THE
AUSTRALIAN NATIONAL UNIVERSITY

1970

REPORT
The Australian National University

REPORT OF THE COUNCIL FOR THE PERIOD
1 JANUARY 1970 TO 31 DECEMBER 1970
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To His Excellency the Right Honourable Sir Paul Hasluck, G.C.M.G., G.C.V.O., K.St.J., Governor-General and Commander-in-Chief in and over the Commonwealth of Australia.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to transmit to Your Excellency the Report of the Council of The Australian National University for the period from 1 January 1970 to 31 December 1970 furnished in compliance with Section 33 of the Australian National University Act 1946-1971.

H. C. COOMBS

Chancellor
The Council

The Council met six times during the year, in March, May, July, September, October and November. The Chancellor presided over meetings in May, July, September, October and November; the Pro-Chancellor presided over the meeting in March.

Mr J. M. McCarthy resigned in March and Professor R. L. Mathews in December 1970.

The terms of office of the following members expired on the dates shown:

*Members elected by the House of Representatives:* Mr K. E. Beazley*; Mr M. J. R. MacKellar*—2 May 1970.

*Members chosen or elected:* Professor A. J. Birch; Professor W. D. Borrie, O.B.E.*; Professor F. C. Courtice; Mr A. D. Crombie*; Mr A. R. Gordon; Professor J. E. Richardson—29 September 1970.

**MEMBERS OF THE COUNCIL AS AT 31 DECEMBER 1970**

**MEMBERS EX OFFICIO**


The Honourable Mr Justice Richard Moulton Eggleston, LL.B.(Melb.)—Pro-Chancellor.


David Noel Ferguson Dunbar, M.Sc.(N.Z.), Ph.D.(Melb.)—Deputy Vice-Chancellor.

Geoffrey Sawer, B.A., LL.M.(Melb.)—Deputy Chairman of the Board of the Institute of Advanced Studies.

Cecil Austin Gibb, O.B.E., M.A., B.Ec.(Syd.), Ph.D.(Ill.), F.A.P.S.—Deputy Chairman of the Board of the School of General Studies.

**MEMBERS ELECTED BY THE SENATE**

Lionel Keith Murphy, Q.C., B.Sc., LL.B.(Syd.).


Peter Elliot Rae, B.A., LL.B.(Tas.).

Elected 3 June 1969; present tenure expires 30 June 1971.

**MEMBERS ELECTED BY THE HOUSE OF REPRESENTATIVES**


Became member of Interim Council 10 June 1949; elected to Council by

* Reappointed or re-elected.

Michael John Randal MacKellar, B.Sc.Agr.(Syd.), B.A.(Oxon.).

MEMBERS APPOINTED BY THE GOVERNOR-GENERAL

The Right Reverend Kenneth John Clements, B.A.(Syd.), Bishop of Canberra and Goulburn.

George Austin Colman.
Appointed 30 September 1969; present tenure expires 29 September 1972.

Sir Norman (Lethbridge) Cowper, C.B.E., B.A., LL.B.(Syd.).

John Qualtrough Ewens*, C.B.E., LL.B.(Adel.).

Sir Warwick (Oswald) Fairfax, M.A.(Oxon.).


Thomas Fulton Coleman Lawrence, B.Sc., B.E.(Syd.), F.R.Ae.S.
Appointed 30 September 1969; present tenure expires 29 September 1972.


The Honourable Mr Justice Anthony Frank Mason, C.B.E., B.A., LL.B.(Syd.).
Appointed 30 September 1969; present tenure expires 29 September 1972.

Sir (Horace) Frank Richardson.


Arthur John Russel Yencken, M.A.(Cantab.).

* C.M.G. conferred 1 January 1971.
MEMBERS CHOSEN BY HEADS OF THE RESEARCH SCHOOLS IN THE INSTITUTE OF ADVANCED STUDIES


Chosen 1 August 1970; present tenure expires 29 September 1971.

MEMBERS CHOSEN FROM AMONG THE DEANS OF THE FACULTIES IN THE SCHOOL OF GENERAL STUDIES

Richard St Clair Johnson, M.A., Dip.Ed.(Syd.).  

Lindsay Dixon Pryor, D.Sc.(Adel.).  
Chosen 30 September 1969; present tenure expires 29 September 1972.

MEMBER ELECTED BY THE PROFESSORS IN THE INSTITUTE OF ADVANCED STUDIES

Elected 30 September 1970; present tenure expires 29 September 1972.

MEMBER ELECTED BY THE PROFESSORS IN THE SCHOOL OF GENERAL STUDIES

Russell Lloyd Mathews, B.Com.(Melb.).  
Elected 22 May 1967; re-elected 30 September 1968; resigned 31 December 1970.

MEMBER ELECTED BY THE NON-PROFESSORIAL ACADEMIC STAFF IN THE INSTITUTE OF ADVANCED STUDIES

Marie Olive Reay, M.A.(Syd.), Ph.D.(ANU).  
Elected 30 September 1969; present tenure expires 29 September 1972.

MEMBER ELECTED BY THE NON-PROFESSORIAL ACADEMIC STAFF IN THE SCHOOL OF GENERAL STUDIES

William Joseph Ginnane, M.A.(Melb.), B.Phil.(Oxon.).  
Elected 30 September 1969; present tenure expires 29 September 1972.

MEMBER ELECTED BY THE RESEARCH STUDENTS

Alastair Donald Crombie, B.A.(R’dg.), B.Phil.(York(U.K.)).  

MEMBER ELECTED BY THE UNDERGRADUATE STUDENTS

John Gerard Fennessy, B.A.(ANU).  
Elected 30 September 1970; present tenure expires 29 September 1971.
MEMBERS ELECTED BY CONVOCATION

Ruth Emma Auguste Arndt, B.Sc.(Econ.) (Lond.).
Elected 30 September 1969; present tenure expires 29 September 1972.

The Honourable John Johnstone Dedman, B.A., Hon.LL.D.(ANU).
Elected 30 September 1966; re-elected 30 September 1969; present tenure expires 29 September 1972.

Germaine Anne Joplin, B.A., D.Sc.(Syd.), Ph.D.(Cantab.).
Elected 30 September 1969; present tenure expires 29 September 1972.

Roy Douglas Wright, M.B., M.S., D.Sc.(Melb.), D.Sc.(ANU), F.R.A.C.P.
Appointed to Interim Council by Governor-General 9 August 1946; elected to Council by Convocation 1 July 1951; re-elected 1 July 1953, 1 July 1957, 30 September 1960, 30 September 1963, 30 September 1966 and 30 September 1969; present tenure expires 29 September 1972.

MEMBERS APPOINTED BY THE COUNCIL

John Darling.

Gerardus Jozef Dusseldorp.

SECRETARY TO THE COUNCIL

The Registrar.
Emeritus Professor Sir John Crawford, C.B.E.

This is the second occasion on which I have submitted a report as Vice-Chancellor. In my 1969 report I referred to some of the problems which confront all universities in Australia and, for that matter, most universities overseas. I mentioned, in particular, the delicate and complex relationships that exist between universities and other bodies whose activities impinge on theirs, such as colleges of advanced education, governments, and society at large. These broad questions of policy are never finally resolved: relations evolve. Each institution has the responsibility of keeping them under constant review, and I am happy to say that, during 1970, some progress has been made on most of the problems I reported on a year ago. (In one area, that of the financial relationships of universities and governments, the difficulties have become acute, and I shall have something to say about this below.)

This year, however, I wish to draw attention to some of the particular questions that have been exercising us in The Australian National University. These are matters of academic development, of the better use of our resources, and of adaptations of our administrative and academic processes of government, all of which will determine the course the University is to follow in the years ahead.

The year 1970 saw notable developments in student matters. Proposals for increased student participation in University government were fully implemented at departmental, faculty, and other levels. By and large the students concerned have responded commendably to these additional responsibilities which give them wide opportunity to have their views on a variety of matters both heard and discussed. The University has benefited from their participation and I believe it has led to sharper definition of common purposes and objectives and certainly a deeper appreciation of mutual problems.

I was therefore particularly disappointed with the Government’s rejection of the considered recommendation of the University that the number of elected undergraduate representatives on Council be increased from one to two, with the President of the Students’ Association as a third undergraduate representative. This recommendation was made only after thorough and painstaking examination of the part played in Council by present and past student representatives and our proposals were indeed a natural development of student participation in other university bodies. The Government did, admittedly, approve the addition of the President of the Students’ Association, but I am bound to say that the Government’s reasons for rejecting our other proposal were not convincing, and for the Council I shall continue to press for reconsideration.

Sale and consumption of liquor in the University Union and Halls of Residence were introduced during the year. There was fairly general conviction that the move was appropriate but, understandably, there were some misgivings. I am happy to report that the student body has used this facility responsibly and with restraint.

The Deputy Chairman of the Board of the School of General Studies has dealt in his report with the new admission procedures introduced by this University
in 1970. The problem of devising an accurate means of selecting the most suitable students for university study has long engaged the attention of research workers in the field of tertiary education. Traditional selection procedures are based explicitly on results achieved at final secondary school examinations. Some overseas universities use objective test results, others obtain supplementary information from interviews and from the secondary school record of their applicants. The Australian National University is keenly interested in this question and over the past few years has been working in a co-operative venture with the Department of Education and Science in experimental trials of an objective test which it is hoped will prove to be useful. More immediately there was an interest expressed in making use of research findings that selections based on secondary school records and headmasters' assessments had proved worthwhile. Council decided that it would, for a trial period of two years, make early offers of admission for a relatively small number of available places to final year secondary school pupils. These offers were made in 1970 before the pupils had attempted their final secondary examination. We are watching this development with great interest, and I am pleased to say that the initial response has been favourable.

Increases in the number of people seeking to enrol at this University and the decision of Council to restrict the University's eventual student enrolment to 7,200 (including 1,300 postgraduates) in accordance with a program of controlled growth has meant that the number of places available to new students is well short of the demand for places. A consequence has been that the minimum standard for admission to the University has risen, and will continue to rise. As a national university, we have readily assumed the responsibility of admitting students without discrimination as to place or state of residence, and we continue to enrol large numbers of students who live outside the Australian Capital Territory. As a result there is an increasing number of young people resident in the Australian Capital Territory who wish to come to the University but who cannot satisfy our admission requirements. The Canberra College of Advanced Education has met some of this unrequited demand and will doubtless meet more as its degree courses become established as attractive alternatives.

I turn now to an insistent problem on which, unfortunately, I can report little progress. I wrote my 1969 report at a time when we were entering upon a new triennium, not alone among Australian universities in feeling that our development needs had been less than adequately met. It was already clear that growth funds would be severely limited and that our plans for new developments in the University, particularly in our arts and oriental studies degrees, must be approached very tentatively indeed.

As I write the 1970 report, it looks as though the slender opportunity that then appeared is seriously endangered by inflation of costs. The number of full-time undergraduate students in 1970 has pleasingly increased well beyond expectation. Because of financial constraints, however, it has not been possible for the faculties to preserve the balance between students and staff deemed appropriate by the Australian Universities Commission.

I reported last year that the University has made a reserve provision of $3,000,000 to cover movements in non-academic salaries and wages (calculated at a seemingly prudent 5% per annum). Already after one year of the triennium has
passed, this provision is proving to be only half, perhaps even less, of the costs we will incur in the three-year period. The increases have been so exceptional that we confidently expected that the Government would provide relief. However, we near the mid-point of the triennium with no alternative, in the absence of supplementary Government help, but again to cut our estimates—not the least of our problems being the uncertainty for 1972.

In educational terms, the financial picture means that the student/staff ratio is higher than it should be. Whereas the Faculty of Arts had planned to introduce Anthropology, Religion and Music—Fine Arts, we have been unable to move in any of these directions. Similarly the Faculty of Asian Studies is undecided about the desired expansion into a modern Indian language, Hindi, and, of course, is unable to extend, as it had wished, its work in developing knowledge and understanding of contemporary Asia. In the Faculty of Economics the development of Management Studies is likewise frustrated.

The Institute of Advanced Studies is particularly affected by cost increases in equipment, materials and non-academic salaries. Very little advance indeed in academic staffing of the Institute has been possible in this triennium.

There may be a case for asking universities to absorb in a triennium predictable increases in costs on the doubtful assumption that the Australian Universities Commission has adequately allowed for these. When the rate of inflation reaches the level of present times the circumstances are surely ‘most exceptional’ and, as such, justify the consideration promised in the Government’s decision announced on 14 August 1969, when the Minister for Education and Science wrote in these terms—

‘I emphasise most strongly that it is the Government’s policy that except for necessary increases arising from reviews of academic salaries, supplementary recurrent grants during the triennium for the Australian National University will be considered only in the most exceptional circumstances and only on the basis of a recommendation made by the Australian Universities Commission.’

Requests have been lodged in terms of this policy, but so far the response has not been encouraging.

The University was heavily engaged during the year in discussions relating to the preparation of the submission to the Australian Universities Commission for the 1973-75 triennium. A large number of proposals for new developments was generated; these were exhaustively discussed through the formal and informal deliberative processes of the University and particular attention was paid to the research programs of the Institute of Advanced Studies. Searching questions were asked about the benefits which were yet to accrue from a continuation of these activities; in the event some difficult decisions were reached which involved the rejection of several worthwhile proposals and which will lead to reductions and realignments in some programs, and the expansion and combination of others.

I should draw attention here to one aspect of these discussions which represented what I regard as a significant departure from the method in which the University had hitherto developed. In the face of persistent demands from both the Institute of Advanced Studies and the School of General Studies for the introduction of
new research programs and new teaching courses, it came to be agreed, at least implicitly, that there was a limit to the net growth of schools, faculties and departments. It was apparent that the University has now achieved a comprehensive coverage of the main academic disciplines and that consequently new developments would be found increasingly, although not exclusively, in combinations and syntheses of activities already being pursued.

As examples of this kind of development, which cuts across standard academic groupings, I would point to the introduction of the combined courses in Arts/Law and Economics/Law. These were designed to meet the needs of students who would need some legal training to fit them for the Public Service or commerce, but would not wish to enter the professional practice of law. At the postgraduate level, a master's degree course in economic policy utilises the resources of several departments in both the Institute of Advanced Studies and the School of General Studies; this is only one of the areas of fruitful co-operation between the two academic wings of the University.

Discussions on the 1973-75 triennium resulted in the formulation of proposals for the establishment of University centres which would draw on the resources of both the Institute and the School and which would be, on the existing structure of the University, truly interdisciplinary. I refer in particular to the proposed Centre for Natural Resources and the Humanities Research Centre. Academic arguments for these centres were thoroughly examined by University Council and I am satisfied that they represent a logical development of work already proceeding in the University and that they will make maximum use of existing resources. They cannot be established until, at the earliest, the 1973-75 triennium and even this will depend on a favourable response to the proposals from the Australian Universities Commission and, ultimately, the Government.

I have referred to these proposals because they represent a significant change in the pattern of university development envisaged for the future. I foresee that much of the development of this and other universities will consist in similar combinations of existing activities, with an increasing emphasis on what will often be an unwelcome and painful elimination of research and teaching programs which are found to be no longer academically productive.

An apparent exception to this type of development was the University's agreement in principle to the introduction of undergraduate teaching in medicine. The demand for medical training in the Australian Capital Territory had long been felt, and the University had taken the initiative, in 1968, of organising an important international consultation on medical education. Arising from this, and in co-operation with numbers of other universities and representatives of the profession, we established the general outlines of a medical course which might be expected to meet the needs of the Australian community, and would not neglect the social requirements of the profession.

The academic case was accepted in the University after searching debate. Reservations were expressed, however, on the score that medicine was an expensive discipline which made heavy demands on resources. There was some fear that the legitimate demands of existing schools and faculties might be prejudiced by this and by the problem of relatively low student/staff ratios required in medicine. Discussions have proceeded with the Australian Universities Commission.
with the object of ensuring that the interests of existing disciplines in the University are adequately protected. At the same time, it is recognised that undergraduate medical training can only proceed if adequate hospital facilities are available for clinical training and if adequate relations between the University and hospital management authorities are established. Concurrently with consideration of our proposals by the Australian Universities Commission, discussions of these matters are proceeding in a fruitful way with the Department of Health.

The emphasis I have placed in this report on the internal affairs of the University might give the impression of an undue, and even selfish, concentration on our own private concerns. The University recognises on the one hand its major obligations to teaching and research. On the other hand, however, it accepts the responsibility for assisting in public affairs where its members have the relevant knowledge and experience. I believe the Australian National University staff has contributed significantly to the work of parliamentary committees and to the work of Ministers and departments in Australia. Its members have also contributed significantly both to universities and to the affairs of government in New Guinea, Fiji, South-East Asia and further afield. The volume of calls on the University for assistance reflects a growing awareness of the valuable contribution University members can, and are ready to, make in the area of public policy in this and other countries.

I am happy to report a marked increase in the numbers of distinguished visitors who spent periods in the University during the year. We were honoured by visits from Her Royal Highness The Princess Anne, and from the Right Honourable the Prime Minister of Canada; academic visitors from both Australia and overseas brought stimulus to us, and, I am convinced, to themselves and their own institutions. A feature of our visitors' program which I especially welcomed was a marked increase in the number of visitors from Australian universities which reflected the standing of the Australian National University as a national centre of teaching and research. If I might be permitted to overstep the boundaries of the calendar year, I should mention the intensive planning which took place in 1970 for the twenty-eighth International Congress of Orientalists, and the highly successful Congress which attracted over 1,200 scholars to the University in early January 1971.

A section of the University's activities which has given particular satisfaction was the Creative Arts Fellowships scheme. Under this scheme, which the University finances from its normal funds, deserving artists from both Australia and overseas are enabled to spend periods in the University, ranging from a few months to a year or more, free from the financial constraints which unfortunately continue to bear on the practising artist. In making these awards, the University is conscious of the benefits which accrue to the artistic development of Australia; I am not ashamed to acknowledge that we ourselves, at the same time, enjoy the stimulus and broadening of interests which these visits bring to our own members, particularly the undergraduate students.

It is needless to say that the operations of a university are complex. They involve extensive academic and administrative organisation and a many-sided relationship between staff and students; at the same time, the University has a role to
play in the community, and must keep under constant scrutiny its relations with governments, institutions and society at large. As chief executive responsible to the Council I wish to thank the Council for the support it has given me; the academic staff for its understanding and constructive co-operation (often in unpleasant tasks), and the student leaders whose frank and forthcoming liaison with me and the Administration has been a major factor in what I regard as good relations on the campus. Not least I thank my administrative staff of all ranks for willing and untiring support in what cannot be regarded as a light burden.

PUBLICATIONS

CRAWFORD, J. G.


THE INSTITUTE OF ADVANCED STUDIES

REPORT OF THE DEPUTY CHAIRMAN OF THE BOARD

Professor G. Sawer

The six schools of the Institute of Advanced Studies maintained a high level of research and training, under circumstances of some financial constraint which imposed limits on expansion and more particularly on rate of expansion as envisaged in the approved triennial plans. With some reallocation and concentration of resources, difficulties were for the most part overcome and intended plans at worst delayed. The Research School of Physical Sciences was again most immediately affected; in consequence the creation of planned Departments of Solid State Physics and Applied Mathematics was further delayed until 1971, but appointments were made to the chair in each case. The expansion of the School’s research facilities, however, went ahead much as planned; technical developments in connection with the homopolar generator added to its unique qualities, contracts were let for the extension of accelerator facilities, and work on the Siding Spring Observatory telescope was steadily maintained. The position of the School in the world of science was indicated by such events as the knighthood conferred on the Director, and the election of Professor J. C. Jaeger, F.A.A. (Department of Geophysics and Geochemistry) as a Fellow of the Royal Society. The youngest School, the Research School of Biological Sciences, saw its permanent building commenced; an interesting joint professorial appointment with the Commonwealth Scientific and Industrial Research Organization was made in order to open up the field of genetics. It was in this School and the closely allied John Curtin School of Medical Research that the effect of consolidation and regrouping was most obvious; for example, sections from existing departments in the John Curtin School formed or contributed to the new Departments of Human Biology and Immunology, in each of which chairs were created and filled. The Research School of Chemistry, also a young School, extended into the field of physical chemistry with the creation of a new research section—this School does not employ a departmental structure—and Professor D. P. Craig, F.A.A., F.R.S., became Dean in succession to Professor A. J. Birch, F.A.A., F.R.S. The Research School of Pacific Studies filled its new Chair of Human Geography. An interesting feature of this School’s operation is its sponsorship of a number of regularly appearing learned journals and bulletins, controlled or edited by appropriate departments and units—Bulletin of Indonesian Economic Studies, Journal of Pacific History, New Guinea Research Bulletin, Canberra Papers on Strategy and Defence, etc. In the Research School of Social Sciences, a first appointment was made to the Chair of Sociology, and Professor P. H. Partridge (Professor of Social Philosophy) was appointed to the Australian Universities Commission. Work in progress in this School has developed a strong emphasis on Australian studies.
The volume of research output is roughly reflected by the publications lists—in all forty-six books and over 700 chapters in collective works and journal articles. It is also indicated by the extensive participation of academic staff in international conferences and the large numbers of visitors to the Institute from other universities, including a steadily increasing number from universities in Australia. The international conferences were held in many parts of the world, but a particularly exotic case was the attendance of Dr I. de Rachewiltz, Department of Far Eastern History, at a meeting in Ulan Bator, Outer Mongolia.

The Institute also suffered grievous losses when Professor G. H. Newstead, Department of Engineering Physics, and Professor A. W. H. Phillips, M.B.E., Department of Economics, Research School of Social Sciences, were obliged to retire through ill-health.

As at December, academic staff numbered 382, and there were 126 research officers and assistants. This was close to the staffing limit under current budget conditions. There were 329 students proceeding to the degree of Doctor of Philosophy and seventy-nine doctoral degrees were awarded.

THE SCHOOL OF GENERAL STUDIES

REPORT OF THE DEPUTY CHAIRMAN OF THE BOARD

Professor C. A. Gibb, O.B.E.

The list of significant developments affecting the School of General Studies during 1970 seems large but pride of place among them almost certainly goes to the adoption and implementation of new admissions policies and procedures. For many years now in Australia there has been a growing unease in the universities about the concept of 'matriculation'. Its precise meaning cannot now be defined both because many students are said to 'matriculate' but are unable to find places in universities either because of quotas or because actual admission standards are considerably above those of matriculation and because other employing authorities continue to behave as if matriculation had one meaning when, in fact, matriculation for each of the universities in New South Wales at least is a rather different qualification. In this climate, and recognising that the Australian Capital Territory is not itself responsible for a 'matriculation' examination it seemed to the University to be wise to vacate the matriculation field and to avoid at least this much further confusion in respect of the meaning of the New South Wales Higher School Certificate. There were other reasons too for abandoning the concept of matriculation so far as The Australian National University is concerned. A very considerable proportion of undergraduates in the School of General Studies has pursued secondary studies in other states and while the university is able to make judgments about the equivalence of qualifications obtained in one state with those obtained in another for purposes of admission to the University it could not reliably assert that these same equivalences held for any other purpose. Consequently to call The Australian National University admission a matriculation qualification was meaningful only in the sense that it meant admission to this University. Furthermore, there is a difficulty in the matriculation concept that it is often equated
with the notion of ‘qualified to pursue a university course’ and in the minds of many this is further equated with ‘has a right to university admission’. Since the universities of New South Wales, Victoria and the Australian Capital Territory are now among them quite unable to accept all students who ‘matriculate’ in their state it is only misleading and conducive to argument to retain this concept. For these reasons The Australian National University in 1970 repealed its matriculation regulations and substituted admission rules. The basic requirements for admission to the University have remained unchanged, as a pattern of performance and an acceptable aggregate of marks are specified in terms of the New South Wales Higher School Certificate Examination or its equivalent in other states. The University’s earlier decision to limit the ultimate size of its undergraduate body and to grow towards that limit in an orderly way has meant that the aggregate marks required have gradually increased over the past several years. To this, however, a new element was added in 1970. After studying results so far to hand of the Tertiary Entrance Examination Project (TEEP) mounted by the Department of Education and Science largely on the initiative of this University but with co-operation from the States of Tasmania and Western Australia and now of all states, and after studying admissions requirements and procedures in the universities of the United Kingdom, Canada and the United States of America, the Deputy Chairman recommended, and the University adopted, two features of admissions that are new to Australia. The more important was to consider for a trial period of two years the success of making admissions offers to school students on the basis of school records and school recommendations before the big and traumatic state public examination was taken. The second, almost corollary, action was to make these offers early, that is also before the student sat for his external public examination. It is also important to record, however, that no early rejections were made and every student not given an early offer was reconsidered when the results of the state public examinations were available. These proposals were widely discussed with teachers and education authorities in the states and met with very general though not completely unanimous support. While not enough is yet known of 1971 admissions to evaluate adequately the new procedures it is already clear that the possibility of attending this University as a National University was seriously considered by a far greater number of school leavers than ever before and that a great many of these were students of very high calibre, and a higher proportion of them were from areas beyond the borders of the Australian Capital Territory. At this early stage both public and professional reaction and the preliminary results already observable suggest that the innovation has had advantages for the School of General Studies and that it will bring advantages to the secondary schools of the states. In any case, of course, it is already public knowledge that many states are re-examining their policies in respect of the external matriculation examination. It is not to be expected that all universities will react as this University has done but it is undeniable that this University’s ‘experiment’ will be studied with interest in other places.

These policies have had an inevitable effect upon admission to undergraduate study of older and more mature students who wish often to pursue part-time courses. School records dating back often more than a quarter of a century could not be obtained for them and they have continued to be assessed under
the old arrangements by which their preparation for university study is judged for its equivalence to the basic prescription in terms of the state public examinations. As standards have gradually risen, however, for school leavers it is inevitable that equivalences also have risen. The middle-aged man or woman who probably would have been admitted to a university with five Bs in the New South Wales Leaving Certificate of 1945 cannot expect that qualification alone to admit him to the Australian universities of 1970-75. The judgment of equivalence of qualification must therefore be based on evidence of academic ability and preparation of more recent date. The person who has pursued other tertiary studies within or outside the state educational system may be able to present that evidence while those who have simply achieved regular promotions through faithful service may not. It must be a consequence of rising standards in the School of General Studies that the mature-age student as well as the school-leaver will find admission more difficult. There is a suggestion that this already reveals itself in a much smaller proportion of part-time students in the 1971 intake to the School though age analyses have not yet been made.

A further consequence of the adoption of new admissions policies relying more heavily on the student's school record and on the school report of him is that relations between the University and 'feeder' schools must be much closer in future than has been the custom in Australia. In this University the processes of making greater contact have already begun and will be stepped up considerably during 1971. Not only will this provide a basis of mutual confidence for reports on which admissions and scholarships are based but it will ease the present rather difficult transition from school to university.

In the light of the emphasis which has been placed here on rising standards it is a pleasure to report that the steady rise in success rates referred to in the 1969 Report has been sustained through 1970 and that departments have continued experimenting with new methods of teaching and assessment. The Dean of the Faculty of Arts has commented in respect of his Faculty that 'the old chant "50% must fail" is now ridiculous. In most units 90% of those sitting the examination pass it; in most first-year units over 80%. An increasing proportion of those who enrol in units reach the examination room — the wastage rate continues to decline'. This is not to suggest, however, that all is well. Wastage in economics remains unacceptably high at 35% to be compared with only 17% in science and so does the general drop-out rate, especially of part-time students. The proportion of students who enrol in first year who eventually obtain degrees in minimum time remains far too low. These matters deserve and must receive continued research attention. In preparing its submission to the Australian Universities Commission for the 1973-75 triennium the School has included a provision for a small office for Research in Academic Methods which would concern itself closely with issues of this sort as well as with a wide variety of other questions affecting the efficiency of the entire academic operation.

During 1970 the Board has welcomed evidence that there is increasing interest in the further liberalisation of studies that cut across faculty boundaries. The Faculty of Arts has for some time provided very liberal rules for the degree of Bachelor of Arts. The Faculty of Science has now made more room for non-science studies in the degree of Bachelor of Science. The arrangements for
combined B.A./LL.B. and B.Ec./LL.B. degrees are proving increasingly popular with students and staff, and discussions are well advanced for combined degrees in Asian Studies/Law and Asian Studies/Economics. The time is probably near at hand when the School of General Studies should reconsider the wisdom of retaining five separate degrees of bachelor.

Undergraduate enrolments again increased in 1970. The overall increase in students enrolled for courses for degrees of bachelor was 10.6% despite efforts to hold the rate of increase somewhat lower than this. On this occasion the greatest increase was in the arts/law combination—an increase of 43%. On the other hand direct law enrolments were up by only 3%. The Faculty of Economics showed a 25.7% increase, the Faculty of Science (excluding forestry) 14.3%, the Faculty of Arts 6.7% and the Faculty of Asian Studies 2.5%. It does need to be emphasised that these are faculty or degree enrolments and that the increasing frequency of students crossing faculty boundaries means that these figures do not always reflect the increase in teaching loads of departments within faculties.

In terms of time devoted to it the second major activity in the School of General Studies during 1970 has been preparation of the submission to the Australian Universities Commission for the 1973-75 triennium. The difficulties of seeing five years ahead in these changing times are certainly not diminishing as the years pass. However, a modest submission has been completed which apart from the separate question of undergraduate medical education in the School contemplates very few, very modest, developments in Arabic and Islamic Studies, and Engineering Science. Otherwise the School has confined its requests to the development of new proposals approved for the current triennium. Some of these—Prehistory, Sociology and Hindi, have now been launched. Others such as Religious Studies, Administrative or Management Studies, Italian, Music, Thai and Microbiology remain to be begun in 1971 or 1972. If, however, the extreme tightening of the funds position which threatens at the end of 1970 due to rapid increases in non-academic salaries remains unalleviated none of these approved developments can eventuate and the 1973-75 triennium proposals will require modification accordingly.

A development during 1970 which is likely to have wide and significant consequences for the School of General Studies and for the University has been the agreement in principle to establish a Graduate Degrees Committee for the University as a whole. This will enable the research schools in the Institute of Advanced Studies and the faculties in the School of General Studies to avoid difficulties created by the provisions of section 15c. of the University Act under which responsibility for doctoral degrees rested with the Board of the Institute of Advanced Studies and for other degrees with the Board of the School of General Studies. The statutory provision ceased to be mandatory in September 1970 and the new arrangement will give to the faculties power to manage the affairs of growing numbers of students for the degree of Doctor of Philosophy working in them and will also permit the research schools to enrol students for and to award degrees of master should they wish to do so. The earlier provisions were an almost inevitable consequence of the creation of the new Australian National University by amalgamation of the Australian National University and the Canberra University College, but in practice they led to awkwardness in administration which the new proposals seek to avoid.

Two discussions begun earlier fused during 1970 to give rise to committee
consideration of the total academic organisation of the School of General Studies. The question of student participation in the Board of the School remained unresolved because the structure of the Board needed reconsideration. Considerations of size of the University also had implications for the academic organisation. As a result the Deputy Chairman presented for committee consideration some detailed proposals for the overall organisation of departments, faculties and boards as well as other forms of academic association. That committee has been active and while it has not reported in 1970, the new year should see this whole matter brought forward for general debate at Board and faculty levels as well as among student bodies.

The student participation arrangements reported in some detail last year have continued to work well in most departments and faculties. The Board placed on record its disappointment that the Government did not see fit to accept in full the Council's recommendation with respect to increased student membership at Council level.

The Board of the School has resolved too that greater consideration should be given in both appointment and promotions procedures to an applicant's skill in teaching. To this end a committee of the Board, which now also has student membership, has been examining ways and means of evaluating teaching performance. Here too positive action may be expected during 1971.

There were some less satisfactory features of life in the School of General Studies in 1970 which also deserve mention. Whole-hearted commitment to the semester organisation of courses has remained confined to the Faculty of Science which has again reported its satisfaction with the system. In some other faculties there are departments which have effectively accepted the semester organisation. However, throughout the University it has become clear that the operation of the present dual arrangement creates strains for both staff and students. In 1971 efforts must be directed to a resolution of the interfaculty conflicts remaining. Neither can these considerations be divorced from discussions proceeding in the Australian Vice-Chancellors' Committee and from actions already taken in other places as in the University of New South Wales and the Macquarie University.

During the year too, strong differences of view were expressed in a prolonged discussion leading to a variation of the formula used to allocate available academic staff positions to departments in terms of enrolments in those departments. The science departments, mathematics departments and language departments all claim that their particular teaching methods demand more liberal staffing. The Board has asked a small committee under the Chairmanship of Professor Emeritus R. N. Robertson, F.A.A., F.R.S., Master of University House, to look at the allocation of staff resources in this and other Australian universities and to report later in 1971.

The Board has also been somewhat disappointed to see its resources available to provide postgraduate scholarships falling further behind demand, this means that a decreasing proportion of good applicants, with first class and upper second class honours degrees, can be accepted into the school of General Studies as postgraduate scholars. It may well be that this is a general phenomenon but the need for higher-degree qualifications in Australia is not diminishing and the
School, at least, expresses the wish that more of its available resources could be turned in this direction by increasing the number of postgraduate scholarships available from all sources.

During the year the University of Puget Sound, Tacoma, Washington, approached the University with a request that this University might be the centre for an expansion of the Puget Sound program for its students to have a Junior Semester of study abroad. Such a program operates successfully now in a number of European countries and growing interest in the South-West Pacific has directed attention to Australia. The University has welcomed the approach and appropriate arrangements have been substantially completed. The problem of accommodation for some twenty to twenty-five students in the first semester of each year remains for solution. The arrangement makes no call on University funds but Australian National University staff will join staff members from the University of Puget Sound in teaching such courses as Australian Literature, Australian History, Australian and Asian Politics, Asian Civilisation. Similar discussions with another group of American colleges are proceeding.

Once again a comment on research in the School of General Studies is of justifiable interest. At 30 April 1970, 173 of the total 533 students enrolled in the University for the degree of Doctor of Philosophy were working within departments of the School. In addition 172 were pursuing courses for degrees of master. Grants made to individual research workers and groups within the School by the Australian Research Grants Committee for 1971 are made both to a larger number of recipients and represent a larger share of total funds distributed than in previous years.

The Canberra College of Advanced Education continues, of course, as a sister tertiary institution of very great significance to the School of General Studies. Relations with the College have remained good and developments in both institutions are carefully considered with a view to a complementary rather than a competitive relationship. University faculties and committees have given much consideration to qualifications gained at the College for purposes of admission to the University and have taken positive steps to ensure that proper status can be given in University degree courses to work done in the College where that work is of degree standard.

Finally, the School of General Studies reports some matters of lesser national significance but of considerable internal importance. First, during the year two departments benefited greatly from the presence in them of Leverhulme Visiting Scholars and it is with much regret that we have learned that the scheme is to be discontinued in 1976 by the Leverhulme Trust.

The School lost by resignation, the much valued services of Professor J. D. Smyth, Foundation Professor of Zoology who went to a Chair of Parasitology at the Imperial College of Science and Technology, London; and so shortly after his election as a Fellow of the Australian Academy of Science, Professor Hannan, Head of the Department of Statistics has accepted a Chair of Statistics in the Institute of Advanced Studies. On the other hand, a number of very distinguished appointments can be recorded: Professor R. M. W. Dixon to the Chair of Linguistics; Professor G. S. Reid to the Headship of the Department of Political Science; Professor J. Zubrzycki to the Chair of Sociology; Professor
R. G. A. de Bray to the long-vacant Chair of Russian; Professor S. A. Barnett to replace Professor Smyth as Head of the Department of Zoology; and finally a very distinguished geographer to replace Professor A. T. A. Learmonth who joined the staff of Britain's Open University during 1969.

SITE AND BUILDINGS

A list of buildings completed during the year and in the stage of planning is included in the Building Program Summary which appears later in this Report.

The year 1970 is the first year of the 1970-72 triennium and already some of the major buildings, for example, the Biochemistry Building, the permanent building for the Research School of Biological Sciences, and a block of motel-type units mainly for single research students are well under way. It is expected that the new University Union with the associated Recreation and Sports Centre and with accommodation for the University Health Service and University Counselling Service will go to tender early in 1971, and that work on the permanent building for the tandem accelerator will also be commenced before the end of that year.

The University's capital building submission for the 1973-75 triennium was sent to the Australian Universities Commission in December 1970. A tentative building program for meeting expansion needs for the 1976-78 triennium has also been submitted to the Australian Universities Commission.

At its meeting in October 1970, Council approved a revised draft review of the University site plan as the best indication of likely site development and traffic and parking arrangements for the foreseeable future. The site plan has been under review since the appointment of Mr R. Simpson as Site Planner in 1968.

In step with the review of the site plan new roads have been constructed and a vigorous campaign of landscaping and tree planting has been continued during the year.

With the co-operation of the appropriate city authorities significant adjustments to the University's boundaries are under way.

The University and the National Capital Development Commission have entered into discussions on the implications of constructing a tunnel under the Acton Ridge on the University site to continue Parkes Way which will go across the mouth of Sullivans Creek and round the south end of Black Mountain.

At Siding Spring Observatory near Coonabarabran, all work connected with the mountain top development in preparation for the construction of a building to house the Anglo-Australian 150-inch telescope has been virtually completed.

NOTES ON OTHER DEVELOPMENTS

The General Studies Building of the University Library has been named after Mr J. B. Chifley, former Prime Minister of Australia, whose government established the University. It is now known as the J. B. Chifley Building of the University Library.
Emeritus Professor A. D. Trendall (left) and Professor Emeritus Sir Harold Bailey both received the degree of Doctor of letters (honoris causa) at the Conferring of Degrees ceremony held on 11 September. Professor Trendall, former Master of University House and Deputy Vice-Chancellor of the University, is now a Resident Fellow at La Trobe University. Sir Harold Bailey, Professor Emeritus of Sanskrit in the University of Cambridge, is considered the world's greatest living authority on Indo-Iranian studies.

Photo by courtesy of G. Carpay

The Prime Minister of Canada, the Right Honourable Mr P. Trudeau, at the question and answer session with University staff and students during his visit to Canberra on 18 May.

Photo by courtesy of G. Carpay
The President of the Students' Association, Mr M. E. Cunliffe, accompanies Her Royal Highness The Princess Anne as she walks to the Union Building during her visit to the University on 24 April. 

Photo by courtesy of G. Carpay

The Minister for Education and Science, the Honourable Nigel H. Bowen, Q.C., M.P., set the foundation stone for a permanent building for the Research School of Biological Sciences on 14 November. The building is expected to be finished by March 1972.

A capacity audience filled the Dining Hall of University House on 10 March for a concert of baroque music performed by members of the Canberra Sinfonietta. The concert, the first of several concerts on campus held during the year, was sponsored by the University in association with the Arts Council of Australia (A.C.T. Branch) and with assistance from the Special Projects Fund of the Australian Council for the Arts.

Photo by courtesy of G. Carpay
Professor P. O. Bishop, Professor of Physiology, makes an adjustment to apparatus he used in an experiment concerned with the mechanism of visual perception. This experiment was seen in Australia’s first direct nation-wide telecast on 9 July, which marked the completion of the Sydney-Perth microwave link.

Photo by courtesy of G. Carpay

Residents of Bruce Hall meet over a drink in the Junior Common-room. Orders were approved in May to cover the sale of liquor in the University Union and the Halls of Residence.

Photo by courtesy of G. Carpay
Mr G. T. Green (left) and Mr J. F. V. Knight, Office of the Registrar (Property and Plans) inspect a concrete block which once marked the boundary of the original Acton estate granted to Lieutenant J. J. Moore in 1838, while a surveyor sights along the boundary line. Mr Knight is undertaking extensive research into the history of the University site.

Photo by courtesy of G. Carpay

The University Site Planner, Mr R. Simpson (left), the Registrar (Property and Plans), Mr D. St. A. Dexter (centre), and the Chairman of the Buildings and Grounds Committee, Mr A. J. R. Yencken, discuss a model showing how the University might develop under the revised site plan.

Photo by courtesy of G. Carpay
The Chifley Building in the Research School of Physical Sciences has been re­
named the Oliphant Building in recognition of Emeritus Professor Sir Mark
Oliphant's contribution to the University as a member of the Academic Advisory
Committee and as first Director of the Research School of Physical Sciences.

The second building in the Arts complex has been named the John Dedman
Building. As Minister for Postwar Reconstruction, the Honourable John John­
stone Dedman was actively associated with the early plans for the founding and
development of the University and was the Minister in charge of the Bill to
establish the University which was enacted in 1946.

In retirement, he enrolled as a student and earned the degree of Bachelor of
Arts. An honorary degree of Doctor of Laws was conferred upon him in 1964.

Emeritus
Professors

The status of Emeritus Professor was granted to Professor A. G. Ogston, F.A.A.,
F.R.S., who left the University to become President of Trinity College, Oxford,
and to Professor G. H. Newstead who retired because of ill-health.

Postgraduate
Committee in
Medicine

During 1970 this Committee arranged ten clinical functions (symposia, lectures,
etc.) with participation by invited speakers from interstate and overseas as well
as from the Australian Capital Territory. In addition to arranging symposia, etc.,
the Committee has conducted a survey of the educational needs of practitioners
within its area (i.e. the Australian Capital Territory and south-eastern New South
Wales within a radius of 100 miles of Canberra) and valuable information on the
structure and timing of clinical meetings has been obtained. The publication of
a quarterly ‘Newsletter’ commenced in September 1970. A part-time Director of
Resident Training at Canberra Hospital has been appointed.

Funds for the Committee’s work have come from two successful appeals to the
drug industry; administrative backing has been provided by the University and
many local practitioners have given freely of their time in support of the Com­
mittee’s activities.

Research
School of
Chemistry

Professor D. P. Craig, F.A.A., F.R.S., was appointed Dean of the Research
School of Chemistry in succession to Professor A. J. Birch, F.A.A., F.R.S. The
School was established with an understanding that responsibility for the head­
ship would not remain continuously with the same person.

Research
School of
Biological
Sciences

The foundation stone for a permanent building for the Research School of Bio­
logical Sciences was set by the Minister for Education and Science, the Honour­
able Nigel H. Bowen, Q.C., M.P., on Saturday, 14 November 1970.

Burgmann
College

Burgmann College, an affiliated college established by a group of churches, will
open in 1971 with accommodation for men and women. Dr D. M. Griffin has
been appointed first Master of the College.

Gift for the
Performing
Arts Centre

A gift of $100,000 was received from Mr F. Duval, an Australian businessman
resident in Japan to assist in the design and construction of a centre for the Per­
forming Arts to be available to the staff and students of the University. The
heart of the complex will be a workshop theatre. Surrounding the theatre will
be studios for painting, sculpture and design and exhibition galleries. The Uni-
versity is seeking further donations from the public towards the total cost of
$500,000.

Mr Arthur Cantrill completed his period as Creative Arts Fellow. His experi-
mental film making was of interest to staff and students.

Mr Arthur Boyd has accepted a short-term Creative Arts Fellowship and will
arrive during the second half of 1971.

A longer term Fellowship has been awarded to an Adelaide artist, Stanistar
Ostoja-Kotkowski, who is interested in experiments with advanced techniques
in which art and electronics come together.

Dr L. Ross gave the first John Curtin Memorial Lecture endowed by the Hon-
ourable Dr J. J. Dedman.

The Right Honourable Lord Butler of Saffron Walden, C.H., Master of Trinity
College, Cambridge, and former British Foreign Secretary and Deputy Prime
Minister, accepted the University’s invitation to give the first of the Arthur F.
Yencken Lectures.

The Lectures which have been generously endowed by the family of the late
Arthur F. Yencken are designed to improve contacts between professional diplo-
mats and the University and to promote understanding of their roles in inter-
national relations.

Donations towards the cost of the painting ‘River Bend’ have assured the Uni-
versity’s possession of this major work by Sidney Nolan. By arrangement with
the Commonwealth Government, the nine large panels composing the series
were on exhibition at Expo ’70 at Osaka. Mr Nolan was a Creative Arts Fellow
in the University in 1965 and the degree of Doctor of Laws honoris causa was
conferred on him in 1968.

The following exhibitions were held during the year, in the R. G. Menzies
Building of the University Library, except where otherwise shown:

22 February to 15 March—Photographs of Sarawak by Mrs Hedda Morrison;
4 to 20 April—Best German books of 1967 (arranged by the Embassy of the
Federal Republic of Germany); 17 to 26 April—Bush Week art exhibition (J. B.
Chifley Building of the University Library); 20 August to 5 September—‘Design
with Paper’ (Royal Melbourne Institute of Technology students in conjunction
with Canberra Art Club); 7 to 14 September—Fifth Annual Union Art Exhibi-
tion (Union Building); 15 to 24 September—Entries in international art competi-
tion (arranged by Robin Hood Art Committee); 29 September to 6 October—
Exhibition of black and white prints by Australia’s leading photographers (ar-
ard by Australian Photographic Society); 26 to 31 October—Russian books
—in commemoration of Lenin’s Centenary (arranged by the Embassy of the
USSR).
The exhibition of the 'Seven Days' paintings by Leonard French continued to attract visitors to the South Building, Civic Square. Staged by the University in conjunction with the Department of the Interior, the exhibition has been seen by more than 70,000 people, including many visitors to Canberra, since it opened in January 1969. More than 55,000 colour reproductions of individual paintings and 6,000 colour brochures illustrating all the paintings have been sold in this time. At the end of the year arrangements were being made for the paintings to be transported to Western Australia for exhibition at the Festival of Perth in February and March 1971.

The following public lectures were given in the University during 1970:


The Arthur F. Yencken Lectures were given on 24 and 25 March by the Right Honourable Lord Butler of Saffron Walden, C.H., on 'Problems of Diplomacy and Foreign Policy'.

The Morrison Lecture was given on 6 April by Professor K. A. Wittfogel on 'Chinese Agriculture—A Key to the Understanding of Chinese Society, Past and Present'.

The John Curtin Memorial Lecture was given on 16 September by Dr L. Ross on 'John Curtin—His Life for Labor and Australia'.

An Inaugural Lecture was given on 29 July by Professor P. S. Atiyah on 'Consideration in Contracts: A Fundamental Restatement'.

Other public lectures arranged were as follows:


In addition, a number of departmental lectures was given to which the public was invited.

The University established, or made first appointments to, the following new Chairs:

Chair of Administrative Studies, Faculty of Economics—to be filled.

*Chair of Applied Mathematics, Research School of Physical Sciences—Professor B. Ninham.

* The holder of the Chair is also Head of the Department.
Chair of Econometrics, Faculty of Economics—to be filled.

*Chair of Genetics, Research School of Biological Sciences—Dr J. Langridge.

*Chair of Immunology, John Curtin School of Medical Research—Dr B. Morris.

*Chair of Linguistics, Faculty of Arts—Dr R. M. W. Dixon.

†Chair of Mathematics, Research School of Physical Sciences—Professor R. E. Edwards.

Chair of Mathematical Statistics, Faculty of Economics—to be filled.

*Chair of Political Science, Faculty of Arts—Professor G. S. Reid.

Chair of Population Biology, Research School of Biological Sciences—to be filled.

Chair of Prehistory, Faculty of Arts—Dr D. J. Mulvaney.

Chair of Religious Studies, Faculty of Arts—to be filled.

*Chair of Russian, Faculty of Arts—Professor R. G. A. de Bray.

*Chair of Sociology, Faculty of Arts—Mr J. Zubrzycki.

†Chair of Sociology, Research School of Social Sciences—Professor L. Broom.

*Chair of Solid State Physics, Research School of Physical Sciences—Professor W. A. Runciman.

Chair of Statistics, Research School of Social Sciences—Professor E. J. Hannan.

The following appointments have been made to Chairs which fell vacant:

Chair of Human Geography, Research School of Pacific Studies—Professor R. G. Ward.

Chair of Physical Biochemistry, John Curtin School of Medical Research—Dr L. W. Nichol.

Chair of Zoology, Faculty of Science—Dr S. A. Barnett.

Professor W. E. H. Stanner, Department of Anthropology and Sociology, and Associate Professor E. K. T. Koch-Emmery, Department of Germanic Languages, retired on 31 December 1970.

Mr H. E. Maude, O.B.E., Professorial Fellow in Pacific History, Professor A. W. H. Phillips, M.B.E., who held a Chair in the Department of Economics, Research School of Social Sciences, Mr C. D. Hamilton, Senior Lecturer in Forestry, and Mr T. J. Keith, Assistant Registrar in the Office of the Registrar (Property and Plans), retired during the year on grounds of ill-health.

* The holder of the Chair is also Head of the Department.
† Non-established Chair.
Summary of Staff Numbers

The total full-time staff (excluding research scholars) increased from 2,530 at 30 June 1969 to 2,713 at 30 April 1970, an increase of 183 (or 7%). Of this increase seventy-seven were teaching and research staff (including central academic) and 106 were other staff.

Teaching and research staff increased by 9.5% from 798 to 875 and other staff increased by 6% from 1,732 to 1,838.

ENROLMENTS

One hundred and fifty-four new research students enrolled in the University during 1969-70 of whom 105 enrolled in the Institute of Advanced Studies. These new research students comprise seventy-five Australians, twenty-four students from Britain, fourteen students from New Zealand, nine students from the United States of America, ten students from Canada, fifteen students from Asian countries and seven students from other countries.

The total number of students enrolled by the School of General Studies increased by 350 (or by 9%) from 3,731 in 1969 to 4,081 in 1970. The number of new students increased from 1,383 to 1,386. Of the total students 2,027 were full-time students and 2,054 were part-time; the proportion of full-time students remained at 49% in 1970. The number of students enrolled for degrees of bachelor was 3,682 (3,329 in 1969), for degrees of master 172 (146 in 1969), for masters preliminary 71 (106 in 1969) and for miscellaneous subjects not leading to a degree 156 (150 in 1969). In addition there were 173 students for the degree of Doctor of Philosophy formally enrolled in the Institute of Advanced Studies, who were working in and under the supervision of staff in the School of General Studies (162 in 1969).

DEGREES AWARDED


The degree of Master of Arts was conferred on: S. C. Bennett (History, School of General Studies); Wendy M. H. Brazil (Classics, School of General Studies); Ann Bright (English, School of General Studies); J. W. Doyle (Geography, School of General Studies); H. J. Gibbney (History, School of General Studies); Jantine Hensen (French, School of General Studies); Mary P. Kneipp (History, School of General Studies); J. F. Livermore (Geography, School of General Studies); B. R. Maley (Sociology, School of General Studies); R. J. Moss (History, School of General Studies); Pamela Nase (English, School of General Studies); Philippa M. Sawer (Political Science, School of General Studies); D. B. Shield (Pure Mathematics, School of General Studies); G. M. Tobin (History, School of General Studies); R. L. Tweedie (Statistics, School of General Studies); G. P. Walsh (History, School of General Studies).


The degree of Bachelor of Economics with Honours was conferred on: M. Gawan-Taylor, R. L. Hillman, G. M. Maughan, G. R. Potts, A. Richardson.

The degree of Master of Economics was conferred on: E. A. Lyall (Political Science, School of General Studies).


The degree of Bachelor of Laws with Honours was conferred on: A. C. Bundu, Pamela M. Coward, G. J. Kelly, S. J. Loneragan, F. S. Marris, G. B. Memmolo, R. V. Miller, K. R. Strang.

The degree of Master of Laws was conferred on: D. Nochimson (Faculty of Law, School of General Studies); E. Willheim (Faculty of Law, School of General Studies).

The degree of Bachelor of Arts (Oriental Studies) was conferred on: P. R. Boag, Nancy Clark, A. W. George, Wendy J. Muetzelfeldt, F. A. Murphy, Mary L. Smith, H. N. H. Statham.

The degree of Bachelor of Arts (Oriental Studies) with Honours was conferred on: Valerie L. Binns, Helen M. Denny, Merrilyn A. Fitzpatrick, R. N. James, G. W. Landy, Lyndall J. May, Jennifer A. Paris, Julia L. Rock, Carol J. Taylor, Elizabeth A. Todd, Nancy C. van Setten van der Meer.


The degree of Master of Science was conferred on: J. S. Armstrong (Forestry, School of General Studies); P. Broué (Botany, School of General Studies); J. B. Burnett (Chemistry, School of General Studies); W. J. Davidson (Chemistry, School of General Studies); Margaret Davies (Zoology, School of General Studies); M. H. Doobov (Physics, School of General Studies); A. N. Gillison (Forestry, School of General Studies); B. J. Hesterman (Pure Mathematics, School of General Studies); P. G. Laird (Mathematics, Research School of Physical Sciences); R. A. Leppik (Chemistry, School of General Studies); H. M. Raval (Theoretical Physics, School of General Studies); P. C. Smits (Chemistry, School of General Studies); C. P. Vlagsma (Pure Mathematics, School of General Studies); J. P. Wood (Forestry, School of General Studies).

The degree of Doctor of Philosophy was conferred on: E. P. Aimer (Political Science, Research School of Social Sciences); J. R. Angel (International Relations, Research School of Pacific Studies); D. E. U. Baker (History, Research School of Social Sciences); Susan C. Bambrick (Economic History, Research School of Social Sciences); A. D. Barker (Philosophy, Research School of Social Sciences); G. J. Barritt (Biochemistry, John Curtin School of Medical Research); A. P. Bindra (Chemistry, School of General Studies); L. P. Black (Geophysics and Geochemistry, Research School of Physical Sciences); J. M. Brady (Mathematics, Research School of Physical Sciences); I. A. Bunting (Philosophy, Research School of Social Sciences); E. R. Cawthron (Physics of Ionized Gases Unit, Research School of Physical Sciences); B. D. E. Chatterton (Geology, School of General Studies); I. S. Chauhan (Anthropology and Sociology, Research School of Pacific Studies); J. R. Christie (Research School of Chemistry); K. L. Coop (Nuclear Physics, Research School of Physical Sciences); J. A. Cooper (Geophysics and Geochemistry, Research School of Physical Sciences); P. R. Corris (Pacific History, Research School of Pacific Studies); R. P. Creaser (Electron and Ion Diffusion Unit, Research School of Physical Sciences); M. J. Dallwitz (Physics, School of General Studies); G. J. Davison (History, Research School of Social Sciences); D. W. Dellinger (Linguistics, Research School of Pacific Studies); N. B. de Marchi (Economic History, Research School of Social Sciences); J. M. Edmond (Geophysics and Geochemistry, Research School of Physical Sciences); K. G. Eldridge (Forestry, School of General Studies); D. W. Ferrell (History, Research School of Social Sciences); S. A. FitzGerald (International Relations, Research School of Pacific Studies); D. M. Foster (Research School of Chemistry); W. L. Gammage (History, School of General Studies); G. P. Card (Microbiology, John Curtin School of Medical Research); R. G.
Gilbert (Chemistry, School of General Studies); P. M. Greenham (Zoology, School of General Studies); I. P. Griffith (Microbiology, John Curtin School of Medical Research); W. D. Grumley (Chemistry, School of General Studies); M. A. Haas (Research School of Chemistry); Dorothy M. Halsall (Genetics, Research School of Biological Sciences); Joy K. Harris (Linguistics, Research School of Pacific Studies); D. D. Heath (Zoology, School of General Studies); J. O. V. Hellström (Nuclear Physics, Research School of Physical Sciences); D. C. Hickman (Sociology, Research School of Social Sciences); M. L. Higgs (Forestry, School of General Studies); Minta Huang (Biochemistry, John Curtin School of Medical Research); D. J. Huish (Far Eastern History, Research School of Pacific Studies); C. A. Jeffcott (Far Eastern History, Research School of Pacific Studies); A. S. Joyce (Geology, School of General Studies); G. W. Kerrisson (Philosophy, Research School of Social Sciences); N. L. R. King (Chemistry, School of General Studies); J. D. Kleeman (Geophysics and Geochemistry, Research School of Physical Sciences); G. Klim (Germanic Languages, School of General Studies); T. Kobayashi (Medical Chemistry, John Curtin School of Medical Research); P. A. Krinks (Human Geography, Research School of Pacific Studies); Ann L. Kumar (Indonesian Languages and Literatures, School of General Studies); N. Kumar (Theoretical Physics, Research School of Physical Sciences); Julia M. La Nauze (Biochemistry, John Curtin School of Medical Research); H. M. Laracy (Pacific History, Research School of Pacific Studies); Lee Sing (Physics, School of General Studies); B. M. Lewis (Astronomy, Research School of Physical Sciences); F. G. Little (Sociology, Research School of Social Sciences); R. K. J. Luke (Biochemistry, John Curtin School of Medical Research); K. A. McElhanon (Linguistics, Research School of Pacific Studies); R. R. Macintyre (International Relations, Research School of Pacific Studies); C. P. Mackerras (Far Eastern History, Research School of Pacific Studies); C. C. MacKnight (Prehistory, Research School of Pacific Studies); I. D. G. Macleod (Engineering Physics, Research School of Physical Sciences); Beverley M. Male (International Relations, Research School of Pacific Studies); I. E. Maxwell (Research School of Chemistry); S. M. A. Meggitt (Applied Mathematics, School of General Studies); S. Nagarajah (Botany, School of General Studies); J. E. Norris (Astronomy, Research School of Physical Sciences); R. Norris (History, Research School of Social Sciences); K. J. Palmer (Pure Mathematics, School of General Studies); J. P. Powell (Philosophy, Research School of Social Sciences); J. F. Price (Mathematics, Research School of Physical Sciences); Caroline Ralston (Pacific History, Research School of Pacific Studies); G. B. Ralston (Physical Biochemistry, John Curtin School of Medical Research); J. M. Rhodes (Geology, School of General Studies); A. Roy (Asian Civilizations, School of General Studies); E. G. Schmidt (Astronomy, Research School of Physical Sciences); Jennifer M. Shield (Zoology, School of General Studies); W. M. Sirisena (Asian Civilizations, School of General Studies); T. C. Smeaton (Experimental Pathology, John Curtin School of Medical Research); Elizabeth Smith (Biochemistry, John Curtin School of Medical Research); G. T. Smith (Zoology, School of General Studies); N. M. H. Smith (Statistics, Research School of Social Sciences); R. F. I. Smith (Political Science, Research School of Social Sciences); D. R. Smyth (Genetics, Research School of Biological Sciences); Soewito-Santoso (Indonesian Languages and Literatures, School of General Studies); J. R. Specht (Prehistory, Research School of Pacific Studies); H. J. W. Stokes (History, Re-
search School of Social Sciences); G. A. Tannock (Microbiology, John Curtin School of Medical Research); R. D. Terrell (Statistics, School of General Studies); P. L. Thomas (Genetics, Research School of Biological Sciences); F. A. Tosolini (Microbiology, John Curtin School of Medical Research); M. L. Treadgold (Economics, Research School of Pacific Studies); Pauline N. Turner (History, School of General Studies); Angela C. Walker (Biochemistry, School of General Studies); J. V. Wall (Astronomy, Research School of Physical Sciences); Eleanor W. Walsh (Theoretical Physics, Research School of Physical Sciences); R. F. C. Walters (Mathematics, Research School of Physical Sciences); M. Westcott (Statistics, Research School of Social Sciences); N. H. Williams (Mathematics, Research School of Physical Sciences); G. B. Wood (Botany, School of General Studies); N. G. Wrigley (Experimental Pathology, John Curtin School of Medical Research); Yen Ching Hwang (Far Eastern History, Research School of Pacific Studies); Christabel M. Young (Demography, Research School of Social Sciences); M. W. Young (Anthropology and Sociology, Research School of Pacific Studies).

The degree of Doctor of Science was conferred on: A. F. Reid (Research School of Physical Sciences); K. Serkowski (Research School of Physical Sciences).

**HONORARY DEGREES**

The degree of Doctor of Laws (honoris causa) was conferred on Emeritus Professor Sir Kenneth Bailey, C.B.E., Q.C., LL.M.(Melb.), M.A., B.C.L.(Oxon.), Hon.LL.D.(Dalhousie), on the ground of distinguished eminence in public service and in the field of Law.


**PRIZEWINNERS**

*The Alliance Française de Canberra Prizes*  
FRENCH I: Amanda Jane Metcalf  
FRENCH II: Penelope Turner  
FRENCH III: Susan Alexandra Baldwin  
FRENCH IV: Not awarded

*The Ansett Air and Space Law Prize*  
Michael Robert Sandor

*Australian-American Association Prize for American Studies*  
Marion Shnukal

*The Australian Capital Territory Bar Association Prize*  
William Ian Nairn

*The Australian Institute of Physics Prize*  
Leonard Charles Whyte

*The Australian Psychological Society Prize*  
Robert Bruce Lee

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The Australian Society of Accountants' Prizes  ACCOUNTING I: Joanne Mary Robertson  ACCOUNTING II: Brian Spencer Winston Churchill  COMPANY FINANCE: Edward Cyril Bloomfield  FINANCIAL ACCOUNTING THEORY: Edward Cyril Bloomfield

B. C. Meagher Prize for Commonwealth Constitutional Law  John Charles Kelly and Ronald Gordon Mills

Canberra Association of University Women Prize  Margaret Honor Johnson

The C.S.R. Chemicals Prize  Julian Maurice Brown and Daryl Peter Henry Murphy and Michael John Robey

The Commonwealth Forestry Bureau Book Prize  Graham George Wright

The Economic Society Prizes  ECONOMICS I: Peta Glen Keaney  ECONOMICS II: Jennifer Marjorie Corbett  ECONOMICS III: Kevin William Popple and James Christopher Sharah

The Geological Society of Australia Prize  Not awarded

The George Knowles Memorial Prize  Leigh Alan Warwick

The Goethe Society Prizes  GERMAN I: Mary Grace Livermore and Amanda Jane Metcalf  GERMAN II: Penelope Turner  GERMAN III: Jill Common  GERMAN IV: Douglas Roy Fraser

The Institute Prize for Economic History  Neil Francis Hyden

The Lady Isaacs' Prize  Michael Matthew McKernan

The Law Society of the Australian Capital Territory Prize for Contracts  Patricia Ann de Lacy

The Leslie Holdsworth Allen Memorial Prize  Michael Hilary Boothroyd

The Marie Halford Memorial Prize  Katherine Eve Crago

Permanent Trustee Company (Canberra) Limited Prizes  PROPERTY II: Philip Anthony McNamara  TRUSTS: Kevin Michael Crotty and Philip Anthony McNamara

Priscilla Fairfield Bok Prize  Diana Stuart Sutherland

The Professional Officers' Association Prizes  BOTANY A01: Peter George Williams  CHEMISTRY A01: Kerrie Irene Gell

The Pure Mathematics Prizes  PURE MATHEMATICS III: Robert Ian McKay  PURE MATHEMATICS IV: Andrew Wellard Wadsley

Rachel Dorph Memorial Prize  Carolyn Margaret Page

The Ramsay Prize  Richard Shine

The Royal Australian Chemical Institute Prize  Roger James Morris and Diana Stuart Sutherland

The Royal Institute of Public Administration Prize  Kobsak Chutikul

Schlich Memorial Trust Prize  Ronald Desmond Beck

The Shell Company Prizes  ECONOMICS: Sirilaksana Chutikul and Ian James Robinson  SCIENCE: Graeme Eric Sneddon

The Statistical Society of Australia (Canberra Branch) Prize  Kenneth James Palmer

The Supreme Court Judges' Prize  Henry Clifford Burmester
The Tillyard Prize  Ian George Cunliffe
The Timbind Utilization Prize  James William Shirley
The Trustees Executors (Canberra) Limited Prize  Ronald Gordon Mills
The United Commercial Travellers' Association Prize  John Alfred Charles Conybeare

The University Medals  Michael Hilary Boothroyd (English); Julian Maurice Brown (Chemistry); Douglass Roy Fraser (German/Latin); Andrew Wellard Wadsley (Mathematics)

The W. B. Clarke Prize in Geology  David John Holloway

STAFF

THE INSTITUTE OF ADVANCED STUDIES

Mr W. A. C. Adie, Senior Research Fellow in International Relations, formerly Senior Research Fellow, St. Anthony's College, University of Oxford.

Dr P. A. Arriens, Senior Research Fellow in Geophysics and Geochemistry, formerly Research Fellow.

Dr J. A. Barnard, Professorial Fellow in Economic History, formerly Senior Fellow.

Dr M. A. Bennett, Senior Fellow in Research School of Chemistry, formerly Fellow.

Dr D. A. Buckingham, Senior Fellow in Research School of Chemistry, formerly Fellow.

Professor J. C. Caldwell, Professor of Demography, formerly Professor of Demography, University of Ife.

Dr R. I. Close, Senior Fellow in Physiology, formerly Fellow.

Dr A. R. Crawford, Senior Research Fellow in Geophysics and Geochemistry, formerly at University of Toronto.

Dr D. J. Daley, Senior Fellow in Statistics, formerly Fellow, Selwyn College, University of Oxford.

Dr R. E. Edwards, Professor in Department of Mathematics, formerly Professorial Fellow.

Dr J. Ferguson, Professorial Fellow in Research School of Chemistry, formerly Principal Research Scientist, National Standards Laboratory, Commonwealth Scientific and Industrial Research Organization, Sydney.

Dr R. A. Gollan, Professorial Fellow in History, formerly Senior Fellow.

Professor E. J. Hannan, Professor in Department of Statistics, formerly Professor of Statistics, School of General Studies.

Dr J. Langridge, Professor of Genetics, formerly Research Scientist, Commonwealth Scientific and Industrial Research Organization, Canberra.

Dr G. J. R. Linge, Professorial Fellow in Human Geography, formerly Senior Fellow.
Dr P. J. Lloyd, Senior Fellow in Economics, Research School of Pacific Studies, formerly Senior Research Fellow.
Dr B. Morris, Professor of Immunology, formerly Professorial Fellow, Department of Experimental Pathology.
Dr M. F. Newman, Senior Fellow in Mathematics, formerly Reader in Pure Mathematics, School of General Studies.
Dr J. O. Newton, Professor of Nuclear Physics, formerly Reader in Physics, University of Manchester.
Dr G. E. Parker, Senior Fellow in Law, formerly Professor of Law, York University, Toronto.
Dr D. H. Penny, Senior Fellow in Economics, Research School of Pacific Studies, formerly Fellow.
Dr S. J. B. Reed, Senior Research Fellow in Geophysics and Geochemistry, formerly Senior Scientific Officer, Department of Mineralogy, British Museum, London.
Dr P. J. Rimmer, Senior Fellow in Human Geography, formerly Fellow.
Dr R. T. Shand, Senior Fellow in Economics, Research School of Pacific Studies, formerly Fellow.
Dr R. M. Sundrum, Professorial Fellow in Economics, Research School of Pacific Studies, formerly Director of Development, Programs Study Group, World Bank, Washington, D.C.
Dr Marion W. Ward, Field Director (Senior Research Fellow), New Guinea Research Unit, formerly Research Fellow.
Dr R. G. Webster, Senior Fellow in Microbiology, formerly Associate Professor in Microbiology, University of Tennessee.

THE SCHOOL OF GENERAL STUDIES

Mr P. S. Atiyah, Professor of Law, formerly Lecturer, University of Oxford.
Dr R. A. Bryce, Senior Lecturer in Pure Mathematics, formerly Research Fellow in Mathematics, Institute of Advanced Studies.
Mr E. C. Chapman, Reader in Geography, formerly Senior Lecturer in Geography, University of New England.
Dr P. Cossey, Senior Lecturer in Pure Mathematics, formerly Lecturer.
Dr R. R. C. de Crespigny, Senior Lecturer in Chinese, formerly Lecturer.
Dr K. A. W. Crook, Reader in Geology, formerly Senior Lecturer.
Dr N. J. Daly, Senior Lecturer in Chemistry, formerly Lecturer.
Dr B. Davies, Senior Lecturer in Applied Mathematics, formerly Lecturer, Department of Physics, Flinders University of South Australia.
Mr R. M. W. Dixon, Professor of Linguistics, formerly Lecturer in General Linguistics, University College, London.
Dr R. A. Eggleton, Senior Lecturer in Geology, formerly Lecturer.
Mr J. H. Grainger, Reader in Political Science, formerly Senior Lecturer.
Mr I. R. Hancock, Senior Lecturer in History, formerly Lecturer in History, Monash University.
Dr S. Hinds, Professor of Physics, formerly Chief Scientific Officer, Daresbury Nuclear Physics Laboratory, United Kingdom.
Dr Thelma A. C. Hunter, Senior Lecturer in Political Science, formerly Lecturer.
Dr P. A. Janssens, Senior Lecturer in Zoology, formerly Lecturer.
Dr J. T. F. Jordens, Senior Lecturer in Asian Civilizations, formerly Senior Lecturer in Indian Studies, University of Melbourne.
Dr R. B. Knox, Senior Lecturer in Botany, formerly Lecturer.
Mr F. H. Langman, Reader in English, formerly Senior Lecturer.
Dr H. H. E. Loofs, Reader in Asian Civilizations, formerly Senior Lecturer.
Mr D. C. Pearce, Senior Lecturer in Law, formerly Lecturer.
Professor G. S. Reid, Professor of Political Science, formerly Professor of Politics, University of Western Australia.
Dr E. Seneta, Senior Lecturer in Statistics, formerly Lecturer.
Dr Dorothy L. Shineberg, Senior Lecturer in History, formerly Senior Research Fellow in Pacific History, Institute of Advanced Studies.
Dr D. W. Stammer, Senior Lecturer in Economics, formerly Lecturer.
Dr M. T. Tanton, Senior Lecturer in Forestry, formerly Lecturer.
Dr Alice E-S. Tay, Senior Lecturer in Law, formerly Lecturer.
Dr R. D. Terrell, Senior Lecturer in Statistics, formerly Lecturer.
Dr C. H. Tyndale-Biscoe, Reader in Zoology, formerly Senior Lecturer.
Dr M. A. Ward, Senior Lecturer in Pure Mathematics, formerly Lecturer.
Dr M. J. Weidemann, Senior Lecturer in Biochemistry, formerly Humboldt Forschungsstipendiat, University of Munich.
Mr J. Zubrzycki, Professor of Sociology, formerly Professorial Fellow in Sociology, Institute of Advanced Studies.

THE INSTITUTE OF ADVANCED STUDIES

Mr A. A. Barton, Fellow in Electron Microscope Unit attached to Department of Experimental Pathology, on return to the United Kingdom.
Mr J. M. Bennett, Senior Research Fellow in Law, on appointment as Chief Legal Officer, Law Reform Commission of New South Wales.
Dr M. Ann Chowning, Senior Research Fellow in Anthropology and Sociology, on appointment as Associate Professor of Anthropology, University of Papua and New Guinea.
Dr J. A. Dowie, Senior Research Fellow in Economic History, on appointment as Lecturer, Department of Economic History, University of Durham.
Dr B. R. Finney, Senior Research Fellow in Pacific History, on appointment as Associate Professor, Department of Anthropology, University of Hawaii.
Mr S. K. Gupta, Senior Research Fellow in International Relations, on appointment as Professor, School of International Studies, Jawaharlal Nehru University, New Delhi.
Dr S. Izumi, Senior Research Fellow in Mathematics, on appointment as Visiting Fellow in Mathematics.
Dr Norma R. McArthur, Professorial Fellow in Demography, on commencement of a course in Prehistory for the degree of Doctor of Philosophy.
Dr D. N. McVean, Senior Fellow in Biogeography and Geomorphology, on return to the United Kingdom to work in the field of ecological land use surveying. Dr S. Mukherjee, Senior Research Fellow in Theoretical Physics, on appointment to Saha Institute of Nuclear Physics, Calcutta.

Dr D. J. Mulvaney, Senior Fellow in Prehistory, on appointment as Professor of Prehistory, School of General Studies.

Professor A. G. Ogston, Professor of Physical Biochemistry, on appointment as President of Trinity College, Oxford.

Dr W. H. Pearson, Senior Research Fellow in Pacific History, on appointment to the English Department, University of Auckland.

Dr Dorothy L. Shireberg, Senior Research Fellow in Pacific History, on appointment as Senior Lecturer in History, School of General Studies.

Dr D. Vere-Jones, Senior Fellow in Statistics, on appointment as Professor of Mathematics, Victoria University of Wellington.

Mr J. Zubrzycki, Professorial Fellow in Sociology, on appointment as Professor of Sociology, School of General Studies.

THE SCHOOL OF GENERAL STUDIES

Mr K. M. Achdiat, Senior Lecturer in Indonesian, to devote time to creative work.

Dr I. M. S. Dey, Senior Lecturer in Pure Mathematics, on appointment as Lecturer in Mathematics, Open University, United Kingdom.

Professor E. J. Hannan, Professor of Statistics, on appointment as Professor of Statistics, Institute of Advanced Studies.

Mr G. Marston, Senior Lecturer in Law, on appointment to a research position with Institut Universitaire de Hautes Etudes Internationales, Geneva.

Dr M. F. Newman, Reader in Pure Mathematics, on appointment as Senior Fellow in Mathematics, Institute of Advanced Studies.

Dr K. Sloane, Senior Lecturer in Economics, on appointment to the Commonwealth Treasury.

Professor J. D. Smyth, Professor of Zoology, on appointment as Professor of Parasitology, Imperial College of Science and Technology, London.

Dr R. D. Terrell, Senior Lecturer in Statistics, on appointment as Fellow in Statistics, Institute of Advanced Studies.

COMPUTER CENTRE

Mr B. W. Smith, Fellow in Computer Centre, on appointment as Government Systems Manager, Comunet Ltd, Canberra.

Visiting Research Workers

Professor G. Alexandersson, Stockholm School of Economics; Professor R. Arens, University of Toronto; Professor K. Awaysa, Yamaguchi University; Mr J. R. Bainbridge, Monash University; Professor H. B. Barlow, University of California (Berkeley); Dr C. Bartolini, University of Bologna; Professor G. K. Batchelor, University of Cambridge; Professor M. Beck, Rutgers State University; Dr T. M. Berra, Tulane University of Louisiana; Dr V. J. Bofinger, University of New England; Mr H. G. Brooks, Commonwealth Department of Immigration, Canberra; Professor L. Broom, University of Texas (Austin); Professor C. W. Burnham, Pennsylvania State University; Dr L. E. Carlson; Professor W.
hashi, University of California (Berkeley); Dr M. A. W. Thomas, University of Sydney; Mr R. J. Thomson, University of Sydney; Professor H. B. Whittington, University of Cambridge; Dr R. S. Wilcox, University of Michigan; Professor K. A. Wittfogel, University of Washington.

VISITORS

During the year the University was honoured by the visit of—

Her Royal Highness The Princess Anne
The Right Honourable Mr P. Trudeau, the Prime Minister of Canada

Among overseas visitors to the University during the year were: the Right Honourable F. A. Ahmed, Minister for Food, Agriculture Development and Cooperation, India; Dr S. Djojohadikusumo, Minister for Trade, Indonesia; the Right Honourable Lord Butler of Saffron Walden, C.H., Master of Trinity College, Cambridge; Dr C. D. S. Devanesen, Principal, Madras Christian College; the Right Honourable Sir Alexander Douglas-Home, K.T., British Minister for Foreign Affairs and Chancellor of Heriot-Watt University, Edinburgh; Professor Sir Brian Flowers, F.R.S., Chairman of the Scientific Research Council of Great Britain; Professor R. Gibson, University of Indiana; His Excellency Mr E. Hambro, permanent representative of Norway at the United Nations; His Excellency Mr A. T. Benhima, permanent representative of Morocco at the United Nations; Professor D. R. Hampton, San Diego State College; Mr E. Hayward, Deputy Director of UNICEF; Professor E. M. Hoover, University of Pittsburgh; Emeritus Professor Sir Joseph Hutchinson, C.M.G., F.R.S., University of Cambridge; Mr F. Indire, University of Kenya; Professor S. Ishekawa, Hitotsubashi University; Mr S. Kaya, Vice-President of the Japan Centre of Area Development Research; Mr D. Kerr, Director of Information, Commonwealth Secretariat; Professor K. Kojima, Hitotsubashi University; Sir Derek Lang, Secretary of the University of Stirling; Dr S. P. Lopez, President, University of the Philippines; Dr A. Maghrabi, Minister of Supply, United Arab Republic; Dr B. van der Meulen, Head of the Asia and Oceania Section of the Economic Information Service of the Dutch Ministry of Economic Affairs; Professor Ken-Ichi Mori, Tohoku University; Professor H. Nasr, Vice-Chancellor, University of Teheran; Professor D. Oliver, Harvard University; Professor A. T. Phillipson, University of Cambridge; Professor J. R. Prescott, University of Calgary; Dr G. Pringgogidndo, Registrar, University of Indonesia; Mr Hyo Sang Rhee, Speaker of the Korean National Assembly; and a Korean parliamentary delegation; Professor J. R. Roach, University of Texas; Dr F. Sanger, C.B.E., F.R.S., Fellow of King's College, Cambridge; Dr L. M. Singhvi, Honorary Professor of Law, University of Delhi; His Excellency the Honourable Y. S. Sun, Minister for Economic Affairs, Republic of China; Mrs Endang Sulbi Suska, Secretary-General to the Supreme Advisory Council to General Suharto of Indonesia; Professor Toeplitz, Director of the Film Section in the Research Centre at the Polish Academy of Art, Warsaw; Mr G. G. Turbott, Registrar, University of Canterbury, New Zealand; Dr J. Velasco, Commissioner of the Philippines National Institute of Science and Technology; Mr O. V. Wells, Deputy Director-General, FAO; Mr H. Wheldon, O.B.E., M.C., Managing Director of BBC Television; a party of Cambodian students; wives of delegates to the Commonwealth Parliamentary Association Conference.
### PRINCIPAL BENEFACIONS

Special Purpose Grants and Bequests to the University during 1970 were as follows:

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<tr>
<th>Donor</th>
<th>Amount</th>
<th>Purpose</th>
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<tr>
<td>Abbott Laboratories Pty Ltd</td>
<td>$200</td>
<td>For A.C.T. Postgraduate Committee in Medicine</td>
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<td>A.C.T. Cancer Society</td>
<td>$250</td>
<td>For A.C.T. Postgraduate Committee in Medicine</td>
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<td>Aboriginal Affairs Grant</td>
<td>$3,036</td>
<td>For research—Department of Psychology</td>
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<tr>
<td>Amalgamated Engineering Union</td>
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<td>For research—Department of Economic History, Institute of Advanced Studies</td>
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<td>American Council of Learned Societies</td>
<td>$2,218</td>
<td>For library—School of General Studies</td>
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<td>Ampol Petroleum Limited</td>
<td>$1,200</td>
<td>For research—Department of Economic History, Institute of Advanced Studies</td>
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<td>Anonymous</td>
<td>$3,000</td>
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<td>A.P.M. Forests Pty Ltd</td>
<td>$1,000</td>
<td>For research—Department of Botany</td>
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<td>Asian Development Bank</td>
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<td>Associated Pulp and Paper Mills</td>
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<td>Australian Dairy Produce Board</td>
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<td>Australian Academy of Science</td>
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<td>Australian Institute of Aboriginal Studies</td>
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<td>Australian Institute of Urban Studies</td>
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<td>Australian Margarine Manufacturers’ Association</td>
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<td>Australian Newsprint Mills Ltd</td>
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<td>Australian Paper Manufacturers Ltd</td>
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<td>For publication of <em>The Australian Economic Review</em></td>
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<td>Australian Research Grants Committee</td>
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Acknowledgment must also be made here of the many gifts in kind received by the University.
Accompanying Reports and Statements

THE INSTITUTE OF ADVANCED STUDIES

THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH

REPORT OF THE DIRECTOR

Professor F. J. Fenner, M.B.E., F.A.A., F.R.S.

Nineteen-seventy, the first year of a new decade, and more importantly of a new triennium, has seen the initiation of several important new developments in the John Curtin School of Medical Research. Two new departments have been established, two new professors appointed, and the library, common-room and Faculty board-room have been reconstructed and extended.

On 1 January two small academic groups, the Urban Biology Group, previously attached to the Department of Microbiology, and the Human Genetics Group, previously attached to the Department of Clinical Science, were brought together to form the nucleus of the new Department of Human Biology. On 13 November Council established a Department of Immunology and appointed Dr B. Morris, F.A.A., previously Professorial Fellow in the Department of Experimental Pathology, as head of the new department. Neither of these new departments will have much opportunity to expand until additional laboratory space becomes available in the early months of 1972, but several immunologists and research students who are at present members of the Department of Experimental Pathology will transfer to the Department of Immunology in January 1971.

The other major academic appointment during the year followed the resignation of Professor A. G. Ogston as Head of the Department of Physical Biochemistry. Dr L. W. Nichol, Reader in Biochemistry in the University of Melbourne and formerly a Research Fellow in the Department of Physical Biochemistry, has been appointed Professor and Head of the Department and takes up his appointment on 1 January 1971. In August Dr J. B. Smith, who holds a veterinary degree and the degree of Doctor of Philosophy, was appointed as Officer-in-Charge of Experimental Animals; his appointment reflects the growing importance of high quality experimental animals in biomedical research. Staff numbers at the end of 1970 stood at seventy academic (forty-three permanent; twenty-seven short tenure); nine postdoctoral fellows; forty-seven research students and 241 support staff. Eleven research students were awarded the degree of Doctor of Philosophy during the year and twelve new research students were enrolled.

In biomedical subjects the commonest method of publication of research results is articles in technical journals. In addition, more experienced scientists may be invited to contribute chapters to multi-author books, or may themselves produce
books. During 1970, exclusive of abstracts, reviews, and similar brief notes, 126 articles were published in technical journals, thirty-six chapters were contributed to a wide variety of scientific books, and eight books were published.

When the permanent building of the John Curtin School of Medical Research was constructed in 1954 it was intended that the library should eventually extend over the whole of the top floor of the spine. This extension has now been completed, and the library was extended for a further eighteen feet to the west, and completely reorganised. Eighteen carrels were added and five small noise-proof studies constructed for staff and students engaged in continuous library work. Carpentry of the floor and rearrangement of the lighting have produced a first class library, which should satisfy the needs of the School for many years. Consequent to the expansion in the library we were able to enlarge the common-room so that it is better able to accommodate the present staff. On the ground floor level the additional space has been utilised to establish a School computer centre, which houses the School Programmer, a PDP8/I computer purchased during the year, and card punching and card sorting facilities.

Honorific lectures given during 1970 included the George Judah Cohen Memorial Lecture of the University of Sydney (Dr S. V. Boyden, F.A.A.), a Congress Lecture at the third International Congress of Lymphology (Professor F. C. Courtice, F.A.A.), the Lilly Lecture of the Royal College of Physicians of London (Professor Fenner), the Ciba Lectures in Microbial Biochemistry at Rutgers University (Professor Fenner), the Congress Lecture at the eighteenth International Dairy Congress (Dr H. A. McKenzie), and the Guest Lectureship for 1970 of the Australian Biochemical Society (Professor A. G. Ogston, F.A.A., F.R.S.).

The Department of Biochemistry has continued to investigate problems of fundamental biochemistry with an emphasis on the chemical processes within cells. For much of the work it has been found most convenient to study the bacterium *Escherichia coli*. The biochemical processes within the cells of this organism are much the same as in all other living cells and it has the additional advantage that more is known about its genetic make-up than is known about any other living organism.

The problems under investigation include the respiration of cells; the biosynthesis of cell constituents; the functioning of enzymes; the structure of the cell membrane and the transport of materials through this fatty barrier.

The detailed biochemical processes underlying cellular respiration in many ways is still one of the least understood important biochemical processes in the cell. Investigations with mutants of *E. coli* unable to form an important component (ubiquinone) of the respiratory process, have allowed a new theory of ubiquinone function to be proposed. These mutants are also being used to study the pathway of ubiquinone synthesis. Other mutants which can use oxygen to oxidise sugars, but obtain no energy from such oxidations, are also being studied. Several key enzymes which serve as control points in the chemical activities of the cell are being studied in detail. These investigations include a study of the actual chemistry of the enzymes and the kinetic studies in which the enzymic activities are measured under various conditions, such as the absence and presence of inhibitors and activators.
A new iron-binding compound formed by bacterial cells has been isolated and its role in iron transport studied. Work on the transport into the cell of compounds containing phosphorus has also continued with the development of a new method for isolating the specific protein which binds phosphate for its transport and further studies of the reactions between phosphate and the protein. One new project started during the year is a study of the formation of the skin pigment, melanin. Little is known about this process which is technically very difficult to study. It is hoped that, by using material from individuals who have genetic defects in melanin formation (the extreme is albinism), it may be possible to find out something more about pigment formation in man.

Among the achievements of members of this Department over the past few years are the isolation and identification of more than thirteen chemical compounds, important in cell metabolism, which were previously unknown or had not been definitely identified, and the identification of fifteen new genes and their positions on the chromosome of *E. coli*. This work has opened up the study of about thirteen new enzymes, some of which will form the basis of further studies in the Department.

The Department of Clinical Science is located in the Canberra Hospital. It accepts responsibility for the investigation and treatment of patients and pursues a program of clinical and laboratory research orientated towards problems associated with coronary heart disease.

Work done during the year has included continuing epidemiological studies in the highlands of New Guinea where coronary heart disease is rare; investigations into the form in which fats are transported in blood and the dietary and hormonal factors which influence the concentration and flux of blood fats; studies on the interrelationships between carbohydrates and fats; an evaluation of the treatment of obese patients and examination of the responsiveness of obese tissue to normal controlling mechanisms; studies on borderline high blood pressure and its control by a drug which blocks nervous stress effects; and investigations relating to blood coagulation and thrombus formation. The effect of diet during pregnancy on the growth and health of offspring has been under study in rats.

In the Department of Experimental Pathology work has concentrated on the basic mechanisms concerned in several normal and disease processes.

Studies on the origin and development of atherosclerosis have continued. These have concerned especially the ultrastructural changes that occur in the arterial wall with ageing and the transport and metabolism of cholesterol, a substance which plays an important role in the development of the atherosclerotic lesions of arteries.

In the broad field of lipid transport and metabolism, further work has been done on the precise mechanisms concerned in the formation and ultimate fate of chylomicrons. These are lipid particles in which form ingested fat and cholesterol are absorbed from the gut and a knowledge of their mode of formation and of their metabolism is important in an understanding of the aetiology of several disorders including coronary heart disease.

Other experiments concern the reactions of cells and tissues to different kinds of injury leading to inflammation. The types of injury used have been heat, depri-
vation of oxygen and various foreign materials including homografts. In these experiments changes in cellular organelles and enzymes as well as in the microcirculation have been studied.

Further work has been focussed on the mechanisms concerned in the development of immunity. Special attention has been given to the reaction of homograft rejection, particularly in relation to kidney transplants and to methods for increasing the survival time of transplants.

In all of these studies many different approaches to the problems have been made to assess both the ultrastructural and biochemical changes involved.

Two Siemens Elmiskop I electron microscopes and one Philips EM200 electron microscope and accessory apparatus are in operation. The facilities enable the investigation of the fine structure of cells, viruses and other material of biological origin. The equipment is available to all members of the School, and when required assistance is given with specimen preparation and microscope operation.

The Department of Human Biology was established in January 1970 by amalgamating two small research groups which had previously been attached to other departments; the Urban Biology Group (previously attached to the Department of Microbiology) and the Human Genetics Group (previously attached to the Department of Clinical Science). The Director acts as Head of the Department, pending the appointment of a permanent head. Work in the Department has continued upon two lines—the biological consequences of civilisation and genetic polymorphisms in human blood.

Dr S. V. Boyden has participated in numerous conferences in Australia and overseas, relating to problems of man and the environment, and during the year his book *The Impact of Civilisation on the Biology of Man* was published by the Australian National University Press.

Due to the long operation of its caste system India provides unique material for human genetical studies, which Dr R. L. Kirk is exploiting in collaborative studies with Indian geneticists located in Bombay and Calcutta. He has also continued his work on antigens and enzymes in the blood cells and plasma of Australian Aborigines and in New Guinea populations, and he has used the data collected for a number of theoretical studies on genetic distance and segregation analysis.

The research work of the Department of Immunology is concerned with the way in which the animal recognises micro-organisms and foreign tissues and subsequently reacts against them. The immunological reactions that occur against organ and tissue grafts are being studied with special emphasis on kidney and skin grafts and transplants of white blood cells. Experiments are being done to induce a state of tolerance in animals to tissue grafts and to analyse the reasons why this tolerant state exists.

The aim of all these experiments is to discover a rational approach to the important medical problem of organ transplantation and to gain an insight into some of the possible immune mechanisms that operate in cancer and autoimmune disease.

The greater part of the work of the Department of Medical Chemistry has continued to be concerned with the study of heterocyclic substances with a view
to unravelling their chemistry and paving the way for the discovery of new biological agonists and antagonists. Inevitably, having regard to those families of heterocycles that play dominant roles in human metabolism, the research effort has been concentrated on the purines, pteridines and pyrimidines and on analogues containing one extra nitrogen atom in each molecule.

In the year under review, special attention has been paid to the azapurines, which are the only naturally occurring substances to have three consecutive nitrogen atoms in the molecule, and which are much used in experimental cancer research. A new general method has been discovered which enabled depot forms of the anti cancer agent '8-azaguanine' to be prepared for the first time, and these have gone forward for biological testing. Our earlier report that azapurines combine strongly with water has prompted further work. Preliminary results suggest similar behaviour by azapurines with other nucleophiles, a class of substance widely distributed in tissues.

Research into the azapteridines (which occur in micro-organisms and have potent biological actions) has been narrowed to concentrate on the most promising series (the 7-azapteridines) for trial as potential antileukaemic agents.

Remarkable potentiation of the action of the antibiotic phleomycin has been effected with some purines synthesised in the Department (work in collaboration with Dr G. W. Grigg, Division of Animal Genetics, CSIRO). It is hoped that this will prove to be the first step in improving the selectivity of this antibiotic in human use.

Physicochemical aspects of the work of the Department, notably in metal-complex equilibria, ionisation constants, and nuclear magnetic resonance spectra, have benefited considerably from the installation of a PDP8/I computer in the John Curtin School of Medical Research and the development of computer programs for handling routine calculations from experimental data. New methods have been devised for exploring the distribution of biologically essential heavy metals among the complex-forming species present in living cells, and work is continuing on mixtures of metal ions and complex species as models for biological systems.

Work in the Department of Microbiology is concerned mainly with the properties of viruses, with the ways in which they infect animals and with the defence mechanisms which the animals use to overcome such infections. In addition the Department is interested in the way in which the body can recognise and react against much simpler substances than whole viruses. Much of the work carried on in the Department has a long-term basis but every now and then findings are made which may have more immediate applications. In this Report three such findings are mentioned.

There are two main immunological defence mechanisms of the body. One mechanism is the secretion of specific substances, called antibodies which will react with and neutralise the effect of injected foreign substances; the other aspect is that other cells, which are closely related to the former type, may act as killer cells which can directly kill a foreign cell or cause the destruction of foreign substances. During viral infections one or other of these two types of defence mechanisms seems to play a dominant role. In a virus disease of mice, called mousepox, which has many similarities with smallpox, it has now been shown that the major defence mechanism is the production of killer cells by the
body. This type of work is being expanded to a variety of other types of viral infections of animals and it is expected that some of these findings may be relevant to viral diseases in humans.

Closely related with this work is our interest in the properties of vaccines which boost the ability of the body to combat a viral or a bacterial infection. A finding of considerable importance made this year is that the ability of a vaccine (in this case, an isolated component of a bacteria) to stimulate the body’s defences may be varied according to the way in which the vaccine or isolated protein is treated during preparation. Thus, when isolated without any modifying treatment, the substances may cause predominantly the formation of antibody molecules by the host. If modified during isolation, however, the modified antigen may preferentially stimulate the production of killer cells by the body. Such a finding has considerable practical implications.

Finally, there have been important advances in the study of one of the commonest of all viral infections, namely influenza. By taking the virus to pieces more carefully than previously, additional components have been found and some of these seem to have particularly important properties. Influenza virus has the remarkable ability to 'change' its properties every now and then and this was most marked during 1957 when Asian influenza hit the Western world. The origin of the new types of influenza virus during such outbreaks is not completely clear but China seems a strong possibility. Recently investigations have been carried out to see whether birds which migrate from the Northern Hemisphere to Australia may carry influenza viruses and preliminary evidence now indicates that this may be the case.

Members of the Department of Physical Biochemistry aim to study physical and chemical aspects of substances, systems and processes of biological and medical interest.

A major interest of one group during the last decade has been in the complex sugars found in connective tissues (e.g. artery walls, heart valves and cartilage). With the retirement during the year of Professor A. G. Ogston as Head of the Department, work in this area largely ceased in June. However, a small group led by Dr J. R. Dunstone, Honorary Fellow, is concerned with tissue polysaccharides and analogous systems. One of Dr Dunstone's special interests is the correlation of the macromolecular properties and chemical composition of the blood group substances with their biological activity. Another group is interested in protein chemistry and is mainly concerned with the chemical evolution of proteins and the relationship of their structure to their biological behaviour. The effects of small changes in composition, wrought by evolution, on the effects of temperature and organic substances on the stability of a variety of proteins and enzymes are being studied. Attention has been directed to comparative studies of milk proteins with a view to gaining some idea of their relative importance in allergenicity reactions and in cot deaths of infants. Studies of proteins responsible for the synthesis of the milk sugar lactose in a range of mammals from humans through to monotremes (echidna, platypus) have led to some remarkable observations on the evolution of these proteins.

A group led by Dr A. B. Roy is concerned with the enzymes of sulphate metabolism in mammals. Considerable progress has been made recently in gaining an understanding of the kinetics and physical properties of sulphatase A
from ox liver. It has been found that similar sulphatases occur in the liver of the red kangaroo, showing that evolution of the sulphatases had proceeded to an advanced state in the early evolution of the mammals.

One worker has been concerned with theoretical studies of the mammalian retina and another with radiation studies of lineolic acid. With the latter's resignation the radiation work has now ceased in Canberra but is being continued at Macquarie University.

Early in 1971 Dr L. W. Nichol is expected to take up duty as Professor and Head of the Department.

The work of the Department of Physiology is mainly concentrated along three separate lines—(a) the nature of the chemical substances used to transmit information between nerve cells; (b) the way muscle nerves influence and determine the properties of the muscles to which they are connected; and (c) the nervous mechanisms in the eye and the brain that enable us to see and recognise the objects in the world about us.

Studies of chemical transmitter substances operating at synapses within the mammalian brain and spinal cord have continued using microtechniques developed in past years. A major discovery has been the finding that bicuculline, a convulsant alkaloid, is a specific antagonist of gamma aminobutyric acid. For the first time convincing pharmacological evidence has been provided for the function of this amino acid as an inhibitory transmitter controlling the operation of nerve cells in the cerebral cortex, deeper cerebral nuclei and spinal cord. Further analyses have been made of the structure of a range of convulsant drugs, including those related to strychnine, which provide information regarding the properties of membrane receptors at inhibitory synapses on nerve cells. Investigations have also continued of the factors involved in the synthesis, storage and inactivation of transmitter agents, and the manner in which these substances excite or inhibit nerve cells.

Further work has been carried out on the mechanism of muscular contraction and neural control of the speed of shortening of mammalian muscles. Changes in the mechanical properties of fast and slow muscles during development and following nerve cross-union have now been characterised by determining the relation between speed of shortening and load of the contractile filament units. The next stage in the investigation was to find out which property of the molecules of the contractile filaments limits the rate at which the muscle fibres shorten and perform work. The results obtained in the last two years show that the speed of shortening of normal and cross-innervated fast and slow muscles is directly proportional to the rate at which the enzyme sites on the contractile material, hydrolyse adenosine triphosphate, thereby releasing energy for contraction.

Four electrophysiological laboratories are now in routine use for studies on the brain mechanisms underlying vision and a fifth laboratory will soon come into use. The main aim of this work is to understand how the brain uses the showers of nerve impulses that come from the eyes so as to be able to recognise objects in the external world and to discriminate one object as being different from another. Over the past few years an entirely new and detailed theory for stereoscopic depth vision has been developed and more recently much new
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evidence in its support has been obtained. Important advances have also been made concerning the neural mechanisms responsible for the visual data processing in the eye and in the main centres on the visual pathways in the brain. A start has also been made on behavioural studies designed to assess the normal visual abilities and characteristics of the animals used in the electrophysiological work. A solution to the problem of visual pattern recognition is of the greatest importance not only in relation to vision but also for our general understanding of brain function.

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‡ Not a member of this University.
† Member of the Department of Physical Biochemistry.
¶ Based on work done while a member of the Department of Physical Biochemistry.
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† Not a member of this University.
* Based on work done while a member of the Department.
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* Based on work done while a member of the Department.
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PEDERSEN, N. C. & MORRIS, B.

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* Based on work done while a member of the Department.
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* Based on work done while a member of the Department.
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Gibbs, A. J.* & Smith, H. G.‡


Laver, W. G.


Mc Cahon, D.* & Cooper, P. D.


Mandel, T.‡, Byrt, Pauline‡ & Ada, G. L.


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* Based on work done while a member of the Department.
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**Theses**

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'Studies on the pathogenesis of lymphocytic choriomeningitis virus infection.' *Department of Microbiology.*

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† Not a member of this University.
‡ Visiting Research Worker.
* Based on work done while a member of the Department.
REPORT OF THE DIRECTOR

Professor Sir Ernest Titterton, C.M.G., F.A.A.

During 1970 the level of operations within the School was held very close to that of the preceding year. The cut in the funds requested for the year, which became necessary following publication of the Australian Universities Commission recommendations for the 1970-72 triennium, not only made expansion in established departments impossible but also necessitated a year’s delay in developing the new Departments of Applied Mathematics and Solid State Physics. Nevertheless, research work in the School was pursued with vigour and resulted in a total of 265 publications, 243 of these being papers in international or local scientific journals, nine books, chapters of books or encyclopaedia entries while thirteen were research reports published by the University itself. In addition twenty-three theses for the degree of Doctor of Philosophy went forward for examination during the year.

At an investiture in Government House, Canberra, on 24 April, the Queen conferred a Knighthood on the Director, Professor E. W. Titterton and, in the same month, the Royal Society of London announced that Professor J. C. Jaeger, F.A.A., had been elected to a Fellowship. The year also saw an unusual tribute paid to Professor B. H. Neumann, F.A.A., F.R.S., by his ex-pupils and colleagues from all over the world. In recognition of his sixtieth birthday, twenty papers dedicated to him were published in the *Journal of the Australian Mathematical Society*. A similar number of papers from others of the group are due to appear during 1971. This is eloquent testimony to the esteem in which Professor Neumann is held amongst the community of pure mathematicians. Professor Neumann, also, was elected a Fellow of the Australian College of Education and to a Vice-Presidency of the Australian Academy of Science.

One of the apprentices in the main workshop, Mr A. Harding, received a certificate from His Excellency the Governor-General as the outstanding apprentice of the year in the fitting and machining trade. A part of his prize was a trip aboard H.M.A.S. Swan to take part in the Independence celebrations in Fiji.

A Churchill Fellowship was awarded to Mr A. D. Campbell, a senior technical officer in the Department of Engineering Physics; he will spend six months overseas during 1971.

Some significant staff changes occurred and, in addition, important new appointments were made during the year.

Professor J. O. Newton arrived in Canberra to take up the Chair of Nuclear Physics in February while Professor G. H. Newstead, for health reasons, resigned from the Chair of Engineering Physics in July.

The two new Chairs of Applied Mathematics and Solid State Physics were advertised during the year. Excellent candidates were forthcoming for both and Professor B. Ninham, Associate Professor in the Department of Applied Mathematics, University of New South Wales, was appointed to the first and Dr A. Runciman, Head, Solid State Physics Division, Atomic Energy Research Establishment, Harwell, UK, was appointed to the second.
Professor Runciman will take up duties in Canberra in mid-February 1971 and will initiate experiments to study magneto-optical phenomena making use of the facilities of the high magnetic field laboratory already developed in the School. The Department of Applied Mathematics, established on 1 January 1971, will pursue as its principal research interest the applications of mathematics and mathematical physics in biological areas. Professor Ninham will take up his chair in April 1971. The new Department was launched with news from the Department of Education and Science that it had been awarded three of the six available Queen Elizabeth II Fellowships. The recipients Drs C. Pask, P. Richmond and M. O. Diesendorf are very able young men. The award of three Fellowships to one Department in a single group is an Australian record; it says much for Professor Ninham's standing in his research field.

Dr R. E. Edwards, F.A.A., was appointed to a non-established chair in the Department of Pure Mathematics, the first such chair in the University since their introduction earlier in the year.

The term of Emeritus Professor Sir Leonard Huxley, K.B.E., as a Visiting Fellow in the Electron and Ion Diffusion Unit was completed and he was appointed to an Honorary Fellowship. Both he and Emeritus Professor Sir Mark Oliphant, K.B.E., F.R.S.N.Z., F.A.A., F.R.S., our second Honorary Fellow, continue their work in the School.

The School received its usual quota of distinguished overseas visitors. Notable amongst them were Professor Sir Brian Flowers, F.R.S., Chairman of the United Kingdom Science Research Council; Dr I. S. Zheludev, Deputy Director General of Technical Operations, International Atomic Energy Agency, Vienna; Professor T. Lauritsen, California Institute of Technology; Dr G. Morrison, Argonne National Laboratory; Dr R. Creagan, Westinghouse, Pittsburgh and Professor T. Erber, Illinois Institute of Technology. Of particular interest to the geophysicists was the visit of Dr P. Chapman, an Australian-born NASA scientist, now in charge of the scientific experiments to be carried in the moon landing vehicle of Apollo XIV.

Visiting research workers were not quite as numerous as last year as the School could offer very little financial support. However, some thirteen workers, funded from outside the School, joined in the various research programs and their contributions have been of great value.

An effort was made to increase the flow of information at all levels within the School. In addition to the Director's regular talks to the non-academic staff, to a technical officers' group and to students, a monthly news sheet was established and summaries of the agenda of each Faculty Board meeting are now posted on notice-boards.

Faculty met, as usual, three times during the year while Faculty Board came together on twelve occasions. Dr B. A. Robson completed his term on Faculty Board and, by election, was replaced by Dr S. R. Taylor.

Faculty, encouraged by the experiment it initiated last year, of inviting students to attend one of its meetings carried out a referendum amongst the student body to seek their opinions. As a result, an open invitation was issued to all
students in the School to attend Faculty meetings with speaking but not voting rights.

Discussions in Faculty ranged over a great breadth of topics. Amongst them were the current building program, the 1973-75 triennium plans, the urgent need for an adequate School lecture theatre, improvements ('cosmetics') to the appearance of the old buildings on the Physics Peninsula and worries about the effects of the expressway to be built along the lake shore. This will be very close to the Mathematical Sciences Building and Oliphant Building, as well as to the proposed Solid State Physics and Applied Mathematics Building.

Faculty Board covered much of the same ground but had, in addition, to consider in detail plans for the 1973-75 triennium. Two new proposals—for a Department of Liquid State Physics and a High Energy Physics Unit—were considered. Although both these suggestions had merit a significant expansion in staff and a substantial injection of new funds would have been required to implement them. In addition the Department of Geophysics and Geochemistry made two proposals, each envisaging a large expansion in its operation. The first was for separation from the Research School of Physical Sciences, a new School of Earth Sciences to be formed which would have an ultimate size double that of the present Department. The second was that a very substantial increase in the operations of the Department be funded within the School.

Faculty Board examined all of these suggestions with care. In the case of the Department of Geophysics and Geochemistry it was unable to support either of the proposals if, as was evident, the increase in size of Geophysics had to be at the expense of other operations in the physical sciences in the University. Faculty Board took the view that the balance between the various disciplines within the School had been determined carefully and it was felt that this balance should be maintained.

The submission finally sent forward requests a modest expansion to allow a proper consolidation of operations in the original departments, including Geophysics, to be achieved and allowing for the full development of the two new Departments of Applied Mathematics and Solid State Physics and the School's Computer Unit during the 1973-75 triennium. In addition, Faculty Board backed a proposal for special capital funds to allow the Department of Astronomy to build a 60-inch photometric telescope at Siding Spring Observatory. This instrument would replace the 100 year old 50-inch telescope at Mount Stromlo Observatory which is now at the end of its useful life.

The unexpected retirement of Professor Newstead made it necessary to consider the future of the Department of Engineering Physics.

It was decided to concentrate work into those areas capable of utilising the unique facilities of the homopolar generator. With this in mind, the decision to cease activities in plasma physics research in 1972 was reaffirmed and it was decided to terminate that Department's share of the work with the Warramunga Seismic Array at the end of the present triennium.

Following on this streamlining of the Department's research program, the Chair of Engineering Physics was advertised and it is hoped to make an appointment early in 1971.
By the end of the year work had commenced on the extensions to the Mathematical Sciences Building urgently required to help to house Applied Mathematics.

The drawings for the extensions to the Cockcroft Building were completed and it is hoped that work will begin early in 1971.

At Siding Spring Observatory, building operations relating to the Anglo-Australian 150-inch Telescope were well advanced. The Lodge has been extended by sixteen new units, five houses have been completed and handed over, and the visitors' block is approaching completion. Preliminary levelling of the site for the 150-inch telescope itself has been completed and a contract for the dome let.

The decision to build a new accelerator for Nuclear Physics in a vertical configuration was taken late in the year. A crash program to design a tower to accommodate the machine was initiated and completed by year's end. This tower has to be ready by June 1972 to receive the accelerator. It will stand on the site of the old HT Laboratory, which was demolished late in December to provide the space. The contract for the 72 ft long by 18 ft diameter pressure vessel, to be built in Australia, calls for its installation, mounted off the base of the tower, commencing in August 1971.

The following sections give a brief outline of the more important developments in the various departments and units of the School.

Research Activities

Three senior members of the Department of Astronomy continued to provide aid to the Anglo-Australian 150-inch Telescope project. Professor O. J. Eggen attended meetings of the Joint Policy Committee held in the UK and in Australia, Professor S. C. B. Gascoigne, F.A.A., continued his work on the optics of the instrument, while Dr A. W. Rodgers is involved in work with ancillary instrumentation.

On the observing side the program for identifying and studying Quasars and radio galaxies has been a major one this year. It was undertaken as a joint operation by a working group of Mount Stromlo and Parkes astronomers. Thirty Quasars were identified and spectra obtained for nineteen of these as well as for an additional eight radio galaxies.

This activity already consumes some 50% of the available time of the 74-inch reflector during the dark of the moon and is expected to grow in future years. Researches of major importance include the tracing of the magnetic fields of our galaxy and of the Magellanic Cloud galaxies; observations with new, sensitive infra-red detectors that have revealed many details of both star births and star deaths; developments of new procedures for deriving the masses of globular clusters, made possible by new image tube spectrographs; significant advances in the building of stellar models, especially for the important evolutionary phases represented by planetary nebulae and red supergiants; and accumulation of evidence that the initial helium abundance at the formation of our galaxy was some 20%.

The past year was marked by a large increase in the use of Mount Stromlo Observatory and Siding Spring Observatory equipment by Australian astrono-
mers who are not members of this University, and a sharp increase in the
construction of equipment, mainly for use with the 150-inch reflector. The pro-
gress with the construction of the 150-inch telescope is as planned and by the
end of the year all secondary buildings (workshop, visitors' museum, etc.) were
completed and construction started on the main building.

The proposal of the British Science Research Council to build a 48-inch
Schmidt telescope at Siding Spring Observatory received approval late in the
year. This will be a pilot instrument for the 150-inch telescope and it is expected
that construction will begin during 1971.

Researches undertaken in the Diffusion Research Unit lie in certain areas of
liquid state physics. Important developments have been made in the theory
where, starting from a molecular basis, it has been possible to calculate some
macroscopic properties of liquids. Among the techniques employed is that
of molecular dynamics where a group of molecules are assigned certain inter-
action parameters and then allowed to interact, their progress being followed by
a computer. From their configurations as a function of time it is possible to
calculate various properties of the liquid. Since the interaction parameters are
arbitrarily assigned in these theoretical studies, one role of the experimentalist
is to measure liquid properties very accurately so as to test the correctness of
the assigned parameters. The experimental groups have, therefore, concentrated
work on high pressure and cryogenic studies both of which are essential for
such comparisons.

Other studies are also in progress on aqueous electrolytes and liquid water, the
latter mainly in connection with its interaction with silica surfaces. The im-
portance of water makes such studies valuable, particularly as the rigorous
theory for complex molecules is still at an elementary stage.

The pre-eminence of diffusion techniques, pioneered by the Electron and Ion
Diffusion Unit, for studying the collisions between low-energy electrons and
ions and neutral particles is becoming increasingly recognised. The Unit con-
tinues to take advantage of its leading position in this field by studying a small
number of selected topics in depth.

Work on low energy elastic scattering in helium, which provides the most
reliable data for this gas, has been extended to neon and argon with similar
success. An extension of the analysis of electron transport data in hydrogen has
provided the first evidence for the dependence of the pure vibrational cross-
section on the rotational state of the molecule.

Experiments to measure diffusion coefficients directly, using the equipment
designed by CISE, Milan, have undergone considerable development following
the recognition of the importance of surface effects on measurements with the
thermal electrons. The method is expected to fulfil its promise in the near future.
A series of precise experiments on positive ion mobilities has demonstrated a
most interesting, but unexpected, dependence of the mobility on the gas number
density. This has not been observed previously and it cannot, as yet, be ex-
plained theoretically. The phenomenon is being investigated further using a
facility for mass analysis to determine whether or not another ion species is
present. If it is it would be evidence for a previously unobserved ion-molecule
reaction.
The current prime objective of the *Department of Engineering Physics* is to contribute new knowledge to the physical sciences by conducting experiments which can make use of the unique capabilities of the homopolar generator system through providing very large pulsed currents at very high power rates.

Administratively, the year was marked by the retirement, at short notice, of Professor G. H. Newstead, through ill-health. As mentioned earlier, in the review of the Department’s program which followed, it was decided to establish a tighter, more integrated departmental structure, based more closely than previously on an expanding experimental program employing the homopolar generator. To ensure success of the program additional staff with strong physical sciences backgrounds are being sought to complement the existing strong group of staff which is orientated in the engineering and information sciences fields so as to achieve an optimum interdisciplinary balance. In the rearrangement of the activities of the Department, it will be necessary to taper off the present work in plasma physics and seismic information processing in order to release personnel and resources to the main program.

A considerable step forward in enhancing experimental capabilities and opening up a wide range of experiments which can be powered by the homopolar generator was achieved by the development of new techniques for employing an intermediate inductor energy store. This store, energised from the homopolar generator, delivers, through the action of novel circuit breakers, energy of correctly matched voltage, power and time duration to suit loads to which the homopolar generator itself would be unable to feed energy directly. This development has contributed to the success of the high power laser and macroparticle accelerator projects, both of which are developing well.

Commissioning tests of the 300,000 gauss solenoidal magnet devised and built in the Department (the most powerful such device ever constructed) were begun. Although the magnet was not tested up to full power due to initial limitations imposed by the cooling water manifold, tests up to 212,000 gauss indicated that the behaviour and performance were within design predictions. This field, for its time duration, is already the highest available anywhere in the world. The tests to date give confidence that the full design specifications of the system will be met. A solid state physics experiment was carried out during commissioning tests at a field in excess of 200,000 gauss.

Successful development of an extremely precise laser system puts the laboratory on an equal footing with some five other laboratories elsewhere in the world. Using high precision optical components and careful operation, a diffraction limited beam has been produced from a mode locked oscillator which produces a series of pulses of radiation, each of a few picosecond's duration, separated by several nanoseconds. A light gate allows a single pulse to be selected for further amplification. To produce a laser of great power, it is planned that such pulses will be amplified by an amplifier powered by the homopolar generator. This will be achieved via an inductive energy store switched by a newly developed switch capable of breaking extremely large currents in times much shorter than has been possible in the past. This system will lead to a laser of power output unmatched by that of any other group; moreover, it is expected that the realisable photon energy density will also be unique.
Other developments in the Département have involved construction of experimental macroparticle and linear gas accelerators which are to be tested shortly; studies of low current arcs which have thrown interesting light on the behaviour and mechanism of such arcs; and work on runaway electrons in a toroidal plasma machine. These last experiments have provided the first evidence defining the region of a Tokamak plasma from which the runaway phenomenon is initiated. A time averaged energy distribution of the runaway electrons has been obtained for the first time.

Finally, work of the information science group has produced interesting results. These include the development of procedures for the automatic formation of models involving a novel organisation of information, original contributions to the processing of natural images, and the building up of unique interactive picture processing capabilities. An on-line control and data acquisition facility to aid experimental work has been established within the Department.

Developments in seismic information processing during the year included a particularly effective long period seismometer, improvements in the handling of large masses of seismic data, and successful development of a new horizontal seismometer of versatile performance.

In the Department of Geophysics and Geochemistry the most exciting activity continues to be the study of the lunar rocks from the Apollo XI and XII missions. Three members of the Department were nominated by NASA as principal investigators for the Apollo XI and XII samples. The Department's involvement in lunar work is greater than that of any single earth science department outside the USA and is exceeded by only a few departments in that country. The main results have been the increased precision in dating of the very small samples available, so that major volcanic activity is now known to have taken place over a long period, between 2.8 and 3.8 billion years ago. Secondly, it is fortunate that the conditions of pressure and temperature in the moon come within the range of high-pressure-temperature apparatus available in the Department. Because of this it has been possible to make direct experimental investigations of the phase and mineralogical relationships in the lunar interior.

Important observations on the nature of the zone of low seismic velocities have been made by the experimental petrology group. These have shown that very small amounts of water (0.1 to 0.2%) have a profound effect on the melting temperature and mineralogy of the peridotite in this region of the upper mantle of the earth.

The first observations with a magnetometer array in Australia were made across South Australia and western New South Wales in September. Twenty-five instruments, belonging to Professor D. I. Gough, a visitor from the University of Alberta, were installed along three lines across the centre of the continent. The northern one stretched between north of Wilcannia and west of Oodnadatta, the central one between Wilcannia and west of Coober Pedy, and the southern one from south of Menindee to Maralinga. The instruments were installed mainly at homestead airstrips, and were serviced by light aircraft. They record continuously, and are sensitive to magnetic storms. By examining the responses of different instruments to the same magnetic storm, information can be obtained on the electrical conductivity of the earth to depths of the order of 100 miles. Electrical conductivity is closely linked with temperature, and thus lateral vari-
ations of temperature may be detected. The present area was chosen for study because it is believed to cover a fundamental suture line in the Australian continent, shown on the surface by the Flinders Ranges. Preliminary inspection of the records indicates that there is, indeed, an anomalous zone in the vicinity. The interpretation of these results should give new information on the structure of the continent. A second experiment is planned for the early part of 1971, to cover Victoria and southern New South Wales.

Other activities of the Department remain as before. There is a very large collaborative program of isotopic age dating and isotope studies on rocks from Australia, Antarctica and India, and activity in the Pacific Islands is increasing. So far as possible, this work is combined with studies of trace-element geochemistry and palaeomagnetism so that the course of continental drift is now becoming clear. Work in magnetic deep sounding and magnetotellurics is being extended; seismology continues with the operation of the Warramunga and Canberra arrays and work on rock deformation, structural geology, rock mechanics and heat flow continues.

The Department of Mathematics pursued its research activities in pure mathematics, principally in algebra and analysis; substantial use was made of the computing equipment of the University to study a narrow range of algebraic problems and different computer methods to attack them. The throughput of research students continued, and former scholars of the Department are now to be found in many parts of the world. Members of the Department were in demand for many ancillary activities, such as refereeing, reviewing, examining, editing, advising; several members travelled extensively to attend conferences and to give lectures in numerous places overseas. The Department again played a large part in bringing distinguished mathematicians as visitors to Australia, and visitors from other parts of Australia to Canberra. A particularly valuable short visit, shared with other Australian universities, was that of Dr P. Neumann. He gave some fifteen seminars including detailed reports on work going on in Oxford, England and Moscow, USSR.

In the Department of Nuclear Physics final decisions were taken on the spending of the $2.2 million made available by the Australian Government for improvement of the accelerator facilities.

It was decided to install—

(a) A fixed energy cyclotron, to be built by Cyclotron Corporation, to inject into the EN tandem. This will arrive in August 1971 and, combined with the EN tandem, will produce protons with energies of 26-39 MeV and deuterons of 13-26 MeV.

(b) A 14 UD tandem accelerator to be built by the National Electrostatics Corporation is expected to arrive in the middle of 1972. This is the most sophisticated accelerator yet built and it will provide beams of $^3$He and $^4$He up to 42 MeV and of Cl and Br up to 200 MeV as well as those of many other projectile species. This tandem will, for a considerable time, be by far the best machine of its type in the world. Existing tandems only achieve terminal voltages of some 10 MV as compared with the guaranteed 14 MV of the 14 UD machine.
Another important event on the technical side was the arrival of the polarised ion source in July. The acceptance tests in New Zealand were highly successful and the ion source has now been installed. It is hoped to have a beam from the source through the tandem by the end of February 1971. If all goes as expected the beam current obtained should be in the region of 80 na, which is considerably larger than that of any other existing polarised source; this should, therefore, put the Department in a good position to do effective work in this important new field.

The research activities of the Department continued along similar lines to those of last year. An experiment which has excited considerable interest was an investigation of the lowest \( T = 2 \) state in \(^{12}\text{C}\). It was expected on theoretical grounds that this state might be measurably excited in the isospin forbidden reactions involving deuteron capture on \(^{10}\text{B}\). However, the cross-sections for these reactions were not observed and are remarkably small. The \( T = 2 \) state was observed in the \(^9\text{Be} (^3\text{He},\gamma\gamma)^{12}\text{C}\) reaction, with the new 10" NaI crystal assembly. However, the main mode of decay of the state remains a mystery.

A number of experiments has been carried out, again with the aid of the 10" NaI crystal, to study \(^3\text{He}\) and \(^4\text{He}\) capture reactions. This type of work gives information on the 3 particle - 3 hole and 4 particle - 4 hole states of nuclei about which rather little is known at present.

Work on reactions initiated by heavy-ions has increased. Some has been directed towards measuring the very small cross-sections at energies well below the Coulomb barrier, since these are of astrophysical interest. Other experiments have been directed towards the study of high-spin states in s-d shell nuclei.

Considerable effort has continued in the study of reaction mechanisms at tandem energies. Experiments on the tensor polarisation of elastically scattered deuterons showed the necessity of including tensor components in the optical potential. The presence of such components can only be identified by measurements of this type. A study of the \( j \)-dependence of stripping cross-sections and an investigation into the field of sub-Coulomb stripping are notable, amongst the other work in this field.

Many experiments have been performed, using a variety of reactions and techniques, to give further information on nuclear energy levels.

The techniques used in the beam-foil spectroscopy work have been improved so that measurements can be made in the vacuum-ultra-violet region. Efforts to improve the relatively poor line resolution, resulting mainly from Doppler broadening, have given hopeful results. The most interesting results are on \(^{20}\text{Ne}\) where many previously unknown lines were identified. The ionic charge-states from which the lines arose could be assigned in most cases.

The Department of Theoretical Physics continued to work on fundamental problems of nuclear physics, elementary particles and fields and statistical mechanics. Much of the work was related to the experimental interests of staff of the School.

A convenient expression was found for the nucleon-nucleon interaction at energies up to 300 MeV. Calculations of deuteron induced nuclear interactions were made, which are probably the first to take adequate account of the effects of the non-spherical nature of the deuteron.
Further progress was made with the quark model of 'elementary' particles, with the dispersion relations for their interactions and with the analysis of the modes of disintegration of neutral K mesons.

In statistical mechanics an improved method was developed for calculating electron and ion mobilities.

Members of the Department took part in three overseas international conferences and two Australian conferences.

Four research students were examined and awarded the degree of Doctor of Philosophy during the year.

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CLEYR, J. R. & HALES, A. L. ‡

COMPTON, W., ARRIENS, P. A., VERNON, M. J. & CHAPPELL, B. W. †††

COMPTON, W., CHAPPELL, B. W. †††, ARRIENS, P. A. & VERNON, M. J.

COOPER, J. A. *

COOPER, J. A. *° & RICHARDS, J. R.

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CURRAY, J. R. ‡, SHEPARD, F. P. ‡ & VEEH, H. H.

DASCH, E. J. ‡ & CAMPBELL, K. S. W.

ESSENE, E. J., HENSEN, B. J. & GREEN, D. H.

‡ Not a member of this University.
† Member of the Computer Centre.
†† Member of the Department of Applied Mathematics, School of General Studies.
††† Member of the Department of Statistics, School of General Studies.
* Based on work done while a member of the Department.
*° Member of the Department of Geology.
† Visiting Research Worker.
ESSENE, E. J., RINGWOOD, A. E. & WARE, N. G.

EVANS, M. E.* & McELHINNY, M. W.

FARQUHARSON, R. B.* & RICHARDS, J. R.

FARQUHARSON, R. B.* & STIPP, J. J.*

GILL, J. B.

GREEN, D. H.

GREEN, D. H. & HIBBERSON, W. O.

GREEN, D. H. & RINGWOOD, A. E.

GREEN, T. H.‡ & RINGWOOD, A. E.

HEIER, K.‡ & COMPSTON, W.

HENSEN, B. J. & GREEN, D. H.

HOBBS, B. E., VERNON, R. H.‡, RANSOM, D. M.* & WILLIAMS, P. F.‡

HYNDMAN, R. D.*, JAEGGER, J. C. & SASS, J. H.*

IRVING, A. J. & GREEN, D. H.

JAEGGER, J. C.

* Based on work done while a member of the Department.
‡ Not a member of this University.

72
JAKES, P. & GILL, J. B.

KLEEMAN, J. D.* & COOPER, J. A.

LILLEY, F. E. M.

LILLEY, F. E. M. & CARMICHAEL, C. M.†

LOVERING, J. F.* & BUTTERFIELD, D.*

LOVERING, J. F.* & KLEEMAN, J. D.*

LUCK, G. R.

MASON, B.† & GRAHAM, A. L.

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RICHARDS, J. R. & WILLMOTT, W. F.‡

¶ Member of the Department of Geology.
* Based on work done while a member of the Department.
† Not a member of this University.
¶¶ Member of the Department of Prehistory, Institute of Advanced Studies.
¶¶¶ Member of the Department of Environmental Biology.
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TAYLOR, S. R.


TAYLOR, S. R., JOHNSON, P. H.†, MARTIN, R.‡, BENNETT, D.‡, ALLEN, J.‡ & NANCE, W.‡


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VEEH, H. H. & GIEGENACK, R.‡


VEEH, H. H. & VEEVERS, J. J.‡

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* Based on work done while a member of the Department.
† Not a member of this University.
¶ Member of the Department of Geology.
** Based on work done while a Visiting Research Worker.
†† Visiting Research Worker.
¶¶ Member of the Department of Geography, School of General Studies.
Ware, N. G. & Lovering, J. F.*

Wellman, P., McElhinny, M. W. & McDougall, I.

Willey, G.‡, Cleary, J. R. & Marshall, P. D.‡

Wright, C.

Wright, C. & Corbishley, D. J.§

Mathematics

Brady, J. M.

Brooks, M. S., Kovacs, L. G. & Newman, M. F.¶

Bryant, R. M., Bryce, R. A. & Hartley, B.†

Bryce, R. A.

Bryce, R. A. & Cossey, P. J.¶

Chau, T. C.*

Coppel, W. A. & Palmer, K. J.¶

Edwards, R. E.


Farouqi, I. H.*

Gregorac, R. J.*

Gupta, Chander, K.*

* Based on work done while a member of the Department.
‡ Not a member of this University.
¶ Member of the Department of Pure Mathematics, School of General Studies.
† Visiting Research Worker.
IZUMI, S. & IZUMI, MASAKO‡
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Tacon, D. G.

WILLIAMS, N. H.

Yamamuro, S.

Bashkin, S.*** & Carriveau, G. W.

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† Not a member of this University.
† Visiting Research Worker.
*** Based on work done while a Visiting Research Worker.
CARRIVEAU, G. W.


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COOP, K. L.*, GRAHAM, I. G. & TITTERTON, E. W.

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'Linear-polarisation studies of gamma radiation from the reaction 26Mg(α,νγ)29Si.' Bull. Am. phys. Soc., 15, 783.


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C.†, LECUYER, J.†, CHAPMAN, N. G.† & ROSE, H. J.


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KNEFF, D. W.†, LEFEVRE, E. H. W.*** & DIN, G. U.


* Based on work done while a member of the Department.
† Not a member of this University.
*** Based on work done while a Visiting Research Worker.
KOMOROV, V. V.*, TREACY, P. B. & TUCKER, S. N.

LEFÈVRE, E. H. W.***

MACDOUGALL, J. D.,†, MCLATCHIE, W.,‡, WHINERAY, S. & DUCKWORTH, H. E.‡
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ROSALKY, D. M., BAUGH, D. J.*, NURZYNSKI, J. & ROBSON, B. A.¶
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TREACY, P. B.

WHINERAY, S., MACDOUGALL, J. D.,†, MCLATCHIE, W.,‡ & DUCKWORTH, H. E.‡
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KENNY, B. G.
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* Based on work done while a member of the Department.
*** Based on work done while a Visiting Research Worker.
† Not a member of this University.
¶ Member of the Department of Theoretical Physics, Institute of Advanced Studies.
Kenny, B. G. & Kabir, P. K.†

Kumar, K.

Mukherjee, S., Samaddar, S. K.† & Satpathy, R. K.†

Peaslee, D. C.

Pope, R. L. & Tassie, L. J.

Powell, D. L., Crawley, G. M., Rao, B. V. N.§ & Robson, B. A.
‘Deuteron-induced reactions in 6Li, 9Be and 10B at bombarding energies of 4.5 to 6.0 MeV.’ Nucl. Phys., A, 147, 65-80.

Robson, B. A.
‘Scattering and polarization of nucleons and deuterons.’ Lecture series ANU-P/497.

Robson, R. E.

Rosalky, D. M., Baugh, D. J., Nuzynski, J.¶ & Robson, B. A.
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Smith, G. B.

Smith, G. B. & Tassie, L. J.

Tassie, L. J.

Watts, R. O.¶, Henderson, D.† & Baxter, R. J.

Woolcock, W. S. & Rasche, G.‡

Theses

Thesis titles of work successfully submitted by research students in the Research School of Physical Sciences on whom degrees were conferred in 1970:

Black, L. P.
‘Isotopic relationships in the Chillagoe-Herberton area, North Queensland.’ Department of Geophysics and Geochemistry.

Brady, J. M.
‘Just-non-cross varieties of groups.’ Department of Mathematics.

Cawthron, E. R.
‘Some phenomena produced by positive ion bombardment of metal surfaces at medium energies.’ Physics of Ionized Gases Unit.

† Not a member of this University.
¶ Member of the Department of Nuclear Physics.
§ Based on work done while a member of the Department of Nuclear Physics.
¶¶ Member of the Diffusion Research Unit.
COOP, K. L.
‘Nuclear energy levels in $^{57}$Co, $^{59}$Co and $^{61}$Co.’ Department of Nuclear Physics.

COOPER, J. A.
‘Some genetic and geochronometric applications of lead isotope measurements.’
Department of Geophysics and Geochemistry.

CREASE, R. P.
‘The mobility of ions in gases.’ Electron and Ion Diffusion Unit.

EDMOND, J. M.
‘Effects of pressure during rock deformation—with particular reference to volume changes.’ Department of Geophysics and Geochemistry.

HELLSTROM, J. O. V.
‘The compound nuclear process in reaction mechanism and nuclear structure studies.’ Department of Nuclear Physics.

KLEEMAN, J. D.
‘Fission track studies and the geochemistry of uranium in rocks from the crust and upper mantle.’ Department of Geophysics and Geochemistry.

KUMAR, N.
‘Effective nuclear interactions and level properties for the lighter nuclei in the lp-shell.’ Department of Theoretical Physics.

LEWIS, B. M.
‘The masses of some southern galaxies.’ Department of Astronomy.

MACLEOD, I. D. G.
‘A study in automatic photo-interpretation.’ Department of Engineering Physics.

NORRIS, J. E.
‘Neutral helium line strengths in the early type stars.’ Department of Astronomy.

PRICE, J. F.
‘(Lp, Lq)—Multiplier problems.’ Department of Mathematics.

SCHMIDT, E. G.
‘An astrophysical investigation of four classical Cepheid Variable stars.’ Department of Astronomy.

WALL, J. V.
‘A deep sky survey at 2700 MHz.’ Department of Astronomy.

WALSH, ELEANOR W.
‘Plasma distributions and particle motion.’ Department of Theoretical Physics.

WALTERS, R. F. C.
‘A categorical approach to universal algebra.’ Department of Mathematics.

WILLIAMS, N. H.
‘Cardinal numbers with partition properties.’ Department of Mathematics.

LAIRD, P. G.
‘Mean-periodic functions and ordinary differential equations.’ Department of Mathematics.

Master of Science
REPORT OF THE DIRECTOR
Professor W. D. Borrie, O.B.E.

This was the first year of a new triennium. The previous triennium closed with all but two of the eighty academic posts on establishment filled or committed for 1970.

The School's submission for the 1970-72 triennium was based on an average annual establishment of eighty-six academic staff, but cash available for 1970 was sufficient for a maximum of only eighty staff for a full year, so that recruitment in 1970 was concerned primarily with replacements arising from resignations, and from the termination of short-run appointments, rather than with new posts.

In December only four of the posts for which cash was available had not been filled or committed. The commitments at the year's end were as follows:

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>On pay-roll</td>
<td>67</td>
</tr>
<tr>
<td>Accepted but not yet on pay-roll</td>
<td>4</td>
</tr>
<tr>
<td>Under offer</td>
<td>1</td>
</tr>
<tr>
<td>Temporarily filled by long-term visitors</td>
<td>4</td>
</tr>
</tbody>
</table>

Total: 76

In December nine academic posts were under advertisement to cover posts temporarily filled by visitors and resignations known to be taking effect early in 1971.

During 1970 there were eight resignations, of which four involved tenure positions and four termination of or resignation from temporary posts. Two of the resignations were to take up chairs—Mr J. Zubrzycki to the Chair of Sociology in the School of General Studies, and Dr H. Mol to a chair in the Department of Religion, McMaster University. All other resignations were associated with the continuation of academic teaching or research. The School deeply regretted the early retirement in December of Professor A. W. H. Phillips, M.B.E., from the Department of Economics for health reasons.

On the positive side the following senior appointments were made or were taken up. Professor J. C. Caldwell took up his post in March as Head of the Department of Demography. Professor L. Broom, previously Ashbel Smith Professor of Sociology at Texas University, accepted a chair in Sociology and will join the School in 1971. Professor E. J. Hannan, F.A.A., of the School of General Studies was also appointed to a chair of Statistics and will take up duties in January 1971. Mr F. R. Routley (Department of Philosophy), Dr G. E. Parker (Department of Law) and Dr D. J. Daley (Department of Statistics) were appointed Senior Fellows; and Dr R. P. Byron and Dr R. D. Terrell were appointed Fellows in the Department of Economics.

With the keener competition for jobs now appearing in many disciplines, the School seems well placed to sustain its academic target levels in 1971 and 1972.
The corollary of the high level of academic staffing was a similar situation with supporting staff and funds, and over the total budget of the School expenditure almost exactly matched revenue in 1970.

This situation of a relatively full house did not mean the creation of any large departments, whose heads had agreed earlier in the year that, in the interests of achieving a better balance across the School as a whole, academic staff in any one of them should not exceed ten—a figure which actually involved a reduction of earlier approved establishments in two cases. The actual staff numbers ranged from six to ten over the nine departments and the three units remained at three each.

The research of the School therefore continued to be focussed on selected areas of concentration rather than on a comprehensive coverage within each discipline. As the latter part of this report indicates, many books and articles continued to flow from established research projects. In addition some new lines of research were opened up; for example, in the Department of Economics, an analytical presentation of Australian banking and monetary statistics since 1850 and of vital statistics since 1921; in the planning by the demographers of a major survey to study family formation and structure in Australia; in the growing emphasis of economic history on the Australian economy since 1920; in the use of computer analyses in political science to study the formation and structure of political groupings in Commonwealth and State legislatures in Australia; in the development of various aspects of the theory of point processes in statistics; in the study of radical movements by the History of Ideas Unit; and economic studies in the field of higher education in both the Education Research Unit and the Department of Economic History.

As in previous years, applied research continued to focus substantially on Australia or on overseas events related to Australia, but there was some expansion of work this year in Pacific and South-East Asian studies in disciplines which are not represented in the Research School of Pacific Studies; for example, in the study of population growth and structure, and of legal and political systems in Papua and New Guinea; in the political structures in developing countries; and in population growth and control in South-East Asia. The Department of History also sustained its interest in Commonwealth history, as did the Department of Political Science in European political and strategic studies and in the power systems of Europe’s communist countries. The history of European philosophy and political and social ideas were also substantially represented in the work of the Department of Philosophy and the History of Ideas Unit.

Again the School’s research benefited greatly from the considerable number of distinguished visitors from many of the leading universities of Britain and North America who worked amongst us in 1970. A pleasing feature was also the increased number of scholars coming from the universities of Australia and New Zealand to spend a period of study leave in the School. The main areas of origin and numbers of scholars on leave from their own institutions to work in the School in 1970 were—USA, 8; Canada, 2; UK, 7; Australia, 9; New Zealand, 1; other, 1.
The number of students working for the degree of Doctor of Philosophy remained much as in the previous two years and was considered by departments to represent about the maximum commensurate with the joint training and research activities of the staff. The improvement in the quality of applicants which was noticed in 1969 was sustained in 1970, probably reflecting the competition arising from the much higher outputs of honours graduates from universities in Australia and abroad. It is of some interest to note that during the year a request emanated from students that a study should be made of the employment opportunities for Doctors of Philosophy in the social science disciplines. A Faculty committee is examining this matter.

The student statistics for the year were—

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enrolled, January 1970</td>
<td>56</td>
</tr>
<tr>
<td>Students appointed during 1970</td>
<td></td>
</tr>
<tr>
<td>From Australia</td>
<td>11</td>
</tr>
<tr>
<td>From overseas</td>
<td>8</td>
</tr>
<tr>
<td>Terminated during year</td>
<td></td>
</tr>
<tr>
<td>Degree conferred</td>
<td>9</td>
</tr>
<tr>
<td>Completed course and admitted by Council</td>
<td>5</td>
</tr>
<tr>
<td>Transferred</td>
<td>1</td>
</tr>
<tr>
<td>Enrolled at December 1970</td>
<td>60</td>
</tr>
</tbody>
</table>

A further development affecting students was the proposal adopted by Faculty, following earlier informal staff/student discussions, that students should be represented on Faculty. It was initially agreed that one student from each department and unit (twelve in all) should be elected by the students to attend Faculty and an amendment to Faculty rules to enable such students to be brought on to Faculty with full voting rights will be considered at the first meeting in 1971.

The other innovation aiming to broaden the area of staff/student co-operation was the agreement, about the middle of the year, that all students should be brought into departmental meetings. This change appears to have been particularly significant in giving the students a much wider understanding, not only of their role in the research of the departments, but also of the wider objectives of the School. More extensive representation of students on Faculty committees has also been of great value to the planning of both research and teaching activities within the School.

While the work-in-progress seminar, built around the research of each department, remained the core element in teaching and the discussion of research methods and ideas, several wider seminars were held involving a number of disciplines and the participation of persons from outside the University, and frequently from other states. In this interdisciplinary activity the units of the School again played a significant role. The History of Ideas Unit sponsored a series of eight public lectures with the topic of 'A World in Revolution?' which were subsequently published by this University. The Urban Research Unit brought together a group representative of most states to discuss 'The impact of technology on urbanisation', with particular reference to the Aus-
tralian scene. The Education Research Unit conducted a series of eleven discussions on 'Issues and problems in higher education in Australia' with participation from Commonwealth Government and State Government departments, from the Canberra College of Advanced Education, and from other universities as well as from this University. The papers from this seminar are also to be published.

Research output continued at the high levels of 1969 and 1968, and the summary statistics of the detailed publication lists attached are—books published twenty-six; chapters contributed to books, thirty-seven; articles and lectures published, 119.

During 1970 members of the School were also associated with activities relating to the administration and the conduct of research at the national level. Professor P. H. Partridge was appointed a member of the Australian Universities Commission, and also Chairman of the Australian Advisory Committee on Research and Development in Education. In December the Council agreed to a request from the Commonwealth Government that the University should conduct a national inquiry in the field of population. This project, which has been placed under the control of the Director of the School, is planned to run over the next three years.

During the year one important activity involving many members of the School was the preparation of the submission to the Australian Universities Commission for the 1973-75 triennium. A document prepared by a Faculty committee during 1969 and approved by Faculty in March 1970, formed the basis of the School's deliberation. While recommendations of this submission refer to the future and are therefore not relevant here, it may be said that the School reiterated a view held since 1966 that while no department should exceed an academic staff of twelve persons, each should, nevertheless, be large enough to give a theoretical foundation adequate to support both its research and doctoral training functions, and that carefully selected high quality research rather than comprehensive spread should remain the School's primary objective. The three Units, now well integrated parts of the School's structure, continued to carry forward vigorous research programs involving the interplay of a number of disciplines. Particularly pleasing was the continued support from outside funds for projects in the Education Research Unit and the Urban Research Unit.

The following is a summary of the main research developments of departments and units in 1970.

A major activity of the Department of Demography was the commencement of preliminary work on a major project to study Australian family formation. Four members of the Department produced a bibliography on the subject and planned a large field survey on aspects of fertility, the life cycle of the family, and other more general aspects of population growth in Australia. The Department strengthened its interests in population trends in developing countries in Asia and Oceania, continuing major studies in Indonesia and New Guinea, establishing new work in the Philippines and planning a study of Fiji.
The other major field which has long concerned the Department is the impact of immigration upon Australia and studies of immigrant groups. Work in 1970 concentrated on the contribution of immigration to population growth, on the settlement patterns of immigrants within metropolitan areas, and on the subsequent history of displaced persons arriving in Australia two decades earlier.

Other staff and student research was concerned with Australian mortality, aspects of the labour force, marriage, vital rates and internal migration in Korea, India, Pakistan, Ghana and New Zealand; population policy history in Australia; and the immigration of Scandinavians and Chinese. One staff member resigned and two others took up appointment in the course of the year; three students gained higher degrees and twelve were working for the degree of Doctor of Philosophy at the end of the year.

The Department of Economic History continued to cover both individual and co-operative studies. Individual work has included the analysis of Australian consumption, the workforce and capital stock; the preparation of a book on political economy in the 1920s; the history of Goldsbrough Mort; a series of studies of service activities; and research in the economics of accidents and education. Two separate industry studies on agricultural and industrial innovation were continued by scholars. Two co-operative projects undertaken by the staff were on the earnings profiles of graduates 1920-70 and on the course of economic fluctuations 1918-40.

The Department of Economics filled its establishment in 1970 with new appointments in the field of econometrics. The development of this work owed much to the initiative of Professor A. W. H. Phillips whose retirement in December on health grounds was a grave loss to the Department.

Economic conditions and prospects, capital and growth and more generally, quantitative studies of economic problems, all with particular reference to Australia, and the research of Professor Phillips on China, were the other major research interests of the Department in 1970. Two statistical projects require specific mention: a comprehensive and analytical presentation of Australian vital statistics from 1921; and a similar presentation of Australian banking and monetary statistics, 1850-1945, undertaken in collaboration with the Reserve Bank of Australia. Both projects provide massive data, adjusted from the original figures and extensively annotated, which will be valuable to research workers in many departments in this and other universities.

This year also saw the establishment of postgraduate course work in economics referred to in the 1969 Report, as a co-operative venture amongst all Departments of Economics in the Institute of Advanced Studies and the School of General Studies. The courses, primarily for students for the degree of master are also open to scholars for the degree of Doctor of Philosophy. Nine courses were offered in 1970 and there is every indication that there will be a considerable increase in 1971 in both the numbers and quality of students enrolling for this course work degree.

The Education Research Unit conducted research on problems of social significance in education. No fundamental distinction is seen between problem-centred research and research which commences with a purely theoretical perspective, as both approaches are able to contribute to the improvement of education and
to the development of a generalised understanding of education and society. Because education is an area in which a very broad range of human behaviours and social processes occur, a variety of social science disciplines is seen as appropriate in the Unit. The intention is that research be multidisciplinary rather than interdisciplinary; that is each discipline will explore problems using its own perspective and methods but opportunity will be taken to work in similar areas, and occasionally on similar problems, and to share insights across the boundaries of disciplines. Close collaboration has been maintained with other departments and with interested social scientists elsewhere in the University. Attendance at most of the Unit's seminars have included staff and students from other departments.

At present most of the work of the Unit is in higher education but it is intended that eventually equal emphasis will be given to studies in the secondary area. So far the main focus has been on Australia, but it is envisaged that when resources permit some work may be developed in New Guinea or Indonesia. The Unit has also been exploring the possibility of including comparative elements (e.g. with Canada, the UK or Sweden) in some of its Australian studies.

During 1970 research in the sociology, politics and economics of education was carried out. A study of professional education in universities is revealing a considerable diversity in the interests and motivations of entering students which is not matched by a variety of teaching-learning arrangements or flexibility of course structure. Another study of students in advanced colleges underlined some of the social correlates of participation in higher education and indicated that financial barriers must prevent many able students from gaining professional qualifications.

The political study is concentrating mainly on case-studies of pressure groups and preparing for a major study of educational bureaucracies in Australia.

The economic studies of costs and benefits in Australia and earning difficulties among equivalently educated persons are for the moment centred on higher education. Serious difficulties have been created because of the elimination of the proposed income question from the 1971 Census. This information now has to be obtained from other sources and this is proving costly.

The main research interest of the Department of History is Australian history and its relations with British and Commonwealth history. Pioneer work has been done in the study of modern Indian history, but as this field is now developing elsewhere it is possible that it may now be phased out. The long-term project, the *Australian Dictionary of Biography*, continued with the aid of collaborators from all parts of Australia on Volume IV, which is the second of four volumes covering the period 1851-90.

Staff have been working on a range of subjects, including the making of the Australian Constitution, the federation movement, the gold rushes of the mid-nineteenth century in the Pacific area, Australian urban history, nineteenth century British history and Australian labour history. A book on the making of the Constitution, and the second volume of a biography of W. M. Hughes, will go to press in 1971.
An important project, sponsored jointly by the University and the National Library of Australia, and administered for the University by the Department of History, was completed in 1970. This was the compilation of a comprehensive guide to manuscripts in Britain relating to the history of Australia and New Zealand, compiled in London under the direction of Miss P. Mander Jones. The manuscript of this important aid to scholarship is now with the Australian National University Press. The Department continues its association with the Australian Academy of Science in the collection of materials relating to the history of Australian science.

The History of Ideas Unit continued to work on the development of radical ideologies and of ideas about man and society since the eighteenth century. Staff research concentrated on Marxist thought and its significance for philosophy, jurisprudence, theories of modern society and contemporary radical movements, on the philosophical, ethical and political stance of radical Christianity and on the history of ideas about the Church. Research students worked on notions of energy, imagination and organic growth in the criticism of literature, society and art in England in the late eighteenth and early nineteenth centuries, on cyclical theories of history in Western thought and on the relation between Marxist aesthetics and the criticism of literature in the Soviet Union since 1953.

The Unit undertook responsibility for arranging the University Lectures 1970, "A World in Revolution?", which were later published by the University. A selection of the works of Karl Marx with new translations and a substantial introduction illustrating his intellectual development, was also prepared for the Press. A major project on Marxism and the theory of law, was initiated in collaboration with a member of the Faculty of Law in the School of General Studies, and the first of two volumes will be ready for the printer early in 1971. Visiting fellows again made significant contributions to the Unit's research and seminar activities.

Two books by a member of the Unit, published in London in 1969 and early this year, were translated into Japanese and are being published in Tokyo. A number of articles on various aspects of modern religious thought and on problems in history and theology were also published or submitted for publication.

The work of the Department of Law developed a considerable emphasis on public law problems, particularly in constitutional and international law. In the international field work progressed on a digest of Australian contributions to international law doctrines and practice, and in the constitutional field there were important studies on Australian federal relations, and on the development of constitutional government in Papua and New Guinea. The private law side was represented by some original analysis of legal personality concepts, especially in relation to group activities. The Department unfortunately lost two temporary staff during the year, but against this a new senior fellow was appointed (to arrive early in 1971) and the vacant temporary posts were again advertised.

The work of the Department of Philosophy fell into a number of mutually supporting and overlapping divisions. Further work was done on seventeenth and eighteenth century philosophers, notably on Leibniz, Hobbes and Hume,
and a major study of the idea of the perfectibility of man was brought to
completion and published. Several members of the Department worked on
problems in moral philosophy related to fundamental moral principles, including
a study of 'justice', and another of 'freedom' and 'autonomy', and others worked
in the neighbouring fields of educational philosophy and political philosophy.

The latter field linked closely with an expansion of work in the philosophy of
the social sciences, notably in the methodology of sociology, on concepts em­
ployed by political scientists, and on more general problems of explanation and
theory construction in the social sciences. Supporting these activities was work
done in philosophical logic, an area likely to develop in 1971 with a new senior
appointment. One book and a number of articles completed during the year
will appear in 1971.

In the Department of Political Science there were no changes in academic staff,
which was, however, supplemented by two senior visitors from overseas. No
new lines of work were opened up, but a number of substantial projects was
completed. These included the manuscripts of books on the New South Wales
Country Party; on the impact of postwar migration on Australian politics; on
political change in New Guinea; and on Australian naval administration to
1939, by Mr R. Hyslop, a Public Service Fellow. A handbook of Australian
trade unions, and a study of Ukraine politics in relation to the Czechoslovak
crisis of 1968, were published in the Department's Occasional Paper series.

Coding of the second wave of interviews in the Australian Survey Project was
completed by mid-year, and the major report on this study was planned. A
further depth interview of a sub-sample of the main survey panel was begun
to study attitudes to various governmental institutions. Data from the project
were also being used by two research scholars, while a third was applying survey
techniques to the study of political attitudes in a new industrial city in India.

Further research continued on the Australian Labor and trade union move­
ments; and on the evolution of major strands of Australian political thought
and the analysis of political groupings in legislatures lacking party solidarity.

The work in Australian politics continued its focus on such basic questions as
the legitimacy of the polity in voters' eyes, and the ways in which political
organisations are embedded in interests and ideologies.

In the international field further refinements were applied, partly by more
sophisticated quantitative methods, to the analyses of the USSR's internal
government and its relations with its neighbours, and studies were continued
of major trends in the theory and structure of world politics, in relation to
nuclear strategy and deterrence, and the west European community and its
relations with that of east Europe.

In the Department of Sociology there were three major changes in the staff in
1970. Two senior staff resigned to take up chairs, one in Canada (Dr H. Mol)
and the other the foundation Chair of Sociology in the School of General Studies
(Mr J. Zubrzycki). Following his appointment as Chairman of the Australian
Advisory Committee on Research and Development in Education, Professor
P. H. Partridge resigned as Acting Head and was replaced in May by Dr F. L.
Jones.

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These staff movements confirmed the Department's intention to concentrate its research efforts in two major areas—stratification and mobility, and organisations and systems analysis. In 1971 these interests will be strengthened with the arrival of new staff and the visits of two distinguished sociologists from Canada.

An important step in 1970 was the building up of the graduate student body to nine, with fields of research covering a variety of topics relating to the social structure of contemporary Australia, including poverty and the large family; leisure organisations; planning organisations; sociology of religion; immigration and social change; achievement motivation among part-Aborigines; the formation of the matrifocal family among part-Aborigines; cultural change among Greek immigrants to Australia; and elites and the sociology of power. Two former students of the Department were awarded the degree of Doctor of Philosophy.

With this student body and the replacement of staff arising from new appointments this year, this Department now seems well structured for further research developments in 1971 and later years.

Research in the Department of Statistics continued on mathematical statistics and probability theory and their application in other sciences. Important staff changes, referred to earlier in this report, included the filling of a senior fellowship and of a second chair. Three long-term visiting fellows worked in the Department during the year.

Work continued on the theory of optimal asymptotic tests of composite hypotheses and various applications of this theory. New methods of studying and optimising the operation of complex hydroelectric systems were developed.

Considerable new developments were made in various aspects of the theory of point processes and part of a series of long papers on geometric probability were written and published. Work continued on the estimation of modes of inheritance in human genetics and a good deal of consulting was done for other departments. Seminars were run throughout the year.

The Urban Research Unit worked on economic, social and administrative aspects of urban development in selected areas of Sydney and Melbourne. During the year surveys of households and of businesses have been carried out in the Melbourne study areas, and analysis has continued of the results of similar surveys in Sydney. Data collected from property valuation records are also being analysed and the various public authorities involved in urban development are being studied. The first monograph containing detailed research results was published and a number of papers containing progress results were prepared for publication. A study of Australian Capital Territory collisions has been completed during the year. A book on Walter Burley Griffin went to press during 1970.

The Unit's first thesis, on costs of urban development and programming, was successfully completed during the year. Theses in progress deal with state housing authorities, local services within Sydney, and local government politics.

Finally, the School acknowledges the role of support staff in its academic research program—the Archives Section, under the direction of its new Archives Officer, Mr R. C. Sharman; the Programming Section; and the administrative and secretarial staff.
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† Visiting Research Worker.
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**THESES**

Thesis titles of work successfully submitted by research students in the Research School of Social Sciences on whom degrees were conferred in 1970:

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BAKER, D. E. U.
'Politics in a bilingual province: The Central Provinces and Berar, India, 1919-1939.' *Department of History.*

BAMBRICK, SUSAN C.
'Australian Price Indexes.' *Department of Economic History.*

BARKER, A. D.
'Evolution and explanation.' *Department of Philosophy.*

BUNTING, I. A.
'Imagination and perception.' *Department of Philosophy.*

DAVISON, G. J.
'The rise and fall of "Marvellous Melbourne" 1880-1895.' *Department of History.*

DE MARCHI, N. B.
'John Stuart Mill and the development of English economic thought: A study in the progress of Ricardian orthodoxy.' *Department of Economic History.*

* Based on work done while a member of the Department.
FERRELL, D. W.
‘Delhi, 1911-1922: Society and politics in the new imperial capital of India.’ Department of History.

HICKMAN, D. C.
‘The social context of religious orientation: A study of form five students in thirteen Melbourne schools.’ Department of Sociology.

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‘Meaning and necessity: A study in the philosophy of C. I. Lewis.’ Department of Philosophy.

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‘A study and reappraisal of aspects of the development of Federal Government with some attention to the expectations of the founders and the actual exercise of Federal power.’ Department of History.

POWELL, J. P.
‘The philosophy of higher education.’ Department of Philosophy.

SMITH, N. M. H.
‘On the distribution of queuing times for queues with two servers.’ Department of Statistics.

SMITH, R. F. I.
‘“Organise or be damned”: Australian wheatgrowers’ organisations and wheat marketing, 1927-1948.’ Department of Political Science.

STOKES, H. J. W.
‘North-West Tasmania 1858-1910: The establishment of an agricultural community.’ Department of History.

WESTCOTT, M.
‘Some applications of the probability generating functional to point processes.’ Department of Statistics.

YOUNG, CHRISTABEL, M.
‘An analysis of the population growth and mortality of selected birth cohorts in Australia, with reference to the relationship between cohort and transverse (or calendar year) experience.’ Department of Demography.
The Research School attained its majority during the year, and the occasion was marked by a party jointly, with the Research School of Social Sciences, in the H. C. Coombs Building tea-room. By coincidence, the year also saw the retirement of Professor W. E. H. Stanner of the Department of Anthropology and Sociology, who was originally appointed as Reader in Comparative Social Institutions on 1 September 1949. To him, and to Mr H. E. Maude, O.B.E., Professorial Fellow in Pacific History, the School extends its best wishes for a happy and fruitful retirement, with regrets for the loss—we trust only partial—of two of its most valued members.

As foreshadowed in last year's Report, an appointment was made to the chair of Human Geography: Professor R. G. Ward of the University of Papua and New Guinea, will take up his appointment late in 1971 but in the meantime he is keeping in close touch with his future department. Dr G. J. R. Linge, the Acting Head of the Department, became a Professorial Fellow in May, and in October Dr R. M. Sundrum of the World Bank, Washington, D.C., was appointed a Professorial Fellow in the Department of Economics. During the Director's absence on study leave in South America, Professor D. Walker was Acting Director from 12 September to 26 October.

The new hemihexagon and the laboratory block are approaching completion. The additions will impose a formidable problem of internal navigation to an already confusing building, and a committee has recommended an ingenious system of room numbering and directional aids which will, we hope, do something to assist visitors to the H. C. Coombs Building: its report at any rate was a model of clarity, with diverting illustrations for which we are indebted to the University Design Section.

Discussion on student participation continued and resulted in concrete proposals which were expected to go to the Board of the Institute of Advanced Studies in October, though in the event they will not be presented until February 1971. They include provision for all research students enrolled for the degree of Doctor of Philosophy to be members of Faculty and for three students elected by the students to be full members of Faculty Board. These proposals may seem sweeping, but they were adopted by Faculty by decisive majorities in well-attended meetings and after very full and frank discussions. It may be remarked that, since in many of the School's disciplines some 'outside' experience is of material advantage, many students do not come to us immediately after first degree or a master's degree, and the average age on enrolment is about twenty-seven, which is probably higher than the norm in other Schools.

The twenty-first birthday is a natural occasion for looking back as well as forward. For the future, developments which the School would wish to see in the 1972-75 triennium include a Northern Australia Research Unit, a sibling for the very successful New Guinea Research Unit, which would facilitate work, not only by departments in Pacific Studies, in the social and economic problems,
and perhaps the field sciences also, of tropical Australia, certainly a big and intractable item on the nation's agenda; while the problem of 'developmental sociology', referred to in the 1969 Report, is also the subject of a submission for a new department. Looking back, it would seem that the School's major academic contributions during its history have been concerned with (a) the study in a rigorous and scholarly manner of problems of international relations and foreign affairs in Australia, with improved dialogue between government officials and academic political scientists; (b) the framing of political, social, and economic policies in some of the emerging island nations of the Pacific; (c) the bridging of the gap between 'classical' Chinese and Japanese studies and more modern approaches; (d) the location, classifying and recording of the numerous and complex languages of New Guinea; (e) anthropological, social, political and economic studies in New Guinea and in South-East Asia, especially Indonesia; (f) the development of more sophisticated approaches in Australian geography; (g) the study of human and natural prehistory (including land-forms, vegetation, and palynology) in New Guinea and south-east Australia.

These are not set out in any order of priority; but in many aspects the School's contribution has been a major one and in some cases it can claim to be a leader, or at least a pioneer, not only on the Australian but the world scene, as is shown by the ever-increasing number of distinguished visitors and of invitations to attend major international gatherings or to join important international research agencies. This claim is a proud one, but it would be amply borne out by a study of detailed annual reports from the departments. As mentioned in last year's Report, 'the H. C. Coombs Building is very far from being an ivory tower'; rather it is a nursery or forcing-house for new approaches, many of which have a very practical bearing on the problems of the nation and of the region represented in the title 'Pacific Studies'.

Publications activity was well maintained; a feature which may be specifically noticed is the irruption of the Department of Economics into the Pacific proper with no fewer than three books: *The Political Economy of Independent Fiji* (E. K. Fisk), *Economic Statistics of Samoan Village Households* (B. A. Lockwood), and *Nauru: Phosphate and Political Progress* (Nancy M. Viviani). The Department of Pacific History contributed *Pacific Island Portraits* (J. W. Davidson and D. A. Scarr (eds)), *Selected Letters of Hubert Murray* (F. J. West (ed.)), *An Illustrated History of Surfing* (B. R. Finney and F. Margan†), and a valuable aid to research in *World Catalogue of Theses on the Pacific Islands* (Diane Dickson and Carol Dossor). Members of the School were largely responsible for two *Festschriften: Studies in the Vegetational History of the British Isles* (D. Walker and R. G. West (eds)), in honour of Professor H. Godwin, F.R.S., of the University of Cambridge, and *Pacific Linguistic Studies in Honour of Arthur Capell* (S. A. Wurm and D. C. Laycock (eds)). *Atlas of Bundaleer Plains and Tatala* (Introduction by N. G. Butlin (Department of Economic History, Research School of Social Sciences) and J. N. Jennings) is a notable joint contribution to both social and field science. This list is highly selective and many aspects of the School's work are not represented in it.

Periodical and occasional publication is increasingly important. The Strategic and Defence Studies Centre publishes the *Canberra Papers on Strategy and
Defence; the Department of Pacific History The Journal of Pacific History, now in its fifth year; the Department of Economics the Bulletin of Indonesian Economic Studies, which now prints 2,500 copies of each issue, thanks partly to a bulk order of 500 from the Commonwealth Government for distribution by Indonesian agencies, but also to steadily increasing subscriptions from all over the world. The Department of Far Eastern History has started a series of papers and the Contemporary China Centre will have its own series; the Department of Linguistics is very active in this field, and indeed all departments issue occasional papers and sometimes substantial monographs, mostly in numbered series. The New Guinea Research Unit's very well-regarded Bulletin published six issues during the year and the total now stands at thirty-eight; it has begun a new series, Luksave, which consists of summaries of New Guinea Research Bulletins written in simple English so as to make the work of the Unit available to Niuginians themselves, as some feedback and return for the information vouchsafed by them to our workers; it is considering publishing in Pidgin.

It has been an unusually active year on the seminar and conference front. Professors O. H. K. Spate and J. W. Davidson, with Professor C. M. H. Clark from the School of General Studies, opened the ball by ‘taking the University to the people’, as a contribution to the Cook Bicentenary Celebrations, in a very enjoyable series of lectures in the Town Hall at Bega—the nearest town to Cook’s landfall. Towards the end of the year the School was strongly represented—as strongly as the USA, Canada or Singapore—at the Conferencia del Pacifico held by the Instituto de Estudios Internacionales of the University of Chile at Vina del Mar, and attended by Professor Spate, Professor H. W. Arndt and Professor H. N. Bull—a fascinating experience. In between, the School played a major part in the bold, but very successful, experiment of holding an ANZAAS meeting in New Guinea: Professors J. Golson and D. Walker, and Mr H. E. Maude, were presidents of the sections on anthropology, botany and history, respectively, and the School contributed many papers. Two Departments, Far Eastern History and Prehistory, were and are very actively engaged in preparations for the twenty-eighth International Congress of Orientalists to be held at the University in January 1971.

A notable event was the establishment, by the generosity of the family of the late Arthur F. Yencken, an Australian who had a distinguished career in the British diplomatic service, of a biennial series of memorial lectures on some aspects of diplomacy. The first two lectures were given to packed houses in the H. C. Coombs Lecture Theatre, by the Right Honourable Lord Butler of Saffron Walden, C.H., under whom Arthur Yencken served. The School extends its thanks to the family for this imaginative benefaction and to Lord Butler for giving the series such a prestigious start.

Internally, seminars and short conferences, with participants not confined to this University, included two very successful seminars in the Department of Human Geography, on spatial analysis and on governmental influence on economic location, while the Department was also responsible for organising the 1970 Urbanisation Seminar, on the impact of technology on urbanisation.

The Departments of International Relations and Economics sponsored a meeting of Australian and Indonesian minds on relations between the two countries, and an interdisciplinary conference on present-day China marked the
formal establishment of the Contemporary China Centre (soi-disant et ci-devant the ‘China Lobby’) which brings together scholars from various parts of the University interested in the problems indicated by its name. The Department of International Relations took an active part in a conference on Australian-New Zealand-American relations, held under the joint aegis of the Australian and New Zealand Institutes of International Affairs. Needless to say, the School as well as its New Guinea Research Unit, played a leading role in the fourth, and highly successful, Waigani Seminar on ‘The Politics of Melanesia’ which brought to the same platform personalities as diverse as the then Secretary, Department of External Territories, Mr G. Warwick Smith, C.B.E., and the Mataungan Association leader, Mr J. Kaputin.

Members of the School continue to be in demand for multifarious consultative and academic functions. Professor Arndt, Department of Economics, is a member of the Governing Council of the United Nations Asian Institute for Economic Development and Planning and of an Asian Development Bank Expert Group, while Dr P. J. Lloyd has worked for the Tariff Board, Dr C. Barlow for the Ceylon Rubber Research Board and the Bogor Research Institute, and Dr R. T. Shand for the New Guinea Rural Minimum Wage Enquiry. Professor Davidson has been involved in the discussions on the constitutional future of American Micronesia, Professor Wurm with the vast project of the Centre of Applied Linguistics, Washington, supported by the Wenner-Gren Foundation, for a survey of the languages of the world, to which the area of his Department's interests contributes approximately 1,500 languages, one-third of the world total. There has been a good deal of outside lecturing, ranging from talks to the Senate Foreign Affairs Committee to Dr J. D. Freeman’s opening address on the etiology of human aggression to the Seventh Congress of the Australian and New Zealand College of Psychiatrists. Perhaps our farthest-flung activity was that of Dr I. de Rachewiltz, Department of Far Eastern History, who presented a paper to the Second International Congress of Mongolists at Ulan Bator—probably the first Australian scholar to visit that remote capital.

In all this, research scholars in the School have taken an active part. There were seventy-two enrolled for the degree of Doctor of Philosophy at the beginning of the year, twenty-one enrolments during the year, and twenty-one were awarded or recommended for the degree. Students played a substantial role at the ANZAAS meeting held in Port Moresby, and have published, often on their own initiative, a number of papers. Quite apart from questions of 'student participation', it is evident that many of them see themselves as responsive and responsible junior colleagues; this is evidenced, for example, by their constructive responses to a questionnaire on the requisites for preparation for research and field-work initiated by Dr D. H. Penny, Department of Economics.

The list of visitors continues to grow each year. Academic visitors who spent some time in the School were Professor G. Alexandersson (Department of Human Geography), Professor S. H. Riesenberg (Department of Pacific History), Professor L. G. Reynolds (Department of Economics), Professor E. Dahl, Drs A. B. Costin and P. J. Grubb, and Mr J. B. Firman (Department of Biogeography and Geomorphology), Professor J. Chesneaux (Department of Far Eastern History), Professors G. Grace and H. McKeoughan, and Mr B. Jernudd (Department of Linguistics). Amongst those whose visits were briefer may be mentioned—
Mr R. Akwai, Ghana; the Right Honourable Lord Butler of Saffron Walden, C.H.; Dr Busono, Indonesia; Mr H. R. Dunkerly, World Bank; Mr F. Espie, Melbourne; Mr M. J. Fox, Ford Foundation; Professor B. G. Gafurov, Moscow; Dr M. Godelier, Paris; Professor R. G. Golledge, Ohio State University; Mr A. Henry, Premier of the Cook Islands; Sir Alec Douglas-Home; Professors S. Ishikawa and K. Kojima, Hitotsubashi University; Professor J. Lindbeck, Columbia University; Professor F. Machlup, Princeton University; Mr La Norinder, Laos; Professor M. Oksenberg, Columbia University; Professor G. Olsson, University of Michigan; Professor N. P. Perera, Vidyokaya University, Ceylon; Professor D. Perkins, Harvard University; Mr D. G. Price, Snowy Mountains Authority; Dr Bachtiar Rifai, Indonesia; Dr Rhee Hyo Sang, Speaker, National Assembly of Korea; Dr Soebroto, Indonesia; Dr R. P. Suggate, New Zealand; Sir Robert Thompson; Professor Y. Yasue, Okayama University; Docent V. M. Yurkovsky, Kiev.

The School is grateful for financial support from the Reserve Bank of Australia Rural Credits Development Fund for research into agrarian problems in New Guinea; the Bougainville Copper Company for social investigations of that island and the Ford Foundation for a variety of projects. Cordial contact was maintained with the CSIRO, the Bureau of Census and Statistics, the Australian Institute of Aboriginal Studies, the Australian Institute of International Affairs, and a wide range of governmental and academic agencies.

Within the University, there has been an increase in collaboration with the School of General Studies—notably in the new courses for the degree of Master of Economics by course work—and the Centre for Continuing Education.

Last but by no means least, it is a pleasure to repeat last year's tribute to the work of the Graduate Assistant, Mr G. L. Hutchens, and the Business Manager, Mr P. J. Grimshaw, and their staffs, to the small army of research assistants, to the secretarial and clerical staff (and especially the departmental secretaries), and to the service ancillaries of the School, cartographers, cleaners, technicians, the ladies of the tea-room, and others. They have done much to make this twenty-first year a happy one.

**Research Activities**

Research in the *Department of Anthropology and Sociology* has centred largely on Papua and New Guinea and to some extent on Aboriginal Australia, but particular studies have also been located elsewhere in the Pacific and Asia. The emphasis has been on the effects of economic and political innovations upon traditional, social, and political life. Professor A. L. Epstein took a leading part in organising a study of the 1968 election for the New Guinea House of Assembly, and he and Dr Marie O. Reay co-edited a book on the politics of the election in collaboration with political scientist Professor R. S. Parker. Professor W. E. H. Stanner directed research into anthropological aspects of a land claim brought by Aboriginal clans at Yirrkala against the Commonwealth Government and a mining company. Research among Aborigines has concentrated on Aboriginal land rights, Aboriginal responses to Australian legal institutions and procedures, and Victorian Aboriginal policy and administration. Students have been studying the Hahalise Welfare Society of Buka and the Nagriamel movement in the New Hebrides; traditional values in changing economic conditions in Eastern Fiji; social change following innovations in fishing technology in...
Southern Ceylon; also the role of caste in economic development and political and ceremonial behaviour elsewhere. A study is now being undertaken on chieftainship among the Mekeo of Papua, and a Chinese student has begun research into some aspects of overseas Chinese settlement in Papua and New Guinea. Dr J. D. Freeman has published a new edition of his Report on the Iban, and members of the Department have published chapters in various symposia volumes.

In the Department of Biogeography and Geomorphology the year has been marked more by consolidation of existing lines of work than by new developments. Nevertheless, the first staff member to work in Australian palynology joined the Department and the first degree of Doctor of Philosophy investigation in New Guinea geomorphology began in 1970. On the biogeographical side, Professor D. Walker’s address as President of the Botany Section of ANZAAS represented a landmark in that it summarised the results of the Department’s researches thus far into the vegetation history of the New Guinea Highlands, stressing the bearing they have for human history. Dr G. Singh began palynological work on the vegetation history of the dry lands of the south-eastern quadrant of Australia and the Department’s first electronic microscope stereoscopy of pollen was carried out by Mrs Joan C. Guppy. Modern vegetation studies may be hindered a little by the time interval between the resignation of Dr D. N. McVean, the senior staff member with prime interest in this field, and the arrival in mid-1971 of his successor, Dr N. Wace. However, comparative productivity study of tussock grassland in mountain and tundra habitats by Mr R. J. Hnatiuk began well this year. Professor E. Dahl from Norway made a lively impact as Visiting Fellow on the whole Department but special mention should be made of the study of the significance of lethal temperatures for Australian plants he began with CSIRO colleagues and of his considerable activity on the conservation front. In geomorphology, historical, modern process and morphometric studies were all pursued but in that order of emphasis. In historical geomorphology, Mr R. J. Coventry’s work is significantly showing that the highest beaches of Lake George, New South Wales, formed about the time of the last glacial maximum when there was some overflow to external drainage. On the process side Mr J. N. Jennings’ finding of barrier islands in active development within mangrove swamps in King Sound, western Kimberley, is a surprising novelty. In morphometry Mr J. M. Urquhart’s negative results from spectral analysis of Murray River meandering should lead to further development of method in this direction. Field trials in very bad weather of the main new item of equipment—a Mackereth lake sediment corer—at Burrill Lake, New South Wales, tried also the mental and physical powers of many members of the Department, including Mr J. M. Bowler’s skin-diving skill.

The increased emphasis in the work of the Department of Economics on the economies of Mainland China and of the Pacific islands which was foreshadowed in earlier reports is this year reflected in the publication of two books in the former field and three in the latter. But much the larger part of the Department’s work continues to be centred on New Guinea and on Indonesia and other countries of South-East Asia.

The Department has resumed full responsibility for the publication and distribution of the Bulletin of Indonesian Economic Studies whose circulation in In-
donesia has been further increased by a decision of the Commonwealth Govern-
ment to donate 500 subscriptions to the Indonesian associations of economists
and agricultural economists.

The Department's strength, especially on the statistical and quantitative side of
its work, has been reinforced by the appointment of Dr R. M. Sundrum to a
professorial fellowship. Among activities other than research, special mention
should be made of seminars on Australian-Indonesian relations and Contem-
porary China Studies which the Department co-sponsored, of an interdisciplinary
seminar on 'Motivation in Economic Development' which ran through most of
the year, and of the Department's part in teaching for the new Master of Eco-
nomics degree by course work. A period of doldrums in the recruitment of
scholars for the degree of Doctor of Philosophy appears to have come to its end
with a spate of good applications.

The Department of Far Eastern History has kept up its interest in early and
modern Chinese history and modern Japanese history, although new staff and
students this year reflect the continued growth of attention on modern China.
The range of research subjects remains very wide, but two areas of research
have received special attention: political history and certain aspects of social
and cultural history. In social and cultural history, research is focussed on the
archaeology of ancient China, the history of Chinese science and the social
aspects of the Chinese theatre. In political history, the work is centred on tra-
ditional Chinese government and foreign relations, the politics of Meiji Japan
and the internal and international politics of twentieth century China. The inter-
est in modern China was greatly supported by a visiting fellow in the Depart-
ment in July and August, who gave a series of lectures and seminars on modern
Chinese history.

The Department began this year to produce its own journal, Papers on Far
Eastern History, and three issues have appeared. It also started a series of staff-
student meetings on research problems and held six meetings during the Third
Term. During the year, the Department agreed with the Faculty of Oriental
Studies to dissolve the Centre for Oriental Studies on the grounds that this is no
longer necessary; direct co-operation has been possible between the Faculty
and the Department and excellent relations have been maintained. There has
been co-operation in research and teaching, in work-in-progress seminars and
also in the help given to the preparations for the twenty-eighth International
Congress of Orientalists. Several members of the Department have also been
active in the newly-established Contemporary China Centre of the Research
School of Pacific Studies.

The Department of Human Geography continued its theoretical and empirical
research into the changing spatial structure of Australia, the Pacific, and South-
East Asia. In hand were investigations into the spatial organisation of manu-
facturing and mineral processing in Australia; transport decision-making in
Australia, the Pacific, and South-East Asia; aspects of the behaviour and
strategy of retailers and consumers in Australian metropolitan area; population
and migration in New Guinea and the Pacific Islands; rural development and
plural societies in Malaya; and the ecology of tropical man. These seemingly
diverse studies were linked by a common interest in many aspects of individual,
entrepreneurial, and government decision-making; by a comparison of problems
arising from the ‘modernisation’ of societies at various stages of development; and by the use of similar methodological and analytical techniques. During the year the Department ran three short seminar series (on ‘the analysis of spatial form and its relation to geographic theory’, ‘spatial perception and behaviour’, and ‘geography and social engineering’) and a series of twenty invited papers on the theme ‘government influence and the location of economic activity’ which is to be published as a monograph.

Staff appointments were Professor R. G. Ward to the Chair of Human Geography (which will be taken up late in 1971), Dr G. J. R. Linge as Professorial Fellow, and Dr P. J. Rimmer as Senior Fellow. Mr P. Dibb took up his appointment as Research Fellow on 1 January and resigned as from 21 October, thus making a short but nonetheless significant contribution to the work of the Department. Mr R. Ho, Senior Fellow, returned in September after an absence of eight months on study leave, and Dr W. C. Clarke, Research Fellow, spent several months in New Guinea which included a period as Acting Field Director of the New Guinea Research Unit. The Department benefited from an extended visit by Professor G. Alexandersson of the Stockholm School of Economics, and from shorter visits by Professor G. Olsson, University of Michigan, and Professor R. G. Golledge, Ohio State University. Eleven doctoral students were in residence for some or all of the year, and two successfully submitted theses for examination. The cartographic office of the Department continued to provide a service not only to the Department but also to members of the Research Schools of Pacific Studies and Social Sciences and the Australian National University Press.

The Department of International Relations continued with its work in general world politics, in Asian affairs, and in Australian foreign and defence policy. Sixteen scholars were engaged on topics in these fields, the largest number since the establishment of the Department. Four former students received the degree of Doctor of Philosophy.

The staff were very much concerned with two pioneering conferences involving academics and officials. The first of these, on Australian-New Zealand-American relations, was held in Canberra in February under the joint aegis of the Australian and New Zealand Institutes of International Affairs, the Institute for Defence Analyses, Washington, and the Strategic and Defence Studies Centre. The second, in May, was on Australian-Indonesian relations. It was organised in company with the Department of Economics, Research School of Pacific Studies, and the Strategic and Defence Studies Centre. In both cases most, if not all, the papers are being published.

The year was also notable for the first series of Arthur F. Yencken Memorial Lectures on diplomacy and foreign policy. They were given by the Right Honourable Lord Butler of Saffron Walden, C.H. There will be lectures every two years.

Apart from the Department’s regular seminars (on work in progress, Asian International Politics and International Theory), there were several from notable visitors, including Professor O. Young, Sir Alec Douglas-Home, Sir Robert Thompson, and Professor Z. Brzezinski.
Only two books appeared during the year from members of the staff—*The Concert of Europe* (C. Holbraad) and *The Defence of Moscow* (J. T. G. Jukes), but several others are on the way. They include *Survey of Commonwealth Affairs 1952-1969* (J. D. B. Miller), Professor H. N. Bull's book on the conditions of world order, Dr R. J. O'Neill's history of Australia's participation in the occupation of Japan and the Korean War, and Sir Alan Watt's memoirs of his life as a diplomat.

As before, members of the staff assisted with courses for trainee diplomats, public servants and service officers, and with evidence before the Parliamentary Foreign Affairs Committee.

The headship of the Department lay with Professor Bull until the end of August, when Professor Miller resumed it on returning from study leave; Professor Bull then went on study leave. Between them, they gave a number of lectures in Britain, the USA, Canada and Germany, and visited several universities.

Mr S. K. Gupta resigned at the end of the year to take up a chair at the new Jawaharlal Nehru University, New Delhi. Mr W. A. C. Adie, formerly of St. Antony's College, University of Oxford, is to join the staff early in 1971.

During 1970, three students submitted theses for the degree of Doctor of Philosophy in the *Department of Linguistics*. Two of these were awarded degrees, and the third is still undergoing examination. One student who submitted in 1969 was awarded the degree this year.

In August 1970, Professor S. A. Wurm attended an important international symposium organised by the Centre of Applied Linguistics in Washington, D.C., with Wenner-Gren Foundation sponsorship and held at the Foundation's European conference centre at Burg-Wartenstein, Austria. The symposium was concerned with the planning and establishment of a long-term international project devoted to the study and description of hitherto little-known languages of the world, and Professor Wurm was appointed one of the members of the executive committee charged with the preparation of the program during the next two years. The position of Australia and the University is a particularly important one in this project because one-third of all languages of the world are spoken in the vicinity of Australia in the south-western Pacific, and in Australia itself.

The research activities of the Department were concentrated on the long-term project concerned with the complete linguistic survey, classification of the languages, and clarification of the linguistic situation in the New Guinea area, and with vigorous work in the second long-term project initiated in 1969 and concerned with a comparable study in the New Hebrides area. In the New Guinea field, it was possible for the first time in 1970 to extend the Department's activities into West Irian where a large number of languages related to those spoken in Papua and New Guinea are located. This work was carried out by Dr C. L. Voorhoeve, whereas Professor Wurm and Dr D. C. Laycock contributed significantly to the clarification of the still not fully understood linguistic situation in the Sepik and Western Districts of Papua and New Guinea. Professor Wurm carried out extensive work directed at the solution of an important linguistic problem relating to the islands of the Santa Cruz Archipelago of the British Solomon Islands. This problem is of vital significance for the understanding of prehistoric migrations of man into the south-western Pacific area.
In the New Hebrides project, other significant work was carried out by Dr D. T. Tryon who succeeded in establishing the fact that the languages of the New Hebrides, hitherto believed to be very different from each other and strongly deviating from other languages of the Pacific, were in fact much more similar to each other than previously believed, and by no means as aberrant as assumed. Professor Wurm and Dr Laycock edited a very large book of four­nine contributions by overseas and Australian linguists and compiled in honour of Dr A. Capell, retired from the University of Sydney, who has been pione­ering Pacific linguistics in Australia.

The Department's work in Australian linguistics and linguistics of South-East Asia has been continuing with further good results.

The publication activity of the Department has continued strongly, and ten important monographs, occasional papers and books have been published.

In the New Guinea Research Unit research continued in the fields of resettle­ment, economic growth (nucleus estates, transport, indigenous cattle farming), motivation of rural cash croppers, religious change among the urban elite, and urban migration and emerging leadership.

The fourth Waigani Seminar on the theme 'The Politics of Melanesia' was held in May, and was organised jointly by the New Guinea Research Unit, the University of Papua and New Guinea, the Administrative College and the Council on New Guinea Affairs. The collected papers from this conference are expected to be published in January 1971.

An exhibition of drawings by New Guinean high school students, collected as part of a study on motivation, was sent on tour through the main urban centres of Papua and New Guinea between May and August.

Financial assistance was received during the year from the Reserve Bank of Australia.

Six issues of the New Guinea Research Bulletin were published during the year. Several more are in the final stages of preparation. Six issues of a new series called Luksave, which contains simplified summaries of selected Bulletins, were published during the year.

The Department of Pacific History continued to expand and develop its work relating to Pacific Islands and South-East Asian history and politics.

An unusually large number of lectures and papers was given by members of the Department to bodies and universities outside Canberra in the course of the year. Amongst others, three papers were given to the meeting of ANZAAS at Port Moresby, two lectures delivered at Bega and Adelaide, respectively, in connection with the Captain Cook Bicentenary, and two further lectures given at the Institute of Commonwealth Studies, London (on the recent history of the Commonwealth) and at Nuffield College, Oxford (on Australian Colonial policy in Papua and New Guinea). Professor J. W. Davidson acted as Consultant to the Congress of Micronesia and also represented the University at the South Pacific Conference in Suva.

A book on Samoa by the late Mr R. P. Gilson and another major book on the history of the Pacific Islands were published. A book has appeared dealing with
documents in the modern history of India and Pakistan and Volume III of the Pacific History Series of primary source materials has been edited and accepted for publication. Volume I of the Pacific Monograph Series of working tools for scholars engaged in Pacific studies has also been published. Several other books are in course of being written or edited by members of the Department. The fifth volume of the *Journal of Pacific History* has appeared.

The Pacific Manuscripts Bureau, which is supported jointly by the University and a group of research libraries, continued its work of locating collections of Pacific manuscripts and microfilming for distribution over 1,000 separate documents relating to the Islands held in New England, USA.

The Department continued to co-operate with the Department of History, School of General Studies, principally through the joint appointment held by one member of the staff who conducted and examined a course in Pacific history in the School of General Studies and also through the supervision of several students for the degree of Master of Arts.

Four students working in the Department took their doctorates in the course of the year and two others submitted their theses for examination. Eleven other students are working for doctoral degrees in the Department at present.

Nineteen-seventy has been the first full year of the independent existence of the *Department of Prehistory* and has seen a beginning to several aspects of internal reorganisation. Departmental archives have been established for written and photographic records compiled by staff and students in the course of field-work and arrangements made for the selection and curation of small representative collections of material from archaeological projects conducted by departmental members. The foundations were laid for a departmental publication series to be known as *Terra Australis* to cater for research data too bulky for journals and too specialised for commercial publishers. Faunal reference collections to allow the identification and interpretation of animal remains from archaeological sites have been begun.

The concentration of future research effort on a limited number of problems of regional and wider significance has been decided and the deployment of present and future departmental facilities to serve them determined.

In Australia initial emphasis is on archaeological and ethnographic investigation of Aboriginal settlement of the diverse and changing environments of south-eastern Australia over a period of 30,000 years. Such work is in progress in Tasmania, the semi-arid west of New South Wales, the high country of the Southern and Monaro Tablelands and Australian Alps, and the maritime environment of the South Coast. A notable discovery has been the persistence amongst older Aborigines of the Nowra district of traditional knowledge of useful plants, the previous list of which for south-eastern Australia has been extended enormously.

In New Guinea, while the work of unravelling the relationships of pottery using communities in the south-eastern parts of the island has continued, particular attention is being paid to the problem thrown up by departmental work some years ago, of prehistoric cultivation on the Wahgi River flats that had long since reverted to swamp when Europeans first entered the region forty years ago.
In the Pacific Islands a long-standing departmental interest in the early settlement of the islands of the South-West Pacific has been strengthened and will be developed with attention to specific questions like the divergence of Melanesian from Polynesian culture and general ones like the development of human societies in small island situations. A significant contribution to South Pacific culture history was made during the year, involving a complete redating of a sequence of archaeological sites and materials in Tonga from 0 A.D.—1700 A.D. back to 1000 B.C.—0 A.D. This has not only removed a series of inexplicable unconformities between the Tongan evidence and that from Fiji on the one hand and Samoa on the other: it allows the hypothesis that it was in the Tongan islands during the first millennium before Christ that Polynesian culture as we know it developed, to be subsequently carried throughout the islands of the South Pacific during the great maritime expansion of the first millennium A.D.

The academic staff in residence was three, including two research fellows; one senior academic with tenure was on leave throughout the year. At the end of the year there were six students in the Department, two others having submitted their theses in the course of the year. Two former students of the Department were admitted to the degree of Doctor of Philosophy.

The Strategic and Defence Studies Centre joined in sponsoring two major conferences during the year, one on Australian-New Zealand-American relations in February, and one on Australian-Indonesian relations in May. Regular afternoon seminars continue to be held; these have been attended by a wide range of academics, officials and journalists. The series of Canberra Papers on Strategy and Defence has been extended by a further five titles. These papers are now widely read throughout Australia and overseas.

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HOWARD, T. M.‡ & HOPE, G. S.**

JENNINGS, J. N.


KERSHAW, A. P.

LANG, G.*

NOY-MEIR, I. & ANDERSON, D. J.¶¶¶

† Member of the Department of Prehistory, Institute of Advanced Studies.
‡ Not a member of this University.
¶ Member of the Department of Economic History, Institute of Advanced Studies.
* Based on work done while a member of the Department.
** Based on work done prior to joining this University.
¶¶ Member of the Department of Environmental Biology.
PAIN, C. F.** & HOSKING, P. L.†
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** Based on work done prior to joining this University.
† Not a member of this University.
¶ Member of the Department of Prehistory, Institute of Advanced Studies.
§ Based on work done while a member of the Department of Geophysics and Geochemistry.
* Based on work done while a member of the Department.
*** Based on work done while a Visiting Research Worker.
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Hughes, Helen* & Brown, Pat*

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† Not a member of this University.
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‡ Not a member of this University.

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ZGRAGGEN, J. A.*


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**New Guinea Research Unit**

FAIRBAIRN, I. J.†


LIND, A. W.†


OESER, LYNN*


PARRATT, J. K.**

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* Based on work done while a member of the Department.
† Visiting Research Worker.
** Based on work done prior to joining this University.
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LARACY, H. M.*
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LEWIS, D. H.

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* Based on work done while a member of the Department.
† Not a member of this University.
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WEST, F. J.

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‡ Not a member of this University.
** Based on work done prior to joining this University.
¶ Member of the Department of Biogeography and Geomorphology.

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Mulvaney, D. J.
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Williams, G. E.¶ & Polach, H. A.

Bellany, I.

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Bellany, I. & Richardson, J.‡

Millar, T. B.

Welfield, J. B.

Theses

Thesis titles of work successfully submitted by research students in the Research School of Pacific Studies on whom degrees were conferred in 1970:

Angel, J. R.
'The new emerging forces in Indonesian foreign policy.' Department of International Relations.

* Based on work done while a member of the Department.
† Not a member of this University.
*** Based on work done prior to joining the Department of Biogeography and Geomorphology.
§ Based on work done while a member of the Department of Geophysics and Geochemistry.
¶ Member of the Department of Biogeography and Geomorphology.

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Strategic and Defence Studies Centre

Doctor of Philosophy
CHAUHAN, I. S.  
‘Leadership and social cleavages: Political processes among the Indians in Labasa, Fiji Islands.’ *Department of Anthropology and Sociology.*

CORRIS, P. R.  
‘Passage, port and plantation. A history of Solomon Islands labour migration 1870–1914.’ *Department of Pacific History.*

DELLINGER, D. W.  
‘Akha: A transformational description.’ *Department of Linguistics.*

FITZGERALD, S. A.  
‘Overseas Chinese affairs of the People’s Republic of China.’ *Department of International Relations.*

HARRIS, JOY K.  
‘Descriptive and comparative study of the Gunwingguan languages, Northern Territory.’ *Department of Linguistics.*

HUISH, D. J.  
‘The nature and role of the Meirokusha. A reassessment.’ *Department of Far Eastern History.*

JEFFCOTT, C. A.  

KRINKS, P. A.  
‘Peasant colonisation in Mindanao, the Philippines.’ *Department of Human Geography.*

LARACY, H. M.  
‘Catholic missions in the Solomon Islands 1845–1966.’ *Department of Pacific History.*

MCELHANON, K. A.  
‘The Selepet language within the Finisterre-Huon phylum (New Guinea).’ *Department of Linguistics.*

MACINTYRE, R. R.  
‘The Arab Ba‘th Socialist Party: Ideology, politics, sociology and organisation.’ *Department of International Relations.*

MACKERRAS, C. P.  
‘The rise of the Peking Opera (1760–1860).’ *Department of Far Eastern History.*

MACKNIGHT, C. C.  
‘The Maccassans—a study of the early trepang industry along the Northern Territory coast.’ *Department of Prehistory.*

MALE, BEVERLEY M.  
‘Pakistan’s relations with the Middle East.’ *Department of International Relations.*

RALSTON, CAROLINE  
‘Pacific beach communities of the nineteenth century.’ *Department of Pacific History.*

SPECHT, J. R.  
‘Prehistoric and modern pottery industries of Buka Island, T.P.N.G.’ *Department of Prehistory.*

TREADGOLD, M. L.  

YEN CHING HWANG  
‘Chinese Revolutionary Movement in Malaya (1900–1911).’ *Department of Far Eastern History.*

YOUNG, M. W.  
‘Fighting with food: Values and social control in a Massim society.’ *Department of Anthropology and Sociology.*
The School had its third anniversary in August 1970 and at that time the office of Dean was assumed by Professor D. P. Craig in succession to Professor A. J. Birch, F.A.A., F.R.S., for the following three-year period. The general growth of the School has continued, with some emphasis in favour of postdoctoral work rather than the training of students for the degree of Doctor of Philosophy. The present staff consists of two professors, four professorial fellows, three senior fellows, three fellows, fourteen research fellows, and eight postdoctoral fellows. There are twenty-nine scholars.

In the early part of the year, a Summer School in Theoretical Chemistry was organised jointly by the School and the Department of Chemistry in the School of General Studies. There were more than forty participants drawn from most of the Australian universities, and a teaching staff that included a number of visiting lecturers as well as members of the School. Among staff activities, Professor Birch was invited to advise on vitamin and drug synthesis at an Indian Government establishment in Hyderabad and was a visiting lecturer at the School of Pharmacy in the University of Wisconsin. Mr R. W. Rickards spent four months at the University of Wisconsin as Visiting Scientist and gave the Pfeiffer Lecture Series at the University of Connecticut. Professor Craig was Visiting Professor at University College, London. Dr A. J. Parker gave a Plenary Lecture at the International Union of Pure and Applied Chemistry symposium on electrochemistry in non-aqueous solids in Paris. Dr A. M. Sargeson was Visiting Professor in the University of Copenhagen, and Dr D. A. Buckingham lectured by invitation at the California Institute of Technology and the Massachusetts Institute of Technology.

Dr J. Ferguson accepted an appointment as professorial fellow and established a research group in physical chemistry, with special interests in the optical properties of organic and inorganic solids.

In the inorganic section the general theme of this year's research has continued to be the ways in which transition metals affect the reactions of attached organic molecules. The reactions of organic nitrogen compounds, such as amines, amino acids and peptides attached to cobalt in both aqueous and non-aqueous media have been intensively studied, and the results have been applied to the synthesis and degradation of small peptides. Studies of organophosphorus and organoarsenic compounds of manganese, iron, ruthenium, rhenium, rhodium, platinum and gold have led to a better understanding of the way in which metal-catalysed reactions of hydrocarbons occur, and have also led to the stabilisation of hitherto unknown organic compounds. The structures of some of these metal-containing compounds in the solid state are being elucidated by X-ray crystallography, which provides an indispensable aid to the interpretation of the reactions of the compounds in solution.
In the organic section work is being carried out on synthetic methods, and on the isolation, structure-determination and synthesis of compounds of biological importance. The structure of the diterpene hydrocarbon, nasutene, which is the trail-substance of the termite Nasutitermes, has been elucidated. Synthetic work on the production of the medicinally important prostaglandin hormones has made favourable progress. The structures of the three remaining pigments of *Penicillium brevicompactum* have been elucidated and the compounds are being examined as possible liver carcinogens in view of a possible linkage with this organism as a food contaminant. The structure of the clinically important antifungal agent nystatin has now been completely defined. This and other related compounds have recently found promise in control of blood cholesterol levels, and the stereochemistry of the subgroup is being examined. The important plant pathogen *Phytophora cinnamomi* is being examined to define the chemical basis of its toxicity, and the fungus *Naematoloma fasciculare* which is antagonistic to it, has yielded a simple metabolite which is strongly fungistatic. Work on the chemical basis of the sheep disease romulosis continues. The structure of the biologically important antifungal agent nystatin has now been completely defined. This and other related compounds have recently found promise in control of blood cholesterol levels, and the stereochemistry of the subgroup is being examined. The newly established physical-organic section has grown into a well balanced research group with one professorial fellow, two research fellows, two postdoctoral fellows, three postgraduate students and a research assistant. The section is now making a significant contribution to the work of the School, both in published papers and through contributions at international conferences. The main lines of work are in (a) the mechanism of reaction of carbon compounds with bases; (b) the factors which influence the rates and products of these reactions; and (c) chemistry in non-aqueous solvents. Under the first two headings the main effort is concerned with olefin-forming elimination reactions. Several new base-solvent systems have been discovered. These give entirely different proportions of isomeric olefins from the conventional base-solvent systems which have been widely used by almost all organic chemists during the past 100 years. The work under heading (c) highlights the enormous effect of solvation by water on the chemistry of ions. When ions are studied in non-aqueous solvents, the chemistry often changes dramatically. Attempts are being made to use these changes in the development of non-aqueous batteries, the refining of lead, nickel, copper, silver and uranium and in electroplating. In addition to these practical applications, fundamental studies into enthalpies, entropies and free energies of transfer of ions from one solvent to another are in progress.

In the physical and theoretical section, work has continued on the optical and spin resonance study of molecules and ions in solids, and new aspects of the exchange coupling of neighbouring systems have been elucidated. Theoretical studies have been completed on the interaction of optically active molecules, on the energy states of thin crystals, and the influence of electron correlation on molecular properties.
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BENNETT, M. A. & MILNER, D. L.*

BENNETT, M. A. & PATMORE, D. J.†

BIALE, G.‡, PARKER, A. J.**, SMITH, S. G.‡, STEVENS, I. D. R.‡ & WINSTEIN, S.‡

BIRCH, A. J.**, ALLEN, M.‡ & JONES, A. R.‡

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BIRCH, A. J. & MCKAGUE, B.***


BIRCH, A. J. & POWELL, V. H.*

‡ Not a member of this University.
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* Based on work done while a member of the Department.
† Visiting Research Worker.
*** Based on work done while a Visiting Research Worker.

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*** Based on work done while a Visiting Research Worker.

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§ Based on work done while a member of the Department of Chemistry.
¶ Member of the Department of Chemistry.
* Based on work done while a member of the Department.
† Not a member of this University.
** Based on work done prior to joining this University.
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**THESES**

Thesis titles of work successfully submitted by research students in the Research School of Chemistry on whom degrees were conferred in 1970:

CHRISTIE, J. R.
'Theoretical studies of the electronic states of large molecules.'

FOSTER, D. M.
'Cobalt (III) promoted reactions of glycine derivatives.'

HAAS, M. A.
'Some reactions of tricarbonylcyclohexa-1,3-dieneiron complexes.'

MAXWELL, I. E.
'Structural analysis and prediction of molecular geometry of chelate complexes.'

* Based on work done while a member of the Department.
‡ Not a member of this University.
** Based on work done prior to joining this University.
*** Based on work done while a Visiting Research Worker.
The School has continued to flourish and to extend and consolidate its research activities. Already, some changes in the emphasis of work in the longer established departments is noticeable. One marked change is in the Department of Environmental Biology, where Professor R. O. Slatyer, F.A.A., is directing his attention towards the comprehension of ecological systems as self-regulating entities. A full understanding of the factors concerned with stability and instability is fundamental to the continued conservation and management of individual systems and to the Earth as a whole. Effective balance in the exchange of energy and materials between organisms and their environment is essential.

The School's most important new appointment is that of Professor J. Langridge to a chair in the Department of Genetics and to the Headship of that Department. This is significant in several ways. Professor Langridge has retained his position in the Division of Plant Industry, CSIRO, where he is continuing to direct research in the Genetics Section. This joint appointment is the first such close association of the University with the CSIRO. It very greatly strengthens genetics in Canberra since it draws together the complementary staffs of the Division of Plant Industry and the Research School of Biological Sciences. Already Professor Langridge is changing the emphasis of work in the Department, towards a concentration on the biochemical genetics of adaptation and evolution, making use of the interests of present staff and planning recruitment to suit the changing research.

When the School was organised last year formally into named departments, one of the departments thus formed was the Department of Behavioural Biology, then apparently a sensible formalisation of the work started in the general area of behavioural biology. Since Professor G. A. Horridge, F.R.S., assumed his appointment and began to develop the Department, it has become clear that the activities would be in an area of behavioural biology concerned with the organisation, structure and function of nervous systems in lower animals. It is an advantage to change the name to Department of Neurobiology and this has been agreed by Council. This will not only make clear the work of the Department but also allow at the appropriate time, we hope soon, the formation of a department active in the area of behavioural biology known as ethology.

Work on Stage I of the permanent building began in July and appears to be progressing satisfactorily. Not much shows above ground as yet, but much preparation in the way of piling and foundations has been accomplished. The threshold and a flanking wall were ready on Saturday, 14 November, when the School was honoured by the visit of the Honourable Nigel H. Bowen, Q.C., M.P., Minister for Education and Science, who came to lay the foundation stone. The Minister was introduced by the Vice-Chancellor and the ceremony was witnessed by many friends of the School within and without the University.

The School has added a medium high voltage 200 Kw electron microscope to the major equipment in its central facilities. This is the first instrument of its kind for use by biologists in Australia and one of the first in the world. This
instrument greatly extends the capacity for the morphological study of the minu­tiæ of anatomy. Relatively thick sections can be examined and, using a tilting device, pairs of stereo pictures can be obtained, allowing the demonstration of structure in three dimensions. These properties are essential to the work which Professor Horridge and his colleagues are doing on the detailed structure, the actual wiring pattern, of nervous systems.

The present staff of thirty-three academics comprises five professors, two professorial fellows, six senior fellows, three fellows, one senior research fellow and sixteen research fellows. Ten visitors, as visiting fellows or honorary fellows, have worked in the School during the year together with twenty-nine research students. Four students gained the degree of Doctor of Philosophy.

Members of the School continue to participate in the organisation and conduct of important international symposia and conferences. One, sponsored under the joint agreement of the governments of Australia and the USA, concerned the special C₄ pathway of photosynthesis discovered recently and a matter of intensive research by the School's Department of Environmental Biology and the Division of Plant Industry, CSIRO; Professor Slatyer and his colleagues organised it. Another international conference on plant growth substances, sponsored by the Australian Academy of Science and organised by a committee under the chairmanship of Professor D. J. Carr, was concerned with the variety of hormones now known to be concerned in the regulation of growth and development of plants.

Research Activities

In the Department of Developmental Biology research has continued along lines already formulated in previous Reports, and there have been no significant changes in direction. The aims are to describe developmental processes in terms of cellular ultra-structure and to elucidate their biochemical nature and control mechanisms. Special attention is focussed on the apparent autonomy of certain organelles of the cell, particularly the chloroplasts and the mitochondria.

These undergo developmental changes which can be controlled by a variety of physical and chemical treatments of the organisms which contain them. In yeast cells the mitochondrion is suppressed during anaerobic growth in fermentation and then can be induced to develop relatively quickly by admitting oxygen to the cultures. This enables the controls of formation of lipids and other membrane constituents, ribosomes and other structures of the mitochondria to be investigated over conveniently short periods of time.

A similar control is exerted over the development of plant cells by hormones, one class being active in inducing cell division. Isolation and characterisation of these compounds and their mode of action is in progress. Hormones may induce cells to synthesise new proteins. Thus, gibberellic acid causes certain cells of the barley grain to synthesise the enzyme amylase. Analysis of this process, which takes only a few hours, has allowed the timing of the release of genetic information to the cell.

Research in the Department of Environmental Biology is concerned with the relationships between environmental factors and the physiological performance, and ecological distribution, of various organisms. The work has the objective of understanding the key mechanisms which underlie such important ecolo-
gical phenomena as stability in ecological systems, adaptation of species to particular environments, competition between species for energy, water and nutrients, and productivity in relation to genotype and environment.

The research program at present consists of several closely linked areas of activity. The first covers whole organism and population studies, related particularly to the environmental restraints within which individual species operate, the second comprises biochemical and biophysical studies of key physiological processes, and the third is associated with the evaluation and understanding of physical phenomena which have special relevance to energy, water and gas exchanges in ecosystems.

In addition, studies of ecosystems as self-regulating entities are being developed. This field is of considerable importance since a full understanding of ecosystem dynamics, and the factors associated with stability and instability, is fundamental to long-term ecosystem conservation and management. This applies not only to natural ecosystems but also to the many ecosystems modified by human activity.

A major interest in the Department of Genetics has been the study of genetical and biochemical processes of control in living cells. Experiments are carried out on bacteria because of their ease of handling and on fungi because they represent a more highly evolved form of life. In examining the genetic control of metabolism, mutants are isolated with increased or reduced production of essential compounds or with changes in the rate at which they take up substances from the medium. These inherited alterations are located in the genetic material and the effects of the mutations on enzymes and their actions are examined. These techniques are giving a good understanding of the control systems governing the formation of important sub-units of proteins and nucleic acids.

A related problem concerns the control of genetic recombination, a process essential to the maintenance of variation in populations. A number of genes, which normally reduce recombination, have been identified. These genes have been further classified into ones which produce products causing recombination depression and others which appear to be responsible for the recognition of such products.

There has been increased emphasis on experiments directed towards understanding processes of population change and organic evolution in terms of molecular genetics. The origin of new or modified genetic functions such as those allowing utilisation of new substrates, resistance to poisons and adaptation to environmental extremes, is being studied in micro-organisms. Different techniques are necessary for higher organisms where relatedness is being assessed by comparisons of nucleic acid and protein structure.

This year has seen a rapid development of the Department of Neurobiology and the establishment of the main lines of research in this new Department. The two main themes of its work will be the analysis of the mechanism of the interaction of nerve cells in a few favourable preparations and the analysis of the mechanisms whereby these patterns of nerve cells become established in growth. The system selected is the insect visual system. Techniques for its analysis involve electrophysiological recording from the primary receptors and from the nerve
cells which abstract patterns in the insect optic lobe, electron microscopy of the anatomy to work out the circuitry, optical studies on the eye itself and behavioural tests of what the insect shows itself to be capable of seeing.

Once the actual wiring system of a part of the nervous system is known it is possible to study how it grows and heals when damaged. In fact the system of nerve connections behind the insect eye turns out to be incredibly accurate besides being complicated.

This work has several bearings upon current scientific thought in the following ways. The primary receptors for light can be studied directly—this is relevant to the study of human reception of light and receptors in general. The mechanisms of pattern perception can be analysed—this is relevant to how pattern in other animals including man can be perceived and is also relevant to the making of instruments for tasks such as sorting mail. The exact study of the neuronal wiring system can be pursued in the insect eye preparation more readily than in any other animal. The description of the accuracy of synaptic connections has been first realised as part of this work.

In the Molecular Biology Unit work on the molecular mechanism of protein synthesis and its role in cell differentiation and carcinogenesis has continued. Protein synthesis starts by supply of a genetic message, a ‘blue print’ of the protein to be synthesised, to the complicated machinery. Specific selection and recognition of individual messages by ribosomes is involved. Notable progress has been made in understanding the mechanism which underlies this specificity. This knowledge should open a new way to investigate the irreversible alteration of cell functions.

The Taxonomy Unit is developing research into modern methods of taxonomy such as computational applications, comparative biochemical studies and experimental investigations of plant variation and is contributing along classical lines to a modern Flora of Australia. Close contact is being maintained with the CSIRO and State herbaria, and with the Division of Computing Research, CSIRO.

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† Not a member of this University.

** Based on work done prior to joining this University.

† Visiting Research Worker.
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Neurospora crassa.' Proceedings of the Australian Biochemical Society, 3, 12.

Jha, K. K.
'Mutagenic action of nitrous acid on two transversions in the histidine-3 locus of
Neurospora crassa.' Mutation Res., 9, 467-72.
'The aza loci of Neurospora crassa: A regulatory function in the purine metab­

* Based on work done while a member of the Department.
† Not a member of this University.
‡ Visiting Research Worker.
** Based on work done prior to joining this University.
POWER, T. F. & BENNETT, D. J.

ALTMAN, J. S.†** & NIXON, M.‡
'Use of beaks and radula by *Octopus vulgaris* in feeding.' *J. Zool.*, **161**, 25-38.

HORRIDGE, G. A.**
'The interpretation of behaviour in terms of interneurons.' In *The Interneuron* (ed. M. A. B. Brazier), 1-20, Univ. of Calif. Press, 1969.

HORRIDGE, G. A. & MEINERTZHAGEN, I. A.
'The accuracy of the patterns of connexions of the first- and second-order neurons of the visual system of *Calliphora*.' *Proc. R. Soc.*, **B**, **175**, 69-82.
'The exact neural projection of the visual fields upon the first and second ganglia of the insect eye.' *Z. vergl. Physiol.*, **66**, 369-78.

HORRIDGE, G. A., WALCOTT, B. & IOANNIDES, A. C.

SOSULA, L. & GLOW, P. H.‡
'A quantitative ultrastructural study of the inner plexiform layer of the rat retina.' *J. comp. Neurol.*, **140**, 439-78.

TAMM, S.† & HORRIDGE, G. A.

TYRER, N. M.**

YOUNG, D.**
'The structure and function of a connective chordotonal organ in the cockroach leg.' *Phil. Trans. R. Soc.*, **B**, **256**, 401-28.

YOUNG, D.**, ASHHURST, DOREEN E.‡ & COHEN, M. J.;‡

NAORA, H. & KODAIRA, KUMIKO
'Interaction of informational macromolecules with ribosomes. II. Tissue-specific ribosomes.' *Proceedings of the Australian Biochemical Society*, **3**, 73.

WATSON, L.
'The representation of taxonomic data.' In *Data Representation* (eds R. S. Andersen & M. R. Osborne), 108-12, Univ. of Queensland Press.

† Visiting Research Worker.
** Based on work done prior to joining this University.
‡ Not a member of this University.

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THESES

Thesis titles of work successfully submitted by research students in the Research School of Biological Sciences on whom degrees were conferred in 1970:

HALSALL, DOROTHY M.
'Genetic and biochemical studies on 3-deoxy-D-arabino heptulosonate 7-phosphate synthase in Neurospora crassa.' Department of Genetics.

SMYTH, D. R.
'Genetic control of recombination in the animation-l region of Neurospora crassa.' Department of Genetics.

THOMAS, P. L.
'The control of recombination at the histidine-l locus of Neurospora crassa.' Department of Genetics.
As one reads the departmental reports for 1970, an overriding impression emerges of steady work along set lines without spectacular development. The changes towards greater student participation in departmental and Faculty policy-making, innovations of 1969, were digested in 1970; they have made considerable impact in many departments, especially on methods of assessment, with emphasis on more continuous assessment throughout the year. The students appear to be less concerned with content of courses, quality of teaching, or workload than with the single bogy of examinations.

And they are a bogy. The old chant '50% must fail' is now ridiculous. In most units 90% of those sitting the exam pass it; in most first-year units, over 80%. An increasing proportion of those who enrol in units reach the examination room—the wastage rate continues its decline. If in the tables of examination results one reads 'wastage plus failure' it is clear that in practically every department over 70% of the students who enrol in it continue and pass their examinations; often the rate is much higher.

This is probably a reflection, at least in part, of the rising entry standards. It is getting more difficult each year to enter the University; still more difficult to enter the Faculty of Arts. There are fewer second chances; a youth or girl of eighteen who, in a new environment, fritters away six weeks of term, falls behind in work and then panics, may well find the doors of this and all other universities closed to them. Another result of the rising entry standard in the national university is that Canberra residents will find it increasingly difficult to enter, compared to their previous access. Already the application of such essential limits as firm closing dates for enrolment has led to strong protest and attempts to bring pressure to bear on the Dean’s office.

In this first year of the new triennium, two of the Faculty’s desired new projects were launched with the appointments of Professor J. Zubrzycki to the Chair of Sociology and Professor D. J. Mulvaney to that of Prehistory. Undergraduate teaching in the former will begin in 1971, in the latter in 1972. Professor G. S. Reid was appointed to the chair and headship of the Department of Political Science. The new Chair of Religion has been advertised, drawing a large field of applicants. The long-standing vacancy in the Chair of Russian has been filled with the appointment of Professor R. G. A. de Bray. The calibre of these appointments is a very considerable tribute and gain to this University.

**Publications**

Burge, E. L.


Rawson, Beryl M.

‘Pompey and Hercules.’ *Antichthon*, IV, 30-7.
English

**BRISSENDEN, R. F.**

**DONALDSON, C. I. E.**


**GREEN, DOROTHY**
‘Walter Lindesay Richardson: The man, the portrait and the artist.’ *Meanjin Quarterly, I*, 5-20.

**HEWITT, A. HOPE**

**MILGATE, W.**

**RAMSON, W. S.** (ed.)

**RAMSON, W. S.**

French

**TORY, ETHEL E.**
‘Introduction and notes.’ In *Intermezzo* (by J. Giraudoux), 7-33; 119-29; Harrap.

Geography

**CHAPPELL, J. M. A. & WEBBER, M. J.**

**VEEH, H. H.¶, & CHAPPELL, J. M. A.**

**WEBBER, M. J.**
*An Equilibrium Model for Planning the Size and Location of Retail Centres.* Report to the National Capital Development Commission, 88.

Germanic Languages

**HOLT, R. F.**
*Kleine Deutsche Idiomatik.* Hawthorn Press, 80.

**KUHN, H.**

History

**FRY, E. C.**

**HANCOCK, I. R.**

**McQUEEN, H. D.**
*A New Britannia.* Penguin, 261.

¶ Member of the Department of Geophysics and Geochemistry.

141
RITCHIE, J. D.


BLUMHE, H.

Review article on Distinktive Spracheinheiten im Niederländischen und Deutschen, zum Phonologischen Identifizierungsprozess (by N. Morciniec). Erasmus, XXII, 722-5.

'Das phonemsystem des Deutschen.' Lingua, XXV, 358-80.

DIXON, R. M. W.**

'Languages of the Cairns rain forest region.' In Pacific Linguistic Studies in Honour of Arthur Capell (eds S. A. Wurm & D. C. Laycock), 651-87. Pacific Linguistics, C, XIII.

'Olgolo syllable structure and what they are doing about it.' Linguistic Inquiry, I, April, 273-6.

'The emergence of Noam Chomsky.' The Listener, May, 690-1.

RENSCH, K. H. M.

'Dia-synchronische Verwandtschaft von Phonemsystemen.' Orbis, I, 94-101.


ANDERSSEN, R. S., DOYLE, H. A., PETERSONS, H. F. & SENETA, E.


BROWN, A. & DOWNES, GAYE L.


BURNS, J. C.*


DAVIES, B.


DRUMMOND, J. E.


PETERSONS, H. F.


BROOKS, M. S., KOVACKS, L. G. & NEUMANN, M. F.


BRYCE, R. A. & COSSEY, P. J.


COPPELL, W. A. & PALMER, K. J.


COSSEY, P. J.


DEY, I. M. S. & NEUMANN, HANNA


** Based on work done prior to joining this University.
† Member of the Computer Centre.
¶ Member of the Department of Geophysics and Geochemistry.
¶¶ Member of the Department of Statistics, School of General Studies.
* Based on work done while a member of the Department.
§ Member of the Department of Mathematics, Institute of Advanced Studies.

142
LOY, R. J.**


McPHERSON, J. M.**

'Wild knots and arcs in a 3-manifold.' In Topology of Manifolds (eds J. C. Cantrell & C. H. Edwards, Jr), 176-8, Markham Publishing Co.

WARD, M. A.


WIEGOLD, J.†


COOKESEY, R. J. (ed.)

The Great Depression in Australia. Labour Hist., XVII, xi + 188.

COOKESEY, R. J.


CRISP, L. F.


'Legislative research service: The view from Canberra.' In The Vital Adjunct: Parliamentary Libraries and Their Role in Australia (ed. R. L. Cope), 14-22, N.S.W. Parliamentary Library Reference Monograph VII.

'Specialists and generalists: Further Australian reflections on Fulton.' Public Administration (Sydney), XXIX, iii, 197-217.


HUME, L. J.

'Jeremy Bentham on industrial management.' Yorkshire Bulletin of Economic and Social Research, XXII, i, 3-15.


MCFARLANE, B. J.

'Challenging the control of the Australian economic system.' In The Australian New Left (ed. R. Gordon), 95-125, Heinemann.

'Investment policy for Australia.' Economics (Sydney), IV, iii, 29-36.

'The politics of economic reform in eastern Europe.' Australian Outlook, XXIV, ii, 164-77.

MCFARLANE, B. J. & WHEELWRIGHT, E. L.‡


STOCKWIN, J. A. A.

'Foreign policy perspectives of the Japanese left: Confrontation or consensus?' Pacific Affairs, XLII, iv, 435-45.

JONES, T. R.

'Anna Karenina and the tragic genre.' Melbourne Slavonic Studies, IV, 57-67.

** Based on work done prior to joining this University.
† Visiting Research Worker.
‡ Not a member of this University.
JONES, T. R. & STUPIN, L. P.***


MISING, IRENE I.


THESIS

Thesis titles of work successfully submitted by research students in the Faculty of Arts on whom degrees were conferred in 1970:

GAMMAGE, W. L.

'The broken years—a study of the diaries and letters of Australian soldiers in the Great War, 1914-18.' Department of History.

KLM, G.

'Stanislaw Przybyszewski.' Department of Germanic Languages.

MEGGITT, S. M. A.

'The stability of massive hydrogen stars near the main sequence.' Department of Applied Mathematics.

PALMER, K. J.

'Integrally small perturbation theory.' Department of Pure Mathematics.

TURNER, PAULINE N.

'Forces behind the passing of the "Grants for Public Worship Prohibition Act" of 1862 (NSW).'

BENNETT, S. C.

'Annotated documents on the making of the Commonwealth of Australia.' Department of History.

BRAZIL, WENDY M. H.

'The language of the Cantica of Plautus.' Department of Classics.

BRIGHT, ANN

'The originality of Robert Burton.' Department of English.

DOYLE, J. W.

'Regions in Northeast Thailand.' Department of Geography.

GIBNIE, H. J.

'Hugh Mahon: A political biography.' Department of History.

HENSEN, JANINE

'L'influence des arts poétiques médiévaux sur l'œuvre de Chrétien de Troyes.' Department of French.

KNEIPP, MARY P.

'Anti-German sentiment in the United States 1914-1917.' Department of History.

LIVERMORE, J. F.

'Internal migration, population trends, and the regional influence of towns in the Albury-Wodonga and Wagga Wagga area.' Department of Geography.

MALEY, B. R.

'Professionalism and professional ethics.* Department of Sociology.

MOSS, R. J.


NASE, PAMELA

'Martin Boyd's Langton Novels: An interpretative essay.' Department of English.

*** Based on work done while a Visiting Research Worker.
* Submitted as a requirement in addition to course work.

144
SAWER, PHILIPPA M.
'The problem of the State in Marxist Theory and practice from Marx to Lenin.'
*Department of Political Science.*

SHIELD, D. B.
'Nilpotency and related properties of group extensions.' *Department of Pure Mathematics.*

TOBIN, G. M.

TWEEDIE, R. L.
'Stationary measures for random walk on a half line.' *Department of Statistics.*

WALSH, G. P.
'A history of manufacturing, 1788-1850.' *Department of History.*
In 1970 the new Courses of Study (Degree of Bachelor of Economics) Rules adopted in 1969 came into effect. Formerly, a student had been required to confine his choice of units to the fields of economics, accounting and public finance, economic history, mathematics, political science, and statistics; the new rules allow a student, if he wishes, to take up to three units from outside these fields. (This extension of choice is not available to a student who elects to take a major in Political Science which, for this purpose, is treated as a subject offered by the Faculty of Arts.) At present, the effect of this change can be measured with most ease and certainty in the cases of full-time students newly enrolled in the Faculty in 1970, without credit for units completed earlier in this or another university. Of these, about 23% made choices of first-year units that would not have been approved under the old degree rules, while the remaining 77% chose combinations of first-year units long familiar within the Faculty (including mathematics and political science).

Adoption of the new degree rules made it necessary for the Faculty of Economics to revise its working rules relating to credit to be granted for work completed in another faculty or university. This revision has been completed during the year. Attention has also been given to associated questions relating to credit to be granted for work completed at other institutions of higher learning, including colleges of advanced education.

The Faculty has also revised and greatly simplified its academic progress rules, taking as its model those currently being applied in the Faculty of Arts. There are now only minor differences between the two Faculties in this respect. This is administratively convenient; moreover, enrolments in some units offered by the Faculty of Economics have solid components of students registered for the arts degree and it seems desirable that all should be subject to similar progress rules.

During the year the Faculty of Arts acceded to my request that Accounting be accepted as a subject available to students enrolled for the degree of Bachelor of Arts.

In 1970 it had been hoped to introduce courses in Computer Science, for which there were indications of a strong student demand. However, it was found shortly before the beginning of First Term that no satisfactory teaching appointment could be made. Following readvertisement, two posts have since been filled; funds have also been made available for the remote access equipment needed for teaching. There now seems little doubt that Computer Science I will be taught in 1971. To this, Computer Science II will be added in 1972. The Department of Statistics is at present administratively responsible for both of these units.

The first group of candidates for the degree of Master of Economics by course work (as distinct from candidates by thesis) was enrolled in 1970. This fifth-
year program is offered by the Department of Economics, with Dr R. G. Gregory as convenor, but staff members of other departments of the Faculty and of the Research Schools of Social Sciences and Pacific Studies have also taken part in teaching.

In his report for the year 1969 the Dean (Professor J. D. Pitchford) referred to plans for the development of postgraduate work in Administrative Studies. A foundation Chair has since been advertised in this field and applications are currently under consideration. For the 1973-75 triennium the Faculty has not proposed any new development into a field of study not already included within its activities, but it is hoped that greater attention will be given to Econometrics. On the whole, the coming triennium is seen as one of consolidation rather than of major new departures.

Concern has been expressed about the effect of possible restrictions on enrolments in the Department of Pure Mathematics. The units Computer Science II, Mathematical Economics I and II, Operational Research, and Statistics II and III all have a prerequisite in mathematics. At my request, the matter is being discussed by the Standing Committee of the Board of the School of General Studies.

Total undergraduate unit enrolments in the four departments of Accounting and Public Finance, Economic History, Economics and Statistics, which had been 1,584 in 1969, increased by 16.4% to 1,844 in 1970. (Here an enrolment in a semester unit has been given a weight of one half of an enrolment in a full-year unit.) First-year unit enrolments increased from 1,039 to 1,144, or by 10.1%; it follows that enrolments in later-year units are now growing faster than first-year enrolments. Such a pattern is to be expected in the present stage of development of the Faculty.

Fourteen graduate students were enrolled for the degree of Master of Economics by course work; in addition, members of the Faculty were supervising forty-three graduate students at the thesis level during 1970. Of these, twenty-five were proceeding to the degree of Doctor of Philosophy and eighteen to a degree of master. (In some cases, a member was acting as joint supervisor with another from outside the Faculty.)

In the assessment of student performance, most interest attaches to first-year units, where failure rates are usually much higher than in later-year units. First-year units can also be expected to be more affected by wastage arising from withdrawals and exclusions during the year. We can define a 'success rate' as the number of candidates who completed a unit (pass or better) in proportion to total enrolments. (For 1970, data of enrolments used in the calculation of success rates relate to those recorded as at 30 April.) The following figures for first-year success rates in the four departments of Accounting and Public Finance, Economic History, Economics and Statistics are based on departmental reports for the years 1966-68 and on the University's statistical summaries for the years 1968-70. There is an overlap in the year 1968, where a small discrepancy will be noticed.
It will be seen that the gain in first-year student performance noted in the Dean's report for 1969 has been maintained but no further improvement has taken place.

The stability between 1969 and 1970 of the aggregate first-year success rate is a compound of divergent movements in the individual departments to which it refers. The following table ranks departments according to the magnitude of improvement (in percentage points) in the first-year success rate between 1969 and 1970.

<table>
<thead>
<tr>
<th>Department</th>
<th>1969</th>
<th>1970</th>
<th>Change (Percentage points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting and Public Finance</td>
<td>46.2%</td>
<td>53.5%</td>
<td>+7.3</td>
</tr>
<tr>
<td>Statistics</td>
<td>61.6%</td>
<td>64.4%</td>
<td>+2.8</td>
</tr>
<tr>
<td>Economic History</td>
<td>61.4%</td>
<td>62.1%</td>
<td>+0.7</td>
</tr>
<tr>
<td>Economics (Economics I and A)</td>
<td>45.3%</td>
<td>42.5%</td>
<td>-2.8</td>
</tr>
</tbody>
</table>

Since first-year enrolments in the Department of Economics far outweigh those in any other of the departments, the small reduction in its success rate between 1969 and 1970 has been sufficient to counter balance the gains in Accounting and Statistics, so producing approximate stability overall.

An alternative but probably less meaningful measure of student performance is the pass rate, or the number who completed a unit (pass or better) in proportion to those sitting the annual examination. This takes no account of the extent of wastage by withdrawal and exclusion that may have taken place during the year.

Again there was rough stability in aggregate between 1969 and 1970. Disaggregating by first-year unit we obtain—

* For 1969, enrolments used are those as at 31 March; for 1970, 30 April. NDE enrolments have been included.
First-Year Pass Rate (Passed/Sat) by Unit, Faculty of Economics, 1969 and 1970

<table>
<thead>
<tr>
<th>Unit</th>
<th>1969</th>
<th>1970</th>
<th>Change (Percentage points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics I</td>
<td>81.3%</td>
<td>85.0%</td>
<td>+3.7</td>
</tr>
<tr>
<td>Economics I</td>
<td>54.1%</td>
<td>56.3%</td>
<td>+2.2</td>
</tr>
<tr>
<td>Accounting I</td>
<td>69.8%</td>
<td>71.3%</td>
<td>+1.5</td>
</tr>
<tr>
<td>Economic History I</td>
<td>76.6%</td>
<td>75.9%</td>
<td>-0.7</td>
</tr>
<tr>
<td>Economics A</td>
<td>75.0%</td>
<td>74.0%</td>
<td>-1.0</td>
</tr>
<tr>
<td>Faculty</td>
<td>68.5%</td>
<td>70.4%</td>
<td>+1.9</td>
</tr>
</tbody>
</table>

It should be noted that the pass rate shown above for first-year units both in 1969 and 1970 could be affected to a very small extent by the fact that a few results still remained to be determined at the times the University's statistical summaries were prepared. The effect of bringing them in would make scarcely any difference to the pattern. The most pronounced gain in first-year student performance, as measured both by the success rate (passed/enrolled) and the pass rate (passed/sat), was made between 1967 and 1968; there were divergent movements between 1968 and 1969, when the success rate rose a little but the pass rate fell; and, more recently, between 1969 and 1970 there has been little or no change in the success rate and a small improvement overall in the pass rate of first-year students.

Research

Research conducted by members of the Departments of Accounting and Public Finance, Economic History, Economics, and Statistics has included work on public expenditure theory; resource allocation in the public sector; planning, programming and budgeting systems; economics of education; taxation theory and policy; intergovernmental fiscal relations, national accounting systems; income measurement theory; company finance; the British economy in the 1840s; agricultural and economic change in Australia, 1890-1914; economic stagnation in India, 1890-1940; Australian agricultural commodity policy, 1929-1968; residential building in Sydney, 1871-1900; urban growth in eastern Australia, 1861-1891; English fertility ratio, by county, 1841-1911; Australian economic policy; population, pollution, and optimal growth; public policy on industrial research; Pacific area trade; monetary theory and policy; fiscal systems and land use; the application of the Australian tariff to the textile industry; optimal economic growth; financial policy of the firm; stochastic processes; econometrics; multivariate analysis; operational research.

As noted in the report of the Department of Economics, Professor Pitchford produced the first two working papers in a new series established in collaboration with the Department of Economics, Research School of Social Sciences. Their titles are ‘Population and the Pollution of Resources’ and ‘Population and Optimal Growth’.

Student Participation

The term of office of the first Faculty Education Committee, appointed in 1969, ended in April this year. This had been made up of five student members and five staff. Some difficulty was experienced in obtaining student nominations for the incoming committee and it was not until after the First Term vacation that
the new committee held its first meeting. In all there have been three meetings during 1970. Student members of the committee elected two participants who were invited to attend meetings of Faculty until such time as they could become members by an appropriate amendment to the Faculties (School of General Studies) Statute.

The Education Committee’s main concern this year has been with the question of students’ workloads, and a questionnaire was distributed to as many as possible of the students undertaking units offered by the Faculty. As this questionnaire was distributed, completed and returned during class hours, the response rate was extremely high. Student members of the committee will be analysing the results during the long vacation.

Other matters discussed have included examinations and other forms of assessment, a proposal for a combined course in Economics and Asian Studies, and the possibility of rearranging the timetable to provide for extra-curricular activities.

The Education Committee also decided during the year to extend its representation of groups within the Faculty by including as invited members a student enrolled for the degree of Doctor of Philosophy, and a student enrolled for the degree of Master of Economics, the President of the Economics Club, and a junior member of staff with a close relationship to students through tutorial classes.

Another initiative of the Education Committee was to recommend to Faculty that each member of academic staff be assigned a small number of first-year students enrolled in the course for the degree of Bachelor of Economics (say ten to twelve) whom he would meet informally from time to time. They would be told that the staff member would always be ready to discuss with them their university interests and problems. The proposal was agreed to by Faculty and it is hoped to begin implementing it in 1971.

The Education Committee was informed of proposals for the introduction of new semester units in the Faculty, particularly those of a more applied character, and warmly supported them. It also considered many of the main questions that came before Faculty.

At the end of the year two members of staff who had been with the Faculty for long periods left to take up other appointments—these were Professor E. J. Hannan, F.A.A., Professor of Statistics, who went to a chair in the Department of Statistics, Institute of Advanced Studies; and Dr K. Sloane, Senior Lecturer in Economics, who went to the Commonwealth Treasury. Both will be greatly missed.

Professor Hannan has a unique combination of abilities in the separate but related fields of econometrics and mathematical statistics. For his replacement, there seemed to be virtually no chance of finding a man with sufficiently high qualifications in both of these subjects. Approval was therefore sought for the establishment of a separate Chair of Mathematical Statistics in addition to Professor Hannan’s Chair, which was to be renamed explicitly as a Chair of Econometrics. This approval has since been granted and the two chairs have been advertised. Applications are currently under consideration.
Associate Professor J. Cutt, Co-Chairman of the Department of Economics, York University, Canada, spent the period May-November as a Faculty Visitor. Funds have been allocated to finance a visit in 1971 by Professor A. R. Prest, formerly Professor of Economics in the University of Manchester, and recently appointed to a new chair in the London School of Economics and Political Science.

The Vice-Chancellor and members of staff in the Institute of Advanced Studies gave generous assistance in teaching. Faculty is grateful for their help.

**Accommodation**

With the growth of student and staff numbers in existing fields and developments into new ones such as computer science and administrative studies, the Faculty needs full access to the top floor of the south wing of the Copland Building, which is now occupied largely by University Welfare Services (health and counselling). At present, only three rooms in this area have been retained, apart from the common-room (now becoming too small). Building plans for the 1970-72 triennium were based on an assumption that this floor can be vacated by its present occupants at the end of 1971, when the new University Union building was expected to be completed; if this assumption is not realised, 1972 can be expected to be a very difficult year as far as accommodation is concerned. Early completion of Stage IV of the Arts Building, into which the Faculty of Economics is to extend along the north wing of the Copland Building, is equally important.

The Faculty has reason to be sincerely grateful to the Academic Registrar, the Business Manager, and their staffs for assistance and understanding during the year. Here our debts are widely spread but Miss Bouquet, in particular, has been generous with her time, patient and helpful. Students and members of the Faculty would also wish me to thank the Faculty Secretary, Mr R. G. Fraser, for all the work he has done. As Dean, I have also been fortunate in having the support throughout of an effective Subdean—first, Dr C. A. Tisdell, and later Dr D. W. Stammer.

**Acknowledgements**

**Accounting and Public Finance**

Ma, R. A.


Ma, R. A. & Tan, P. C. K.

*A Study of the Public Sector Accounts of Singapore*, Economic Research Centre, Univ. of Singapore, Research Monograph 4, vii + 158.


Mathews, R. L.


'Company organisation and finance.' In *Australia: An Economic and Investment Reference*, 41-7, Commonwealth of Australia.


† Not a member of this University.
STANIDISH, P. E. M.
'Research needs in accounting.' *The Australian Accountant, XL*, i, 16-19.
'Company financial reporting: Communication or mystification.' *The Chartered Accountant in Australia, XI*, xi, 4-10.

FORSTER, C. (ed.)

FORSTER, C.
'Economics of scale and Australian manufacturing.' In *Australian Economic Development in the Twentieth Century* (ed. C. Forster), 123-68, Allen, G.

JACKSON, R. V.
'Owner-occupation of houses in Sydney, 1871-1891.' *Australian Economic History Review, X*, September, 138-54.

TUCKER, G. S. L.
'Irish fertility ratios before the famine.' *Economic History Review, XXIII*, August, 267-84.

DRYSDALE, P. D.

DRYSDALE, P. D., KIYOSHI, K. ‡ & OKITA, S. ‡
'Foreign economic relations.' In *Southeast Asia’s Economy in the 1970’s*, 313-425, Asian Development Bank, Manila, October.

GARNAUT, R. G.
'The balance of trade, comparative advantage and development priorities.' *Search, I*, v, 272-4.

PITCHFORD, J. D.

SLOANE, K. & SMITH, D. W. ¶
'The British Royal Commission on trade unions and employers’ associations 1965-1968.' *9, University of Western Australia Law Review*, 1-49.

TISDELL, C. A.
'Price instability and average profit.' *Oxford Economic Papers, XXII*, 1-12.

ANDERSSON, R. S. §, DOYLE, H. A. ¶¶, PETERSONS, H. F. ¶¶¶ & SENETA, E.

CASSIDY, P. A. ‡, McCARTHY, W. O. ‡ & TOFT, H. I.
'An application of spatial analysis to beef slaughter plant location and size, Queensland.' *Aust. J. agric. Econ., 14*, 1, 1-20.
'Sensitivity testing and plant location problem.' *American Journal of Agricultural Economics, 52*, 3, 403-10.

‡ Not a member of this University.
¶ Member of the Faculty of Law.
§ Member of the Computer Centre.
¶¶ Member of the Department of Geophysics and Geochemistry.
¶¶¶ Member of the Department of Applied Mathematics, School of General Studies.

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HANNAN, E. J.
‘Data smoothing.’ In Data Representation (eds R. S. Anderssen & M. R. Osborne), 34-42, Univ. of Queensland Press.

HEYDE, C. C.
‘Extension of a result of Seneta for the super-critical Galton-Watson process.’
‘Characterization of the normal law by the symmetry of a certain conditional distribution.’ Sankhyá, A, 32, 115-18.

JOHN, S.
‘On identifying the population of origin of each observation in a mixture of observations from two normal populations.’ Technometrics, 12, 553-63.
‘On identifying the population of origin of each observation in a mixture of observations from two gamma populations.’ Technometrics, 12, 565-8.

SENETA, E.
Discrete Markov Chains (trans. V. I. Romanovsky), Walters-Noordhoff, Groningen, 408.

TERRILL, R. D.
‘Application of signal extraction techniques to economic data.’ In Data Representation (eds R. S. Anderssen & M. R. Osborne), 43-57, Univ. of Queensland Press.

TERRILL, R. D. & TUCKWELL, N. E.*

* Based on work done while a member of the Department.
THESES

Thesis titles of work successfully submitted by research students in the Faculty of Economics on whom degrees were conferred in 1970:

TERRELL, R. D.
‘Application of spectral methods in economic data analysis.’ Department of Statistics.

LYALL, E. A.
‘Government patronage in Australia: The exercise of the patronage prerogative by Commonwealth and New South Wales Governments in the period 1927 to 1969.’ Department of Political Science.
REPORT OF THE DEAN

Professor H. Whitmore

Council reappointed to the Faculty, the Honourable Mr Justice P. E. Joske, C.M.G., of the Commonwealth Industrial Court and of the Supreme Courts of the Australian Capital Territory, Northern Territory and Norfolk Island; Mr R. J. Ellicott, Q.C., Commonwealth Solicitor-General; Mr K. F. O'Leary, Barrister; and Professor G. Sawer.

During the year the Faculties (School of General Studies) Statute was amended to provide for an increase in the number of members of Faculty appointed by Council from four to seven members. The Honourable Mr Justice R. W. Fox of the Supreme Court of the Australian Capital Territory, the Honourable Mr Justice U. G. J. Gowans of the Supreme Court of Victoria and the Honourable Mr Justice A. F. Mason of the Court of Appeal, Supreme Court of New South Wales, were appointed to these positions on Faculty.

In July the three students attending Faculty meetings by invitation became members of Faculty when the amendment to the Faculties (School of General Studies) Statute was gazetted. In 1970 the student members of the Faculty Education Committee chose as their representatives Messrs A. P. Barrell and J. G. Fennessy. The Student Representative Council nominated Mr R. C. Resthauge.

The full-time academic staff comprised four professors, one reader, ten senior lecturers, three lecturers and one temporary lecturer. There were two part-time lecturers and six part-time tutors.

Professor Whitmore replaced Professor J. E. Richardson as Dean of the Faculty on 1 October. The Faculty's appreciation of Professor Richardson's services as Dean over a period of almost ten years during the formative and developmental periods of the Faculty were expressed in a formal resolution.

Mr A. D. Hambly resigned from the subdeanship in May and was replaced by Mr D. C. Pearce.

Towards the end of the year Dr J. F. Hookey, University of Papua and New Guinea, was appointed Senior Lecturer. Mr G. J. Kelly was appointed Senior Tutor. Both Dr Hookey and Mr Kelly will take up their positions in February 1971. No members of the academic staff were absent on study leave in 1970.

Professor R. Arens, University of Toronto, spent Second Term in the Faculty as Visiting Professor under a grant from the Australian-American Education Foundation. During his stay Professor Arens lectured in Criminology, Criminal Law and Procedure, Jurisprudence and Soviet Law. Other visitors, many of whom delivered guest lectures, included—the Honourable Mr J. Turner, Federal Minister for Justice of Canada; the Honourable Mr Justice R. A. Blackburn, O.B.E., Judge of the Supreme Court of the Northern Territory; Professor J. Tripathi, University of Delhi; Professor K. Mochtar, Padjadjaran University; Professor Koya Matsuo, University of Tokyo; Professor Munro, University of
South Dakota; His Excellency Mr E. Hambro, Permanent Representative of Norway to the United Nations; Chief Constable A. Muir, County of Durham Police Force, England; Dr H. W. Poulton, Executive Director, Ansett Transport Industries Ltd; Professor J. Wilson, University of Southampton; Mr S. A. Bosci and Mr B. Raison, Commonwealth Taxation Office; Mr W. S. Johnson, Barrister, Canberra; Mr B. J. O'Donovan, Commonwealth Attorney-General's Department; Miss L. Prott and Mr J. Bailey, Department of Foreign Affairs; His Excellency Dr R. Molina-Pasquel, Ambassador of Mexico; Mr L. V. Harvey, Chief Marriage Guidance Officer, Commonwealth Attorney-General's Department; Senator I. J. Greenwood, Q.C., Mr H. Westerman, Mr D. Hain and Dr J. Conner, National Capital Development Commission.

Professor P. S. Atiyah delivered a University inaugural lecture on the subject 'Consideration in Contracts: A Fundamental Restatement' on the evening of Wednesday, 29 July, in the H. C. Coombs Lecture Theatre. About 300 guests attended a reception held in the Law Faculty Staff Library following the lecture.

Approximately 190 students enrolled for law courses for the first time in 1970. Total enrolments on 31 March 1970 (excluding postgraduate enrolments) were 519; 337 full-time and 182 part-time. Of these 179 students were enrolled for the combined B.A./LL.B. degree course and thirty-six students for the combined B.Ec./LL.B. degree course.

In 1970 the Faculty exceeded its maximum enrolment of 500 students approved by the Council. Council has approved the Faculty's proposal to restrict enrolments from the beginning of the 1971 academic year. In 1971, 130 new law students will be accepted in Legal Method.

One noteworthy feature in the 1970 pattern of enrolments was the increase as a proportion of total enrolments in the number of students enrolled for combined courses from 34% to 42%. It has been a deliberate policy of the Faculty to encourage enrolments in combined courses.

Another was the decline in percentage of part-time students from 39% to 34% of the total law student body. As entry standards rise from year to year it is expected that the percentage of part-time students will continue to decrease.

Following the 1970 annual examination thirty-six students are expected to qualify to take out the degree of Bachelor of Laws (the results of a few special examinations are not yet available). Nine of these students qualified for the Degree of Bachelor of Laws with Honours, one with first class honours, four with second class honours, division A, and four with second class honours, division B.

The percentage failure rate for the subjects of Legal Method and Legal and Constitutional History reduced from 27% in 1969 to 23% in 1970. Generally the failure rate for other compulsory subjects of first and second year remained at about the same rate.

The Faculty extended the policy of making substantial allowance in many subjects for mid-year work in assessing students' final examination results. The
legal writing program was extended again in Legal Method. The principal reason for the reduction in the failure rate in Legal Method and Legal and Constitutional History was the sound marks obtained for written work during the year. Despite the intensive programs of written work for the first two introductory law subjects there is as yet no evidence that as a result the weaker students are better equipped to undertake the difficult compulsory subjects that follow. In the meantime, however, the Faculty will continue the policy of setting substantial written work particularly in first-year subjects.

Prizes and Scholarships

The George Knowles Memorial Prize for the student doing the best work during the year was awarded to Mr L. A. Warwick, a National Undergraduate Scholar. Mr H. C. Burmester, who qualified for the Degree of Bachelor of Laws with First Class Honours, received the Supreme Court Judges' Prize for the student obtaining the highest honours result in law.

The Permanent Trustee Company (Canberra) Limited Prize for Will Drafting was awarded to Miss S. R. Eggins. Mr M. Sandor won The Ansett Air and Space Law Prize, Mr W. I. Nairn the Australian Capital Territory Bar Association Prize, Miss P. A. de Lacy the Law Society of the Australian Capital Territory Prize for Contracts, and Mr P. A. McNamara the Permanent Trustee Company (Canberra) Limited Prize for Property II. Two prizes were shared—The Permanent Trustee Company (Canberra) Limited Prize for Trusts was awarded jointly to Messrs K. M. Crotty and P. A. McNamara and the B. C. Meagher Prize for Commonwealth Constitutional Law to Messrs J. C. Kelly and R. G. Mills.

During the year The Trustees Executives (Canberra) Limited established a prize for award to the student obtaining the best results in the subject of Taxation. The first prize was awarded to Mr R. G. Mills.

The Faculty is extremely grateful to the prize donors for their interest in legal education and law students.

Postgraduate Students

In 1970 two full-time students were proceeding to the degree of Master of Laws. In addition, six part-time students were undertaking the degree by thesis and one student was enrolled for the preliminary examination.

Two students were admitted to the degree of Master of Laws at the Conferring of Degrees Ceremony held in May 1970.

Federal Law Review

The Committee was assisted by Mr D. E. Harding as Faculty Advisor. The publication of the seventh issue was commemorated by a dinner at University House. Guest speakers included the Honourable Mr Justice R. Else-Mitchell and the Honourable Mr Justice R. A. Blackburn, O.B.E.

Moots

Mr D. L. Pape continued to direct the moot program. From the beginning of 1970 it was decided that students should take part in moots in topics on subjects already completed rather than in subjects of their current enrolment. It is believed that as a result the standard of mooting has improved. The prime purpose of the program is to teach students the practical skills involved in advocacy and the preparation of a comprehensive brief.
The Law School was represented at the Australian and New Zealand Inter-varsity Law Schools Moot Competition held in Sydney in May 1970, by Messrs R. C. Refshauge, P. A. McNamara, H. C. Burmester and G. J. McCready. The team performed creditably, winning its first round moot and coming second in the second round semifinal.

A new compulsory subject of Legal Drafting was introduced in the final year of the degree of Bachelor of Laws course. Previously Drafting was included in Property II in third year. The syllabus for Legal Drafting includes the preparation, interpretation and construction of commercial, testamentary and real property documents. Two new optional subjects, International Business Transactions and Law of Industrial Property will be offered in 1971. The total number of optional subjects to be offered in 1971 will remain at seventeen as in 1970. It is not possible to teach two subjects, Comparative Law and Jurisprudence, in 1971 because of the absence of teaching staff on study leave. The Faculty has also decided to offer only one subject in the Company Law field.

In December Faculty decided to recommend to the Board of the School and Council that a degree of Bachelor of Laws course of sixteen subjects be introduced for selected graduates in other disciplines to be undertaken over three years of full-time or five years of part-time study. Following the imposition of limitations on enrolments in the Faculty it is apparent that more and more applicants who fail to gain entry to a law course on their final school examination results will seek to qualify for admission by undertaking studies in another field such as arts or economics.

Council in October 1970 approved the proposal to establish a Legal Workshop subject to the provision of the necessary finance.

The Faculty Education Committee met regularly in 1970. The quality of discussions has improved as student representatives have come to appreciate the importance in effective participation of undertaking work in preparing and studying background papers. Student representatives have initiated many discussions and have prepared detailed submissions of quality including papers on the revision of the final honours examination and on the inclusion of mid-year work in final examination assessments. On many occasions the student viewpoint has been expressed very forcibly.

Two of the five student members of the Faculty Education Committee served on the 1969 Committee. This continuity has been helpful but more must be done to acquaint new student members with details of previous decisions and the background to these decisions.

Again the three student members have participated actively in Faculty debates (student membership of Faculty is referred to in the first section of this report). Some disappointment has been expressed by student members when on a limited number of procedural issues the recommendations of the Education Committee have been overruled by Faculty. Included in the Education Committee recommendations overruled by Faculty were sanctions for failure to complete compulsory written work.
Law Building

It is likely that with increased class sizes in third and fourth-year subjects the Faculty will face a significant shortage of class-rooms from 1971. Two staff studies will be used from 1971 as temporary tutorial rooms.

In 1970 pressure on library seating became very apparent. There is space on the book-shelves for only one further year's acquisitions and it has been necessary to use the moot preparation room for book stacks. The library now has 28,000 volumes and was not built to take more books than this.

Planning took place during the year for a submission to the Australian Universities Commission on extensions to the building during the 1973-75 triennium.

The Australian National University Law Society

Forensic, the Law Society newspaper, was published regularly throughout the year. It has proved a very useful forum for student discussion and has contained worthwhile articles.

A careers forum was organised by the Law Society in Third Term and was addressed by Mr K. F. O'Leary (of the Australian Capital Territory Law Society), Mr A. Scottford (Law Society of New South Wales), Mr P. Brazil (Commonwealth Attorney-General's Department), Mr S. Rawling and Mr D. C. Pearce.

Research and Other Activities

Professor Atiyah is preparing for a week-end seminar on the 'Uniform Laws on International Sale' to be held in Canberra from 19-21 February 1971. The seminar is sponsored jointly by the Faculty of Law and the Commonwealth Attorney-General's Department.

Mr Hambly is working with Mr J. N. Turner, University of Adelaide, on a book Cases and Materials in Australian Family Law to be published by the Law Book Company in 1971.

Mr D. E. Harding has prepared several commentaries and attended meetings of the Australian Capital Territory Committee which, under the Honourable Mr Justice R. W. Fox, is revising the Evidence Ordinance. He has continued in 1970 as Assistant Editor and Book Review Editor of the Australian Law Journal and has prepared editorials for the Journal. Mr Harding is also adviser to the Senate Select Committee on Securities and Exchange. This has involved extensive work which will continue until the delivery of the Committee's report.

Mr Harding is preparing an article on the new takeover code and is continuing his research for a work on Evidence.

Mr W. E. Holder is working with Mr G. Brennan, University of Melbourne, on a casebook to be entitled Cases and Materials on Public International Law. In the last half of the year he was, as convenor, occupied with preparations for 'The Role of Law in Asian Society' seminar of the twenty-eighth International Congress of Orientalists.

Mr Pearce is conducting research on the topic of statutory interpretation in Australia.

Professor Richardson is continuing his research into Australian air law. Professors Richardson and Zines have continued as members of the Judiciary Act Review Committee. In September Professor Richardson participated in discus-
sions on Italian investment law and policy with officials of the Bank of Rome, and Industrial Reconstruction Institute, Rome. Throughout the year Professor Richardson has continued as chairman of the Committee on Australian Legal Education of the Australasian Universities Law Schools Association. At the annual conference of the Association in Brisbane in August 1970 he delivered a paper, 'The Relationship Between University Legal Education and Professional Practices: Origins of University Legal Training in Australia'. Professor Richardson is also chairman of the Air and Space Law Committee, Australian Branch, International Law Association. He has lectured to various intellectual, professional and business groups and associations.

Dr Alice E-S. Tay has continued her research on Marxism and jurisprudence and on Chinese and Soviet Law. Her major work, a study of Marxism and the theory of law, being done in collaboration with Dr E. Kamenka, History of Ideas Unit, Institute of Advanced Studies, has grown to two volumes. It endeavours to relate Marxist theories of jurisprudence to the actual development of law in Communist countries, especially in the USSR and the People's Republic of China. A smaller study, *Law in Communist China: An Introduction*, on which Dr Tay has worked through part of this year, is to be published under the auspices of the Research Institute on Communist Affairs, Columbia University, in the City of New York, which Dr Tay visited in January and February this year. During this brief absence overseas, Dr Tay also lectured at York University, Canada, and in the Bundesinstitut für ostwissenschaftliche und internationale Studien in Cologne. Dr Tay presented a paper, 'The Nature and Role of Law in Communist China' to the Contemporary China Seminar held in Canberra in August.

Mr J. L. R. Davis has prepared one memorandum for the Committee revising the Judiciary Act and another with Mr Pape on reform of the law of domicile for the standing Committee of Commonwealth and State Attorneys.

In August, Mr Pape gave three lectures at the University of Natal on company law reform in Australia and on conflicts in the Law of Torts in Australia.

Professor Whitmore is a member of the Commonwealth Administrative Review Committee and of a Committee of Review entrusted with the task of making recommendations on rationalisation of legal services to the defence forces. He also lectured to administrators participating in programs sponsored by the Institute of Administration, University of New South Wales, and in May to the Australian Capital Territory Group of the Royal Institute of Public Administration.

Mr D. W. Smith was Chairman of a committee of the Federation of Australian Universities Staff Associations which conducted negotiations leading to the review earlier in the year of academic salaries.

Dr D. O'Connor is working on a book *Criminal Appeals from Superior Courts in Australia* which is expected to be published in 1971.

**PUBLICATIONS**

**ATIYAH, P. S.**


'Note on damages or social security?' Law Guardian, June, 23.
Davies, J. L. R. & Webb, P. R. H.†
'Title to goods which are moved inter-state.' 2, Australian Current Law Review, 2, 50-4.

Dixon, J.
'The rule against Perpetuities: A plea for a reform.' 1, Australian Current Law Review, 6, 177-88.

Kamenka, E.¶ & Tay, Alice, E-S.

Marston, G.
'Act and intention in crimes.' 86, Law Quarterly Review, 208-38.
'Trespass as a requirement for larceny.' 1, Australian Current Law Review, 5, 157-60.

Marston, G. & Smith, D. W.
'Consideration and the discharge or modification of contracts, Part I.' 1, Australian Current Law Review, 5, 131-42.
'Consideration and the discharge or modification of contracts, Part III.' 2, Australian Current Law Review, 1, 12-17.

O'Connor, D.
'How do we deal with the prisoner?' In Rehabilitation of the Prisoner within the Penal System, 34-54, Report of Australian Frontier Consultation, Australian Frontier Inc.

Pearce, D. C.
'Reform of the law of infancy.' 44, Australian Law Journal, 6, 269-77.

Richardson, J. E.

Sloane, K.¶¶ & Smith, D. W.
'The British Royal Commission on trade unions and employers' associations 1965-1968.' 9, University of Western Australia Law Review, 1-49.

Smith, D. W.
Worker's Compensation, New South Wales. Butterworths Australian Industrial Laws, 64.

Whitmore, H.
'The role of the lawyer in administrative justice.' 33, Modern Law Review, 5, 481-93.
'The Public Servant as a citizen.' In Looking into the 1970's, 31-47, Royal Institute of Public Administration, A.C.T. Group.

Theses
Thesis titles of work successfully submitted by research students in the Faculty of Law on whom degrees were conferred in 1970:

Nochimson, D.
'The legal aspects of foreign investment in Australia.'

Willeim, E.
'Commonwealth Administrative Tribunals.'
REPORT OF THE DEAN

Professor Liu Ts'un-yan

During the year Faculty recommended that its name be changed from Faculty of Oriental Studies to Faculty of Asian Studies and its degrees from Bachelor of Arts (Oriental Studies) and Master of Arts (Oriental Studies) to Bachelor of Arts (Asian Studies) and Master of Arts (Asian Studies). This was approved by Council and the new names will formally come into use during January 1971.

Another change affecting the Faculty was the disbanding of the Centre of Oriental Studies, an advisory and functional structure on the development of Asian Studies established in 1961 with the Faculty and the Department of Far Eastern History in the Research School of Pacific Studies as its two constituent bodies. Consequent on the disbandment the responsibility of the Publications Committee of the Centre was transferred to the Faculty. Two monographs, namely, *Index to Biographical Material in Chin and Yuan Literary Works* (I. de Rachewiltz and Miyoko Nakano) and *A Bibliography of the Sanskrit Texts of the Saddharmapundarikasutra* (A. Yuyama) were published by the Committee during the year.

Preparations continued throughout the year for the twenty-eighth International Congress of Orientalists under the guidance of Professor A. L. Basham as President and Dr R. R. C. de Crespigny as Secretary-General. Professors E. S. Crawcour, J. W. de Jong and A. H. Johns were Program Directors for China and Korea and Japan, South Asia and South-East Asia, respectively.

The Faculty sustained the growth of 1969, and in fact moved further forward. Within the framework of this development the increases were distributed rather evenly among the departments.

Continuing the general policy of creating a broader interest in things Asian among school leavers, the Faculty organised a program of lectures for secondary schools within reach of Canberra. Some lectures were delivered as far afield as Goulburn. The Faculty was also host to a group of high school girls from Goulburn. In addition, Dr J. G. Craiger, the Subdean, with Dr Soebardi, Department of Indonesian Languages and Literatures, gave the introductory talk and answered questions at the Cootamundra High School ‘Careers Night’, which was organised by the Cootamundra Rotary Club. The Subdean also participated in the Open Day of the History Teachers’ Association in Newcastle.

As part of this policy of creating interest, the Faculty also published a booklet outlining the work and publications of the staff of its departments and the employment opportunities available to graduates in oriental studies. It also printed and sold Christmas cards depicting the Asian Studies Building.

During 1970 student participation in Faculty affairs, both at Faculty and departmental level, continued. At Faculty level, the Faculty Education Committee continued to meet regularly and discussed such topics as the examination system in the Faculty, selection for scholarships for the degree of Doctor of Philosophy, recent and future developments in the Faculty, syllabuses of the various units
offered in the Faculty, free time for extra-curricular activities and the proposal to vary the timetable pattern. Discussions also continued on the proposals, put forward by the Committee the previous year, for combined courses in Oriental (Asian) Studies and Economics and Oriental (Asian) Studies and Law. Following amendment of the Faculties (School of General Studies) Statute, the Committee appointed two student members as members of Faculty and Faculty resolved to invite all student members of the Faculty Education Committee to attend Faculty meetings. The contributions of student members at Faculty meetings have been very helpful.

At departmental level, all departments continued the principle that students should participate in the formulation of the education policies and structure of courses in departments. The participation has been satisfactory and fruitful in some cases, but in at least one case there seemed to be less enthusiasm on the part of the students for this kind of consultation than there was last year, and it was only with some difficulty that students were persuaded to nominate and elect a member of the Faculty Education Committee. Further and better cooperation between staff and students has yet to be encouraged.

Visitors to the Faculty during the year included Professor Emeritus Walter Simon, O.B.E., University of London, to the Department of Chinese in April. Professor Emeritus Sir Harold Bailey of Queen's College, Cambridge, who was at the University as Honorary President of the twenty-eighth International Congress of Orientalists, gave seminars in the Department of Asian Civilizations and the Department of South Asian and Buddhist Studies, and a public lecture on "The Iranian Epic of Ossetia in the Caucasus".

In the course of the year members of the Faculty participated in lectures, seminars and continuous education courses arranged at this University and at other universities, institutions and associations elsewhere in Australia and also in New Zealand and Hong Kong.

The Intensive Japanese Language Course was again provided in January and, in the absence of Dr A. Alfonso, was directed by Professor E. S. Crawcour. In conjunction with the course a seminar for Japanese language teachers was held. In addition Professor Crawcour provided a two-week intensive refresher course for members of the Australian Expo '70 exhibit staff in February. For the first time in Australia an intensive course in Chinese was conducted jointly by the Department of Chinese and the Canberra College of Advanced Education.

A Public meeting convened by Professor Basham resulted in the formation of the Asian Society of Canberra. The meeting was attended by some fifty interested persons, and in particular, Professor Emeritus Sir Harold Bailey, the immediate past President of the Royal Asiatic Society of Great Britain and Ireland. It was envisaged that the Society would be a non-University association of Canberra residents interested in Asian matters and Professor Basham was elected provisional chairman.

During the course of the year, Mr I. I. MacDougall resigned from the Department of Japanese to take up the post of Principal Lecturer in Languages at the Canberra College of Advanced Education. The following appointments were taken up: Dr D. J. Prentice and Dr Eva Vanickova in the Department of Indonesian Languages and Literatures, Dr J. T. F. Jordens in the Department of
Asian Civilizations, Dr P. Ryckmans and Miss Julia C-Y. Ching in the Department of Chinese and Miss A. Saito and Mr K. Shiga in the Department of Japanese. Dr Ann L. Kumar was appointed to the Department of Asian Civilizations and will take up her appointment in 1971. Promotions included Dr H. H. E. Loofs to Reader in the Department of Asian Civilizations and Dr R. R. C. de Crespieny to Senior Lecturer in the Department of Chinese.

Among matters of personal interest, Professor Basham was elected Vice-President of the Australian Academy of the Humanities and appointed editor to the new edition of *Legacy of India* to be published by the Clarendon Press, Oxford. He has also undertaken the editorship of a series of eight volumes dealing with the civilisations of Asia, to be published by Angus & Robertson.

As a token of solidarity the Faculty collected some $300 to aid the victims of the East Pakistan tidal wave disaster. The Dean presented a cheque to His Excellency Mr M. Aslam Malik, the High Commissioner for Pakistan.

The Australian Research Grants Committee renewed its grant to Associate Professor O. B. P. N. van der Sprenkel's bibliographical project for a further year. The Australian Research Grants Committee also continued its support of Dr H. H. E. Loofs' participation in the Thai-British Archaeological Expedition in Northern Thailand in January and February this year, when he directed excavations at the fifth and final season. Finds from the five seasons' work are being studied in the Faculty. Support of Dr J. D. Frodsham's research on an anthology of Chinese verse was again continued. In addition, the Australian Research Grants Committee made funds available to assist Mr T. Rajapatirana's research on the historicity of the Pali Manuscript tradition in Ceylon.

Very substantial progress was made on the English-Malay Dictionary during the year.

Undergraduate candidates totalled 635 (Asian Civilizations 343; Indonesian Languages and Literatures 134; Japanese seventy-eight; Chinese fifty-nine; South Asian and Buddhist Studies twenty-one) as compared with 578 in 1969.

Thirty-eight students held Oriental Studies Scholarships during the year. It is regretted that six scholars lost their scholarships due to unsatisfactory progress, and two resigned their scholarships.

Miss M. H. Johnson gained first class honours in Japanese and was awarded the Canberra Association of University Women Prize.

Sixteen full-time and three staff candidates were enrolled for the degree of Doctor of Philosophy; twelve students were enrolled for the degree of Master of Arts (Oriental Studies). Dr Soewito-Santoso received his doctorate at the Conferring of Degrees Ceremony in May and Dr A. Roy his doctorate in September. At this ceremony the Dean presented Professor Emeritus Sir Harold Bailey for the degree of Doctor of Letters (*honoris causa*) on the ground of his distinguished eminence in learning.

At the Conferring of Degrees Ceremony held in May, seventeen students graduated—ten received the Degree of Bachelor of Arts (Oriental Studies) with Honours and seven received the Pass Degree of Bachelor of Arts (Oriental Studies).
PUBLICATIONS

Asian Civilizations

BASHAM, A. L.
'Oriental studies in Australia.' Education News, XII, x, 21-6.
'The International Congress of Orientalists.' Abr-Nahrain, X, 1-16.

GARDINER, K. H. J.
'Some problems concerning the founding of Paekche.' Archiv orientalní, XXXVII, iv, 562-88.

JORDENS, J. T. F.

LOOFS, H. H. E.
'A brief account of the Thai-British Archaeological Expedition, 1965-1970.' Archaeology phys. anthrop. Oceania, V, iii, 177-84.

LOOFS, H. H. E. & WATSON, W.‡

RIZVI, S. A. A.
'The Maktab Khana.' Sanskriti (in English), 166-85, 1969.
'Review of Rashid al-Din's History of India (by K. Jahn).’ Indo-Iranian Journal, XII, i, 48-51, 1969.

Chinese

CHING, JULIA C-Y.
'The problem of evil as a possible dialogue between Neo-Confucianism and Christianity.' Contemporary Religions in Japan, IX, iii, 161-93.

DE CRESPIGNY, R. R. C.

LIU TS'UN-YAN
'Taoist self-cultivation in Ming thought.' In Self and Society in Ming Thought (ed. de Bary), 291-330, Columbia Univ. Press.
'On the three Imperial commentaries on the Lao-tzu.' The Chung Chi Journal, IX, i, 1-9.
'One item from the Canon of the Moists.' Australasian Universities Language and Literature Association, Proceedings and Papers of the Eleventh Congress, 274-85.

RYCKMANS, P.

‡ Not a member of this University.
JOHNS, A. H.
'Review article on A Short History of Indonesia (by Ailsa Zainu'ddin) and A History of Modern Southeast Asia (by J. Bastin & H. J. Benda).' Hist. Stud., XIV, iv, 445-9.
'Bahasua Indonesia and Malay Studies at the Australian National University.' Abr-Nahrain, X, 26-36.

SOEWITO-SANTOSO & SOEMARJONO*
Dari Barat Sampai Ke Timur (From West to East). An Indonesian Reader, Novaks, vi + 80, 1969.

CRAWCOUR, E. S. & YAMAMURA, K.‡
'The Tokugawa monetary system: 1787-1868.' Economic Development and Cultural Change, XVIII, i, 489-518.

DE JONG, J. W.
'Review of Bukkyo setsuwa kenkyu josetsu (by Y. Iwamoto).’ Indo-Iranian Journal, XII, i, 52-60, 1969.
'Review of La Concentration de la Marche Heroique (by E. Lamotte).’ OLZ, I/II, 72-84.
'Review of Kleine Schriften (by H. Oldenberg).’ Indo-Iranian Journal, XII, iii, 224-6.

HERCUS, Luise

YUYAMA, A.
'Review of Die Nala-Legende I und II (by F. F. Schwarz).’ Indo-Iranian Journal XII, ii, 140-3.

THESES
Thesis titles of work successfully submitted by research students in the Faculty of Oriental Studies on whom degrees were conferred in 1970:

KUMAR, Ann L.
'Surapati: Portraits of a hero in Javanese Babad literature.' Department of Indonesian Languages and Literatures.

ROY, A.
'Islam in the environment of medieval Bengal.' Department of Asian Civilizations.

SIRISENA, W. M.
'Ceylon and South-East Asia: Political, religious and cultural relations from A.D. c. 1000 to c. 1500.' Department of Asian Civilizations.

SOEWITO-SANTOSO
'Boddhakawya-Sutasoma: A study in Javanese Wajrayana: Text-Translation-Commentary.' Department of Indonesian Languages and Literatures.
The work of the Faculty in teaching and research continued in 1970. There was an increase in total enrolment but with some change in the pattern of student choice between the different disciplines with a tendency to an increase in the biological sciences. It is too early to say whether this will be a trend lasting for sufficient time to affect the Faculty organisation in any degree. Fluctuations occur from year to year, presumably partly by chance but also no doubt as the result of changes in what are thought to be ultimate employment opportunities.

The decision to limit the size of the University and with it to define the proportion of students in the Faculty of Science, together with a decision within the School of General Studies to modify the basis of staffing in relation to student numbers has caused considerable disquiet in the Faculty. The effect has not been quite the same in all departments, but all see major disadvantages arising in future years. Most departments did not suffer any appreciable set-back in 1970, but in three cases the result has had some immediate effect. The development of the Department of Biochemistry has been halted before its planned limit in subject diversity has been reached and this is a matter for considerable regret since the field of biochemistry has attracted a considerable number of students. In the Department of Physics and Geology there has been an actual staff reduction during the year and although this has been limited to one senior demonstrator in each case, this has had a most unfortunate effect in the situation in which development of the departments in the Faculty is incomplete. Faculty reviewed the position during the year and must continue to scrutinise closely future trends.

If the future changes seen now as likely eventuate, Faculty will be forced to seek modification of present policy if standards widely recognised as appropriate to this University are to be retained.

The long-term position foreshadowed in the Department of Chemistry, for example, must be circumvented. The Department of Geology faces particular difficulties too because of the demand for well-qualified men in the mineral industry and it is felt that various pressures of this type will affect the work of other departments in future years.

The continuation of the semester system has not been without difficulty but the Faculty as a whole has continued to see distinct benefits in it and the students collectively have expressed preference for the arrangement.

Student participation in Faculty affairs has shown a number of similar aspects throughout the different departments. In all but first year, the contact between staff and students, because of the practical laboratory work which is a feature of the Faculty of Science, has continued to provide a very useful contact point for the exchange of ideas. At the same time, the additional more formal contact, although in the smaller departments this has scarcely become a formal arrangement, developed between students and staff has been beneficial in a number of ways.
The addition of a new wing to the Department of Chemistry which also results in an architectural link with the Research School of Chemistry complementing the already effective collaboration between the two, has been timely. The prospect of permanent space being available for the Department of Biochemistry during 1971, although somewhat behind schedule, is heartening and a little preliminary use of the new Psychology Building, in advance of occupation of it, has improved the position for the Faculty.

The situation in some areas in the Department of Zoology in spite of the extension in the previous year has been reached in which there is no space available to take extra students and more provision is needed at once for that Department.

An extensive research out-turn containing much which is in the forefront of scientific work is indicated by the record of scientific publications from the Faculty. Some notable contributions have been made from all departments. Substantial financial support was received by way of the Australian Research Grants Committee allocation to most departments.

Professor J. D. Smyth, the Foundation Professor of Zoology, resigned to take up the position of Professor of Parasitology, Imperial College of Science and Technology, London. He laid the foundation for and developed a vigorous department, highly regarded both in Australia and overseas for the excellent quality of its research and teaching.

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**Biochemistry**

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MICHAELIS, FRANCES B.* & DALGARNO, L.

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‡ Not a member of this University.

* Based on work done while a member of the Department.
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Walker, Angela C.** & Birt, L. M.**

Williams, Mary L. & Bygrave, F. L.

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Hewson, Helen J.

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** Based on work done prior to joining this University.
† Not a member of this University.
* Based on work done while a member of the Department.
BINDRA, A. P. & ELIX, J. A.

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* Based on work done while a member of the Department.
‡ Not a member of this University.

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Daly, N. J. & Zollikowski, F. J.

Davidson, W. J. & Elix, J. A.

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† Visiting Research Worker in Department of Geophysics and Geochemistry.
¶ Member of the Department of Geophysics and Geochemistry.
‡ Not a member of this University.
*** Based on work done while a Visiting Research Worker in the Department of Geophysics and Geochemistry.
** Based on work done prior to joining this University.
¶ Member of the Department of Chemistry.
OSTRY, D. I. & MACDONALD, R. J.

POPE, R. L.*

RAYNER, J. P.

REINKE, F. D. † & DAHLSTROM, C. E.

SOLAGA, T. & MORTLOCK, A. J.

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GILLIS, J. S. & JESSOR, R. ‡

GLADSTONES, W. H.

JOHNSON, N. B. †, MIDDLETON, MARGARET R. & TAJFEL, H. ‡

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† Not a member of this University.
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**Branch, S. I.**


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**Nicholas, W. L.**

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THESES

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'The synthetic approaches to annelated ten $\pi$-systems.' Department of Chemistry.

Chatterton, B. D. E.
'Some aspects of the palaeontology, palaeoecology and biostratigraphy of the lime-
stones of the Murrumbidgee group at Taemas, near Yass, New South Wales.'
Department of Geology.

Dallwitz, M. J.
'Correlation and vacancy-flow effects in binary alloys.' Department of Physics.

Eldridge, K. G.
'Altitudinal variation in Eucalyptus regnans.' Department of Forestry.

Gilbert, R. G.
'The quantum theory of unimolecular reactions.' Department of Chemistry.

Greenham, P. M.
'Some ecological studies on the bushfly Musca vetustissima Walker.' Department
of Zoology.

Grumley, W. D.
'A study of the chemistry of 1, 10 phenanthroline complexes of iridium (III) and
related compounds.' Department of Chemistry

Heath, D. D.
'The developmental biology of larval cyclophyllidean cestodes in mammals.' De-
partment of Zoology.

† Not a member of this University.
* Based on work done while a member of the Department.

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HIGGS, M. L.  
‘Genetic and environmental factors influencing commercially important wood properties of Eucalyptus regnans F.v.M.’ Department of Forestry.

JOYCE, A. S.  
‘Geochemistry of the Murrumbidgee batholith.’ Department of Geology.

KING, N. L. R.  
‘Nuclear magnetic resonance studies of native and denatured proteins.’ Department of Chemistry.

LEE SING  
‘Transverse ionizing shock waves in a planar electromagnetic shock tube.’ Department of Physics.

NAGARAJAH, S.  
‘The effects of stand density on the photosynthetic capacity of leaves in Gossypium hirsutum.’ Department of Botany.

RHODES, J. M.  
‘The geochemistry of a granite-gabbro association at Hartley, New South Wales.’ Department of Geology.

SHEILD, JENNIFER M.  
‘Studies on the nervous system of some cyclophyllidean cestodes.’ Department of Zoology.

SMITH, G. T.  
‘Studies on the behaviour and reproduction of the Royal penguin (Eudyptes chrysolophus schlegeli).’ Department of Zoology.

WALKER, ANGELA C.  
‘Development of respiratory systems in relation to utilization of protein during the metamorphosis of the sheep blowfly Lucillia cuprina.’ Department of Biochemistry.

WOOD, G. B.  
‘Photosynthesis and growth in pinus radiata D. Don as affected by environmental factors and inherent qualities.’ Department of Botany.

ARMSTRONG, J. S.  
‘The development and application of computer simulation models to biological systems.’ Department of Forestry.

BROUE, P.  
‘Environmental control of flowering in Dactylis glomerata L.’ Department of Botany.

BURNETT, J. B.  
‘Hydrogen bonding at high pressure.’ Department of Chemistry.

DAVIDSON, W. J.  
‘The diene synthesis of benzofurans and dibenzofurans.’ Department of Chemistry.

DAVIES, MARGARET  
‘Studies on gluconeogenesis in the mouse.’ Department of Zoology.

DOOBOV, M. H.  
‘Measurement of cross-section for transfer of excitation: Sensitized fluorescence in cassium vapour.’ Department of Physics.

GILLISON, A. N.  
‘Dynamics of biotically induced grassland/forest transitions in Papua New Guinea.’ Department of Forestry.

HESTERMANN, B. J.  
‘The echelon algorithm.’ Department of Pure Mathematics.

LEPPIK, R. A.  
‘Studies on some biologically important compounds.’ Department of Chemistry.
RAVAL, H. M.
'Non-linear lagrangians in general relativity.' Department of Theoretical Physics.

SMITS, P. C.
'Physical studies of the bromine-chlorine system.' Department of Chemistry.

VLAGSMA, C. P.
'On the cohomology theory of knot groups.' Department of Pure Mathematics.

WOOD, J. P.
'Root grafting in Pinus radiata, D. Don.' Department of Forestry.
REPORT OF THE ACTING UNIVERSITY LIBRARIAN

Miss C. Campbell-Smith

The year 1970 has been a year of intensive planning and preparation of submissions for the 1973-75 triennium, the main preoccupation being with the financial and accommodation needs of the Library. A substantial increase in Library funds has been sought; 40% of the triennium request will be spent on books and 57% on salaries and related items. The cut in the building program will pose considerable problems and the minimal book vote will do no more than cater for normal growth and more urgent developments, provided that some adjustment is made for the inexorable increase in book prices and periodical subscriptions.

Staff changes have been fewer this year and the work of acquiring and processing material and of assisting readers has proceeded smoothly.

The Librarian has been overseas on leave since early April and will return early in February 1971.

Of the three building projects put forward by the Library for the 1973-75 triennium, that of extending the R. G. Menzies Building has been deferred. Emphasis has been placed on the need for a Life Sciences library building to serve the University community of students and academic scholars working in this field, and for extensions to the Law library. The rate of acquiring material in the biological sciences has been accelerated and it is hoped to have more than the foundations of a scholarly library by the time the new building is completed. The deferring of plans for the R. G. Menzies Building extensions will place an acute strain on both book space and staff accommodation before the end of 1975; areas at present used for exhibition and other purposes will have to be adapted for staff use, but it is difficult to see how the acquisition program and service to readers can continue satisfactorily unless additional space for both book storage and staff is provided.

The enclosure of the R. G. Menzies Building undercroft will bring into use an extra 4000 sq. ft of space. Lack of effective ventilation and heating limit this area mainly to storage but it has released badly needed space in the main building.

The installation of air-conditioning should provide greatly improved conditions for both readers and staff before the end of this summer.

An informal Library Users' Committee has been set up jointly by the Research School of Social Sciences and the Research School of Pacific Studies. The committee meets at intervals with the Associate Librarian and the Reference Librarian to discuss readers' services and related problems.

The year 1970 has been quietly active, with the naming of the building as a minor landmark; the J. B. Chifley Building now complements the R. G. Menzies Building. There have been few staff changes or student problems; apart from
some loss of books, perhaps the most disturbing feature has been the mutilation of books and journals. This has not yet reached high proportions, but with cheap photocopying services conveniently at hand it is hard to condone the practice. The reorganisation of the reserve book collection on a self-service basis has proved popular with students and staff; it has eliminated queues of impatient users and, despite increased book numbers and a 6% increase in loans, the existing staff has handled the work effectively.

Plans are being made to offer reference help at the week-ends from the beginning of the next academic year, a service which should be of particular benefit to part-time students.

The distribution of the 7,109 items added to the collection (previously called Oriental Studies) was as follows:

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<td>1,155</td>
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<tr>
<td>Western Languages</td>
<td>149</td>
<td>232</td>
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<td>Total</td>
<td>6,694</td>
<td>415</td>
<td>7,109</td>
</tr>
</tbody>
</table>

Approximately 600 titles, mainly current government and semi-governmental publications, were received during the year as part of the Indonesian Co-operative Acquisition Project, now operated by the National Library of Australia through an officer based at the Australian Embassy, Djakarta. The Library is also taking part in the South-East Asian Microform Project (Center for Research Libraries, Chicago) which will make available a wide range of research materials.

A variation of the Dewey Decimal Classification worked out by the Law Librarian, in consultation with members of the Faculty of Law has been introduced and the partial reclassification of the book stock, made necessary by the new schedules, is taking place.

Law purchases again reflect the Faculty's interest in American Law.

Extensions to the library, which increase both book space and the reading area were completed in December, and by early next year readers can look forward to much more comfortable library conditions.

Tenders for extensions to the Mathematical Sciences Building, including the library, closed early in December and the work should be completed by mid-1971.

A Geophysics and Geochemistry sub-branch of the Research School of Physical Sciences has been set up as an extension of the services of that library. By the end of 1970 most of the books and journals approved for transfer had been processed and were ready for use in the recently completed Geophysics Building.
The following tables show the intake of books acquired by purchase, gift and exchange:

<table>
<thead>
<tr>
<th></th>
<th>Purchases</th>
<th>Gifts and Exchanges</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Studies</td>
<td>8,999</td>
<td>2,685</td>
<td>11,684</td>
</tr>
<tr>
<td>General Studies</td>
<td>13,885</td>
<td>2,700</td>
<td>16,585</td>
</tr>
<tr>
<td>Asian Studies</td>
<td>6,694</td>
<td>415</td>
<td>7,109</td>
</tr>
<tr>
<td>Branches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law</td>
<td>3,243</td>
<td>281</td>
<td>3,524</td>
</tr>
<tr>
<td>Medical Sciences</td>
<td>1,527</td>
<td>53</td>
<td>1,580</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>1,520</td>
<td>158</td>
<td>1,678</td>
</tr>
<tr>
<td>Chemistry</td>
<td>659</td>
<td></td>
<td>659</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>1,154</td>
<td>203</td>
<td>1,357</td>
</tr>
<tr>
<td>Astronomy</td>
<td>246</td>
<td>63</td>
<td>309</td>
</tr>
<tr>
<td>Geology</td>
<td>276</td>
<td>472</td>
<td>748</td>
</tr>
<tr>
<td>Geophysics</td>
<td>60</td>
<td>3</td>
<td>63</td>
</tr>
<tr>
<td>New Guinea Research Unit</td>
<td>310</td>
<td>387</td>
<td>697</td>
</tr>
<tr>
<td>Total</td>
<td>38,573</td>
<td>7,420</td>
<td>45,993</td>
</tr>
</tbody>
</table>

During the year a total of 378 accessions were cancelled and various transfers between the main libraries and branches took place, so that the distribution of volumes at 31 December was as follows:

<table>
<thead>
<tr>
<th></th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Studies</td>
<td>178,406</td>
<td>189,486</td>
</tr>
<tr>
<td>General Studies</td>
<td>142,140</td>
<td>158,936</td>
</tr>
<tr>
<td>Asian Studies</td>
<td>75,041</td>
<td>82,066</td>
</tr>
<tr>
<td>Branches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law</td>
<td>24,776</td>
<td>28,365</td>
</tr>
<tr>
<td>Medical Sciences</td>
<td>29,638</td>
<td>31,130</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>19,135</td>
<td>20,724</td>
</tr>
<tr>
<td>Chemistry</td>
<td>4,777</td>
<td>5,455</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>1,881</td>
<td>3,350</td>
</tr>
<tr>
<td>Astronomy</td>
<td>7,248</td>
<td>7,547</td>
</tr>
<tr>
<td>Geology</td>
<td>6,110</td>
<td>6,868</td>
</tr>
<tr>
<td>Geophysics</td>
<td>—</td>
<td>143</td>
</tr>
<tr>
<td>New Guinea Research Unit</td>
<td>3,550</td>
<td>4,247</td>
</tr>
<tr>
<td>Total</td>
<td>492,702</td>
<td>538,317</td>
</tr>
</tbody>
</table>

Among outstanding acquisitions this year in the oriental field are complete runs in microfilm of three major mainland Chinese newspapers first published in 1949, an important collection on Taoism (101 volumes) and several large backsets of Japanese periodicals. Other purchases worthy of note include backsets of important botanical journals. The grant from the American Council of Learned Societies has substantially increased the Library's holdings in American literature.

The Pacific Manuscripts Bureau of the Department of Pacific History is supplying the Library with copies of all its microfilms of rare manuscript and printed materials, excepting newspapers.
The constantly increasing use of the Library is reflected in the following statistics:

<table>
<thead>
<tr>
<th>Services to Readers</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Transactions recorded at Loans Desks</strong></th>
<th>1968</th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Studies</td>
<td>71,718</td>
<td>71,849</td>
<td>77,152</td>
</tr>
<tr>
<td>General Studies (including Law Library)</td>
<td>133,095</td>
<td>150,677</td>
<td>190,391</td>
</tr>
<tr>
<td>Reserved books</td>
<td>88,868</td>
<td>92,056</td>
<td>108,719</td>
</tr>
<tr>
<td>Total</td>
<td>293,681</td>
<td>314,582</td>
<td>376,262</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Inter-library loans—Borrowed</strong></th>
<th>1968</th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Studies</td>
<td>4,117</td>
<td>4,006</td>
<td>3,196</td>
</tr>
<tr>
<td>General Studies</td>
<td>2,612</td>
<td>2,278</td>
<td>2,166</td>
</tr>
<tr>
<td>Total</td>
<td>6,729</td>
<td>6,284</td>
<td>5,362</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Inter-library loans—Lent</strong></th>
<th>1968</th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Studies</td>
<td>4,692</td>
<td>5,728</td>
<td>6,091</td>
</tr>
<tr>
<td>General Studies</td>
<td>1,514</td>
<td>1,687</td>
<td>2,065</td>
</tr>
<tr>
<td>Total</td>
<td>6,206</td>
<td>7,415</td>
<td>8,156</td>
</tr>
</tbody>
</table>

In addition to the formal transactions recorded above, the Reference staff handled a total of 14,000 mail and telephone inquiries in Advanced Studies and nearly 4,700 in General Studies.

The use of the Library continues to expand. It is noteworthy that each year the number of items borrowed from other libraries continues to decrease and the items issued on inter-library loan to increase. A larger proportion on inter-library loans is now in the form of photocopied articles. Statistics do not indicate the very heavy use of the Library by students from other institutions who are admitted as readers but are not permitted to borrow.

The principal activities of the Cataloguing department are recorded in the following table and notes:

<table>
<thead>
<tr>
<th>Technical Services</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Titles catalogued and classified</strong></th>
<th>Western languages</th>
<th>Asian languages</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodicals</td>
<td>22,237</td>
<td>22,076</td>
<td>21,171</td>
</tr>
<tr>
<td></td>
<td>1,350</td>
<td>1,058</td>
<td>969</td>
</tr>
<tr>
<td></td>
<td>3,802</td>
<td>3,622</td>
<td>3,210</td>
</tr>
<tr>
<td></td>
<td>27,389</td>
<td>26,756</td>
<td>25,350</td>
</tr>
</tbody>
</table>

Hopes, high last year, for automating various library processes have been dashed by the difficulties experienced by the Library in gaining a regular allocation of the very modest amount of computer time (approximately 1% of its capacity) needed to complete and carry out the operations. A computer printout of books held in the reserve collection and list of serials received throughout the Library system, both to be updated regularly, were two of the services on which preliminary work had been completed. Negotiations are still being conducted to gain the computer time needed to carry them to fruition.
The reclassification of 16,363 titles has been achieved, maintaining the high rate of work set last year. By late 1971 the General Studies collection should be completely reclassified by the Library of Congress system and it is planned to accelerate the reclassification of the Medical Sciences library.

Three major gift collections, the L. H. Allen, the F. Rinaldi and the Emma Sadka Collections, have been catalogued and classified this year, and a fourth, the Paramanov Collection, is practically completed, with the exception of the manuscript material.

Exhibitions

A variety of exhibitions was staged in the McDonald Room and adjacent area in the R. G. Menzies Building, including two outstanding exhibitions of photographs and an interesting display of paper sculpture. The McDonald Room was also used for a public lecture, a poetry reading and the launching of Professor A. D. Hope's book *A Midsummer Eve's Dream*.

The Asian Studies Division of the Library prepared an exhibition of books on Asia to be held in the J. B. Chifley Building on the occasion of the twenty-eighth International Congress of Orientalists. The display includes books provided by various learned societies and publishing bodies in France and Germany as well as works on the sacred texts of Buddhism from the Asian collections of the Australian National University and the National Library of Australia. A descriptive catalogue on the Buddhist text has been prepared for the Congress by the Asian Studies Division.

Related Developments

Two innovations were tried out this year. An invitation was sent to representatives of the faculties in the School of General Studies to attend Senior Library Staff meetings and discuss informal library policies and readers' problems. The invitation is being extended to representatives of the research schools. The second innovation was the granting to students of representation on the Library Committee. It is as yet too early to comment on the value of the representation.

Miss J. M. Waller as Chairman, and Miss E. Bishop as Secretary, have had a particularly busy year working on the Library Seminars Planning Committee for the twenty-eighth International Congress of Orientalists. Miss Waller is also a member of the Australian Advisory Council on Bibliographical Services Committee planning a survey of South-East Asian material in Australian libraries, while Miss Bishop has been a member of the committees for librarianship and Chinese at the Canberra College of Advanced Education.

The Law Librarian, Mr P. Biskup, has assisted with lectures on Legal Method for first-year students and will be continuing this work in 1971. Miss C. M. James has been the Australian National University representative for MEDLARS. She is being seconded to the Secretariat of the Committee set up by the National Library of Australia to inquire into scientific and technical information services in Australia.

Publications

**Bishop, Enid & Waller, Jean M.**

Biskup, P.

Hope, A. D.

Waller, Jean M.
CENTRE FOR CONTINUING EDUCATION

REPORT OF THE DIRECTOR

Dr C. Duke

During 1970 staff of the Centre explored both theoretically and through various forms of educational provision its brief as an agency for the study and provision of continuing education at a national level. Procedures were refined within the Centre for designing and administering an increased number of schools, conferences and seminars, most of them recruiting nationally. Fifty-nine people attended the intensive Japanese language course in January, and forty-four the week-end refresher school for pharmacists in June. Another annual venture, the one-day program for parents of first-year undergraduates, attracted 325 people; it has however been decided that this is an information-giving rather than an educational exercise, and as such more appropriately handled elsewhere in the University.

A four-day course in biotelemetry, arranged jointly with the University of New England and assisted by grants from the CSIRO and from the Australian Meat Board, was taught by Professor S. Mackay of Boston University and two American assistants; it attracted 109 people, mostly from research positions in the CSIRO and the universities. A week-long course in the teaching of drama and allied subjects in high schools was financed principally by means of a grant from the Australian Council for the Arts and attended by 105 people from schools, training colleges and the theatre. A week-end seminar on American studies in Australia enrolled eighty-four participants. A symposium on rural policy, arranged jointly with the University of Sydney's Extension Board enrolled 155 people concerned as producers or public servants with the definition and execution of Australia's rural policy. A week-end seminar on mental health, arranged in conjunction with the Australian National Association of Mental Health attracted sixty-three participants. A week-long course on the government of the national capital was cancelled through lack of support.

Other new courses which are likely to be repeated annually or at longer intervals included the journalism summer school (arranged jointly with the Canberra Branch of the Australian Journalists' Association) a four-week intensive course in spoken Mandarin (jointly with the Canberra College of Advanced Education) a national summer school on religion, an intensive seminar on the development of human resources conducted at Thredbo, a week-end conference on an aspect of conservation, and another on science education. A number of these special courses has resulted in publications or proceedings either by the Centre or by some other agency.

Discussion with other agencies, particularly those concerned with health in the Australian Capital Territory, resulted in the Centre's taking over and redesigning what had been an informal course for health and welfare workers. This thirteen-week course, two full afternoons a week, is attended mostly by employees of health and welfare agencies in Canberra but serves also as an orientation course for people contemplating going into such work. It is expected that the course will be offered twice a year until such time as other arrangements for this teaching are made, perhaps at the Canberra College of Advanced Educa-
tion. Two shorter in-service courses resulted from discussion with staff of the Public Service Board: a series of eight seminars on organisation theory was arranged for twenty-six public servants from different departments; and a two-day workshop on processes and problems of adult learning was arranged for twelve senior training officers from a number of departments. The Centre has begun exploring, within the University and beyond, problems to be overcome before an effective program of in-service refresher courses can be arranged for professional groups. In all, nineteen schools, seminars and special courses arranged by the Centre enrolled 1,253 people. (This excludes the 325 parents attending the program in February.)

The week-by-week program of classes in 1970 comprised sixty courses varying in length from twenty to 120 hours and enrolling a total of 1,686 students. Courses in French and Russian language were offered by the Canberra College of Advanced Education with administrative assistance from the Centre. As the College of Advanced Education develops a program of evening language classes of an intensive kind, the emphasis in the Centre’s program will further shift towards courses in the natural and social sciences and the humanities, often inter-disciplinary in character, at a level appropriate to a university and which would not otherwise be available to residents in the Australian Capital Territory. Most of the time of the Centre’s research assistant has been devoted to a detailed survey of students enrolling in First Term 1970. Analysis of this data is providing one basis both for better provision and administration of classes and for better theoretical understanding of processes and problems of continuing education. Evaluation procedures have been built into most of the schools, conferences and seminars to inform organisational development and to develop a body of knowledge for research purposes and for teaching about continuing education. Late in the year a program of academic seminars and discussions was arranged. This is developing into a forum for the presentation of substantial papers on aspects of continuing education by educators in Canberra and interstate visitors coming to the Centre for this purpose. One such paper has been worked up by Dr N. Haines of the Centre as a substantial monograph exploring a philosophy of continuing education. Several discussions examined human relations and small group training, an area of increasing significance in which the Centre is acquiring theoretical understanding and practical competence.

Much of the time of academic staff of the Centre is absorbed in formal and informal consultancy, advice and animation calculated to improve the understanding and the quality of continuing education in the Australian Capital Territory and throughout Australia. This work is directed as much to organisations such as public service departments, commercial and industrial concerns as it is to agencies formally devoted to education.

Mr A. T. Davies joined the Centre from a lecturing position on the B.Sc. Education Course at the University of Melbourne early in 1970; he completed work for his doctorate during the year. Mr B. H. Crew worked throughout the year on research for a history of Australian adult education, financed by a grant from the Australian Research Grants Committee. In November he left Canberra to conduct a three-month pilot study of the relation between adult education and economic and social change in a group of Indian villages; while in India he will attend a conference, principally of Asian vice-chancellors, on university adult education. The Director received a university grant towards the cost of
attending the second quinquennial conference of the International Congress of University Adult Education in Montreal; while there he was also a member of the delegation of this University to the conference of the International Association of Universities. He also visited universities concerned with continuing education in the UK, the United Arab Republic, Thailand and Hongkong. Late in the year he was appointed editor of the Journal of the International Congress of University Adult Education. He was re-elected to the Executive of the Australian Association of Adult Education and elected vice-president of the Australian Institute for Human Relations. In June he gave a paper to a regional conference of the Australian Association of Adult Education held in Sydney. He and Dr Haines also read papers to the annual conference of the Association in August.

PUBLICATIONS

CREW, B. H.
'Mansbridge and his mission to Australia.' *Australian Highway*, December, 1969.

DUKE, C.
'Review article: Adult education in Australia.' *Adult Education*, XLIII, iii, 189-90.
'The liberal and the socio-emotional; the need for a synthesis of approaches in adult education.' *Aust. J. Adult Educ.*, X, iii, 107-17.
'Review article: Running voluntary bodies.' *Workers' Educational Association News*, I, ii, 3.

DUKE, C. & MARRIOTT, S.‡
'Social science and adult education.' *Studies in Adult Education*, I, i, 45-64.

HAINES, N. F.

WILSON, J. L. J.* & FURNASS, S. B.¶ (eds)

‡ Not a member of this University.
* Based on work done while a member of the Centre.
¶ Member of the University Health Service.
REPORT OF THE DIRECTOR

Mr W. A. Wood

The Press is the publishing department of the University administering the University imprint and publishing fund. General responsibility for and control of the Press are vested in the Vice-Chancellor. An Editorial Committee, consisting mainly of members of the academic staff, supervisors editorial policy, authorises publication, and advises the Director.

During 1970 thirty-seven new books and one journal were published; a total of 67,140 copies were printed. They reflected most of the major research activities of the University, the medical and physical sciences excepted. The biological sciences are, however, an increasingly important publishing field for the Press. Asia, the Pacific, and Australia, through works embracing many disciplines, continue to provide the main geographic focus for the Press’s publications.

Sixty-four manuscripts were submitted to the Press in 1970, and twenty-eight were accepted for publication. Twenty-three publications issued by other departments of the University were accepted for commercial world-wide distribution, a service the Press has traditionally rendered.

Small increases in staff combined with senior appointments in the previous year brought considerable expansion of promotion efforts and closer production control of a record number of publications. Continuing improvements in design and production standards of the Press’s books were widely noted.

Strong emphasis continued to be placed on overseas sales. Fifteen separate editions of Press books were sold to publishers outside Australia, and the Press’s current total export sales percentage of forty-two compares very favourably with the twelve to fourteen per cent reported for all Australian publishers.

The Press commenced activities as stock-holding agent on behalf of the University of Toronto Press.

The Director was elected President of the Association of Australian University Presses.

PUBLICATIONS

Andrews, E. M.
Isolationism and Appeasement in Australia

Badger, G. M. (ed.)
Captain Cook: Navigator and Scientist

Bellany, I. & Richardson, J. L.
Australian Defence Procurement

Bolton, G. C.
A Thousand Miles Away (Reprint)

Boydén, S. V. (ed.)
The Impact of Civilisation on the Biology of Man
BROWN, R. G. & WHYTE, H. M. (eds)
Medical Practice and the Community

BURBIDGE, NANCY T. & GRAY, M.
Flora of the A.C.T.

DAVIDSON, J. W. & SCARR, D. A. (eds)
Pacific Islands Portraits

DICKSON, DIANE & DOSSOR, CAROL
World Catalogue of Theses on the Pacific Islands

EDWARDS, C. T.
Public Finances in Malaya and Singapore

FISK, E. K.
The Political Economy of Independent Fiji

FUKUI, H.
Party in Power

HOPE, A. D.
A Midsummer Eve's Dream

JONES, F. L.
The Structure and Growth of Australia's Aboriginal Population

LAZARIDES, M.
The Grasses of Central Australia

LONG, J. P. M.
Aboriginal Settlements

MANNING, G. A.
The Elder Smith Goldsborough Mort Merger

MARTIN, P.
Voice Unaccompanied

MILLAR, T. B.
Soviet Policies in the Indian Ocean Area

MOORE, R. M. (ed.)
Australian Grasslands

THE NATIONAL CAPITAL DEVELOPMENT COMMISSION
Tomorrow's Canberra

OLLIER, C.
Volcanoes

DE RACHEWILTZ, I. & NAKANO, MIYOKO
Index to Biographical Material in Chin and Yüan Literary Works

RAMSON, W. S. (ed.)
English Transported

ROTHERY, F. M.
Atlas of Bundaleer Plains and Tatala

ROWLEY, C. D.
The Destruction of Aboriginal Society

SCHAPPER, H. P.
Aboriginal Advancement to Integration

SHANAHAN, MARY
Out of Time, Out of Place

SILCOCK, T. H.
The Economic Development of Thai Agriculture

SIMMONDS, J. D.
China's World

SLATYER, R. O. et al.
Man and the New Biology

TAFT, R., DAWSON, J. L. M. & BEASLEY, PAMELA
Attitudes and Social Conditions
TRYON, D. T.
Conversational Tahitian

VIVIANI, NANCY M.
Nauru

WELFIELD, J. B.
Japan and Nuclear China

WRIGHT, D. I.
Shadow of Dispute

YUYAMA, A.
A Bibliography of the Sanskrit Texts of the Saddharmapundarīkasūtra

DEPARTMENT OF SOCIOLOGY, INSTITUTE OF ADVANCED STUDIES
The Australian and New Zealand Journal of Sociology (2 issues)
COMPUTER CENTRE

REPORT OF THE ACTING HEAD OF CENTRE

Dr R. S. Anderssen

The year has been one of frustration and disappointment, for not only has the load on the machine continued to grow, but also the proposed Joint Centre with the CSIRO has still failed to win official approval.

As the computer is already saturated, the growth in the work load has led to longer job turn-around times, with delays of five days being normal for certain job classes. The effect of this is to curtail seriously many research projects in the University. Changes to the method of operating the computer are planned to give a small increase in the throughput of the computer, but this will be of little avail with the current demand for computer time.

The delays in gaining approval for the Joint Centre are of considerable concern, as no other provision was made for the expansion of present campus facilities in this triennium.

The Centre's research activities are now concentrated in the fields of numerical analysis and on-line computer applications. In numerical analysis, contributions during the year include new methods for optimisation, as well as the solution of integral equations and problems in mathematical physics. A console system for the computer is currently being implemented.

Introductory courses were provided whenever there was sufficient demand; longer courses were given throughout the year to outline the available facilities and to give the relevant theoretical background in the fields of scientific computation, information processing, digital circuit design, and real time computer use. Colloquia are organised jointly with the CSIRO, and a one-day seminar on 'Data Acquisition and Real Time Systems' was organised in December and attracted over 300 participants.

The University of Queensland Press undertook the publication of the proceedings of our previous one-day seminar on 'Data Representation'.

Members of the Centre's staff have made important contributions to several seminars and conferences held during the year.

PUBLICATIONS

ANDERSSSEN, R. S.


'A note on the fitting of non-equispaced two-dimensional data.' Geoexploration, 8, 41-8.


'Linear models in Data Representation.' In Data Representation (eds R. S. Anderssen & M. R. Osborne), 4-15, Univ. of Queensland Press.

ANDERSEN, R. S., DOYLE, H. A., PETERTONS, H. F. & SENETA, E.


ANDERSEN, R. S. & OSBORNE, M. R. (eds)

Data Representation. Univ. of Queensland Press, 117.

HARRIS, A. J.

‘MFT 11 operating system.’ Computer Centre Manual, October, 76.

JENNINGS, L. S. & OSBORNE, M. R.


LAWRENCE, D. E. & CLEASY, P. N.


OSBORNE, M. R.


‘A class of nonlinear regression problems.’ In Data Representation (eds R. S. Anderssen & M. R. Osborne), 94-101, Univ. of Queensland Press.

RYAN, D. M., KOWALIK, J. & OSBORNE, M. R.


RYAN, D. M. & OSBORNE, M. R.


SMITH, B. W.

‘Faster, versatile E.D.P. for the 70’s.’ Rydge’s Business Journal, 43, 105-10.


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(™ Member of the Department of Geophysics and Geochemistry.
(™ Member of the Department of Applied Mathematics, School of General Studies.
(™ Member of the Department of Statistics, School of General Studies.
(™ Not a member of this University.

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UNIVERSITY HOUSE

REPORT OF THE MASTER

Professor Emeritus R. N. Robertson, C.M.G., F.A.A., F.R.S.

At the end of 1970 the composition of the Governing Body was as follows:

Master: Professor Emeritus R. N. Robertson.

Fellows: Retiring 15 August 1971: Dr P. A. Arriens (Steward), Mr R. A. Marshall, Professor G. H. Russell, Dr Gutta I. Schoefl, Professor Wang Gungwu (Deputy Master).

Retiring 15 August 1972: Dr R. E. Barwick, Dr A. R. Crawford, Dr C. R. Heathcote (Bursar).

The Master was in residence throughout the academic year except for attending the ANZAAS Congress in Port Moresby in August and for an absence of three weeks in November and December visiting the USA and Canada as a member of the party led by the Minister for Education and Science. Professor Robertson was elected President of the Australian Academy of Science in April. During the year he has continued research on biochemistry of the mitochondrial membranes, in collaboration with Dr D. Weiss, CSIRO, and Dr F. L. Bygrave, Department of Biochemistry, School of General Studies.

The Chancellor

The Chancellor, Dr H. C. Coombs, F.A.A., has been frequently in residence in the Chancellor's flat during the year.

Members and Residents

The total membership increased to about 650, including seventy-two visitor members and sixty-three invited members. Over 150 regular new members were enrolled. There has been some decrease in the number of research students in residence during the year; this decrease is probably due to the increase in alternative accommodation available in Canberra and to an increased preference for research students to share a house or flat of their own. The decrease in students in residence was largely offset by a steady demand for accommodation for visitors, some long-term, some casual.

Tariffs

The tariffs for casual visitors were increased from 1 July 1970 and the tariff for permanent residents will be increased from 1 January 1971. Increasing costs, due particularly to award increases in domestic staff wages, have posed some difficult financial problems and necessitated increase in tariffs.

Visitors

Visitors from overseas who stayed in University House for one month or more included—Professor G. Alexandersson, Stockholm School of Economics; Professor R. Arens, University of Toronto; Professor K. Awaya, Yamaguchi University; Professor Emeritus Sir Harold Bailey, Queen's College, Cambridge;
Professor H. B. Barlow, University of California (Berkeley); Professor J. Chesneaux, University of Paris; Professor J. W. Cornforth, Millstead Laboratory, Britain, and Mrs Cornforth; Professor H. S. M. Coxeter, University of Toronto, and Mrs Coxeter; Assistant Professor O. P. Dwivedi, University of Guelph; Professor J. T. Edsall, Harvard University, and Mrs Edsall; Professor B. Fabian, University of Munster, and Mrs Fabian; Professor D. I. Gough, University of Alberta, and Mrs Gough; Professor G. W. Grace, University of Hawaii; Professor E. Hewitt, University of Washington, and Mrs Hewitt; Dr M. Kluge, Technical University of Darmstadt; Professor P. J. Kramer, Duke University, and Mrs Kramer; Professor S. S. Kumar, University of Virginia; Dr J. F. Ledlie, Rice University, and Mrs Ledlie; Dr D. Lynden-Bell, University of Cambridge; Professor A. Maccoll, University College, London; Dr J. A. McDonald, University of Saskatchewan; Professor H. McKaughan, University of Hawaii; Professor H. McLennan, University of British Columbia; Mr R. Madden, Princeton University; Dr and Mrs S. Mathai (Delhi); Mr F. Miyashita, Waseda University; Dr H. Mizuno, Tokyo; Professor N. A. Nilsson, University of Stockholm; Dr E. Ogan, University of Minnesota; Professor K. Pawlick, University of Hamburg, and Mrs Pawlick; Professor H. Penzl, University of California (Berkeley), and Mrs Penzl; Professor P. H. Prabhu, India; Professor K. Rankama, University of Helsinki; Professor L. G. Reynolds, Yale University, and Mrs Reynolds; Dr L. E. Rorabacher (Florida); Professor R. Sharrock, King's College, London; Professor G. M. Van Dyne, Colorado State University, and Mrs Van Dyne; Professor K. A. Wittfogel, University of Washington, and Mrs Wittfogel; Dr T. Yoshida, Osaka University.

Many other overseas scholars and visitors have been in residence for shorter periods including—

Dr Leona Baumgartner, Harvard University; Lord and Lady Butler, University of Cambridge; Professor M. K. Chailakyan, Moscow; Sir Alex and Lady Clegg, Britain; Sir Christopher Cox, Britain; Dr Violet Conolly, Britain; Professor C. F. Evans, King's College, London, and Mrs Evans; Sir Brian Flowers, Britain; Professor and Mrs G. Fülleborn, Germany; Professor B. G. Gafurov, Moscow; Professor T. H. Hollingsworth, University of Edinburgh; Professor E. Hoover, University of Pittsburgh, and Mrs Hoover; Sir Joseph Hutchinson, University of Cambridge; Dr H. M. Kim, Korea; Professor L. A. Landa, Princeton University, and Mrs Landa; Dr L. L. Langness, University of Washington, and Mrs Langness; Professor J. Lindbeck, Columbia University; Dr E. A. C. MacRobbie, University of Cambridge; Professor G. K. Milailov, Moscow; Dr R. Moore, University of London; Professor S. H. Nasr, University of Teheran; Professor R. B. Park, University of California (Berkeley); Professor S. K. Runcorn, University of Durham; Professor Emeritus W. Simon, University of London, and Mrs Simon; Professor B. Skinner, Yale University; Professor A. Smithies, Harvard University; Professor F. C. Steward, Cornell University, and Mrs Steward; Professor S. Sudzuki, Chile; Professor K. V. Thimann, University of California (Santa Cruz); Professor H. B. Whittington, University of Cambridge, and Mrs Whittington; Professor V. M. Yurkovsky, Kiev.

Many members of the staffs of Australian universities and national institutes have also stayed in the House.
Buildings and Grounds

The redecoration of the House has proceeded with the repainting of Hall, Foyer to Hall, Common-room, Music-room and Library. The new colour scheme suggested by Mr F. Ward has been widely appreciated. New rugs have been provided for Hall Foyer, Common-room, Library and Fellows' Room. The repainting of rooms in the East, West and North wings has been completed.

Library, Gramophone and Record Collection

The Library has been in constant use during the year; over 3,600 borrowings were recorded and there were many acquisitions either by gift or by purchase. The Music-room has been as popular as usual and many new records have been acquired.

Functions and Activities

The Commencement Dinner was held on 2 March and was attended by about 120 members. The Annual Ball was held on 15 April with an attendance of about 170. Guest Nights were held on 1 July and on 14 October; both had full attendances. The University Consort presented musical programs at the Commencement Dinner and at one of the Guest Nights. The Christmas Party organised by the Residents' Committee was held on 11 December.

Guest Tables have been arranged four evenings a week during term and two evenings a week out of term; the average number taking part has been about twelve. These provide opportunities for members of the House to dine with casual residents and invited guests.

The light lunch served in the bar and in the Fellows' Garden has increased in popularity, particularly with non-resident members.

Residents' Committee

The Residents' Committee began the year under the chairmanship of Mr A. D. Crombie and, with a new Residents' Committee in August, Mr J. W. Robertson was elected Chairman. Mr W. J. Caelli was elected to the position when Mr Robertson moved out of the House. The Residents' Committee has organised various social functions and regular film shows.

Gifts and Donations

A tapa cloth was given by a member of the House, Dr D. J. Anderson, following his visit to invite the King of Tonga to become Chancellor of the University of the South Pacific. This tapa cloth is used as a decoration for the north wall of the Hall.

A Korean parliamentary delegation led by Dr Rhee Hyo Sang, Speaker of the National Assembly of the Republic of Korea, visited the University and presented to the House a 'box with nine compartments', characteristic art work of Korea.

Books have been presented by Sir Edward Morgan (South Australia), Dr L. Rorabacher (North Carolina), Mr P. Ritter (Western Australia) and Dr A. Winter (Cambridge).

Mrs G. H. Newstead gave the House a handsome rubbing of the celebrated brass of Sir John D'Abernon.
At its November Meeting, the Council of the University appointed a Committee to look into the policy and functions of the House, including its future role in the University, the balance of membership and the relation of costs to tariffs and subsidies. The Committee consists of the Master (Chairman), Professor G. Sawer, Professor C. A. Gibb, O.B.E., Mr D. M. B. Butt, Mr A. D. Crombie and Mr R. A. Hohnen, O.B.E.
STUDENT RESIDENCES

BRUCE HALL—Warden: Mr W. P. Packard

BURTON HALL—Warden: Mr G. G. Rossiter

GARRAN HALL—Warden: Dr J. R. T. Short (on leave from 30 June 1970)

Acting Warden: Dr B. E. Kent (from 1 July 1970)

Although overall applications for residential accommodation were down in 1969, the three halls again had little difficulty in filling their vacancies. The imbalance between female and male residents was still in evidence, particularly in Garran Hall. Because of the short supply of female undergraduates, Ursula College accepted into residence people from other educational institutions in order to keep their vacancies down. A number of male undergraduates was unable to be accommodated in student residences. The University Accommodation Officer assisted in finding private lodgings for this group of students in addition to extending help to those undergraduates who preferred private accommodation or who were not eligible for admission to the halls.

The following table shows the numbers of males and females, undergraduates and postgraduates, in the halls during 1970:

<table>
<thead>
<tr>
<th>Halls</th>
<th>Undergraduates</th>
<th>Postgraduates</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Bruce</td>
<td>106</td>
<td>80</td>
</tr>
<tr>
<td>Burton</td>
<td>121</td>
<td>101</td>
</tr>
<tr>
<td>Garran</td>
<td>126</td>
<td>87</td>
</tr>
</tbody>
</table>

A high proportion of undergraduate hall members held scholarships, particularly the Commonwealth University Scholarship. This was reflected in the number of undergraduates who passed all their units in the annual examinations; in each hall over 75% achieved this. The percentage of residents who failed all units was around 2%.

Activities of hall residents continued to be both diverse and successful. Of note were the interhall sporting competitions which were followed with interest by hall members. The sale of alcohol was introduced into the halls and this proceeded smoothly as students availed themselves sensibly of this added facility in their social life.

Intensive conference trade again was a major factor in enabling halls to balance their budgets and maintain student fees at a level of $630. Often the number of conferences placed some strain on hall facilities, but co-operation between the halls enabled commitments to be met. Just under fifty separate conferences were in residence over the three vacations during 1970.

At the beginning of the academic year, one third of Bruce Hall's accommodation was rearranged in that men and women were given rooms on the same floor in the same wings. This arrangement proved more flexible than the system of segregated blocks or floors and members asked that it be extended throughout the hall in 1971.
As in recent years, tutors both resident and non-resident, continued to play a useful role in the life of each hall by taking part in the activities of the Senior Common-room and by providing guidance for first-year students.

The Halls of Residence Committee met four times in 1970 and discussed a number of important matters relating to the halls, including the length of the residential year, vacation usage of the halls and changes in rules. The Committee, under the chairmanship of the Dean of Students, continues as a useful forum for discussing items of general concern to the halls and affiliated colleges. Over the last three or four years, the University has been able to accommodate about 55% of its full-time undergraduates and with Burgmann College opening in 1971 this situation should remain unchanged through 1971-72.
STUDENT ASSOCIATIONS AND WELFARE

REPORT OF THE DEAN OF STUDENTS

Professor C. M. Williams

The establishment—and considerable success—of a large measure of student participation in the governance of the University has not lessened the need for informal contacts and discussion between members of the campus community. At the same time, the wish of many students to elicit and mould student opinion by public meeting rather than through representatives has made it necessary to seek those contacts with a large number of lively individuals. Fortunately there is no lack of lively students, though it is a matter for regret that the public attention paid to students is too often determined by the 'news value' rather than by the intrinsic merit or importance of their activities. Hence, while some people may be excused for believing that the life of an undergraduate is one long demonstration, the quiet and effective work of groups like Social Action and World University Service, and the energy put into sporting, religious, professional and cultural societies, remain unknown to the public at large.

During 1970 there has been much discussion of drugs in the press and elsewhere. Mention is made of this question in the report of the University Health Service. It is fair to add that a great many students who have no intention of using or abusing drugs nevertheless resent what they see as the hypocrisy of elders who preach on this subject with a supply of alcohol in one hand and of nicotine in the other. The discussion of drugs is befogged by much emotion, ignorance and sensationalism. It is to be hoped that success will attend student moves to form a group with which students can talk about drugs from a rational and informed position.

Undergraduate scholarships continue to absorb much of the time of the Dean of Students. With very few exceptions, the academic results of the University's undergraduate scholars in 1970 fully justified the various scholarship schemes. The National Undergraduate Scholarships, in particular, are still attracting to the campus a variety of splendid talents from all parts of Australia. During the year discussions began which may result in a recommendation to Council that the National and Asian scholarships be amalgamated so as to make the best possible use of the funds available without detriment to the objects of either scheme. Buildings planned during 1970 included a new home for the Union; new types of halls of residence for graduate and undergraduate students; and the Arts Centre. I am grateful for the insight into student aspirations that participation in this planning has offered me. The very high cost of being a student—even with the assistance of a scholarship—is one problem emphasised by the growing demand for low-cost residence as well as by the need of many students to take part-time and vacation jobs. This combines with the current desire for a fuller measure of self-government to make the planning of future student residences, and the conduct of those now building or planned, especially important to the University.

The year brought to my notice an average number of problems, personal and otherwise, suffered by individual students. Few of these cannot be solved or greatly alleviated, usually by appropriate help from one or more of the student...
welfare services. The range of those services is still not fully understood by numbers of staff and students. A new (and mildly alarming) tendency is for students who feel themselves wronged to approach the Dean of Students as a kind of informal ombudsman. Most such cases arise from misunderstandings and can be cleared up fairly readily. The idea of having an official University ombudsman, which was raised during 1970 by the President of the Students' Association, may well warrant consideration against the day when the University population is larger and more complex than at present.

**UNIVERSITY HEALTH SERVICE**

Dr S. B. Furnass, the Director of the University Health Service, reports an 18% increase in undergraduate consultations in 1970, from 2,346 (1969) to 2,773. On the other hand, visits by postgraduate students and staff remained comparable in number to those of 1969. During November an assessment was made of the proportion of students in whom examination stress appeared to be the main underlying reason for consultation. Of a total of 442 consultations during the month, forty students displayed some degree of examination stress, often being associated with a tendency to try to study into the early hours of an examination morning. A small number of cases of examination panic was referred to the Health Service and most of these successfully completed their papers under more relaxed conditions.

While the sports clinic proved markedly less popular during 1970, possibly because of a lower injury rate from contact sports, an increased proportion (from 668 to 873) of staff and students attended the Health Service for inoculations and advice on the medical hazards of overseas travel during field studies and vacations. Students first entering a hall of residence or affiliated college were again asked to provide a medical history and these statistics enabled an interesting comparison of the incidence of cigarette smoking by students first entering a residence with those who consulted the Service during the month of November. Although the two groups were not strictly comparable there was evidence of a relative increase in the incidence of smoking over the year, particularly in the number of heavy smokers. Several causes were seen for the rise; the sample of students attending the Health Service for clinical reasons was relatively older than the sample of school leavers; the November group contained a higher proportion of students with respiratory tract infections; and the second sample was taken during the Third Term when examination stress was prominent. Among reasons given for smoking included peer group pressure, attempts to combat nervous tension and simple enjoyment. Some seasonal variations in consultations were noted with respiratory diseases being prevalent during the winter months of Second Term and the Third Term seeing a rise in sexual problems, hay fever and skin complaints. As in previous years, the generally higher consultation rate in the Third Term was to some extent also attributable to symptoms of pre-examination stress, which appeared more obviously as an anxiety state or depression.

During July and August Dr Furnass visited centres in Canada, Britain, Scandinavia and the USA, and while overseas took note of current patterns of drug abuse. Dr Furnass found that experimental and occasional recreational use of cannabis and LSD appeared to be common in high school and university
students, particularly in North America. Drug dependence as such was uncommon amongst undergraduates and was generally incompatible with academic success. When it did occur, it was often the expression of an underlying psychiatric or social problem. In relating this to Australia Dr Furnass observed that in general, Australian students seem to show a healthy scepticism about the use of chemical agents in seeking a solution to personal problems. Apart from nicotine and the occasional abuse of alcohol there have so far been no clinical problems associated with drug abuse at this University. During Dr Furnass's absence, clinical assistance for the Health Service was available from four medically qualified scholars studying for the degree of Doctor of Philosophy in the John Curtin School of Medical Research.

UNIVERSITY COUNSELLING SERVICE

The Counselling Service, under Mr J. E. Gough, reports an increased use of most of its facilities during 1970. Undergraduate interviews rose from 242 in 1969 to 289 in 1970 and similarly a marked rise was noticeable in pre-entry student interviews, from 165 in 1969 to 281 in 1970. As a result total interview hours for 1970 were 2,300 compared to 1,940 in 1969. Statistics indicate that those who make most use of the Counselling Service tend to be undergraduates who are single, full-time, under twenty years of age and in the first year of their course. It is further revealed that by far the greatest number of clients seek interviews unprompted, although some are referred by academic staff, the Health Service or by other students. So far no clear pattern of seasonal usage has appeared although the number of clients in December seems to have been high both in 1969 and in 1970.

Working in close co-operation with the Dean of Students and the Health Service, the Counselling Service continued to give emphasis to individual interviews covering quite ordinary, everyday issues concerning a student at the moment to long-term assistance of a supportive or re-educative nature. Counsellors endeavoured to dispel the clinical or psychiatric image in favour of an informal atmosphere in order to encourage students to discuss matters of concern. In addition, group work was undertaken with students interested in study techniques and problems, sensitivity training groups, and groups focussing on problems in the area of interpersonal relations. Counsellors have again served as supervisors for postgraduate students undertaking practical work for the degree of master in counselling.

The Careers and Appointments section continued in its efforts to assist final-year undergraduate students. Some 141 students had interviews with the Careers and Appointments Officer and, as in the past, the problem facing these students was that of relating academic studies to job opportunities. It was found that final-year students were sometimes reluctant to look realistically at available employment opportunities and there seemed to be a need for a greater awareness of the career implications of their course amongst students beginning undergraduate studies. In view of the increasing difficulty facing graduates with the degree of Doctor of Philosophy in obtaining employment from the traditional sources (universities and the CSIRO) the Careers and Appointments Officer, for the first time, made a direct approach to scholars completing their degree of Doctor of Philosophy in order to establish what the needs of these students were. Other
activities of the Service included pre-entry counselling, schools visits, employer campus interviews and general liaison with employers and other bodies. In addition, the Careers and Appointments Officer attended a two-day conference organised by the Commonwealth Public Service Board and two meetings of the Graduate Careers Council of Australia.

The Part-time and Vacation Employment section consolidated its efforts to assist students in obtaining casual employment and reported an encouraging response from employers; many firms are now readily seeking students for job vacancies. The demand for regular part-time work through the academic year appears to have been satisfied with students preferring well paid casual jobs such as drink-waiting, labouring and, in particular, survey work.

The Efficient Reading and Efficient English programs continued to provide effective guidance for individual students deficient in these skills. Although undergraduates are no longer tested in written expression, students are encouraged to seek help where necessary. At the end of Second Term students were asked to comment on the efficacy of the Efficient English service and almost without exception students indicated a preference for individual tuition.

UNIVERSITY UNION

In 1970 the Union had 3,839 undergraduate members, ten student members enrolled for the degree of Doctor of Philosophy, eighteen staff members and twenty-eight life members. There were some changes in the membership of the Board of Management during the year. Miss D. E. Phillips, one of the two Staff Association representatives, resigned and was not replaced; the Sports Union representative, Mr T. Beath, was replaced by Mr N. D. Gray, and the Students' Representative Council representative, Mr M. E. Cunliffe, was replaced by Mr P. J. Mayer.

The present composition of the Board is—Mr W. R. C. Jay: The Vice-Chancellor's nominee; Mr G. A. Colman: appointed by Council; the Bursar (Mr W. S. Hamilton): ex officio; Mr W. P. Packard: appointed by the Staff Association; Mr P. J. Mayer: appointed by the Students' Representative Council; Mr N. D. Gray: appointed by the Sports Council; Mr D. L. Scott: appointed by the Research Students' Association; Mr R. Ahuja, Mr M. E. Cunliffe, Miss A. P. Hamilton, Miss S. C. Hobley, Miss C. J. Leaver, Miss J. B. McSpedden, Mr P. F. Pentony, Mr R. C. Refshauge, Mr G. R. Sadler, and Miss J. Wookey: elected by the general membership.

The staff of the Union consisted of the Secretary to the Board, Mr E. C. de Totth; Assistant Secretary, Mr H. E. Falvey; and fourteen other members of the permanent staff.

Revenue was received mainly from four sources, i.e. annual membership fees, first enrolment fees, development fees and an allocation from the service fee levied on all postgraduate students by the University.

Financial accounts for the calendar year 1970 are not yet available but preliminary figures suggest that the total revenue will be $87,258, an increase of $8,145 over the previous year. This increase is mainly due to the rise in overall
membership and higher interest earnings. The overall expenditure totals $49,463
of which $45,787 represents the normal running costs, the rest being absorbed
by capital purchases. The bulk of the capital expenditure was connected with
the installation of the Union Bar following the promulgation of the Liquor
(Halls of Residence and University Union) Statute permitting the sale of liquor
in the Union.

The Bar has proved to be one of the most popular facilities offered by the
Union to its members. The liquor service has been trouble-free and, generally,
the supervisory and other rules imposed by the Board in accordance with the
Liquor Order have been accepted by the users. Financially, the Board has re­
cognised the principle that the Bar must not be subsidised but instead it
should contribute to providing cheaper Refectory services. Nevertheless, the
prices have been kept as low as possible and comparable with those in the
University Staff Centre.

However, it is worth noting that the liquor service restricts even further the
space available for other Union activities. The marked reduction in certain
sections of the catering revenue and a general decrease in such student functions
as lunch time concerts, staff/student parties, etc., is directly attributable to the
acute shortage of space. This serves to underscore the inadequacy of the present
building and the consequent limitations imposed on the Union’s ability to
provide as many services as it would wish.

The Union continued to keep food prices low by following the past policies of
subsidising the trading activities. In 1970 this subsidy is expected to be nearly
$18,500, being borne by revenue from sources other than trading income. Earlier
in the year, the Board attempted to change its financial policies in order to
absorb some of the indirect costs. However, this proved unacceptable to the
general membership and the Board reverted to the past policy of charging prices
only on the basis of direct costs.

Activities in the Union continued to expand. The Union Nights program is now
established as a permanent feature of Union entertainment and a new activity—
Union Bar Nights—has been added. The traditional events of the Union calendar
—the Staff/Student Cricket Match, the Union Dinner and the Art Exhibition—
were held successfully. It is notable that this year’s Annual Dinner attracted
more student participation than in any previous year. During the year, the
Union also continued the policy of sponsoring Parliamentary debates. While
some of these were held at the University, grants enabled participation in the
debating programs of other universities.

A main preoccupation of the Board has been with the development of plans for
the new Union building. It accepted the Architect’s proposals early in the year
and gained approval of the plans from the general membership. Further pro­
gress has been hampered by the continuously increasing cost estimates and the
consequent need for replanning in order to introduce ‘savings’. Nevertheless, the
total costs are still expected to be $170,000 above the budget. This is despite an
initial contribution of $30,000 by the Union and a borrowing of $250,000 to
finance the building.

The quantity surveyors’ estimates are expected in January 1971. The Board
is aware that those estimates may only confirm the shortfall and has taken
steps to prepare for such a contingency. It has submitted a proposal to the University for approval of a guarantee for a loan of $340,000 instead of the previously approved $250,000. At the same time, investigations are being made into the ways and means of changing the plans to reduce costs without sacrificing the basic concepts. Finally, the Board is prepared to proceed with the complete replanning of the building, if the estimates prove to be higher than the present $1,270,000.

In short, it is very likely that the new building will not be ready for occupation until late in 1972. With the steadily increasing demands on our present building, the limitations on Union activities will continue and will become even more severe as the membership increases.

The Board of Management takes this opportunity to express sincere appreciation for the help received over the year from the University Administration.

STUDENT ASSOCIATIONS

In the past year a good deal has been achieved but on reviewing activities it seems that there is still much to be done. The Thesis Typing Scheme has been reorganised, typing being done by a private firm and printing being carried out free by the University. The contract with the firm Lettercopy is to be renegotiated in April but the scheme appears to be working satisfactorily at present.

During the year a submission from the Research Students’ Association resulted in a rise in stipends of 4.5% from 1 April 1970 with a further rise to a total of 6.6% from 1 January 1971. It is important to note that the rise applied to allowances as well as basic stipends. The University also showed some willingness to accept that stipends should rise to match rises in the Consumer Price Index.

The most pressing accommodation problem is that of married scholars ineligible for University housing. Consideration of rents of houses and flats in Canberra indicates that these scholars probably pay at least $9.00 per week more on rent than married scholars in University accommodation. The recent rental increases have created some problems, however. All scholars will shortly be paying the maximum rent for University housing, but for vastly different houses and flats. It is thus imperative that at the very least, older residences be well maintained and old furniture speedily replaced.

In the field of accommodation for single scholars, the new postgraduate hall should be reasonably cheap as well as comfortable and convenient. Unfortunately, the old postgraduate hall, University House, is likely to become more expensive in future. There seems to be a very good case for the University to subsidise the Eastern Annexe residents to counteract rises in costs.

The field-work sub-committee has prepared a report suggesting changes in calculation of field-work expenses and the standardisation of payments throughout the University.

The University Council’s Welfare Committee after consideration of submissions by the Research Students’ Association and Students’ Association agreed in principle that some form of on-campus dental service might be established. A

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sub-committee was appointed to consider the possible forms such a service could take and a questionnaire was sent to a sample of students. A report on questionnaire responses is being prepared.

During the year appointments have been made to a large number of committees and it seems to be policy in the University Administration to allow Research Students' Association representation on most committees. The number of committees and boards presents a problem, however, in that it is extremely difficult to gain a clear idea of the aims, functions and powers of various committees. Areas of particular concern are faculties and faculty boards where students are inadequately represented, notably in the Research School of Physical Sciences. In retrospect there has been little progress in this direction this year. Throughout the year the Research Students' Association has found the members of the University Administration to be readily approachable and helpful.

The Students' Association in 1970 was in many ways more active than for a number of years. A series of constitutional amendments has been passed at General Meetings of the Association which could lead early in 1971 to the suspension of the executive body of the Association, the Students' Representative Council. This step would be taken for one year, and would involve regular General Meetings running the Association's affairs.

The Association continued an established policy of supporting, morally or financially, various demonstrations and similar activities. However, during the year an injunction was taken out on the Association restraining it from making a payment to the September Moratorium Campaign. Because of irregularities in the calling of a meeting of the Students' Association which authorised the payment, the question of the Association's right to make such payments was not clarified. An amendment to the Objects Clause of the Constitution of the Association has been proposed and this is under discussion by a committee of University Council. Hopefully, this situation will be finalised so that the Association will be certain of the width of its powers, and be able to enter such fields as its members decide.

Several steps were taken to try to better the lot of students at this University. As well as the usual 'water-bubbler' welfare gains, a survey has been undertaken in conjunction with the Welfare Committee of University Council to determine the need for, and probable support of, a University dental service. Also a cheap housing scheme has been put into operation in Lennox House. Despite a number of teething problems it is hoped that this scheme will enable less well-off students to complete a university education without incurring considerable debts in the process. Since Canberra is greatly lacking in cheap accommodation, unlike Sydney or Melbourne, this step was most necessary.

In other fields, particularly education, welfare, social action, Abschol and drama, the Students' Association has continued along the lines of past years. Planning is well under way for the third Combined Universities Festival of Arts to be held in May 1971 at this University. This is the high point of the university cultural scene in Australia.

The Association was shocked by the Government's refusal to meet fully the request of the University Council and the Association for three undergraduate...
members on the University Council. It is hoped by the membership of the Association that this refusal will be reversed by the Government or, failing that, by the Parliament itself.

During 1970 there was continued rapid expansion of Sports Union activities. In particular, the plan of the Sports Union to develop sport as a recreation for the whole University community has been successful. As a result, even though student participation through clubs has decreased slightly to 25%, the percentage making use of the facilities and of intracampus competition is around 35%-40%.

In order to encompass a more complete spectrum of the University community more opportunity has been afforded to the spouses of students and other members to join in Sports Union activities. The associate membership system has been expanded to allow for spouses to join one or all clubs and use all the facilities.

Two new clubs were affiliated bringing the total affiliation to thirty-two clubs.

During the year the membership voted in a fee rise to $12 in order that the mounting costs of administration and entering teams in the local competitions might be covered. The concept of a differential fee was introduced with part-time students paying only $10.

The appointment of Mr N. D. Gray as executive secretary has filled a gap in the administration of the Sports Union. Already the wisdom of this appointment has reaped benefits in a more efficient administration, increased activity in recreational sport and in better advice for, and supervision of the capital development program.

The Kingsley Street Hall was developed to provide temporary accommodation for volleyball, basketball, badminton and tabletennis with areas being developed for rifle storage and repairs, judo and karate and an excellent weights/circuit training room. Full use of these facilities has been made by all clubs and individual and recreational use has been most satisfying. The numbers of members using the facilities has increased to such an extent that it has been necessary to employ part-time student attendants and to provide some supervised programs. The Hall provided an excellent centre for the successful intracampus competitions held during the year. The demand for these competitions is very strong and enthusiasm high.

The ski hut at Thredbo is still entangled in the legal web but during this season the Sports Union rented the facility from the vendors. It was most gratifying to see the full use made of the hut by members. The demand for summer use by groups and clubs is also high.

Final planning for the six squash courts and associated areas as the first stage of the sports recreation centre has progressed. This facility, along with the boathed on Sullivans Creek, will go to tender in early 1971.

A new sports area near Barry Drive has been built to accommodate athletics and hockey and it is expected this will be in operation for the new year. Sports Council has spent considerable time planning the development of the next stage of the sports recreation centre to be presented to the Australian Universities.
Commission. It is pleasing to note that the Sports Union is now able to contribute around $11,000 a year for capital development from its already stretched budget.

During the season, extensive use was made of the fields and tennis courts of the old Canberra High School which are on loan to the Sports Union.

Club teams had varying success this year in competitions. Many teams made the finals indicating that a high standard exists within the clubs. The skiing and skin-diving clubs did extremely well in their respective intervarsity competitions. A highlight of the club scene was the Rugby Union club's hosting of a match against a visiting Californian universities team. The tennis, cricket and table-tennis clubs also hosted teams from New Zealand universities. The rowing, women's hockey and rifle clubs did an excellent job in hosting intervarsity competitions in these sports during the vacation. The skin-diving club also hosted the first underwater intervarsity contest at Bermagui during February. An excellent competition was run.

Full blues for outstanding sporting achievement were awarded to W. C. Whittakers (Australian Rules), M. R. Davison (Rugby Union), M. Jones (Hockey); and half blues to J. Bourchier (Hockey), R. Scollay (Basketball), J. M. Page (Rugby Union), A. Hill (Rowing), M. Etheridge (Cricket).

Past President, Mr C. D. S. Alexander, was elected President of the Australian Universities Sports Association.

Services to the members have increased as the Sports Union has become more capable of meeting their requirements and it is hoped future development will further enhance this service.

The assistance and co-operation from the University Administration continued to the great benefit of the Sports Union.

PUBLICATIONS

FURNASS, S. B.


‘Recreation for community health.’ Proceedings of the Sixth International and First Australasian Regional International Congress of Park Administration, Canberra, 64-75.


§ Based on work done while a member of the Centre for Continuing Education.
BUILDING PROGRAM SUMMARY

Buildings Completed in 1970

Residence at Waigani for New Guinea Research Unit ..............................................
Copland Lecture Theatre ........................................................................
Extensions to Visual Aids Section ......................................................................
Extensions to John Curtin School of Medical Research Library,
  Common-room, etc. ........................................................................
Enclosure of basement at R. G. Menzies Building of the University Library . . . .
Extensions to Bruce Hall ........................................................................
Extensions to Chemistry Building ......................................................................

Buildings Under Construction in 1970

Air-conditioning—R. G. Menzies Building of the University Library, Law Building and Chancery Stage I
Chancery Hall ........................................................................
Extensions to H. C. Coombs Building ...........................................
Construction of houses for New Guinea Research Unit ................................
Biochemistry Building ........................................................................
Extensions to Forestry Building ....................................................................
Northbourne Hall (Postgraduate Residence) ..............................................
Permanent Building for Research School of Biological Sciences ..............................
Research School of Physical Sciences—Extension to Mathematical Science Building ...........................
Arts Building Stage III ........................................................................

Buildings Being Planned

The John Curtin School of Medical Research
  Extension to Animal Breeding Establishment

The Research School of Physical Sciences
  Extension to Cockcroft Building
  Building for Tandem Accelerator

General University
  New University Union
  Recreation and Sports Centre
  University Health Service and Counselling Service
  Boat-house
  Conversion of University Union for Administration
  New student residence

Affiliated College under construction in 1970
  Burgmann College
### UNIVERSITY STATISTICS

**FULL-TIME STAFF**

**AS AT 30 APRIL 1970**

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* Includes three research only staff in the School of General Studies.

** Excludes four staff who are shown under Teaching Staff and one shown under Research Staff.

† Excludes three staff who are shown under Research Staff.
FULL-TIME STAFF

As at 30 April 1970—continued

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As at 30 April 1970

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<td>Director's Section</td>
<td>. .</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
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<tr>
<td><strong>The Research School of Chemistry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analytical Chemistry</td>
<td>. .</td>
<td>.</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Inorganic Chemistry</td>
<td>. .</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Organic Chemistry</td>
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<tr>
<td>Physical and Theoretical Chemistry</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>13</td>
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<tr>
<td><strong>The Research School of Biological Sciences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developmental Biology</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Biology</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genetics</td>
<td>. .</td>
<td>2</td>
<td>2</td>
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<td>.</td>
<td>7</td>
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<tr>
<td>Neurobiology</td>
<td>1</td>
<td>.</td>
<td>4</td>
<td>1</td>
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<tr>
<td>Molecular Biology Unit</td>
<td>. .</td>
<td>1</td>
<td>.</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Taxonomy Unit</td>
<td>. .</td>
<td>1</td>
<td>1</td>
<td>.</td>
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<td></td>
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</tr>
<tr>
<td>Other</td>
<td>. .</td>
<td>1</td>
<td>.</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>47</td>
<td>110</td>
<td>225</td>
<td>123</td>
<td>505</td>
<td></td>
<td></td>
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</table>
(B) THE SCHOOL OF GENERAL STUDIES—TEACHING STAFF

AS AT 30 APRIL 1970

<table>
<thead>
<tr>
<th>Departments, etc.</th>
<th>Associate Professors, Readers</th>
<th>Senior Lecturers, Tutors, Fellows</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td><strong>The Faculty of Arts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classics</td>
<td>1</td>
<td>1</td>
<td>4</td>
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<td>English</td>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>French</td>
<td>1</td>
<td>..</td>
<td>5</td>
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<tr>
<td>Geography</td>
<td>..</td>
<td>1</td>
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<tr>
<td>Germanic Languages</td>
<td>1</td>
<td>1</td>
<td>4</td>
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<tr>
<td>History</td>
<td>2</td>
<td>2</td>
<td>12</td>
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<tr>
<td>Linguistics</td>
<td>..</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Pure</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
<td>Mediaeval Studies</td>
<td>..</td>
<td>..</td>
<td>1</td>
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<tr>
<td>Philosophy</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Political Science</td>
<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>Russian</td>
<td>..</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Sociology</td>
<td>1</td>
<td>..</td>
<td>1</td>
</tr>
<tr>
<td><strong>The Faculty of Economics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounting and Public Finance</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Economic History</td>
<td>1</td>
<td>1</td>
<td>4</td>
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<tr>
<td>Economics</td>
<td>2</td>
<td>1</td>
<td>9</td>
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<tr>
<td>Statistics</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>The Faculty of Law</strong></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>The Faculty of Oriental Studies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian Civilizations</td>
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<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Chinese</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Indonesian Languages and Literatures</td>
<td>1</td>
<td>..</td>
<td>4</td>
</tr>
<tr>
<td>Japanese</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>South Asian and Buddhist Studies</td>
<td>1</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td><strong>The Faculty of Science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1</td>
<td>..</td>
<td>5</td>
</tr>
<tr>
<td>Botany</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Chemistry</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Forestry</td>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Geology</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Physics</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Psychology</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Theoretical Physics</td>
<td>1</td>
<td>..</td>
<td>2</td>
</tr>
<tr>
<td>Zoology</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>37</td>
<td>34</td>
<td>181</td>
</tr>
</tbody>
</table>

215
### CENTRAL ACADEMIC STAFF

**AS AT 30 APRIL 1970**

<table>
<thead>
<tr>
<th>Departments, etc.</th>
<th>Professors</th>
<th>Senior Fellow, Reader</th>
<th>Senior Fellow, Research Fellow</th>
<th>Demonstrator, Tutor, Teaching Fellow</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuing Education*</td>
<td>1</td>
<td>.</td>
<td>3</td>
<td>.</td>
<td>4</td>
</tr>
<tr>
<td>Computer Centre**</td>
<td>.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>.</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

* All academic staff counted as teaching staff.

** All academic staff counted as research staff.
ENROLMENTS
To 30 April 1970

<table>
<thead>
<tr>
<th></th>
<th>Full-time</th>
<th>Part-time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ph.D. Course</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in the Institute of Advanced Studies</td>
<td>354</td>
<td>6</td>
<td>360</td>
</tr>
<tr>
<td>in the School of General Studies</td>
<td>134</td>
<td>39</td>
<td>173</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>488</td>
<td>45</td>
<td>533</td>
</tr>
</tbody>
</table>

| **Master Degree Courses**—in the School of General Studies (excluding preliminary courses for the degree of Master) | | | |
|---|---|---|
| Arts | 42 | 47 | 89 |
| Economics | 9 | 21 | 30 |
| Law | 2 | 6 | 8 |
| Oriental Studies | 3 | 4 | 7 |
| Science | 12 | 26 | 38 |
| **Total** | 68 | 104 | 172 |

| **Bachelor Degree Courses**—in the School of General Studies | | | |
|---|---|---|
| Arts | 682 | 983 | 1,665 |
| Arts/Law | 160 | 17 | 177 |
| Economics | 200 | 401 | 601 |
| Economics/Law | 37 | 1 | 38 |
| Law | 137 | 151 | 288 |
| Oriental Studies | 146 | 60 | 206 |
| Science | 438 | 128 | 566 |
| Forestry | 138 | 3 | 141 |
| **Total** | 1,938 | 1,744 | 3,682 |

| **Non-Degree Courses**—in the School of General Studies | | | |
|---|---|---|
| Preliminary courses for the degree of Master | 14 | 57 | 71 |
| Miscellaneous (single units) | 7 | 149 | 156 |
| —in the Institute of Advanced Studies | | | |
| **Course of research not leading to a degree** | 4 | | 4 |
| **Total** | 25 | 206 | 231 |

Students enrolled in both the Institute of Advanced Studies and in the School of General Studies | | | |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of Students in the University</strong></td>
<td>2,519</td>
<td>2,084</td>
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</table>

217
## ASSISTED STUDENTS

To 30 April 1970

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Higher Degree Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonwealth Government Assistance</td>
<td>112</td>
<td>27</td>
<td>139</td>
</tr>
<tr>
<td>University Assistance</td>
<td>371</td>
<td>47</td>
<td>418</td>
</tr>
<tr>
<td>Other Assistance</td>
<td>37</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total Assisted Higher Degree Students</strong></td>
<td>520</td>
<td>77</td>
<td>597</td>
</tr>
<tr>
<td><strong>Students other than Higher Degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonwealth Government Assistance</td>
<td>638</td>
<td>335</td>
<td>973</td>
</tr>
<tr>
<td>State Government Assistance</td>
<td>231</td>
<td>161</td>
<td>392</td>
</tr>
<tr>
<td>University Assistance</td>
<td>171</td>
<td>99</td>
<td>270</td>
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<tr>
<td>Other Assistance</td>
<td>13</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total Assisted Students other than Higher Degree</strong></td>
<td>1,053</td>
<td>604</td>
<td>1,657</td>
</tr>
<tr>
<td><strong>Adjustment for students receiving assistance from more than one source</strong></td>
<td>84</td>
<td>60</td>
<td>144</td>
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<tr>
<td><strong>Total Assisted Students at the University</strong></td>
<td>1,489</td>
<td>621</td>
<td>2,110</td>
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</table>
## DEGREES CONFERRED

**Year ended 30 June 1970**

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Number Conferred on</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
</tr>
<tr>
<td>Doctor of Laws <em>(honoris causa)</em></td>
<td>2</td>
</tr>
<tr>
<td>Doctor of Science <em>(honoris causa)</em></td>
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<tr>
<td>Doctor of Science</td>
<td>2</td>
</tr>
<tr>
<td>Doctor of Philosophy</td>
<td>93</td>
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<tr>
<td>Master</td>
<td>20</td>
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<tr>
<td>Bachelor</td>
<td>301</td>
</tr>
<tr>
<td>Total Degrees</td>
<td>419</td>
</tr>
</tbody>
</table>
Financial Statements

Annual Report 1970
# FINANCIAL STATEMENTS

## STATEMENT OF ASSETS AND LIABILITIES

**AS AT 31 December 1970 (i)**

### GENERAL FUNDS

#### Current Assets

- **Cash at Bank and on Deposit**
  - Operating Funds—Cash: 364,376
  - Restricted Funds, Special Purpose Funds and Scholarship Funds—Cash: 745,887
  - Investmen ts: 20,812
  - Reserves—Cash: 906,605
  - Cash Held in Imprests: 2,037,680

- **Commonwealth Superannuation and Provident Account**
  - Reserve—Cash and Securities: 5,999,693

- **Halls of Residence Funds—Investments**: 13,293

- **Debtors**: 346,897

- **Advances and Prepayments**: 264,068

- **Materials in Stores and Service Pools (at cost)**: 706,991

### Fixed Assets

- **Buildings (at cost or valuation)**
  - Buildings and Service Installations: 38,130,870
  - Dwellings: 5,427,072

- **Teaching and Research Equipment and Furniture (at cost or valuation)**
  - The Institute of Advanced Studies: 43,557,942
  - The School of General Studies: 15,178,605
  - The Library: 4,458,044
  - Computer Centre: 286,363
  - Centre for Continuing Education: 619,868
  - Administration and General Services: 843,153
  - Residential Properties: 532,834

- **The Library**
  - Books and Publications (at cost): 21,929,952

- **Halls of Residence**
  - Buildings (at cost): 6,010,664
  - Furniture and equipment (at cost): 817,214

### Less

- **Liabilities**
  - Creditors: 559,651

### Total Assets

- **$2,037,680**

---

*continued on following page*
### STATEMENT OF ASSETS AND LIABILITIES

**AS AT 31 DECEMBER 1970 (i)—continued**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Accumulation Account (ii)</td>
<td>$76,353,921</td>
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<tr>
<td>Halls of Residence Funds (vi)</td>
<td>$123,542</td>
</tr>
<tr>
<td>Staff Centre Fund</td>
<td>$33</td>
</tr>
<tr>
<td>Australian National University Press Accumulated Funds (vii)</td>
<td>$178,718</td>
</tr>
<tr>
<td>Library Funds</td>
<td>$512</td>
</tr>
<tr>
<td>Restricted Funds, Special Purpose Funds and Scholarship Funds—Cash and Investments (viii)</td>
<td>$766,699</td>
</tr>
<tr>
<td>Reserve Funds—Cash (ix)</td>
<td>$906,605</td>
</tr>
<tr>
<td>Commonwealth Superannuation and Provident Account Reserve</td>
<td></td>
</tr>
<tr>
<td>Cash and Securities</td>
<td>$5,999,693</td>
</tr>
<tr>
<td>Properties included in Fixed Assets</td>
<td>$182,870</td>
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<tr>
<td></td>
<td>$6,182,563</td>
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<tr>
<td>Trust and Agency Funds (x)</td>
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<tr>
<td></td>
<td><strong>84,512,593</strong></td>
</tr>
<tr>
<td></td>
<td>$2,341,470</td>
</tr>
</tbody>
</table>

### Contingent Liability

Guarantees—Staff Housing Loans Program $221,840

---

**J. G. CRAWFORD**  
Vice-Chancellor

**L. A. BELLINGHAM (Mrs)**  
Accountant

The above Statement of Assets and Liabilities and the accompanying Statement of Income and Expenditure have been examined and are in agreement with the accounts, which have been audited. In my opinion, they show fairly the financial operations for the year ended 31 December 1970 and the state of the affairs of the Australian National University as at that date.

**V. J. W. SKERMER**  
Auditor-General for the Commonwealth

28 June 1971
## CAPITAL ACCUMULATION ACCOUNT

**FOR THE YEAR ENDED 31 DECEMBER 1970 (ii)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
<th>Amount</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance, 1 January 1970</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td><strong>Add</strong> — Transfer from Income and Expenditure Statement (iii)</td>
<td>. . . . . .</td>
<td>1,552,665</td>
<td>1,552,665</td>
</tr>
<tr>
<td><strong>Plus</strong> Previous Year's Income and Expenditure Adjustments</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Staff Centre—Water Rates</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Halls of Residence and Staff Centre—Depreciation</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Gifts received other than in cash</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Commonwealth Grant for capital works and Services</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Purchases of assets from Restricted Funds and Special Purpose Funds</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Loan from Trust Funds, repaid</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Purchases of assets from Halls of Residence Funds (including Bruce Hall extension)</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Profit on sale of houses to members of staff</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td><strong>Total Additions</strong></td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td><strong>Less</strong> — Disposal of equipment and adjustment of book values</td>
<td>. . . . . .</td>
<td>372,563</td>
<td>372,563</td>
</tr>
<tr>
<td>Transfer to School of General Studies Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Transfer to Research School of Biological Sciences Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Transfer to Research School of Chemistry Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Transfer to Waigani Building Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Transfer to Tandem Generator Tube Replacement Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>Proceeds of houses sold to staff and transferred to Staff Housing Replacement Reserve</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td><strong>Total Disbursements</strong></td>
<td>. . . . . .</td>
<td>. . . . . .</td>
<td>. . . . . .</td>
</tr>
<tr>
<td><strong>Balance, 31 December 1970 as Contra to Assets in Statement of Assets and Liabilities (i)</strong></td>
<td>. . . . . .</td>
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## STATEMENT OF INCOME AND EXPENDITURE

**FOR THE YEAR ENDED 31 DECEMBER 1970 (iii)—continued**

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<th>Description</th>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>Description</td>
<td>Amount</td>
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<tr>
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Transfer to Capital Accumulation Account (ii), the predominant part of this balance having been used for the purchase of equipment which is capitalised in the Statement of Assets and Liabilities. $1,552,665
### ATTACHMENT TO INCOME AND EXPENDITURE STATEMENT

#### 31 December 1970 (iv)

<table>
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<tr>
<th>Research and Teaching Materials Salaries</th>
<th>Pay-roll Tax</th>
<th>Super-annuation Provision</th>
<th>Travelling and Service Expenses</th>
<th>Total</th>
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<tbody>
<tr>
<td>$</td>
<td>$</td>
<td>$</td>
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**THE INSTITUTE OF ADVANCED STUDIES**

*The John Curtin School of Medical Research*

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<th>Department of Biochemistry</th>
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**Total**

| 236,872 | 1,703,841 | 44,895 | 207,685 | 7,901 | 247,528 | 2,448,722 |

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**Total**

| 447,802 | 2,161,411 | 54,191 | 294,639 | 44,994 | 323,755 | 3,326,792 |

*continued on following page*
### ATTACHMENT TO INCOME AND EXPENDITURE STATEMENT

31 December 1970 (iv)—continued

<table>
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<th>Total $</th>
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<table>
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<td></td>
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<td>151,086</td>
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<td>15,257</td>
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<th>Pay-roll Tax</th>
<th>Superannuation Provision</th>
<th>Travelling Service</th>
<th>Administrative Expenses</th>
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<td>Plant and Animal House</td>
<td>8,680</td>
<td></td>
<td></td>
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<td>Central Services</td>
<td>31,128</td>
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<td>31,128</td>
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<td>677,156</td>
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<td>13,999</td>
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<table>
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<tr>
<th>THE SCHOOL OF GENERAL STUDIES</th>
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<th>Pay-roll Tax</th>
<th>Superannuation Provision</th>
<th>Travelling Service</th>
<th>Administrative Expenses</th>
<th>Total</th>
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<td>13,526</td>
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<td>424,333</td>
<td>10,702</td>
<td>48,935</td>
<td>949</td>
<td>19,539</td>
<td>506,411</td>
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<td>The Faculty of Law</td>
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<td>256,241</td>
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<td>27,543</td>
<td>2,380</td>
<td>19,865</td>
<td>314,024</td>
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<tr>
<td>The Faculty of Oriental Studies</td>
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<td>9,916</td>
<td>68,449</td>
<td>1,421</td>
<td>14,959</td>
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<td>196,687</td>
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<td>Language Laboratory</td>
<td>1,696</td>
<td>20,285</td>
<td></td>
<td></td>
<td>157</td>
<td></td>
<td>22,138</td>
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<tr>
<td><strong>Total—The School of General Studies</strong></td>
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<td>4,117,591</td>
<td>104,112</td>
<td>497,380</td>
<td>54,330</td>
<td>290,801</td>
<td>5,327,496</td>
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229
HALLS OF RESIDENCE AND UNIVERSITY STAFF CENTRE
CONSOLIDATED OPERATING STATEMENT
FOR THE YEAR ENDED 31 DECEMBER 1970 (v)

<table>
<thead>
<tr>
<th>University House</th>
<th>Bruce Hall</th>
<th>Burton Hall</th>
<th>Garran Hall</th>
<th>Staff Centre</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
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<tr>
<td>Tariff received—Residents</td>
<td>165,784</td>
<td>161,699</td>
<td>176,349</td>
<td>176,349</td>
<td>680,181</td>
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<td>—Visitors</td>
<td>37,861</td>
<td>70,955</td>
<td>34,889</td>
<td>34,889</td>
<td>178,594</td>
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<td>Accommodation</td>
<td>6,418</td>
<td>1,665</td>
<td>1,965</td>
<td>1,965</td>
<td>6,563</td>
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<td>Membership Fees</td>
<td>6,418</td>
<td>1,665</td>
<td>1,965</td>
<td>1,965</td>
<td>6,563</td>
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<tr>
<td>Registration Fees</td>
<td>3,059</td>
<td>422</td>
<td>18</td>
<td>17</td>
<td>4,636</td>
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<tr>
<td>Reimbursement of Board—House Staff</td>
<td>4,326</td>
<td>2,730</td>
<td>2,478</td>
<td>2,478</td>
<td>12,018</td>
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<tr>
<td>Income from Casual Meals and Catering</td>
<td>37,281</td>
<td>34,668</td>
<td>9,395</td>
<td>9,396</td>
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<tr>
<td>Punchboard Receipts</td>
<td>1,760</td>
<td>1,760</td>
<td>1,760</td>
<td>1,760</td>
<td>1,760</td>
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<tr>
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<td>422</td>
<td>18</td>
<td>17</td>
<td>4,636</td>
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<tr>
<td>Beverage Sales—Net Proceeds</td>
<td>16,245</td>
<td>1,538</td>
<td>323</td>
<td>322</td>
<td>19,575</td>
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<td>Canteen Sales—Net Proceeds</td>
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<td>1,385</td>
<td>1,386</td>
<td>1,386</td>
<td>4,190</td>
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<tr>
<td>Subvention from University</td>
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<td>11,450</td>
<td>12,140</td>
<td>12,140</td>
<td>75,730</td>
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<td>286,546</td>
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Less Expenditure—

Operating Costs

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<th>Burton Hall</th>
<th>Garran Hall</th>
<th>Staff Centre</th>
<th>Total</th>
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<tbody>
<tr>
<td>Cost of Foodstuffs</td>
<td>56,145</td>
<td>64,594</td>
<td>65,383</td>
<td>65,383</td>
<td>21,378</td>
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<td>Fuel, Light, Power and Heating</td>
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<td>15,670</td>
<td>17,484</td>
<td>17,484</td>
<td>3,186</td>
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<td>Cleaning, Laundry and Sundry Materials</td>
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<td>8,426</td>
<td>8,822</td>
<td>8,821</td>
<td>1,558</td>
<td>33,732</td>
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<td>Domestic Staff Wages</td>
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<td>80,938</td>
<td>80,938</td>
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<td>438,967</td>
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<td>Provision for Long Service Leave—Domestic Staff</td>
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<td>961</td>
<td>740</td>
<td>740</td>
<td>4,041</td>
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<td>Losses, Breakages and Replacements</td>
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<td>1,922</td>
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<td>2,662</td>
<td>1,861</td>
<td>12,326</td>
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<tr>
<td>Local Transport, Freight and Supply Expenses</td>
<td>915</td>
<td>435</td>
<td>228</td>
<td>228</td>
<td>194</td>
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<tr>
<td>Other Operating Expenses</td>
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<td>169</td>
<td>168</td>
<td>546</td>
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Administrative Costs

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<th>Garran Hall</th>
<th>Staff Centre</th>
<th>Total</th>
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<tbody>
<tr>
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<td>228</td>
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<td>400</td>
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<tr>
<td>Warden's Entertainment Expenses</td>
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<td>400</td>
<td>400</td>
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<td>Governing Body Expenses</td>
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<td>113</td>
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HALLS OF RESIDENCE AND UNIVERSITY STAFF CENTRE
CONSOLIDATED OPERATING STATEMENT
FOR THE YEAR ENDED 31 DECEMBER 1970 (v)—continued

<table>
<thead>
<tr>
<th>University House</th>
<th>Bruce Hall</th>
<th>Burton Hall</th>
<th>Garran Hall</th>
<th>Staff Centre</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
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**Property Maintenance and Service Costs**

<table>
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<th>Description</th>
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<th>Burton Hall</th>
<th>Garran Hall</th>
<th>Staff Centre</th>
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</thead>
<tbody>
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<td>Maintenance and Electricity</td>
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<tr>
<td>Warden's House</td>
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<tr>
<td>Rates and General Services</td>
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<td>270</td>
<td>270</td>
<td>65</td>
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<tr>
<td>Sundry Repairs—Staff Centre</td>
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<tr>
<td>Maintenance of Grounds</td>
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<tr>
<td>Provision for Replacement of Equipment</td>
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<td>8,128</td>
<td>6,909</td>
<td>6,909</td>
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<tr>
<td>Provision for Building Maintenance</td>
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<td>11,638</td>
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<td>10,857</td>
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<td></td>
<td>30,081</td>
<td>24,950</td>
<td>22,253</td>
<td>22,253</td>
<td>350</td>
</tr>
<tr>
<td>Total Expenditure</td>
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<td>273,998</td>
<td>235,820</td>
<td>235,820</td>
<td>76,530</td>
</tr>
</tbody>
</table>

Net Operating Loss—
- Transferred to Accumulated Profits and Losses (vi) | 15,529
- Transferred to University's Statement of Income and Expenditure (iii) | 1,112

Net Operating Profit—
- Transferred to Accumulated Profits and Losses (vi) | 12,548
- Transferred to University's Statement of Income and Expenditure (iii) | 3,122

Net Operating Loss—
- Transferred to Accumulated Profits and Losses (vi) | 18,792
- Transferred to University's Statement of Income and Expenditure (iii) | 1,112
STATEMENT OF HALLS OF RESIDENCE FUNDS
FOR THE YEAR ENDED 31 DECEMBER 1970 (vi)

<table>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>University House</td>
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<td></td>
</tr>
<tr>
<td>Profits Equalisation Fund*</td>
<td>11,633</td>
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<td>15,529</td>
<td>1,958 Dr</td>
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* $13,293 invested in B.H.P. 7% Debentures maturing 1 April 1977 (Face Value $13,400).

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<td>Transfer from Reserve</td>
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<td>Less—Adjustment 1969 Trading Loss</td>
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<td>Maintenance of Building Fund</td>
<td>5,445</td>
<td>10,857</td>
<td>9,085</td>
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<td>Maintenance and Replacement of Equipment Fund</td>
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<tr>
<td>Study Leave Fund</td>
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<tr>
<td>Long Service Leave Fund</td>
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<td>871</td>
<td></td>
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<td>814</td>
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<td>Water Rates—Adjustment 1969</td>
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<td>Provision</td>
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<td>Adjustment 1969 Trading Loss</td>
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<td>Maintenance and Replacement of Equipment Fund</td>
<td>6,454</td>
<td>6,909</td>
<td>950</td>
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<td>958</td>
<td>871</td>
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<td>1,829</td>
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<tr>
<td>Relieving Warden's Salary Fund</td>
<td>814</td>
<td>814</td>
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<td>1,162</td>
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<td>Staff Amenities Fund</td>
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<td>Junior Common-room Fund</td>
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<td>Basic Kit Fund</td>
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<td><strong>Total</strong></td>
<td>10,762</td>
<td>29,947</td>
<td>13,733</td>
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<td><strong>Total Halls of Residence Funds (i)</strong></td>
<td>72,988</td>
<td>132,749</td>
<td>82,195</td>
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# Australian National University Press

**Operating Statement**

*For the Year ended 31 December 1970 (vii)*

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<td><strong>Income</strong></td>
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<td>Sales of Publications</td>
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<td>Permission Fees Received</td>
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<td>Miscellaneous Income</td>
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<td><strong>Total Income</strong></td>
<td>152,217</td>
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</table>

| **Cost of Sales**    |      |      |      |      |
| Stock of Publications 1 January 1970 | 106,816 | | | |
| Book Manufacturing Costs  | 169,643 | | | |
| Editorial Expenses  | 817 | | | |
| **Total Cost of Sales** | 277,276 | | | |

**Less**—Stock on hand 31 December 1970

| Works in Progress | 1,546 | | | |
| **Less External Subsidies Applicable to Works in Progress** | 1,430 | 116 | | |

**Total External Subsidies Received**

| 18,586 | 186,732 | | | |

**Add**—Commission on Sales

| Royalties | 7,589 | | | |
| **Total Add** | 8,173 | 98,717 | | |

**Gross Operating Profit**

| 53,500 | | | |

**Administrative Expenses**

| Salaries | 80,430 | | | |
| Superannuation | 9,979 | | | |
| Pay-roll Tax | 2,549 | | | |
| Workmen's Compensation | 181 | | | |
| Stationery and Office Supplies | 2,988 | | | |
| Advertising | 12,857 | | | |
| Subscriptions | 623 | | | |
| Electricity and Heating | 200 | | | |
| Cleaning and Maintenance | 1,837 | | | |
| Freight and Supply Expenses | 2,202 | | | |
| Postages | 5,116 | | | |
| Bank Charges | 45 | | | |
| Other Expenses | 358 | | | |
| Travelling Expenses | 680 | | | |
| Appointment Expenses | 289 | | | |
| **Total Administrative Expenses** | 120,334 | | | |

**Net Operating Loss**

| $66,834 | | | |

Australian National University Press Accumulated

| Funds 1 January 1970 | 155,552 | | | |
| **Add**—University Subvention | 90,000 | | | |
| **Less**—Operating Loss | 66,834 | | | |
| **Total Australian National University Press Accumulated Funds 31 December 1970 (i)** | $178,718 | | | |

234
<table>
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<td>Australian Dairy Board grant for research in lactoglobulins of milk—Dr H. A. McKenzie</td>
<td>442 Dr</td>
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<td>World Health Organization grant for maintenance of regional reference laboratory for anthropod-borne viruses</td>
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STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

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</table>

Department of Physiology—continued

| U.S. National Institutes of Health grant for research—Dr Ellen S. Takahashi | 854 | .. | 854 | .. |
| U.S. National Institutes of Health grant for research—Dr S. M. Sherman | .. | 887 | 931 | 44 Dr |

Department of Experimental Pathology

| National Heart Foundation of Australia grant for study of the ultra structure of the aortic wall | 315 | 267 Dr | 48 | .. |

Department of Clinical Science

| National Heart Foundation grant for research—Professor H. M. Whyte and Dr R. B. Goldrick | 1,833 | 5,577 | 3,614 | 3,796 |
| National Heart Foundation grant for research—Dr R. B. Goldrick | 861 | 3,713 | 4,700 | 126 Dr |
| National Heart Foundation grant for research—Dr P. J. Nestel | 49 | 5,693 | 5,635 | 107 |

Miscellaneous

| Anonymous donation for general purposes | 100 | .. | .. | 100 |

The Research School of Physical Sciences

Department of Geophysics and Geochemistry

| Metropolitan Water, Sewerage and Drainage Board and Snowy Mountains Hydro-Electric Authority grants for seismological research | 8,655 | 4,486 | 4,267 | 8,874 |
| Electron Probe Micro Analyser fund | 2,980 | 162 | 210 | 2,932 |
| National Science Foundation grant for research—Dr R. J. Twiss | .. | 177 | .. | 177 |

Department of Astronomy

| Myer Foundation grant for International Astronomical Union Symposium | 218 | .. | 218 | .. |
| International Astronomical Union grant for distinguished visitors | 202 | .. | 188 | 14 |
| Grant for 150-inch Telescope | .. | 15,188 | 35 | 15,153 |
| Lowell Observatory grant—Mount Stromlo equipment rehabilitation fund | 20,097 | 17,077 | 884 | 36,290 |

The Research School of Social Sciences

General

| John Curtin Memorial Lecture—The Honourable Dr J. J. Dedman | .. | 100 | 144 | 44 Dr |

Department of Law

| Department of Territories, Territory of Papua and New Guinea grant for New Guinea legal research studies | 40 Dr | 74 | 34 | .. |

Department of Economics

| Australian Banks’ grant for visiting professors | 331 | .. | .. | 331 |
| International Bank for Reconstruction and Development travel subsidy for Economists Seminar | 18 | .. | .. | 18 |

Department of Political Science

| Federal Election Survey fund | 7,931 Dr | 5,219 | 4,651 Cr | 1,939 |

Department of History

| W. M. Hughes grant for W. M. Hughes biography | 19 | .. | .. | 19 |
| Assistance for preparation of guide to manuscripts relating to Australia and South-West Pacific | 2,638 | 293 | .. | 2,931 |

continued on following page
## STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES

**FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued**

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### Department of Demography
- **Australian Institute of International Affairs** grant for research into migration problems
  - $947
- **Director's Special fund**
  - $600

### Department of Sociology
- **Council for Aboriginal Affairs** grant for research—**Mrs K. Kitaoji**
  - $5,609
- **Council for Aboriginal Affairs** grant for research—**Dr F. L. Jones**
  - $800

### Australian Dictionary of Biography
- **Grant for Australian Dictionary of Biography**
  - $2,592

### Department of Economic History
- **Wm Cooper & Nephews (Aust.) Pty Ltd** grant for research
  - $1,784
- **Goldsbrough Mort** grant for research of wool industry history
  - $533
- **Anonymous** grant for publication of monographs on historical statistics
  - 8 Dr
- **Anonymous** grant for study of the supply, utilisation and earnings of graduates
  - $3,063
- **Amalgamated Engineering Union** grant to assist in research and publication of labour history and the economics of labour
  - $2,064
- **Grant to Department of Economic History—Dr R. G. Gregory and Mr B. D. Haig**
  - $108

### Urban Research Unit
- **R. Schalkenbach Foundation** grant for urban research
  - $489
- **Nuffield Foundation** grant for survey of health services
  - $225
- **Australian Institute of Urban Studies** grant for the study of urban development in Melbourne
  - $5,603

### Education Research Unit
- **Commonwealth Advisory Committee on Advanced Education** grant for research into characteristics of students entering colleges of advanced education—**Dr H. Maddox**
  - $4,972
- **Gift to Research Unit—Mr P. F. Harrison**
  - $500
- **Espada Educational Trust Fund** grant—**Mr D. S. Anderson**
  - $657
- **Ontario Institute for Studies in Education** grant—**Dr C. S. Smith**
  - $1,437

### The Research School of Pacific Studies

### General
- **Ford Foundation** grant for international research and training program
  - $89,019
- **Anonymous** grant for research on the political, social and economic development in New Guinea
  - $15,300
- **Bougainville Copper** grant to Research School of Pacific Studies for seminars
  - $1,012

*continued on following page*
STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>General—continued</td>
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<tr>
<td>Director's Special fund</td>
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<td>3,091 $245 $404 Cr</td>
<td>3,740 $279 Dr</td>
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<td>Bougainville Copper grant to Research School of Pacific Studies for intensive studies</td>
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<td>5,000 $5,279 $5,711</td>
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<td>Bougainville Copper grant to Research School of Pacific Studies for project investigations</td>
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<td>Arthur F. Yencken Memorial Lecture Fund</td>
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<td>1,000 $1,000 $1,746</td>
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<tr>
<td>Department of Anthropology and Sociology</td>
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<td>1,333 $80 $1,413</td>
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<td>Department of Linguistics</td>
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<td>Australian Institute of Aboriginal Studies grant for linguistics research</td>
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<td>91 Dr $4,042 $5,804</td>
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<td>Australian Institute of Aboriginal Studies travel grant—Dr D. T. Tryon</td>
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<td>15 Dr $ .. ..</td>
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<td>Department of Prehistory</td>
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<td>CSIRO grant for Co-operation with Division of Plant Industry in Carbon-14 Work</td>
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<td>.. $4,748 $4,650</td>
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<td>Department of Pacific History</td>
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<tr>
<td>Republic of Nauru Fund—Professor J. W. Davidson</td>
<td>10,629 $534 $1,766</td>
<td>9,397 $11,145</td>
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<td>Pacific Manuscripts Bureau</td>
<td>8,292 $13,883 $11,030</td>
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<td>New England Microfilming Project</td>
<td>18,320 $11,466 $11,466</td>
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<td>Department of Human Geography</td>
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<tr>
<td>Anonymous grant for a monograph on the freight industry—Dr P. J. Rimmer</td>
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<td>.. $500 $84 $416</td>
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<td>Rural Credits Development Fund grant to cover costs of aerial photographs of the Chimbu Sub-district in New Guinea</td>
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<td>435 .. $400 $35</td>
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<td>Rural Credits Development Fund grant for research in transport and land use in northern Australia</td>
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<td>402 .. $78 $324</td>
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<td>Department of Far Eastern History</td>
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<td>Morrison Papers project</td>
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<td>Department of Economics</td>
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<tr>
<td>Various grants for study of American investment in Australia</td>
<td>2,459 $137 $ .. $2,596</td>
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<td>World Bank grant for research—Dr B. A. Lockwood</td>
<td>.. $2,722 $2,722 Dr</td>
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<td>Anonymous grant for study of economy of Indonesia</td>
<td>9,419 $3,629 $3,578</td>
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<td>Rural Credits Development Fund grant for study of nucleus estate development in rural sector of Papua and New Guinea</td>
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<td>Atlantic Trade Survey grant for Australian Project</td>
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<td>New Guinea Research Unit</td>
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<td>Mr and Mrs C. Banks grant for field-work in Territory of Papua and New Guinea</td>
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<td>Rural Credits Development Fund grant for study of co-operatives in Territory of Papua and New Guinea</td>
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<td>Sale of land—'Matirogo' Territory of Papua and New Guinea</td>
<td>3,125 .. .. $3,125</td>
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continued on following page
### THE RESEARCH SCHOOL OF CHEMISTRY

<table>
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<tr>
<th>Subsidies and Donations Received during 1970</th>
<th>Funds Disbursed or Transferred during 1970</th>
<th>Fund Balances 31 Dec. 1970</th>
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</thead>
<tbody>
<tr>
<td>U.S. National Institutes of Health grant for research—Dr L. C. Warner</td>
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### THE RESEARCH SCHOOL OF BIOLOGICAL SCIENCES

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<th>Subsidies and Donations Received during 1970</th>
<th>Funds Disbursed or Transferred during 1970</th>
<th>Fund Balances 31 Dec. 1970</th>
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<tbody>
<tr>
<td>Australian Water Resources Council grant for the project on the evapotranspiration from vegetated areas</td>
<td>$3,802 Dr 8,049</td>
<td>$3,678 569</td>
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<tr>
<td>World Wild Life grant for a survey of the status of the salt-water crocodile in north-west Western Australia</td>
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<tr>
<td>World Wild Life grant for a survey of the sea turtle resources of Queensland</td>
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<td>$8,237 284</td>
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<td>Australian Academy of Science grant for photosynthesis conference</td>
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<td>Office of Aboriginal Affairs grant to investigate the population dynamics of salt-water crocodiles for use as a cash crop</td>
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<td>$17,778 3,134</td>
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<tr>
<td>Office of Aboriginal Affairs grant to investigate the population dynamics of green sea turtles for use as a cash crop</td>
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<td>National Science Foundation grant—Dr J. A. Duniway</td>
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### THE SCHOOL OF GENERAL STUDIES

#### The Faculty of Arts

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<th>Funds Disbursed or Transferred during 1970</th>
<th>Fund Balances 31 Dec. 1970</th>
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<td>Commonwealth Literary Fund grant for lectures</td>
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<td>Department of Classics</td>
<td>Fund for purchase of classical antiquities</td>
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<td>Department of Geography</td>
<td>Ford Foundation grant for research—Mr E. C. Chapman</td>
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<td>Department of Geography</td>
<td>Wool Board Interdisciplinary Committee for study of Yass Valley</td>
<td>$1,233 Dr 2,979</td>
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<tr>
<td>Department of Geography</td>
<td>Grant for the economic survey of Cooma</td>
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<td>Department of Political Science</td>
<td>Social Sciences Research Council Asian and Pacific travel grant—Dr J. A. A. Stockwin</td>
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<td>Pure Mathematics Publications Account</td>
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#### The Faculty of Economics

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<th>Fund Balances 31 Dec. 1970</th>
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<tbody>
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<td>Department of Economic History</td>
<td>Anonymous grant for assistance in editing a volume on Australian economic growth</td>
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<td>Department of Economics</td>
<td>Anonymous grant for study of Australian manufacturing industry</td>
<td>$1,621 97</td>
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<td>Department of Economics</td>
<td>Australian Academy of Science grant for study of Japanese innovation</td>
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<td>Department of Economics</td>
<td>Anonymous grant for study of money and finance in New Guinea—Dr D. W. Stammer</td>
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*continued on following page*
STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

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<td>Anonymous grant for study of company reporting in Australia</td>
<td>129</td>
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<td>Rural Credits Development Fund grant for study of economic effects of taxation and other fiscal devices on agricultural production in Australia</td>
<td>255</td>
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<td>217</td>
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<td>Grant for study of Japanese agriculture trade policy</td>
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<td>45 Dr</td>
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<td>Australian Institute of International Affairs project—Japan and Australia in a Pacific Economic Community—Dr P. D. Drysdale</td>
<td>3,643</td>
<td>164</td>
<td>840</td>
<td>2,967</td>
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<td>CSIRO grant for the development and testing of methods of utilising the economic potential of research projects as an aid to the planning of research programs</td>
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<td>10,663</td>
<td>6,891</td>
<td>6,727</td>
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<td>13,262</td>
<td>12,394</td>
<td>1,298</td>
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<td>The Faculty of Oriental Studies</td>
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<td>The Faculty of Oriental Studies</td>
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<tr>
<td>Department of Indonesian Languages and Literatures</td>
<td>8,820 Dr</td>
<td>20,000</td>
<td>34,951</td>
<td>23,771 Dr</td>
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<td>John Galvin Trust grant for English/Malay dictionary</td>
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<td>Department of Botany</td>
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<td>Department of Botany</td>
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<td>A.P.M. Forests Pty Ltd grant for research in eucalypti at Coffs Harbour</td>
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<td>5,922</td>
<td>5,246</td>
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<td>Food and Agricultural Organisation grant for collection of special tree seeds</td>
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<td>Champion Research Fund</td>
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<td>1,285</td>
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<td>Department of Chemistry</td>
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<td>Wool Research Committee grant for wool research</td>
<td>1,111 Dr</td>
<td>15,046</td>
<td>9,947</td>
<td>3,988</td>
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<td>Abbott Laboratories grant for research in organic chemistry—Associate Professor W. D. L. Crow</td>
<td>1,706</td>
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<td>1,698</td>
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<td>Department of Geology</td>
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<td>Department of Geology</td>
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<td>Aberfoyle Management Pty Ltd grant—Dr P. W. E. Kingston</td>
<td>157</td>
<td>300</td>
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<td>Planet Management and Research Pty Ltd grant for work spectrometer</td>
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<td>Western Mining Corporation Limited grant to support geological education</td>
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<td>189</td>
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<td>Esso Standard Oil (Australia) Ltd grant for advancement of earth sciences</td>
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<td>Department of Physics</td>
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<tr>
<td>Australian Atomic Energy Commission grant for research on the impurities in ceramic oxides</td>
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<td>7 Dr</td>
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continued on following page
### Statement of Funds Granted for Restricted Purposes

For the Year Ended 31 December 1970 (viii)—continued

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<tr>
<th>Department of Psychology</th>
<th>Social Science Research Council grant to assist in processing data from a study of attitudes towards Aborigines</th>
<th>$145</th>
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<th>$145</th>
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</thead>
<tbody>
<tr>
<td>Office of Aboriginal Affairs grant for the ‘Hermannsburg Project’—Associate Professor G. N. Seagrim</td>
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<td>3,042</td>
<td>2,427</td>
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<td>$2,377</td>
<td>$9,773</td>
<td>$11,618</td>
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<td>Department of Zoology</td>
<td>Insect Ecology grant</td>
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<td>Rural Credits Development Fund grant for the project on the biological control of muscid flies</td>
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<td>620</td>
<td>884</td>
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<td>CSIRO grant for marsupial research</td>
<td>990</td>
<td>2,630</td>
<td>2,236</td>
<td>1,384</td>
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<td>Indonesian Expedition—Mr D. M. Smyth</td>
<td>..</td>
<td>1,049</td>
<td>..</td>
<td>1,049</td>
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<td>Rural Credits Development Fund grant for aphid research</td>
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<td>Rural Credits Development Fund grant for research—Professor J. D. Smyth</td>
<td>1,976</td>
<td>31</td>
<td>1,240</td>
<td>767</td>
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<td>U.S. National Institutes of Health grant for research in vitro cultivation of Echinococcus granulosus</td>
<td>3,325</td>
<td>118</td>
<td>1,463</td>
<td>1,980</td>
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<td>Australian Meat Board grant for immunological and in vitro culture studies in relation to the control of cysticercosis in sheep</td>
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<td>30,648</td>
<td>20,826</td>
<td>9,822</td>
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<td>Department of Forestry</td>
<td>National Capital Development Commission grant for the ecological study of the Tuggeranong area</td>
<td>893 Dr</td>
<td>2,500</td>
<td>1,607</td>
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<tr>
<td>Department of Foreign Affairs grant for project on forest resources information with Asian and Pacific Council Registry of Scientific and Technical Services</td>
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<td>100</td>
<td>1,829</td>
<td>1,729 Dr</td>
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<td>National Capital Development Commission grant for the study on land use and development plan for the Australian Capital Territory</td>
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<td>371</td>
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<tr>
<td>Various grants for research on fungus phytophthora</td>
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<td>Western Australia Forests Department grant for the study of the fungus phytophthora affecting jarrah</td>
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<td>6,129</td>
<td>6,020</td>
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<td>National Capital Development Commission and Department of the Interior grant for the study of multiple land use in Canberra region</td>
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<td>2,959</td>
<td>5,653</td>
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<td>Nuffield Foundation grant for inventory of indigenous uneven aged broadleaved forests</td>
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<td>1,604</td>
<td>804</td>
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<td>A.P.M. Forests Pty Ltd grant for the study of wood density of <em>Pinus radiata</em></td>
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<td>1,981</td>
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</tbody>
</table>

**Australian Research Grants Committee Grants**

**The Institute of Advanced Studies**

*The Research School of Social Sciences*

**Department of Economic History**

For history of land use on Monaro—Emeritus Professor Sir Keith Hancock | 366 Dr | 1,198 | 692 | 140 |

**Centre for Continuing Education**

For a history of adult education in Australia—Mr B. H. Crew | .. | 3,058 | 1,998 | 1,060 |

*continued on following page*
STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

<table>
<thead>
<tr>
<th>Department</th>
<th>Project Description</th>
<th>Subsidies and Donations Received during 1970</th>
<th>Funds Disbursed or Transferred during 1970</th>
<th>Fund Balances 31 Dec. 1970</th>
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</thead>
<tbody>
<tr>
<td>THE SCHOOL OF GENERAL STUDIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Faculty of Arts</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Department of English</td>
<td>For the handbook on Aristotle's poetics in England—Mr J. C. Eade</td>
<td>300</td>
<td>212</td>
<td>88</td>
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<td></td>
<td>For social patterns in Australian literature—Associate Professor T. Inglis Moore</td>
<td>270 Dr</td>
<td>530</td>
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<td></td>
<td>For a preliminary investigation of the vocabulary of Australian English before 1830—Dr W. S. Ramson</td>
<td>4,191</td>
<td>4,279</td>
<td>88 Dr</td>
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<tr>
<td>Department of History</td>
<td>For British colonial native policies in East Africa 1919-1939—Mr I. R. Hancock</td>
<td>3,300</td>
<td>2,460</td>
<td>840</td>
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<td>Department of Philosophy</td>
<td>For edition of a volume on Scandinavian Realism and publication of writings by A. Hagerstrom—Dr T. R. Mautner</td>
<td>650</td>
<td>293</td>
<td>357</td>
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<td>Department of Germanic Languages</td>
<td>For a vocabulary and grammar relating to the German work of Andreas Cryphius—Professor H. Kuhn</td>
<td>4,353</td>
<td>3,928</td>
<td>425</td>
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<td>Department of Linguistics</td>
<td>For distinctive features in Dutch—Dr H. Bluhme</td>
<td>588 Dr</td>
<td>4,080</td>
<td>3,355</td>
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<td></td>
<td>For study of the phenomena of linguistic change—Dr K. H. M. Rensch</td>
<td>3,052</td>
<td>3,387</td>
<td>335 Dr</td>
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<td>The Faculty of Oriental Studies</td>
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<td>Department of Chinese</td>
<td>For an anthology of Chinese verse in translation—Dr J. D. Frodsham</td>
<td>474</td>
<td>1,730</td>
<td>1,550</td>
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<tr>
<td>Department of Asian Civilizations</td>
<td>For participation in Thai-British Archaeological Expedition investigating the late Neolithic and early metal age of Thailand—Dr H. H. E. Loofs</td>
<td>1,850 Dr</td>
<td>4,210</td>
<td>1,887</td>
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<tr>
<td></td>
<td>For annotated selected bibliography of Chinese history—Associate Professor O. B. van der Sprenkel</td>
<td>174</td>
<td>7,642</td>
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<td></td>
<td>For the historicity of the Pali manuscript tradition in Ceylon—Mr T. Rajapatirana</td>
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<tr>
<td>The Faculty of Science</td>
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<td></td>
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</tr>
<tr>
<td>Department of Botany</td>
<td>For research on the induction of apomixis in versatile breeding systems of grasses—Dr R. B. Knox</td>
<td>504</td>
<td>504 Dr</td>
<td></td>
</tr>
<tr>
<td>Department of Chemistry</td>
<td>For the mechanisms of high energy reactions—Associate Professor W. D. L. Crow</td>
<td>7,697</td>
<td>8,374</td>
<td>677 Dr</td>
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<tr>
<td></td>
<td>For time resolved electronic spectroscopy—Dr B. K. Selinger</td>
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<td>5,635</td>
<td>5,737</td>
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<td></td>
<td>For electrocyclic fragmentation reactions induced by thermal photochemical or gamma-radiation processes—Dr R. N. Warrener</td>
<td>5,247</td>
<td>5,329</td>
<td>82 Dr</td>
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<tr>
<td></td>
<td>For the synthesis of dibenzofuran derivatives—Dr J. A. Elix</td>
<td>500</td>
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continued on following page
STATEMENT OF FUNDS GRANTED FOR RESTRICTED PURPOSES
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

<table>
<thead>
<tr>
<th>Department of Chemistry—continued</th>
<th>Subsidies and Donations Received during 1970</th>
<th>Funds Disbursed or Transferred during 1970</th>
<th>Fund Balances 31 Dec. 1970</th>
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<td>For a nitrogenase enzyme model system—Dr J. A. Broomhead</td>
<td>$4,055</td>
<td>$4,219</td>
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<td>For study on nuclear magnetic spectroscopy of enzymes—Dr J. H. Bradbury</td>
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<td>198 Dr</td>
<td>93</td>
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<tr>
<td>Department of Geology For geochemical investigations of granite rocks and associated mineral deposits—Dr A. J. R. White</td>
<td>432 Dr</td>
<td>3,740</td>
<td>2,143</td>
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<td>Department of Physics For research on the production and properties of very strong shock waves—Dr R. J. Sandeman</td>
<td>383 Dr</td>
<td>426</td>
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<td>For study of hypervelocity aerodynamics—Dr R. J. Stalker and Dr H. G. Hornung</td>
<td>7,297</td>
<td>10,995</td>
<td>16,684</td>
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<td>Department of Psychology For studies in space perception—Associate Professor G. N. Seagrim</td>
<td>116 Dr</td>
<td>6,797</td>
<td>4,606</td>
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<td>For studies in the social conditions of ethnocentrism in Australia—Dr D. G. Beswick</td>
<td>367 Dr</td>
<td>42</td>
<td>325 Cr</td>
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<tr>
<td>For study of environmental heat, body temperature and behaviour—Professor K. A. Provins</td>
<td>155 Dr</td>
<td>283</td>
<td>221</td>
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<td>Department of Theoretical Physics For the study of optical aberration theory—Professor H. A. Buchdahl and Dr P. J. Sands</td>
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<td>5,238</td>
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<td>Department of Zoology For study of the relationship between endocrine and environmental stimuli in the appearance and development of enzyme—Dr P. A. Janssens</td>
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<td>11,807</td>
<td>11,439</td>
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<td>Department of Forestry For research on the ecology of trees—Professor J. D. Ovington</td>
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<td>543</td>
<td>521</td>
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<tr>
<td>For a survey of the distribution of the soil-borne fungus Phytophthora cinnamomi—Dr B. H. Pratt and Dr W. A. Heather</td>
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<td>5,213</td>
<td>5,276</td>
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<td>Department of Biochemistry For the study on the control of enzyme synthesis in Drosophila Melanogaster—Dr A. J. Howells</td>
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<td>2,634</td>
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<td>For the study of biosynthesis of the membranes of mitochondria—Dr F. L. Bygrave</td>
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<td>12,054</td>
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<td>For the study of biochemical aspects of insect metamorphosis—Professor L. M. Birt</td>
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<td>3,428</td>
<td>3,155</td>
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<tr>
<td>318,703</td>
<td>651,973</td>
<td>504,063</td>
<td>466,613</td>
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### STATEMENT OF FUNDS FOR SPECIAL PURPOSES

**FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)**

<table>
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<tr>
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<td><strong>SPECIAL PURPOSE FUNDS</strong></td>
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<td>Centre for Continuing Education—Schools and Seminars</td>
<td>7,769</td>
<td>70,526</td>
<td>52,768</td>
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<tr>
<td>Centre for Continuing Education—UNESCO Seminar</td>
<td>1,835</td>
<td>2,683</td>
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<td>28th International Congress of Orientalists</td>
<td>18,379</td>
<td>84,311</td>
<td>43,844</td>
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<td>Wenner-Gren Foundation grant to Far Eastern Prehistory Association to aid attendance of Asian prehistorians in conjunction with 28th International Congress of Orientalists</td>
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<td>250</td>
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<td>Calouste Gulbenkian Foundation of Lisbon grant to Department of Far Eastern Prehistory Association, to aid attendance of Portuguese and British scholars in conjunction with 28th International Congress of Orientalists</td>
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<td>700</td>
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<td>Council on Library Resources grant, to aid attendance for members of the library seminars in conjunction with 28th International Congress of Orientalists</td>
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<td>National Summer School for talented students of mathematics</td>
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<td>Summer School in Theoretical Chemistry</td>
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<td>Wood Science Utilisation Seminar</td>
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<td>Conference on picture language machines</td>
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<td>..</td>
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<tr>
<td>Training Course for 'Expo' personnel</td>
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<td>Conference on Australian-New Zealand-American relations</td>
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<td>Seminar on Mathematics for social scientists</td>
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<td>Pacific Trade and Development Fund—Dr P. D. Drysdale</td>
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<td>South-East Asia Travel Grant from Social Sciences Research Council—Mr B. H. Crew</td>
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<td>The National Conference on crime prevention</td>
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<td>Research Students’ Thesis Typing Scheme</td>
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<td>Gift of books to Russia</td>
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<td>251</td>
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<td><em>The Australian Economic Review</em> Fund</td>
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<td>Professor J. W. Davidson’s Fund for Publications Assistance</td>
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<td>Grant by Professor B. H. Neumann to the Department of Mathematics</td>
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<td>General Purpose Fund, Department of Botany—Professor L. D. Pryor</td>
<td>1,039</td>
<td>1,174</td>
<td>553</td>
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<td>Fund for repair of New Guinea Research Unit houses</td>
<td>9,792</td>
<td>8,629</td>
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<tr>
<td>Fund for repair of Fijian house</td>
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*continued on following page*
### STATEMENT OF FUNDS FOR SPECIAL PURPOSES

**For the Year ended 31 December 1970 (viii)—continued**

<table>
<thead>
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<td>SPECIAL PURPOSE FUNDS—continued</td>
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<td>New Guinea Artefacts Fund</td>
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<td>Ian Potter Foundation grant—Emeritus Professor</td>
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<td>Mark Oliphant</td>
<td>...</td>
<td>4,097</td>
<td>4,190</td>
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<td>Myer Foundation grant—Mr M. Sawyer</td>
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<td>Scheduling of Examinations by Computer</td>
<td>...</td>
<td>300</td>
<td>256</td>
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<td>Laos-Australian Reafforestation Project</td>
<td>...</td>
<td>...</td>
<td>2,111</td>
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<tr>
<td>Anglo-Australian Telescope Project—Photometric Instrumentation Fund</td>
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<td>Staff Amenities Fund</td>
<td>24,917</td>
<td>9,016</td>
<td>2,429</td>
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<td>Department of Japanese publishing account</td>
<td>308</td>
<td>3,709</td>
<td>2,605</td>
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<tr>
<td>Pacific History Publications Promotion Fund</td>
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<td>Far Eastern History Publication</td>
<td>...</td>
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<tr>
<td>Publication of Luksave</td>
<td>2,244</td>
<td>1,750</td>
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<td>5,933</td>
<td>5,256</td>
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<tr>
<td></td>
<td>114,195</td>
<td>337,110</td>
<td>181,245</td>
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</tbody>
</table>
GRANTS FOR SCHOLARSHIPS

THE INSTITUTE OF ADVANCED STUDIES

The John Curtin School of Medical Research
Commonwealth Postgraduate Scholarship ........................................ 5,580
National Heart Foundation Fellowship—Dr P. F. Sinnett .................. 944 Dr
CSIRO grants-in-aid for scholars .................................................. 437
British Commonwealth Scholarships and Fellowships and
Colombo Plan Scholarships ....................................................... 365

The Research School of Physical Sciences
Commonwealth Postgraduate Scholarships ................................... 5,151 Dr
CSIRO grants-in-aid for scholars .................................................. 1,472
Rothmans Senior Research Fellowship—Dr J. J. Lowke ................. 7,249 523 Dr
Queen Elizabeth II Fellowship grant—Dr K. C. Freeman .............. 15 Dr
Queen Elizabeth II Fellowship grant—Dr A. F. Collins ............. 1,020 Dr
Queen Elizabeth II Fellowship grant—Dr G. M. Crawley ............ 364
Queen Elizabeth II Fellowship grant—Dr G. D. Symons ............... 2,772 7,005
Queen Elizabeth II Fellowship grant—Dr J. M. Morris .......... 5,111 4,030
Queen Elizabeth II Fellowship grant—Science Astronomy ............. 372
Australian Institute of Nuclear Science and Engineering
Fellowship—Dr L. E. Carlson ....................................................... 7,394
British Commonwealth Scholarships and Fellowships and
Colombo Plan Scholarships ..................................................... 3,285 2,250

The Research School of Social Sciences
Commonwealth Postgraduate Scholarship .................................. 2,997
British Commonwealth Scholarships and Fellowships and
Colombo Plan Scholarships ..................................................... 4,133 529

The Research School of Pacific Studies
Commonwealth Postgraduate Scholarship .................................. 546 Dr
British Commonwealth Scholarships and Fellowships and
Colombo Plan Scholarships ..................................................... 1,206 3,500
Zoecon Chemical Research Fellowships .................................... 2,492

The Research School of Chemistry
Commonwealth Postgraduate Scholarship .................................. 456
CSIRO grants-in-aid for scholars ................................................ 350

The Research School of Biological Sciences
Commonwealth Postgraduate Scholarship .................................. 79 Dr
Queen Elizabeth II Fellowship grant—Dr R. A. Fischer ......... 1,496 3,556

THE SCHOOL OF GENERAL STUDIES
Commonwealth Postgraduate Scholarship .................................. 11,468
British Commonwealth Scholarships and Fellowships and
Colombo Plan Scholarships ..................................................... 2,758 3,750
National Parks and Wildlife Service Studentship Awards .......... 2,518
Leverhulme Trust Fellowships grant .......................................... 5,598 5,559
Leverhulme Trust Fellowship (Keio University) ...................... 803
Imperial Chemical Industries of Australia and New Zealand
Limited Research Fellowship .................................................... 199 2,500
CSIRO grants-in-aid for scholars .............................................. 381 700

continued on following page
## STATEMENT OF FUNDS FOR SCHOLARSHIPS
FOR THE YEAR ENDED 31 DECEMBER 1970 (viii)—continued

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</table>

**The School of General Studies—continued**

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<td>600</td>
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<td>Australian Wool Board Scholarship—Dr D. D. Heath</td>
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<td>934</td>
<td>552</td>
<td>11 Dr</td>
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<tr>
<td>Australian Wool Board Scholarship—Mr G. E. Ford</td>
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<td>4,499</td>
<td>706 Dr</td>
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<td>Australian Wool Board Grant—Support for Supervisor of Mr G. E. Ford</td>
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<td>1,678</td>
<td>1,241</td>
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<td>Commonwealth Postgraduate Scholarship—Computer Centre</td>
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<td>Department of Supply—Scholarship</td>
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| Total | 56,292 | 61,860 | 88,126 | 30,026 |

**Summary**

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<tbody>
<tr>
<td>Restricted Funds</td>
<td>318,703</td>
<td>651,973</td>
<td>504,063</td>
<td>466,613</td>
</tr>
<tr>
<td>Special Purpose Funds</td>
<td>114,195</td>
<td>337,110</td>
<td>181,245</td>
<td>270,060</td>
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<tr>
<td>Scholarships</td>
<td>56,292</td>
<td>61,860</td>
<td>88,126</td>
<td>30,026</td>
</tr>
</tbody>
</table>

| Total                  | 489,190      | 1,050,943    | 773,434      | 766,699      |
STATEMENT OF UNIVERSITY RESERVES
AS AT 31 DECEMBER 1970 (ix)

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<tbody>
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<tr>
<td>The John Curtin School of Medical Research</td>
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<td>..</td>
<td>20,000</td>
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<tr>
<td>The Research School of Physical Sciences</td>
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<td>..</td>
<td>..</td>
<td>20,000</td>
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<tr>
<td>The Research School of Social Sciences</td>
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<td>5,370</td>
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<tr>
<td>The Research School of Pacific Studies</td>
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<td>..</td>
<td>10,000</td>
</tr>
<tr>
<td>The Research School of Chemistry</td>
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<tr>
<td>The School of General Studies</td>
<td>3,000</td>
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<td>10,000</td>
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<table>
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<th></th>
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<td>University Film Reserve</td>
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<td>University Theatre Group Reserve</td>
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<td>University Performing Arts Council Reserve</td>
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<td>20,084</td>
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<td>Staff Housing Replacement Reserve</td>
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249
## Income Received

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Total: 690,771 113,893 804,664 165,916 638,748 1,702,722 2,341,470
## STATEMENT OF TRUST AND AGENCY FUNDS

FOR THE YEAR ENDED 31 DECEMBER 1970 (x)—continued

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<th>Purchase Price</th>
<th>Face Appreciated to Date</th>
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<td>The Staff Superannuation Scheme—Members’ Accumulations</td>
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<td>The Lady Isaacs’ Prize Fund</td>
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| Loans from Vice-Chancellor’s Discretionary Fund                            | 12,131         |                          |        |
| Interest due to Funds                                                     | 1,871          |                          |        |
| Cash at Bank—Commonwealth Savings Bank of Australia—S.2                    | 80,766         |                          |        |
| **Total**                                                                  | **2,341,470**  |                          |        |