H.
McMahon, I.J.
Mainprice, D.H.
Major, A.J.
Major, F.R.
Martin, R.J.
Matsumura, H.
Mercer, P.M.
Meyer, P.A.
Mikkelsen, L.B.B.
Miller, P.W.
Mimica, J.F.
Miyaoka, M.
Newton, S.E.
Noble, M.G.
Oey, M.
O'Kane, M.
Olson, M.L.
Pares, R.D.
Payne, R.
Prasad, H.S.
Pullan, S.E.
Radom, L.
Robson, J.M.
Scherer, S.P.
Shinouzka, K.
Silvapulle, M.J.
Sinclair, W.J.
Slade, C.M.
Srinivasan, K.
Steele, L.P.
Stevens, M.R.
Summers, P.M.
Szeto, A.M.K.
Tan, C.S.
Theophilus, J.C.
Washington, E.A.
Wellington, A.B.
Williams, D.S.
Willow, M.
Wilson, S.R.
Wood, P.R.
Woolston, M.E.
Yager, R.I.
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.

- Jacinta Ann Covington – Pure Mathematics
- Susan Gillian Faragher – Biochemistry
- Susan Margaret Howitt – Botany
- Christopher James Lennard – Chemistry
- Ross Hugh McKenzie – Theoretical Physics
- Judith Maureen Pearce – Medieval Studies
- Martin Eugene Rayner – Forestry
- Rosalind Anne Sturgess – French
- Nicholas Jeremy Thomas – Anthropology

**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.

- Deborah Mary Gillatt – English

**The Alliance Francaise de Canberra Prizes**

Lesley G.L. Latter Arietti – French IB
Merrilyn Anne Crawford – French IIB
Caroline Heather Cobban – French IIIB
Jennifer Lorraine Degeling – Medieval French Studies (shared)
Rosalind Anne Sturgess – French IV (Honours)

**Ampol Prize for Geology**

Anthony Neville Boston, Bruce Steward Turner (shared)

**A.N. Hambly Prize**

Michael Karl Udvardi

**Ann Downer Memorial Prizes in Medieval Studies**

Conor King – Second-year units
Judith Cecilia Sellers (shared)
Annette Therese Passlow – Third-year units
Judith Maureen Pearce – Fourth-year units

**Ansett Air and Space Law Prize**

Christopher Barcroft Eccles

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Anthony Seelaf Memorial Prize in Geology
Robert Andrew Creaser

The Australian-American Association Prize for American Studies
Shaun Joseph Mackenzie

Australian Capital Territory Bar Association Prize
Michael Thomas Corrigan

The Australian Computer Society Prize
Peter Alexander Whigham

Australian Federation of University Women — ACT Prize
Harriet Louise Mantell

Australian Finance Conference Prize in Company Finance
Man Cheong Robert Hui

Australian Institute of Physics Prize
John Patrick Homer

The Australian Psychological Society Prize
Judith Margaret Parr

Australian Society of Accountants’ Prize
Manuel George Vlandis

Australian Society for Microbiology Prize
Siiri Epp Iismaa

The B.C. Meagher Prize for Commonwealth Constitutional Law
Michael Thomas Corrigan

The Botany Prize
Nina Stahl

Commercial Representatives’ and Agents’ Association of Australia Limited Prize
Ooi Hooi Ng
Commonwealth Forestry Bureau Book Prize
Christopher Leigh Brack

Computer Science Honours Prize
Hugh Joseph Ferguson Grady

Coopers & Lybrand Prize in Accounting
Roderick David Killick  Accounting II

The CSR Chemicals Prize
Christopher James Lennard

Dante Alighieri Society (Canberra Branch) Prizes
Diana Dawn Epton  Italian I
Daniela Concetta Iole Fortini  Italian II
Eleanor Jean Mackle  Italian II  (shared)
Renata Angela Cardin  Italian III
Lynne Stevens Honan  Italian III  (shared)

Daphne Olive Memorial Prize in Jurisprudence
Alexander Walter Gardner

The Dawson Waldron Prize in Business Associations
Mariusz Podleska

E.A. Lyall Memorial Prize
Margaret Helen Mary Kidston

Economic Society of Australia and New Zealand (Canberra Branch) Prizes
Christopher Michael Harris  Economics II
Neil Fraser Gentle  Economics IV (Honours)

Freehill, Hollingdale & Page Prize for Commercial Studies
Brian Nicholas Harvey

Geological Society of Australia Prize
Oliver Lionel Raymond

George Knowles Memorial Prize
Michael Thomas Corrigan

Goethe Society Prizes
Mathew Fabian Dowling  First-year units
Lee Andrew Bygrave  First-year units  (shared)
Margrit Davies  Second-year units
Philippe Georges Mesnage  Third-year units

G.S.L. Tucker Prize
Paul Joseph Fianagan  (shared)
Martin Lee Parkinson  (shared)

The Hanna Neumann Prizes for Pure Mathematics
Jacinta Ann Covington  Pure Mathematics IV (Honours) (shared)
Martin Ross

Institute of Advanced Studies Prizes for Economic History
Vicki Elizabeth Smith  Economic History A

Stephen Phillip Bennett  Economic History B
Yvonne Therese Simic  (Honours)
Carolyn Jean Walsh  (shared)
John Charles Blackwell  Russian Economic History (Honours)
Julie Patricia Smith  Economic History IV (Honours)

Institute of Wood Science Prize
John Anton Robert Stein

Irene Crespin Prize
Murray Joseph Jones

J.B. Were & Son Prize
Neil Fraser Gentle

Krystyna Singler Prize for Polish Studies
Andrew Emil Stanislaw Bierkowski

The Lady Isaacs' Prize
Patricia Anne Collier

The Law Society of the Australian Capital Territory Prize for Contracts
Simon David Palfrey

The Law Society of the Australian Capital Territory Prize for Professional Training in Law
Elizabeth Anne Stumpf

L.D. Pryor Prize
Christopher Preston

The Leslie Holdsworth Allen Memorial Prize
Alexander John Cairns Anderson

Macphillam Cummins & Gibson Prize for Commercial Law
Pauline Anne O'Gorman

Marie Halford Memorial Prize
Wendy Evelyn Lisle  (shared)
Cynthia Margaret Wiber  (shared)

Permanent Trustee Company (Canberra) Limited Prizes
Alexander Walter Gardner  Trusts
Alison Jane Maskelyne Hoyle  Land Law

Price Waterhouse Prize in Accounting
Geoffrey George Stafford

Priscilla Fairfield Bok Prize
Jane McEwen Rodgers

Prizes in Prehistory and Anthropology
Christopher H.L. Ballard  D.A. Casey Prize
 Nerida Julia Susan Clarke  (shared)
Susan Leigh Bassett  Prehistory IV (H)
Beverley Ann McLean  Anthropology I
Inge Birgita Kral  W.E.H. Stanner Prize
Prize in Public Economics
Jonathan Jay Hutson

The Professional Officers' Association Prizes
Allen Robert Woolfrey Botany A01
William Andrew Charles Ducker Chemistry A01

The Quentin Gibson Prize for Philosophy
Igor Frank Urbas

Rachel Dorph Memorial Prize
Simon David Palfrey
Lachlann John Stephens (shared)
Philippa Alison Wicks

The Ramsay Prize
Janet Margaret Anderson (shared)
Jennifer Jane Curnow

Richard B. Davis Prize in Anthropology
Nicholas Jeremy Thomas

The Royal Australian Chemical Institute Prize
Gerard Matthew Cahill

The Scandinavian-Australian Society Prizes
Malcolm James Cohen Germanic C37
Conor King Germanic C38
Jonathan Hugh Dickson Germanic A7
Marianna Malot Germanic A8

Schlich Memorial Trust Prize
Martin Eugene Rayner

The Shell Company Prizes
Alison Meree Roberts Economics
Malcolm Ringland Anderson Science (shared)
Philip Bernard Chapple

The Statistical Society of Australia (Canberra Branch) Prize
Ooi Hooi Ng

Stephen Jaques Stone James Prize for Law Studies
Quentin Digby (shared)
Graeme Edward James Johnson

The Supreme Court Judges' Prize
Andrew Colin Byrnes

The Timbind Utilisation Prize
Richard Gregory Benyon

The Trustees Executors (Canberra) Limited Prize
Quentin Digby
University public lectures

1982 University Lecture
Professor C.I.E. Donaldson
Happy endings  31 March, 7 April, 14 April

1982 Morrison Lecture
Dr A. Thorne
China and Australia: forty thousand years of contact?  4 August

1982 John Curtin Memorial Lecture
Professor G. Harcourt
Making socialism in your own country  11 August

1982 A.L. Basham Lecture
Dr G. Roth
Structure and meaning of the Buddhist stupa and caitya according to Indian traditions  27 October

The Tanner Lectures on Human Values
Dr L. Kolakowski
The death of Utopia reconsidered  22 June

Single Public Lectures
Professor R. Conway
The end of the 'Great Australian Stupor'?  17 March

Professor M. Corden
Australia in the world economy  1 September

Dr E. Hackett
The 53rd card: the influence of the jester in society  8 September

Professor D. Pandermalis
Dion: the sacred city of Macedonians at the foothills of Olympus  1 November

Human Evolution Series
Professor A. Walker
The origin of the genus Homo  17 August

Dr B. Dutrillaux
How can chromosomes teach man his place in human evolution  17 August

Professor A. Wilson
Molecular biology and human evolution  19 August

Professor M. Wolpoff
Europe and Australia: the ends of the earth  19 August
Senior staff appointments and promotions

Institute of Advanced Studies
Professor B.D.O. Anderson  Professor and Head, Department of Systems Engineering, formerly Professor of Electrical Engineering, University of Newcastle, NSW.
Dr M.R. Badger  Senior Research Fellow in Environmental Biology, formerly Research Fellow.
Dr D.J. Ball  Senior Fellow, Strategic and Defence Studies Centre, formerly Fellow.
Dr P.G. Board  Fellow in Human Biology, formerly Research Fellow.
Dr R.R. Bitmead  Fellow in Systems Engineering, formerly Lecturer in Electrical and Electronic Engineering, James Cook University.
Professor H.C. Brookfield  Professor and Head, Department of Human Geography, formerly Professor of Geography, University of Melbourne.
Dr D. Denoon  Senior Research Fellow in Pacific and South-East Asian History, formerly Professor of History, University of Papua New Guinea.
Dr R.L. Dewar  Senior Fellow in Theoretical Physics, formerly Principal Research Physicist, Princeton University.
Mr P. Dibb  Senior Research Fellow in International Relations, formerly Senior Assistant Secretary, Department of Defence, Canberra.
Professor W.F. Doe  Professor and Head, Department of Medicine and Clinical Science, formerly Associate Professor of Medicine at the Royal North Shore Hospital and Co-ordinator for Clinical Sciences, University of Sydney.
Professor P. C. Doherty  Professor and Head, Department of Experimental Pathology, formerly Professor, Wistar Institute, Philadelphia.
Dr G.D. Dracoulis  Senior Fellow in Nuclear Physics, formerly Professor of Nuclear Physics, formerly Fellow.
Dr J.D. Evans  Fellow, Research School of Chemistry, formerly Research Fellow, Atomic and Molecular Physics Laboratories.
Dr M.R.D. Gevers  Senior Research Fellow in Systems Engineering, formerly Professor of Electrical Engineering, University of Louvain.
Dr A. Hughes  Senior Research Fellow in Physiology, formerly Senior Research Fellow (Sulman).

Dr I.N.S. Jackson  Fellow, Research School of Earth Sciences, formerly Research Fellow.
Dr M.F. Land  Senior Research Fellow in Neurobiology, formerly Reader in Biological Science, University of Sussex.
Dr J.D. Love  Fellow in Applied Mathematics, formerly Senior Research Fellow.
Dr D.G. Marr  Senior Fellow in Pacific and South-East Asian History, formerly Fellow.
Dr J.B. Moore  Professorial Fellow in Systems Engineering, formerly Professor in Electrical and Computer Engineering, University of Newcastle, NSW.
Dr F. Nemenzo  Senior Research Fellow in Political and Social Change, formerly Professor of Political Science and Dean of the College of Arts and Sciences, University of the Philippines.
Dr T.R. Ophel  Professorial Fellow in Nuclear Physics, formerly Senior Fellow.
Professor D.W. Robinson  Professor and Head, Department of Mathematics, formerly Visiting Fellow and Professor of Pure Mathematics and Head, School of Mathematics, University of New South Wales.
Dr B.D. Shaw  Course Director, Development Studies Centre, formerly Visiting Fellow.
Dr R.E. Smith  Senior Research Fellow in Economics, formerly Economist and Deputy Director, National Commission for Employment Policy in Washington DC.
Mr B. Smith  Senior Research Fellow, Australia-Japan Research Centre, formerly Visiting Fellow.
Dr M.J. Taylor  Senior Research Fellow in Human Geography, formerly Research Fellow.
Dr N. Visvanathan  Senior Fellow at Mount Stromlo and Siding Spring Observatories, formerly Senior Research Fellow.
Dr R.A. Williams  Senior Research Fellow in Economics, RSSS, formerly Professor in Econometrics, University of Melbourne.
Dr G.A. Withers  Senior Research Fellow in Economic History, formerly Associate Professor in Economics, Macquarie University, Principal Economic Adviser to Department of Employment and Youth Affairs and Acting Director, Bureau of Labour Market Research.
Dr P.R. Wood  Senior Research Fellow at Mount Stromlo and Siding Spring Observatories, formerly Research Fellow.

The Faculties
Dr H.-A. Bachor  Lecturer in Physics, formerly scholar, Institute für Plasmaphysik, University of Hanover.
Dr J.A. Ballard  Senior Lecturer in Political Science, formerly Lecturer.
Dr J.M. Barbalet  Lecturer in Sociology, formerly Research Fellow in Sociology, RSSS.
Professor K.S.W. Campbell  Professor and Head, Department of Geology, formerly Reader and Head of Department.
Dr P.J. Cossey  Reader and Head, Department of Mathematics, formerly Senior Lecturer in Pure Mathematics.
Mr R.B. Cunningham  Lecturer and Statistical Consultant to The Faculties, formerly Experimental Officer with CSIRO.
Dr O.F. Dent  Senior Lecturer in Sociology, formerly Lecturer.
Dr L. Dobrez  Senior Lecturer in English, formerly Lecturer.
Dr J. Holman  Lecturer in Psychology, formerly Senior Tutor.
Professor D.R. Howlett  Professor and Head, Department of Geography, formerly Senior Research Fellow, Development Studies Centre.
Dr D.H. Kelley  Senior Lecturer in Classics, formerly Lecturer.

Mr D.F. Nicholls  Reader in Statistics, formerly Senior Lecturer.
Mr G.A. Rumble  Lecturer in Law, formerly Temporary Lecturer.
Dr A.G. Schweinberger  Senior Lecturer in Economics, formerly Professor of Economics, University of East Anglia.
Dr J.A. Seymour  Senior Lecturer in Law, formerly Senior Criminologist, Australian Institute of Criminology.
Dr M.U. Slee  Senior Lecturer in Forestry, formerly Lecturer.
Dr P.L. Swan  Reader in Economics, formerly Senior Lecturer.
Dr B.J. Terwiel  Senior Lecturer in Asian History and Civilizations, formerly Lecturer.
Dr R. Tonkinson  Senior Lecturer in Prehistory and Anthropology, formerly Lecturer.

Centres
Dr R.A. Britten  Senior Research Fellow, Centre for Resource and Environmental Studies, formerly District Geologist, Joint Coal Board, Sydney.
Professor G.W. Clarke  Professor and Deputy Director, Humanities Research Centre, formerly Professor of Classical Studies, University of Melbourne.
Professor S.F. Harris  Professor and Director, Centre for Resource and Environmental Studies, formerly Chair and Head, Resources Program.
Senior staff resignations and retirements

Institute of Advanced Studies

Dr G.M. Aii Senior Research Fellow in Microbiology, to University of Alabama.

Dr M. Ayoob Senior Research Fellow in International Relations, to University of Singapore.

Professor P.O. Bishop Professor and Head, Department of Physiology.

Dr J.E. Fildes Microanalyst (Fellow), Analytical Services Unit.

Mr E.K. Fisk Professorial Fellow in Economics, RSPacS.

Mr G.G. Lawrie MAIR Fellow in International Relations.

Dr M.W. McElhinny Senior Fellow, Research School of Earth Sciences, to Chief of Division of Geophysics, Bureau of Mineral Resources, Canberra.

Dr F.J. Marceau Senior Research Fellow in Sociology, to University of Liverpool, UK.

Dr R. Mills Senior Fellow, Atomic and Molecular Physics Laboratories, to Visiting Fellow.

Professor P.A.P. Moran Professor and Head, Department of Statistics, to Visiting Fellow, NHMRC Social Psychiatry Research Unit.

Mr N.B. Nairn Professorial Fellow and Joint General Editor of Australian Dictionary of Biography, remaining as Joint General Editor.

Dr R.J. O'Neill Professorial Fellow and Head, Strategic and Defence Studies Centre, to International Institute for Strategic Studies, London.

Dr Wang Ling Professorial Fellow in Far Eastern History.

Dr J.J. Weltman Senior Research Fellow in International Relations, to United States Naval War College, Rhode Island.

The Faculties

Dr M.E. Aiken Reader in Accounting and Public Finance, to Victoria University of Wellington.

Professor A. Brown Professor and Chair of Mathematics.

Dr N.J. Daly Senior Lecturer in Physical Chemistry, to Australian Overseas Corporation.

Dr R. Dessaix Senior Lecturer in Slavonic Languages.

Dr W.T.M. Dunsmuir Lecturer in Statistics, to Siromath Pty Ltd, Sydney.

Mr R.L. Hamilton Lecturer in Law, to Freehill, Hollingsdale and Page, Sydney.

Dr H.G. Horung Reader in Physics, to Institute for Experimental Fluid Mechanics (DFVLR), Gottingen, West Germany.

Dr H.J. Lally Senior Lecturer in Sociology.

Professor Liu Ts'un-yan Professor in Chinese.

Mr K.F. O'Leary Director, Legal Workshop.

Dr A. Ravano Lecturer in Italian, Department of Romance Languages.

Professor S.J. Turnovsky Professor and Head, Department of Economics, to University of Illinois.

Dr T.J. Valentine Reader in Statistics, to Macquarie University.

Centres

Professor G.H. Taylor Professor and Director, Centre for Resource and Environmental Studies, to Member of the Executive of CSIRO, and Visiting Fellow.

Obituaries

Dr J.R. Cleary Senior Fellow, Research School of Earth Sciences, died 25 December 1981.

Dr C.E.B. Conybeare Research Fellow, Centre for Resource and Environmental Studies, died 19 February 1982.

Mrs B.R. Penny Senior Lecturer in History, died 30 June 1982.

Dr J.R.T Short Reader in Zoology, died 5 May 1982.

Dr W. Zurkowski Research Fellow in Genetics, died 20 March 1982.
# Principal grants and benefactions

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