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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA.

THE AUSTRALIAN NATIONAL UNIVERSITY.

REPORT OF THE COUNCIL

FOR THE PERIOD

1ST JANUARY, 1952, TO 31ST DECEMBER, 1952.

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THE AUSTRALIAN NATIONAL UNIVERSITY.

REPORT OF THE COUNCIL FOR THE PERIOD 1ST JANUARY, 1952 TO 31ST DECEMBER, 1952.

To His Excellency Field Marshal Sir WILLIAM SLIM, G.C.B., G.C.M.G., G.B.E., D.S.O., M.C., LL.D. (Leeds, Birm. and Cantab.), D.C.L. (Oxon), Governor-General and Commander-in-Chief in and over the Commonwealth of Australia.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit to Your Excellency the report of the Council of the Australian National University for the period from 1st January, 1952, to 31st December, 1952.

THE COUNCIL.

The Council met five times during the year, in April, June, August, October and December.

The following changes in the personnel of the Council took place:—

- (1) Dr. G. A. Currie resigned as from 28th April, 1952, and was replaced, following an election by Convocation, by Professor J. G. Wood, who took office on 1st August, 1952, and will be entitled to membership until 30th June, 1955.
- (2) Professor W. R. Crocker resigned as from 1st May, 1952, and was replaced, following an election by members of the University staff, by Professor G. Sawyer, who took office on 1st July, 1952, and will be entitled to membership until 30th June, 1955.
- (3) Senator J. G. Gorton resigned as from 5th June, 1952, and was replaced, following an election by the Senate, by Senator J. A. McCallum, who took office on 5th June, 1952, and will be entitled to membership until 1st July, 1953.
- (4) On 29th May, 1952, the first two student representatives—Mr. N. Barnard and Mr. E. C. Fry—were elected members of the Council, Mr. Barnard for one year and Mr. Fry for two years. In each case the member's tenure was dated from 1st July, 1951, the date at which the Council originally took office. Accordingly Mr. Barnard's initial tenure expired on 30th June, 1952, and he was re-elected for a term of two years from 1st July, 1952.

In August, 1952, the death occurred of Professor R. C. Mills, O.B.E., LL.M. (Melb.), D.Sc. (Econ.) (Lond.). Professor Mills was a member of the group whose discussions preceded and prompted the passage of the Act of the Commonwealth Parliament which established the University; he became thereafter the Chairman of the interim Council, and served in that capacity until the interim Council yielded place to the permanent Council. The latter body, of which the Chancellor is Chairman, elected Professor Mills as its Deputy Chairman, and he held that office up to the time of his death. The Council has expressed its deep sense of loss in the passing of one to whom the foundation and development of the University owed an incalculable debt.

Following the death of Professor Mills, the Council elected Dr. H. C. Coombs Deputy Chairman.

The Chancellor, the Right Honourable Viscount Bruce of Melbourne, P.C., C.H., M.C., B.A. (Cantab.), LL.D. (Cantab., Syd. and Melb.), D.C.L. (Oxon), F.R.S., arrived in Australia during October, 1952, and on 23rd, 24th and 25th October a series of functions took place in connexion with his installation as Chancellor. At the principal function, the Installation Ceremony itself, your predecessor honoured the University by attending and delivering an address, and conveyed, to the great joy of the whole University body, a message which Her Majesty had asked him to transmit to the Vice-Chancellor. The University was greatly encouraged by the large number of Universities and other learned bodies who sent representatives or messages of goodwill on this occasion.

At the Installation ceremony the degree of Doctor of Laws was conferred on the Chancellor, who thereby became the University's second graduate.

The Chancellor joined closely in the Council's work during the period of his visit to Australia, and presided at Council meetings held in October and December.

LIBRARY.

The development of the University Library is dealt with in a separate section of this report. Apart from certain minor additions to the collection of books and pamphlets in Oriental languages, accessions to the Library during 1952 numbered 12,869 items, of which 3,543 items were gifts.

ACADEMIC DEVELOPMENT.

As appears from the descriptions of the activities of the several Research Schools, which appear later in this report, the year under review was one of consolidation and continued development in the University's research programme.

During the year new Departments of Demography and of Far Eastern History, each under the leadership of a Reader in the subject concerned, were established, the former in the Research School of Social Sciences and the latter in the Research School of Pacific Studies.

Three new Professors took up duty, Professor J. C. Jaeger in the Chair of Geophysics and Professor P. A. P. Moran in the Chair of Statistics on 1st January, 1952, and Professor P. H. Partridge in the Chair of Social Philosophy on 1st August, 1952.

In April, 1952, the Council granted leave of absence for two years to Professor W. R. Crocker, Professor of International Relations in the Research School of Pacific Studies, to enable him to accept appointment as High Commissioner of Australia in India.

The Council has not yet appointed Directors of the Research Schools of Social Sciences and Pacific Studies, and, late in 1952, it decided to appoint a Dean in each of these Schools, pending the appointment of Directors. Professor S. F. Nadel has accepted the Deanship of the Research School of Pacific Studies and Professor G. Sawyer the Deanship of the Research School of Social Sciences. Each appointment is for two years, during which period the Council will continue to seek Directors for the Schools.

Three Departments of the John Curtin School of Medical Research were brought to Canberra during the year. The Department of Physiology, which had previously worked in Dunedin, New Zealand, transferred in July, the Departments of Microbiology and Biochemistry, which had been built up in Melbourne, transferred in October and December respectively. These Departments have been housed in specially constructed temporary laboratories, where they will work until permanent laboratories for the School are built.

THE VICE-CHANCELLORSHIP.

In October, 1952, Sir Douglas Copland, first Vice-Chancellor of the University, indicated to the Council that he proposed to accept appointment as High Commissioner for Australia in Canada. The Council accepted this decision with the greatest regret, and recorded its gratitude for the great pioneering contribution which Sir Douglas had made to the University's establishment. A committee of the Council was appointed to consider a new appointment to the Vice-Chancellorship.

LEGISLATION.

During the year the Council made the Chancellorship Statute; amended the Convocation Statute to take account of the establishment of the Newcastle University College and of the creation of the office of Research Associate in the University; and amended the Board of Graduate Studies Statute to include the Registrar and the Librarian in the membership of that body.

BENEFACTIONS.

The Danish, Norwegian and Swedish communities in Australia handed to the University sums of £2,100, £2,265 and £1,600 respectively which had been subscribed at the time of the Jubilee of the Commonwealth. The University accepted these amounts as the nuclei of funds to be used in promoting close and friendly relations between Australia and the countries concerned.

During 1950 and 1951 the University had received two other benefactions:—

The late Lady Groom bequeathed to the University the sum of £500 to found a scholarship available to students from Queensland, preferably in law, to be called the Littleton Groom Memorial Scholarship (Sir Littleton Groom was for some time Attorney-General of the Commonwealth and Speaker of the House of Representatives).

Lady Isaacs, the widow of Sir Isaac Isaacs, formerly Governor-General, and for some time Chief Justice of the High Court, has donated the sum of £100 to further the work of the Department of Anthropology.

VISITORS.

At the University's invitation, Professor W. E. Le Gros Clark, Professor of Comparative Anatomy in the University of Oxford, visited Australia from July to September, 1952, during which time he visited the Universities of Sydney, Melbourne, Adelaide, Brisbane and Western Australia.

SITE AND BUILDINGS.

In September, 1952, the main part of the workshops and laboratories of the Research School of Physical Sciences was officially opened by Sir John Cockcroft, Director of the United Kingdom Atomic Energy Research Establishment. At a ceremony after the opening the degree of Doctor of Science was conferred upon Sir John.

During the year preliminary work was begun on the building of the permanent laboratories of the John Curtin School of Medical Research. Extensive excavations were dug, and the building of the School workshops was begun.

Work was also continued on the development of roads and other services on the University site.

DEGREES.

As appears from previous paragraphs of this report, two degrees were conferred during the year, the honorary degree of Doctor of Laws on the Chancellor, the Right Honourable Viscount Bruce, of Melbourne, and the honorary degree of Doctor of Science on Sir John Cockcroft.

STUDENTS.

The University's first considerable intake of students occurred in 1952. In accordance with the University's policy, only graduate students were admitted. The total number of enrolled students working in 1952 was 23, of whom 20 were students for the degree of Ph.D. The distribution of students as between Departments was as follows:—

Anthropology	6
Astronomy	3
Economics	2
Far Eastern History	2
Geography	2
Geophysics	1
History	2
Nuclear Physics	1
Physiology	1
Political Science	3

CONCLUSION.

A university is a dynamic institution. Like every living entity it is born with a predetermined plan of development, but this is modified by the effects of experience and through its own individuality. The National University was fashioned to a plan developed by its founders, the interim Council and the Academic Advisory Committee. It has now passed through infancy and its active academic body is exerting a growing influence on organization and development. The bringing to Canberra of three departments of the John Curtin School of Medical Research has introduced fresh influences into the determination of policy. It is natural, therefore, that some changes in emphasis are becoming apparent and these will affect the future growth of the University and will modify its structure. At the same time it is becoming clear that the four Research Schools, in which the aims and methods of research differ widely, cannot conform to a single pattern of internal structure and administration. The past year has seen the beginning of changes which are designed to strengthen the University as a whole by encouraging greater individuality in the academic and administrative working of the four Schools.

While the growth of the academic body of the University has been highly satisfactory, progress with its permanent buildings has been disappointing. There is no simple relationship between the quality and quantity of work accomplished in an institution and the quality of the accommodation provided for its staff. Palatial buildings are no substitute for good men, but it is far easier to do first-class work in proper surroundings than in makeshift or overcrowded buildings. Experience during the year under review has reinforced the need for University House as a meeting point for workers in all disciplines, for the completion of the laboratories of the Research School of Physical Sciences and for the earliest possible commencement of the buildings for the John Curtin School of Medical Research. The staff of the University has become increasingly aware of the disadvantages and the very considerable fire risks involved in the housing of an extremely valuable library in the wooden huts of the Old Hospital Buildings.

Sir Howard Florey will be spending some months in Canberra early in 1953. It is hoped that during this visit final plans for the buildings of the John Curtin School of Medical Research can be approved and that erection can begin in the near future. It should now be possible to plan an orderly construction programme for the permanent buildings of the University under which a moderate annual commitment by the Government will provide proper accommodation for all existing activities within a reasonable period.

The University has now established itself as a centre of learning. A growing number of distinguished research workers from America and other countries overseas is coming to Canberra to take advantage of the opportunities offered by this unique institution. If the position of the University can be consolidated through the publication of the results of work of high quality and the training of research workers of high attainment, increasing support for its activities will come from other than Government sources, both within Australia and from other parts of the world.

THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH.

By the middle of 1951 it was clear that the arrangements for building the John Curtin School were seriously in arrears, so that during the visit of Sir Howard Florey to Canberra in September, 1951, the Council decided that temporary laboratories should be built to house the Departments that had been working in Melbourne. The decision having been made, serious work was begun on the construction of these temporary laboratories at the beginning of 1952. Largely owing to the energy displayed by Mr. Bunker, the laboratory manager, who was well supported by all in the University, great progress was made so that by the end of 1952 it was possible to begin moving the Departments of Biochemistry and Microbiology from Melbourne and for Professor Eccles, who had moved to Canberra from Dunedin in August, 1952, to be accommodated. Heavy work fell on the heads of departments and their staffs during the construction of the temporary laboratories and during the move to Canberra. It was not considered desirable to set up a temporary department of Medical Chemistry so Professor Albert remained in the Wellcome Institution, Euston-road, London. Thus the work done in 1952 enabled a considerable proportion of the staff that had been steadily recruited for the John Curtin School from soon after its foundation to be assembled in Canberra early in 1953. There is little doubt that great difficulty would have been encountered in holding the John Curtin School together in scattered laboratories and that the decision to establish temporary laboratories in Canberra was probably quite justified. However, the completion of the founding of the John Curtin School was unfortunately still some considerable way off.

In spite of building delays, the work that was accomplished in departments which gave hospitality to the University was considerable, as the lists of published papers accompanying this report will show.

It had been thought the precise instructions had been given to the architect in September, 1951, to proceed with the design of the final building. However, the serious difficulties encountered in commencing work on the permanent buildings were far from solved during 1952. It is unnecessary now to go over the points which gave rise to this unfortunate situation as steps have since been taken to rectify the position.

The University can look back on 1952 as having seen a very considerable advance in the establishment of the John Curtin School. It can also view with satisfaction the excellence of the staff which has been recruited and consider with pleasure the many contributions that they have already made to the medical sciences.

DEPARTMENT OF BIOCHEMISTRY.

STAFF.

Professor ..	A. H. Ennor, D.Sc. (Melb.)
Research Fellows ..	D. M. P. Phillips, Ph.D. (London), appointed 1st January, 1951. C. C. Kratzing, Ph.D. (London), appointed 2nd July, 1952, arrived in Australia 5th September, 1952.
Research Assistant ..	H. Rosenberg, B.Sc. (Melbourne), appointed 3rd January, 1951.
Visiting Worker ..	Miss N. Watkin, B.Sc. (Queensland), Department of Biochemistry, University of Queensland.

SCIENTIFIC WORK.

A short summary of the main problems at present under investigation is set out below:—

(1) *Phosphocreatine and the Fatty Liver.*

This work, a general outline of which was given in the 1950-51 report, was continued with the assistance of Miss N. Watkin. High levels of creatine and phosphocreatine have been found in the fatty livers investigated and the application of specific enzymic methods of analysis has revealed that increases in the absolute amounts of energy-rich proosphate bonds believed to be due to phosphocreatine and adenosinetriphosphate are, in fact, due almost entirely to the former compound. Because of the possible theoretical importance of this finding, it has been decided to withhold publication of this work until we have progressed further with muscle experiments (*see* paragraph 2 below).

(2) *³²P Investigations.*

The work referred to in the last report has been continued. For reasons which will become clear, it has not been possible to extend the use of the radioactive tracer elements to the liver problems and, indeed, it would seem that much remains to be done with simpler tissues (e.g. skeletal muscle) before this will be possible or desirable practically. The chief conclusions which may be drawn insofar as skeletal muscle is concerned are—

- (a) The turnover rate of the terminal P group of adenosine triphosphate is so rapid in the intact muscle as to defy measurement. This finding is contrary to what is the common biochemical belief at present.

- (b) The approximate and relative rates at which each of the three P groups of adenosine triphosphate are replaced are as 1:10:100 with the P atom attached to the ribose being the slowest.

(3) *²⁴Na Investigations.*

The necessity for including the volume of the extracellular space in calculations involving the concentration of the intracellular inorganic P led to the use of ²⁴Na. Some of this work has been reported and the remainder will be written for publication shortly.

(4) *Specific Enzymic Investigations.*

The importance in skeletal muscle of the enzyme creatine phosphokinase is being investigated. Attempts to prepare a pure crystalline preparation are in progress and the effects of many enzyme inhibitors are being studied.

(5) *Protein Chemistry.*

The work previously reported on insulin has continued and has been extended to cover other proteins. Much of this work is still in the preliminary stages.

PUBLICATIONS.

- (1.) *The Antigenic Properties of Adrenocorticotrophic Hormone and Growth Hormone.* J. F. Morrison, A. H. Ennor, P. L. Bazeley and J. H. Thayer. *Nature*, 169, 28, 1952.
- (2.) *Serological Studies on the Antigenicity and Purity of Growth Hormone and Adrenocorticotrophic Hormone.* J. F. Morrison, A. H. Ennor, P. L. Bazeley and J. H. Thayer. *Brit. J. Exper. Path.*, 33, 48, 1952.
- (3.) *The Effect of Adrenocorticotrophic Hormone and Growth Hormone on the Fat, Water and Protein Content of Mouse Liver.* J. F. Morrison. *Aust. J. Exper. Biol. and Med. Sc.*, 30, 313, 1952.
- (4.) *Observations on the Determination of the Specific Activity of the Inorganic Phosphate Fraction of Trichloroacetic Acid Extracts of Liver.* A. H. Ennor and H. Rosenberg. *Biochemical Journal*, 50, 524, 1952.
- (5.) *Observations on the Rate of Incorporation of ³²P into Adenosine Triphosphate in Skeletal Muscle.* A. H. Ennor and H. Rosenberg. *Nature*, 169, 930, 1952.
- (6.) *The Determination and Distribution of Phosphocreatine in Animal Tissues.* A. H. Ennor and H. Rosenberg. *Biochemical Journal*, 51, 606, 1952.
- (7.) *Some Observations on the Incorporation of ³²P into Liver Fractions.* A. H. Ennor and H. Rosenberg. *Chemistry and Industry*, 39, 953, 1952.
- (8.) *The Separation and Determination of ²⁴Na and ³²P in Animal Tissues.* A. H. Ennor and H. Rosenberg. *Biochemical Journal*, 52, 591, 1952.
- (9.) *Factors Involved in the Determination of the Turnover Rate of Adenosinetriphosphate and Phosphocreatine in Skeletal Muscle.* A. H. Ennor and H. Rosenberg. *Abstracts of Communications, Second International Congress of Biochemistry, Paris, 21st-27th July, 1952*, p. 422.

GENERAL.

Professor A. H. Ennor was absent from the Department on study leave from 19th April to 12th November. This leave was spent in England and Europe, the bulk of the time being spent in Oxford where laboratory facilities were kindly and generously extended by Sir Rudolph Peters, F.R.S. Whilst on the Continent, Professor Ennor attended the Second International Congress of Biochemistry in Paris as a member of the International Committee and the Committee of Honour of the Congress. On Professor Ennor's return it was decided, in spite of the fact that the temporary laboratories in Canberra were unfinished, that the Department should be shifted to Canberra. This was done on 15th December and at the end of the period under review much had already been done towards equipping the new quarters. Although the laboratories are still far from finished, it is hoped that active experimental work will be possible as from the end of January, 1953.

The prospect of acquiring larger and better laboratory facilities in Canberra made an increase in laboratory staff possible. Accordingly, arrangements were made during the year to enlist the services as Research Fellows of Dr. C. C. Kratzing and Dr. F. D. Collins who is expected to arrive in Australia in January, 1953.

During the year under review, Miss Nancy Watkin completed her stay in the Department, where she was trained in manometric, radioactive and other biochemical techniques.

Finally, it is a very great pleasure to record our thanks to the Director-General of Health, to Dr. Morgan and his staff at the Commonwealth Serum Laboratories for their generous help during those years in which we developed the Department in Melbourne.

THE DEPARTMENT OF MEDICAL CHEMISTRY.

STAFF.

Professor	A. Albert, D.Sc. (Lond.), Ph.D., Medicine (Lond.), F.R.I.C., appointed 1st January, 1949.
Fellow	D. J. Brown, Ph.D. (Lond.), M.Sc. (Syd.), appointed 1st April, 1949.
Research Assistant ..	H. C. S. Wood, Ph.D. (St. Andrews), appointed 1st October, 1951.
Special Training Grant (Analytical Research)	Miss J. E. Fildes, B.Sc. (Syd.), appointed 1st September, 1950.
Scholar	A. Hampton, M.Sc. (Syd.), appointed 1st October, 1949.
Fellow	L. N. Short, Ph.D. (Oxon), appointed 5th August, 1950, resigned 21st September, 1952.

SCIENTIFIC WORK.

The long-term research projects are—

- (i) The study of the chemistry of the pteridines and related substances;
- (ii) Quantitative study of equilibria between the ions of heavy metals and essential constituents of the living cell.

Project (i) which already includes pyrimidine derivatives has now been broadened to include the purines, which also play a vital role in metabolic processes (i.e. chelation).

(i) *The Pteridines and related substances.*

The studies of the rules governing solubility and stability in the pteridine series have been completed. Dr. Brown has now made several new purines and in addition has discovered a new purine reaction which will be studied further. We are determining the spectra, ionization constants, solubilities and stability (to acid and alkali) of a series of 30 purines.

Difficulties in the direct synthesis of 4:7-dihydroxypteridine led to a roundabout route, in which 4:7-dihydroxy-6-methylpteridine was first synthesized and the methyl-group removed in four stages. This brought to light several new facets of pteridine chemistry and, together with two syntheses of the isomeric 4:6-dihydroxypteridine, is being published as Part IV. The deeper interest of this study lies in the establishment beyond doubt of the orientation in the 6- and 7-positions.

A study is being made of methylation and degradation in the pteridine series. Prior methylation, it is found, makes the molecule more subject to alkaline degradation. In particular the methylation of 4-hydroxypteridine is being studied intensively. Two isomeric N-methyl-derivatives have been obtained. Their orientation has been established by degradation to pyrazines and confirmed by synthesis. In addition to playing an important part in this work, Dr. Wood has studied the acid-degradation of pteridine and shown that 2-aminopyrazine-3-aldehyde is produced. He is also working on the synthesis of (mono-) C-substituted pteridines, no example of which appears in the literature.

(ii) *Quantitative Studies of the Chelation of the ions of heavy metals.*

The stability constants governing the union of purines, riboflavine and pteridines have been determined experimentally. The novel hypothesis is proposed that the metabolic role of these substances occurs in conjunction with the ions of heavy metals.

Mr. Hampton has prepared analogues of the powerful antibacterial, 8-hydroxyquinoline. These analogues have one or more extra ring-nitrogen atoms, and the aim of the work has been to study the site of action of the metal-binding antibacterials, a group of substances including the new antitubercular drug isonicotinichydrazide (and possibly aureomycin). The introduction of these ring-nitrogens has increased the hydrophilic properties of these substances, so that they would be unlikely to penetrate cells easily (it is shown that their partition-coefficients are lowered in proportion to the number, and siting, of nitrogens introduced). In proportion as the molecules become more hydrophilic, so do they lose their antibacterial properties. Hampton has then been able to diminish the hydrophilic properties of the new substances (their oil-water partition coefficients rise in proportion) by the insertion of small alkyl groups, and parallel with this the antibacterial properties are restored. It is concluded from this that the site of action is almost certainly within the cell (in contrast to, e.g., the acridines).

PUBLICATIONS.

- (1.) D. J. Brown. "A new synthesis of formamidine." *J. Appl. Chem.*, 1952, 2, 202-203.
- (2.) D. J. Brown. "Improved synthesis in the pyrimidine series. 2. The preparation of 4:5-diaminopyrimidine." *J. Appl. Chem.*, 1952, 2, 239-241.
- (3.) A. Albert and H. C. S. Wood. "Pteridine syntheses. I. Leucopterin and xanthopterin." *J. Appl. Chem.*, 1952, 2, 591-592.

(4.) A. Albert, D. J. Brown and Gordon Cheeseman. "Pteridine studies. Part II. 6- and 7-Hydroxypteridines and their derivatives." *J. Chem. Soc.*, 1952, 1620-1630.

(5.) A. Albert, D. J. Brown and Gordon Cheeseman. "Pteridine studies. Part III. The solubility and the stability to hydrolysis of pteridines." *J. Chem. Soc.*, 1952, 4219-4232.

(6.) A. Albert and Alexander Hampton. "Analogues of 8-hydroxyquinoline having additional heterocyclic nitrogen atoms. I. Preparative." *J. Chem. Soc.*, 1952, 4985-4993.

(7.) A. Albert. "Quantitative studies of the avidity of naturally-occurring substances for trace metals. 2. Amino-acids having three ionizing groups." *Biochem. J.*, 1952, 50, 690-698.

(8.) A. Albert. "Ionization, pH and Biological Activity." *Pharmacological Reviews*, 1952, 4, 136, 167.

(9.) A. Albert. "The Pteridines." *Quarterly Reviews*, 1952, 6, 197-237.

Of the books *The Acridines* and *Selective Toxicity*, published last year, 129 and 2,012 further copies respectively have been sold.

PAPERS SUBMITTED FOR PUBLICATION.

(1.) D. J. Brown and L. N. Short. "Simple pyrimidines. I. Spectroscopic studies." Accepted for publication by *J. Chem. Soc.*

(2.) A. Albert and D. J. Brown. "Pteridine studies. Part IV. 4:6- and 4:7-Dihydroxypteridine." Accepted for publication by *J. Chem. Soc.*

(3.) A. Albert, M. I. Gibson and S. D. Rubbo. "The influence of chemical constitution on antibacterial activity. Part VI. The bactericidal action of 8-hydroxyquinoline (oxine)." Accepted for publication by *Brit. J. Exp. Path.*

(4.) A. Albert. "Quantitative studies of the avidity of naturally-occurring substances for trace metals. 3. Pteridines, riboflavine and purines." Accepted for publication by *Biochem. J.*

DEPARTMENT OF MICROBIOLOGY.

STAFF.

Professor	F. J. Fenner, M.B.E., M.D. (Adel.), D.T.M. (Syd.), appointed 28th July, 1949.
Senior Research Fellow	S. Fazekas de St. Groth, M.D. (Budapest), Sc.M. (Budapest), appointed 1st January, 1952.
Research Assistants ..	R. H. Leach, B.Sc. (Adel.), appointed 12th March, 1950, resigned 17th September, 1952.
	Gwendolyn M. Woodroffe, M.Sc. (Adel.), appointed 12th March, 1951.
	I. D. Marshall, B.Ag.Sc. (Melb.), appointed 7th January, 1952.
	Doris M. Graham, B.Sc. (Melb.), appointed 3rd March, 1952.

SCIENTIFIC WORK.

There were three main topics of investigation, the biology of mycobacteria, field and laboratory studies on myxoma virus and multiplication of influenza virus.

Mycobacteria.

With R. H. Leach, Professor Fenner completed a series of experiments upon the multiplication of mammalian tubercle bacilli (H37Rv and BCG) in Tween-albumin liquid medium. The growth of these micro-organisms was followed by measurements of the optical density of the cultures, by total and viable bacterial counts and by microscopic observations on the morphology of the bacterial cells. Concomitantly, the virulence of H37Rv for mice, and the virulence and immunogenicity of BCG at various intervals after the initiation of growth, were determined.

Mycobacterium ulcerans, the acidfast bacillus which was isolated from ulcers of the skin of human patients in Melbourne, was compared with *Mycobacterium balnei*, another new species of mycobacterium recently isolated from similar ulcers in Sweden. Although both mycobacteria fail to grow at 37° C. and grow well at 31°-37° C., and both cause skin ulceration in man, they could be easily differentiated. *Mycobacterium ulcerans* presents many analogies to the virulent mammalian tubercle bacilli. *Mycobacterium balnei* on the other hand, closely resembles the saprophytic mycobacteria. *Mycobacterium balnei* has been isolated from the cement walls of swimming pools whereas *Mycobacterium ulcerans* has been isolated only from skin lesions in man.

Neither mycobacterium causes progressive tuberculosis in guinea pigs, but both produce a progressive swelling of the foot when inoculated into the footpad of mice. No other common mycobacteria produce the latter effect, which is a useful diagnostic test. A variety of investigations into the pathogenic behaviour of these organisms in mice and chick embryos illustrated the overriding importance of their temperature requirements for growth on their pathogenicity.

Myxoma Virus.

Field Studies.—With the appointment of Mr. I. D. Marshall at the beginning of the year an attack was made upon the epidemiology of myxomatosis in the field in Australia. Preliminary studies by Miss Woodroffe showed that recovery from infection could be recognized by two serological tests, complement-fixation and neutralization in the egg, and that positive results were specific and were obtained for more than eighteen months after recovery. Working in collaboration with officers of the Wildlife Survey Section of the Commonwealth Scientific and Industrial Research Organization, and the Victorian Lands Department, Mr. Marshall collected and tested sera from several areas with different epizootic histories during the last two years. Assessment of the results showed that in many areas the case-mortality rate in infected rabbits was in excess of 99.5 per cent. In areas where the epizootic had been severe it was not uncommon to find that about 80 per cent. of the surviving rabbits had recovered from the disease. In a few areas anomalous results were found, for there was a high percentage of positive antibody tests although the epizootic had not been very severe. This result suggested that there might have been a change in the host-parasite relationship, and during the remainder of the year field studies were confined to two areas, one in northern New South Wales, where the results had suggested that there might be an altered host-parasite balance, and one near Albury. Officers of the Wildlife Survey Section were stationed at both these areas and are actively collaborating, collecting sera, organs from sick rabbits, recovered rabbits, and potential vectors. In our laboratory the sera have been examined and the immune status of the rabbits determined, virus from sick rabbits is being tested for virulence, and a start has been made on breeding from recovered rabbits to determine whether their innate resistance has altered. Isolation of virus from insects caught in epizootic areas has confirmed the field observations of the importance of *An. Annulipes* as a vector, but positive results have also been obtained, as expected, from several different species of mosquitoes.

Laboratory Studies.—The electron microscope studies carried out in collaboration with Mr. J. Farrant, Commonwealth Scientific and Industrial Research Organization, Section of Chemical Physics, have been completed. They illustrate the morphological resemblances of myxoma and vaccinia viruses. Both are brick-shaped elementary bodies of the same size, and in both digestion with pepsin leaves a resistant central body.

Studies with Miss Woodroffe reveal the close resemblance between the pathogenesis of myxomatosis and mousepox.

The Berry Dedrick "transformation" of fibroma into myxoma virus was carried out with heat-killed myxoma virus. In order to ascertain the temperature resistance of myxoma virus and other pox viruses, so that studies on transformation might be extended, a series of experiments upon heat-inactivation of viruses of the pox group was undertaken with Miss D. Graham. A linear relationship between log titre and period of heating at several different temperatures was observed.

Influenza.

Passive immunity to influenza.—Earlier studies by Dr. Fazekas showed that protection against experimental influenza was determined as much by the distribution of antibody as by its quantity. In order to study the underlying mechanism more closely Dr. Fazekas, in collaboration with Miss Graham, investigated passive immunity, partly because the amount of antibody could be controlled more strictly and the route of introduction varied, and partly because the complicating factor of sensitization to the antigen could be ruled out.

The results show that by whatever route it be introduced antibody eventually reaches an even distribution in the recipient organism. However, since elimination is comparatively rapid, the maximum serum titres vary widely depending upon the route of passive immunization.

Only a minute fraction of antibody finds its way into the bronchial tract, and only this fraction is instrumental in providing protection against intranasal challenge with influenza virus. On this score the nasal route of passive immunization is the most economical one.

Quantitative aspects of influenza virus multiplication.—Following an incidental observation, it was found that the production of "incomplete" virus particles is not a necessary consequence of inoculating concentrated seeds, but rather a characteristic of certain influenza strains, which may be virtually absent from others. On grounds of detailed experiments with ten strains, the generally held hypothesis of "auto-interference" had to be rejected, and the phenomenon interpreted in the framework of the host-virus relationship. This work revealed a new aspect of virus multiplication, and represents the principal topic of investigation of Dr. Fazekas and Miss Graham at present.

WORK AT THE CHILDREN'S HOSPITAL, MELBOURNE.

The arrangement whereby Dr. Fazekas was given laboratory space and facilities at the Children's Hospital, Melbourne, and in turn supervised the establishment of a virus diagnostic unit there, is mentioned later. Several items of interest arose from this work. Besides the establishment of diagnostic techniques some viruses were isolated for the first time in Australia.

In addition investigations were made on diagnostic methods for mumps infection, interest being centred on mumps "meningitis". An improved complement-fixation test was developed, and it was found that the lungs of full-term chick embryos, infected by amniotic inoculation, provided a rich source of antigen. These lungs have the advantage of being uniformly infectible, of giving 10-40 times higher yields than earlier standard preparations, and of not containing particulate (V) antigen, thus making ultracentrifugation or absorption unnecessary.

The immune response to mumps infection (especially meningitis in children) was followed from the clinical material, and it was found that the affinity of antibody changes with the time after infection.

GENERAL.

For the greater part of the year all members of the staff except Dr. Fazekas worked in the laboratories of the Walter and Eliza Hall Institute in Melbourne. In April a new suite of laboratories and animal rooms, constructed for work on myxomatosis, was made available to the Department and allowed considerable expansion in the scale of the experiments undertaken.

Owing to the lack of suitable laboratory space at the Walter and Eliza Hall Institute, Dr. Fazekas worked at the Children's Hospital, Melbourne. In addition to pursuing his own research he supervised the establishment of a Virus Diagnostic Laboratory in that hospital.

During the latter part of October and early in November the Department moved to the new laboratories in Canberra.

PUBLICATIONS.

- (1.) Frank Fenner and R. H. Leach. "Studies on *Mycobacterium ulcerans*. I. Serological relationship with other mycobacteria." *Aust. J. Exp. Biol. and Med. Sci.* 30, 1, 1952.
- (2.) Frank Fenner. "Studies on *Mycobacterium ulcerans*. II. Cross-reactivity in guinea-pigs sensitized with *Mycobacterium ulcerans* and other mycobacteria." *Aust. J. Exp. Biol. and Med. Sci.* 30, 11, 1952.
- (3.) Frank Fenner, M. F. Day and Gwendolyn M. Woodroffe. "The Mechanism of the Transmission of Myxomatosis in the European rabbit (*Oryctolagus cuniculus*) by the mosquito *Aedes aegypti*." *Aust. J. Exp. Biol. and Med. Sci.* 30, 139, 1952.
- (4.) Frank Fenner and M. F. Day. "Contrasting Methods of Transmission of Animal Viruses by Mosquitoes." *Nature*, 170, 204, 1952.
- (5.) F. M. Burnet, F. J. Fenner and I. J. Wood. "The opportunities for research in Australian medical schools." *Med. J. Aust.* 2, 684, 1952.
- (6.) Frank Fenner. "Vaccination against tuberculosis with BCG vaccine." *Med. J. Aus.* 2, 767, 1952.
- (7.) Frank Fenner. "Myxomatosis: the virus and the disease it causes." *Aust. J. Sci.* 15, 81, 1952.
- (8.) Frank Fenner. "Opportunities for medical graduates in the John Curtin School of Medical Research, Australian National University." *Med. Students Review of Adelaide No. 1*, p. 53, 1952.
- (9.) Frank Fenner. "The National University." *Sydney University Medical Journal*, p. 10, 1952.
- (10.) S. Fazekas de St. Groth, A. Isaacs and M. Edney. "The multiplication of influenza virus under conditions of interference." *Nature*, 170, 573, 1952.

PAPERS SUBMITTED FOR PUBLICATION.

- (1.) J. L. Farrant and Frank Fenner. "A comparison of the morphology of vaccinia and viruses." *Aust. J. Exp. Biol. and Med. Sci.*
- (2.) Frank Fenner. "The Classification of Myxoma and Fibroma Viruses." *Nature*.
- (3.) Frank Fenner, I. D. Marshall and Gwendolyn M. Woodroffe. "Studies in the epidemiology of infectious myxomatosis of rabbits. I. Recovery of Australian wild rabbits (*Oryctolagus cuniculus*) from myxomatosis under field conditions." *J. Hyg. (Camb.)*.
- (4.) Frank Fenner and M. F. Day. "Biological control of the rabbit: the use of myxomatosis in Australia." *Science News*.
- (5.) S. Fazekas de St. Groth and D. M. Graham. "The absence of 'incomplete' virus production in certain influenza strains." *Nature*.
- (6.) S. Fazekas de St. Groth and D. M. Graham. "Studies in experimental immunology of influenza. X. Passive immunity and its enhancement." *Aust. J. Exp. Biol. and Med. Sci.*

DEPARTMENT OF PHYSIOLOGY.

STAFF.

Professor	J. C. Eccles, F.R.S.
Fellow	J. S. Coombs, M.Sc. (Otago), appointed 1st September, 1952.
Research Fellow ..	P. Fatt, Ph.D. (Lond.), appointed 23rd October, 1952.
Scholar	Miss R. M. Eccles, M.Sc. (Otago).

The accommodation for the Department in Canberra was not made available until after the end of the year, so no research work was possible here. However, a great deal of preparatory work on instrumentation was performed particularly by Mr. Coombs, both in New Zealand and Canberra. As a consequence the Department was very well prepared to start research immediately its laboratory was ready.

Professor Eccles was overseas for the earlier part of the year. As Waynflete Lecturer of Magdalen College, Oxford, he gave eight lectures entitled "The Neurophysiological Basis of Mind" during Hilary Term. These lectures were expanded to make a book *The Neurophysiological Basis of Mind: Principles of Neurophysiology*, the manuscript being sent to the Clarendon Press, Oxford, in May, 1952, and the book was actually published in February, 1953. Professor Eccles also opened a discussion on Excitation and Inhibition at the Royal Society and took part in the Ciba Symposium on the "Spinal Cord" in London, and in the Symposium on the Nervous System at Cold Spring Harbour, Long Island, United States of America. Lectures given while overseas included the following:—

"Hughlings Jackson Lecture" at the Montreal Neurological Institute.

"Adam Miller Lecture" at the New York State Medical School.

"McArthur Lecture" of the University of Edinburgh.

PUBLICATIONS.

L. G. Brock, J. S. Coombs and J. C. Eccles. Synaptic Excitation and Inhibition. *J. Physiol.*, 117, eight pages.

L. G. Brock, J. S. Coombs and J. C. Eccles. "The recording of potentials from motoneurones with an intracellular electrode." *J. Physiol.*, 117, 431-460.

L. G. Brock, J. S. Coombs and J. C. Eccles. "The nature of the monosynaptic excitatory and inhibitory processes in the spinal cord." *Proc. Roy. Soc. B.*, 140, 169-176.

J. C. Eccles. "Obituary Notice, Sir Charles Sherrington." *Brit. J. Phil. Sci.*, 3, 298-301.

Rosamond M. Eccles. "Action potentials of isolated mammalian sympathetic ganglia." *J. Physiol.*, 117, 181-195.

Rosamond M. Eccles. "Responses of isolated curarized sympathetic ganglia." *J. Physiol.*, 117, 196-217.

SUBMITTED FOR PUBLICATION.

C. B. B. Downman, J. C. Eccles and A. K. McIntyre. "Functional changes in chromatolysed motoneurones." *J. Comp. Neurol.*

K. Bradley and J. C. Eccles. "Strychnine as a depressant of primary inhibition. *Nature*.

J. C. Eccles and A. K. McIntyre. "The effects of disuse and of activity on mammalian spinal reflexes." *J. Physiol.*

L. G. Brock, J. S. Coombs and J. C. Eccles. "Antidromic propagation of impulses into motoneurones." Ciba Symposium.

J. C. Eccles. "The electrophysiological properties of the motoneurone." Cold Spring Harbour Symp.

J. C. Eccles. "The Neurophysiological Basis of Mind: The Principles of Neurophysiology." Clarendon Press, Oxford.

DEPARTMENT OF EXPERIMENTAL PATHOLOGY.

STAFF.

Senior Research Fellow ..	G. M. Watson, M.B., B.S. (Adel.), D.Phil. (Oxon).
Research Fellow ..	G. B. Mackaness, M.B., B.S. (Syd.), D.Phil. (Oxon).

Primarily because of shortage of laboratory space and because of the lack of suitably trained personnel it has not been possible to proceed with the original plan to create a Department of Experimental Pathology within the John Curtin School. Active steps, however, have been taken over the period under review to train some scientists in modern techniques. This has been done with the co-operation of Sir Howard Florey so that Dr. G. M. Watson, Senior Research Fellow, and Dr. G. B. Mackaness, Research Fellow, have worked in the Sir William Dunn School of Pathology, Oxford, under Sir Howard's direction.

The research programme has been primarily concerned with the action of certain antibiotics and pharmaceuticals on the tubercle bacillus in *in vivo* conditions and with the treatment of anaemia.

It is hoped that arrangements similar to those made for the Departments of Physiology, Biochemistry and Microbiology will permit the establishment of a Department of Experimental Pathology in Canberra in 1953.

PUBLICATIONS.

G. B. Mackaness. "The Action of Drugs on Intracellular Tubercle Bacilli." *J. Path. Bact.*, 64, 429, 1952.

G. B. Mackaness and N. Smith. "The Action of Isoniazid on Intracellular Tubercle Bacilli." *Amer. Rev. Tuberc.*, 66, 125, 1952.

G. M. Watson and L. J. Witts. "Aureomycin treatment of Experimental Anaemia in Rats." *J. Path. Bact.*, 64, 232, 1952.

G. M. Watson and L. J. Witts. "Intestinal Macrocytic Anaemia." *Brit. Med. J.*, 1, 13, 1952.

RESEARCH SCHOOL OF PHYSICAL SCIENCES—REPORT FOR YEAR 1952.

BUILDING PROGRAMME.

Delays in the completion of the main buildings and the delivery of equipment continue to prevent the rapid expansion of the work of this School. Experience of the cost-plus-fixed-fee contract, let on the basis of preliminary plans, suggested that some other system should be employed for future building. The contract for the second instalment of the buildings has been let on a fixed-price basis with a definite time for completion, but difficulties are anticipated because the detailed planning has not yet been done, especially of mechanical and electrical services.

OPENING OF THE COCKCROFT BUILDING.

After the shell of the first instalment of the buildings was complete it became evident that the provision of services, finishing operations and painting would take a very long time, and a decision was made in the middle of the year to occupy them, despite the fact that they were incomplete. The workshop was moved over from its temporary quarters in June and the experimental work was transferred as opportunity offered. Temporary offices were provided by installing a floor half way between floor and ceiling of portion of the laboratory space, thereby gaining 2,160 square feet of space which will ultimately be used for laboratories and drawing offices.

On 5th September the laboratories were officially opened by Sir John Cockcroft in the presence of the Prime Minister, Members of the Government and of Parliament, and of the Vice-Chancellor and Council of the University. It is hoped that they will be finished early in 1953.

GOODEN WING.

The wing containing the large accelerator will be known as the Gooden Wing in memory of the first member of the staff of this School, Dr. J. S. Gooden, who died in 1950, and who made outstanding contributions to the theory and design of the proton-synchrotron.

TECHNICAL SERVICES.

Work in the experimental sciences makes exacting demands upon those who provide apparatus, special materials and equipment. Experience over the past year emphasizes that in the isolation of Canberra it is essential to provide even more comprehensive workshops and larger stocks of material than originally planned if frustrating delays are not to upset the progress of research work and the morale of staff and students.

Consequently, in the scientific schools, emphasis will continue to be placed upon the provision of technical services and the building up of comprehensive stocks of all materials needed. This is not an easy task since considerable pre-vision is necessary to anticipate demands in the future. Deliveries from overseas of even simple substances and apparatus still take from twelve to eighteen months.

The School of Physical Sciences will install equipment for making liquid air, oxygen and nitrogen and for compressing the gases into cylinders for the use of the whole University.

DEPARTMENT OF PARTICLE PHYSICS.

STAFF.

Professor	..	..	M. L. Oliphant.
Fellow	..	..	Dr. R. S. Wilson.
Research Fellows	..	..	Mr. J. Blamey.
			Dr. W. I. Berry Smith.

PROGRAMME.

This Department is engaged at present upon the design and building of an accelerator to produce protons with an energy above 10,000 million electron-volts. This involves the production of a circular magnetic field of large value to guide and focus the particles and of radiofrequency equipment to give the necessary acceleration during each revolution of the particles.

The problem of producing pulses of electrical energy of the order of a million k.V.A. lasting for a second or more, has been solved in theory by the proposal to convert the large 136-inch magnet into a homopolar generator, using liquid metal jets to collect a current of about 2.5 million amperes. The practical difficulties involved will be investigated with the aid of a model generator which has been designed to work in the field of the 30-inch model magnet, and through design studies.

A great deal of work has been done upon the practicability of using a strong-focussing guide-field, and in investigating possible designs of conductors to produce these fields and to withstand the very large mechanical forces involved. Arrangements have been made for a member of the staff to visit the U.S.A. and U.K. to obtain realistic information about the attitude of workers there towards the principles of strong focussing, and no decision will be made upon our own design until our doubts are resolved through this visit and through further study of the problem.

We have decided to build a small cyclotron with the 30-inch magnet in the hope that this will produce a beam of 6 MeV. protons suitable for injection into the large accelerator.

Preparations have been made to begin erection of the steel for the 136-inch magnet early in the new year and for installation of switchgear and the motor-generator equipment.

PUBLICATIONS.

A number of laboratory reports have been produced and circulated to workers overseas, but the work is not yet at a stage suitable for general publication.

DEPARTMENT OF NUCLEAR PHYSICS.

GENERAL.

During the year under review the $1\frac{1}{2}$ million volt accelerator was brought into full operation, complete with necessary ancillary apparatus and a full programme of research was started.

The work involves the study of disintegration processes in the light elements using as bombarding particles protons, deuterons, neutrons and γ -rays (photodisintegration). The energy levels of certain nuclei—Beryllium-8 in particular—are under examination. Such studies are essentially concerned with the location of various stationary and quasi-stationary states of the nuclear system and the determination of the properties of these states. Such energy levels represent arrangements of the nuclear constituents which are particularly preferred over other possible arrangements and which may exist for periods of time orders of magnitude greater than the time required for a nucleon to traverse the effective dimensions of the nucleus. There is reason to expect that by examining the distribution in excitation energy of such preferred arrangements and by studying their modes of formation and decay, one may eventually shed light on the central unsolved problem of physics—how nuclei are constructed and how the various particles within the nucleus interact.

In what follows a brief account is given of the various aspects of the work.

$1\frac{1}{2}$ MILLION VOLT ACCELERATOR.

The output from the $1\frac{1}{2}$ million volt generator, completed at the end of last year, was applied to an accelerator tube and proton beams of $300\mu\text{a}$ were achieved up to the full output voltage of the machine. The first man-made nuclear reaction in Canberra was induced on 14th January, 1952, when the γ -rays from the $\text{Li}^7(p\gamma)$ reaction at the 440 KeV resonance were detected. The first nuclear physics experiment with the machine was carried out the following week when lithium-loaded photographic plates were irradiated with the 6.13, 6.9, 7.1 MeV gamma-ray group obtained by bombarding a thick CaF_2 target with protons of 940 KeV energy. The results of this experiment are discussed later.

Construction of the beam analysing magnet was completed in March and the magnet, mounted on a rotating turntable, was brought into operation with the machine. By this means the beam entering the target room through the concrete studd (ceiling) was deflected through 90° and could be directed to the required location in the laboratory.

Addition of the analysing magnet enabled the experimental programme to be started in earnest after Easter.

The machine was run until October when, with the experience obtained, it became clear that certain design changes were desirable. The ion source was converted to the R.F. type, the focusing lens re-designed, and a refrigerated baffle was placed in the pumping box. This work cost almost a month of

operating time but resulted in a great improvement of performance. The beam down the tube was increased to nearly $1000\mu\text{a}$ and the analysed proton beam at the target was nearly $500\mu\text{a}$ and could be focused well. This large, resolved beam at the target represented an improvement of fifteen times over the earlier conditions.

The performance of the Canberra machine is now better than that of any other machine of its type in the world.

NUCLEAR EMULSION WORK.

Research involving the nuclear emulsion technique was pursued during the year in experiments which are difficult or impossible to carry through by counting techniques.

Excitation functions for the reactions $\text{Li}^7 (\gamma\text{T}) \text{He}^4$ and $\text{Li}^7 (\gamma\text{p}) \text{He}^6$ were measured. The former gave the first evidence for the resonance absorption of γ -radiation and the resonance peaks at 9.3 and 16.7 MeV indicate the presence of previously unknown energy levels of the Li^7 nucleus at these energies; it also suggested other levels at 21.5 and 23.5 MeV. A report of the work will be published in the February, 1953 issue of the Proceedings of the Physical Society of London.

Measurements in this laboratory of upper-limits for the cross-section of the reaction $\text{Li}^6 (\gamma\text{D})\text{He}^4$ at 2.76, 6.13 and 17.6 MeV revealed that the reaction has a high degree of forbiddenness. In a communication to the Physical Society it was pointed out that this could be explained partially by assuming dipole transitions to be forbidden. This result is the first example of the isotopic spin selection rule $\Delta T = \pm 1$, not zero for electric dipole transitions in self-mirrored nuclei. In the experiment only $T = 1$ states can be formed by dipole transitions and these can decay by the competing processes of proton and neutron emission i.e., with two $T = \frac{1}{2}$ constituents but not with two $T = 0$ constituents. However in the same communication it was pointed out that similar considerations should apply to the reaction $\text{C}^{12} (\gamma\alpha) \text{Be}^8$ for which we observe a large cross-section and, to date, there is no theoretical explanation of this difficulty.

These new ideas on isotopic spin selection rules applied to low energy nuclear reactions may well yield considerable information on the charge independence of the strictly nuclear forces between nucleons.

The possibility of quaternary fission has been discussed from time to time in the literature and observation of the phenomenon has been claimed by the Paris group. An investigation completed in this laboratory showed their results to be in error; the probability of this mode of break-up of the compound nucleus is exceedingly small in comparison with binary and ternary fission. The results of the work have been published in Nature (London).

DIFFERENTIAL IONISATION CHAMBER MEASUREMENTS.

As part of the programme of investigation aimed at the energy-level structure of the Be^8 nucleus the first counter experiment performed with the H.T. set was a study of the α -particle spectrum from the reaction $\text{B}^{10} (\text{d}\alpha) \text{Be}^8$. Transitions proceeding via the ground state and 2.9 MeV state were identified but runs with both hot and cold targets (to check on carbon contamination) indicated that a level which would yield α -particles of 6cm range was not present as reported by another observer. A Q-value of 17.91 ± 0.06 MeV was measured for the ground state transition and, on the basis of the dispersion theory of Wigner & Eisenbud the shape of the α -particle spectrum was used to indicate properties of the 2.9 MeV state. The experiment suggests that the state has spin $1 = 2$.

A full account of the work has been accepted for publication in the Philosophical Magazine and will appear in March, 1953.

SCINTILLATION COUNTER DETECTORS.

Scintillation counters employing activated Sodium Iodide (for γ -ray detection) and anthracene crystals have been built and brought into operation. It has been found to be possible to evaporate thin layers of anthracene onto glass and still maintain full detection efficiency. By the end of the year the equipment was complete and early next year will be employed for further studies on Be^8 using α - α and α - γ coincidence technique.

THE MONTE BELLO ATOMIC WEAPONS TEST.

At the request of the British Government through the Prime Minister's Office, the University Council granted leave to Professor E. W. Titterton to enable him to join Sir William Penney's group at the Monte Bello Islands. The work undertaken there was of a classified nature, relating directly to the testing of the weapon.

May 18, 1953.

E. W. TITTERTON.

ACADEMIC STAFF.

Head of Department ..	Professor E. W. Titterton.
Research Fellows ..	Dr. P. B. Treacy and Mr. E. K. Inall.
Scholar ..	Dr. Evani Kondaiah.

PAPERS PUBLISHED.

1. E. W. Titterton. "A Microsecond Interval Timer." *Rev. Sci. Inst.* 23, 96, 1952.
2. E. W. Titterton. "The 1.2 MeV Accelerator at the Australian National University." *Nucleonics*, 10, 28, 1952.
3. E. W. Titterton. "Possibility of the Quaternary Fission of U-235. *Nature*, 170, 794, 1952.
4. E. W. Titterton and W. Barneveld. "A Device for Marking Event Positions on the Surface of Nuclear Emulsions." *J. Sci. Inst.* 29, 250, 1952.
5. E. W. Titterton and T. A. Brinkley. "The Forbidden Nature of the Reaction $\text{Li}^6\gamma\text{D He}^4$ for γ -rays of energies up to 17.6 MeV." *Proc. Phys. Soc.* 65, 1052, 1952.
6. J. H. Carver, C. A. Barnes,* G. H. Stafford* and D. H. Wilkinson.* "Photodisintegration of the Deuteron at Intermediate Energies." *Phys. Rev.* 86, 359, 1952.

DEPARTMENT OF RADIOCHEMISTRY.

STAFF.

Reader Mr. F. Scarf.

The year under view has been devoted to the design and fitting out of the laboratory, the provision of equipment and chemical supplies and the commencement of a certain amount of rock analysis in conjunction with the Department of Geophysics.

Delivery of the mass-spectrograph to be used for age-determinations of rocks has been delayed by the manufacturers and work in this field cannot now commence until late in 1953.

Arrangements have been made to appoint Mr. J. R. Richards as a Research Fellow in the Department and he will spend some time with Metropolitan-Vickers in Manchester during the assembly and testing of the mass-spectrograph.

DEPARTMENT OF GEOPHYSICS.

1. STAFF.

Professor ..	..	J. C. Jaeger (appointed 1st January, 1952).
Fellow ..	..	Dr. G. Joplin (appointed 1st August, 1952).
Visiting Reader ..	..	Professor S. W. Carey (from 1st November, 1952).

2. SCHOLARS.

Mr. A. Beck has been working on geothermal problems since July, 1952. Miss J. Langley was appointed to a scholarship in petrology but withdrew. It is hoped to advertise further scholarships shortly.

3. GENERAL POLICY.

It is hoped to build the Department into one which will combine the subjects which are fundamental in the study of the behaviour of the Earth and its materials, namely mathematics, physics, petrology and crystal physics, with a knowledge of field behaviour in limited regions. Thus, we hope to make physical and petrological studies of rocks from typical important sites and to relate them to the field occurrences. Any work which does not combine all these types of investigation loses a great deal of its value and, in particular, it is almost a waste of time making physical measurements on rocks whose petrology and geological history are unknown.

Petrology, being fundamental, has been organized first; some physical properties of rocks are now being measured; and in the course of the next year it is hoped to begin work on the mechanical behaviour of rocks at high pressures and temperatures and their alteration under these conditions in the presence of chemically active fluids.

4. BUILDINGS AND EQUIPMENT.

A small building containing four private rooms and some small laboratories with a large annexe intended to house the main testing equipment, was completed in June, 1952, although services were not connected until much later. Most of this is now filled to capacity, and a small extension containing another five small rooms is now under construction. Great difficulty has been experienced in making thermal measurements in the original building owing to the large variations of ambient temperature and we are having to construct an insulated room in the basement of the new building.

* Individuals so marked are not members of A.N.U. Staff.

Major equipment, both mechanical and electrical, which has been ordered overseas, has not yet come to hand and most time to date has been spent in building basic equipment for rock machining, slide cutting, &c. We have been fortunate in obtaining scrap machine tools damaged in the Mount Stromlo fire, which we have been able to recondition. The chemical and petrological laboratories are now complete and working.

5. WORK IN PROGRESS.

(i) *Geothermal Measurements*.—The flow of heat outwards through the Earth's crust is one of the important absolute measurements which can be made, which gives information about the Earth as a whole. In collaboration with Mr. Newstead, of the University of Tasmania, an instrument has been constructed which will measure temperatures in bore-holes to 1/100 of a degree Centigrade. Measurements have been made in all the available bore-holes in Tasmania and the results are now being written up. It is hoped to use the instrument for geothermal prospecting. In connexion with this work it is necessary to make accurate measurements of the thermal conductivity of rock cores from the bore-holes. Two sets of apparatus for this work have been built and the laboratory is now in a position to make any measurements of this sort.

(ii) *Conduction of Heat*.—Because of Professor Jaeger's interest in the subject and its fundamental importance in geophysics, it is hoped to make this laboratory a centre for work in this subject. It is a very old and difficult subject and progress will be made largely by accurate numerical work, either in the computation of known solutions of problems of practical importance, or by the development of new numerical methods. One computer is employed on this work, mostly on problems involved in the cooling of mines and bore-holes.

(iii) *Petrology*.—Dr. Joplin took up her appointment on 1st August. The point of view of the Department is that fundamental problems such as the origin of ores and granites cannot be solved exclusively, either in the field or in the laboratory, but by a judicious combination of the two. Accordingly, Dr. Joplin, in collaboration with the Bureau of Mineral Resources, has made a field study of the rocks of Mount Isa, and their petrology and chemical composition is being studied in detail, with particular reference to metamorphism, granitization and ore deposition. It is intended to make laboratory experiments on these specimens which, it is hoped, will throw light on the above-mentioned processes. It is hoped later to make laboratory experiments on the physical properties of these specimens and to relate them to their petrological properties.

(iv) *Mechanical and Physical Properties of Rocks*.—Measurements of thermal conductivity by the standard methods have been mentioned above: it is hoped to extend these in various ways and work has begun on measurements at higher temperatures. Work on the magnetic properties of rocks has always been contemplated and is now being begun. Work on the mechanical properties of rocks at high pressures which, it is hoped, will be the main line of the Department, cannot be commenced until the necessary staff and equipment arrives.

(v) *Geotectonics*.—Professor S. W. Carey, Professor of Geology in the University of Tasmania, is spending a sabbatical year in the Department. He is working on geological aspects of the flow of rocks and in particular on problems associated with the theory of Continental Drift.

6. PUBLICATIONS.

J. C. Jaeger (1952). "Approximations in Transient Surface Heating." *Aust. J. Sci.* 5, 1.

J. C. Jaeger (1952). "Conduction of Heat in Tissue supplied with Blood." *Brit. J. Appl. Phys.* 3, 221.

Germaine A. Joplin (1952). "The Granitization Process and its Limitations as Exemplified in certain parts of New South Wales." *Geol. Mag.* lxxxix (1), 25-38.

G. A. Joplin and others (1952). "A Note on the Stratigraphy and Structure of the Wellington-Molong-Orange-Canowindra Region." *Proc. Linn. Soc. N.S.W.* lxxvii (1-2), 83-88.

Seven papers are in the press.

DEPARTMENT OF ASTRONOMY.

1. STAFF.

Professor	R. v.d.R. Woolley, Sc.D.
Research Associates ..	A. R. Hogg, D.Sc.
	S. C. B. Gascoigne, Ph.D.
Research Fellow ..	G. de Caucouleurs, L. ès Sc.
Scholars	C. S. Gum, M.Sc.
	A. Przybylski, D.Sc. Tech.
	K. Brewer, M.Sc.

Dr. Hogg and Dr. Gascoigne were appointed Research Associates in April. In August Mr. Brewer commenced work as Scholar.

2. EQUIPMENT.

On 5th February a fire swept Mount Stromlo, burnt out the pine forest and completely destroyed the workshop and an outlying store, besides damaging other equipment. The damage to the Observatory was estimated at £50,000.

The mounting for the 74-inch reflector arrived at Mount Stromlo early in April and is now stored partly in buildings and partly in protected cases on the site. The foundations which were commenced in August have been laid and piers erected. The steel building was delivered in December and arrangements are in hand for its erection. The primary mirror has been completed and accepted after a satisfactory test by the National Physical Laboratory.

The plywood dome for the 50-inch reflector was completed and erected. A 20-inch equatorially mounted reflector by Grubb was purchased from the estate of the late Mr. J. H. Catts and removed from Sydney in April. This telescope was erected in an existing small building with a sliding roof. The primary mirror was refigured and aluminized and a new secondary mirror (Cassegrain) in Pyrex has been made and installed. The telescope is being used exclusively for photoelectric work.

In the workshop attention has been concentrated on the replacement of fire-damaged machine tools. With the purchase of new machines and the reconditioning of certain others the machine equipment has now been practically completely replaced. Since July the machines have been temporarily installed in the annexe to the 50-inch reflector dome. A new workshop has been designed and a contract let for its construction.

The normal activities of the workshop have, of course, been handicapped by the results of the fire but it has been possible to complete during the year the three-prism spectrograph mentioned in earlier reports, to install the 20-inch reflector and accessory photoelectric equipment, to work on the drive for the 50-inch reflector as well as on a number of minor items.

In the optical shop the grinding machine originally designed for the Great Melbourne Telescope was put into operation and the 20-inch reflector mirror refigured on it. A new Cassegrain secondary was also made for this reflector. These and a number of smaller mirrors were aluminized.

3. RESEARCH PROGRAMMES.

(a) *Monochromatic Magnitudes*.—Work on stellar intercomparisons was concluded in September, by which time 130 plates, carrying about 5,000 spectra of the 100 programme stars, had been taken. Final magnitudes and gradients have been derived for the standard stars, and comparisons between these and similar quantities measured previously at this Observatory indicate mean errors of about 0.01 mag. Star-lamp comparisons have been made on nine nights, with satisfactory agreement: a few more nights are needed. Two lamps were calibrated at the N.S.L., Sydney, and one at the N.P.L., Teddington. The definitive intercomparison between the two has not yet been made.

(b) *Standard Regions*.—Two colour photoelectric observations in the F1 region were continued and completed at the Newtonian focus of the Reynolds reflector on 22 nights. The equipment comprised an EMI multiplier and amplifier feeding a recording milliammeter. Measures of 44 stars in the F1 region down to 12^m (blue) were obtained as well as figures for adjoining areas, and results prepared for publication.

(c) *Cluster Photometry*.—Two colour photoelectric photometry of the galactic cluster NGC 6025 was carried out on 23 nights using the equipment on the Reynolds reflector. Blue and yellow magnitudes were obtained for 65 stars down to nearly 14th magnitude in order to construct a colour luminosity array. The results are in course of reduction.

(d) *Variable Stars*.—The variable star AL Velorum was observed photoelectrically on five nights over an eclipse period. Observations were made of Nova Scorpii.

(e) *Extension of Large Magellanic Cloud*.—A photoelectric survey of the sky in the vicinity of the Large Magellanic Cloud has been commenced with a view to determining the extension of this object in the direction of the Galaxy.

(f) *Extra Galactic Nebulae*.—A programme of observations of bright southern nebulae has been commenced. About 50 plates have been secured with a 3-inch K25 camera for a preliminary survey, some 40 plates with a 5-inch Zeiss camera for a more detailed survey and 30 plates with the 30-inch Reynolds reflector for classification and photometry of selected nebulae south of -35° declination. Papers on (a) the distribution of mass and luminosity in elliptical galaxies and (b) evidence for a local super galaxy have been submitted for publication and a list of total magnitudes of 1,000 bright galaxies is under way.

(g) *H α Emission Region*.—Direct photographs have been made to search for regions of H α emission. The photographs have been taken with the 4-inch/6-inch Schmidt camera of the 130-ft. nebular spectrograph but instead of prismatic dispersion a filter technique has been employed to minimize effect of night sky radiation. The photographs have shown the presence of a large H α region at a galactic longitude of 226° as well as a number of other compact areas close to the galactic equator.

(h) *Stellar Atmospheres*.—Theoretical computations of conditions in stellar atmospheres have been carried out.

4. PUBLICATIONS.

S. C. B. Gascoigne and G. E. Kron.—“Colours and Magnitudes of some Star Clusters in the Magellanic Clouds.” *P.A.S.P.* 64, 196, 1952.

C. S. Gum.—“Photoelectric Observations of BD-3°1413 (HD44701) a new eclipsing binary.” *M.N.* 111, 634, 1951.

C. S. Gum.—“A Large HII Region at Galactic Longitude 226°.” *Obs.* 72, 151.

A. Przybylski.—“Use of Pre-discovery Observations.” *Obs.* 71, 70, 1951.

G. de Vaucouleurs.—“Observations of Nova Scorpii.” *I.A.U. Circ.* 1372.

G. de Vaucouleurs and O. J. Eggen.—“Observations of Eta Carinae.” *P.A.S.P.* 64, 185, 1952.

RESEARCH SCHOOL OF SOCIAL SCIENCES.

ANNUAL REPORT.

School Report.

The year 1952 was the first year in which the School could be said to exist as an organized group of departments pursuing specific research and teaching programmes both within departments and in collaboration with each other. At the end of the year, staff numbered 24 and students eight. Research work and teaching continued to be carried on in close co-ordination with the Research School of Pacific Studies, and all general academic questions were decided at joint School meetings. Accommodation began to become a problem; as other occupants left the Old Hospital Buildings, staff and students were able to take over additional space at a rate sufficient for immediate purposes, but the location of the additional space was such as to create obstacles to keeping the personnel of various departments conveniently close together. However, co-operation between the two Social Science Schools and the ready assistance of central administration enabled us to make satisfactory interim arrangements. Regulations for a permanent faculty structure were drafted by the joint provisional faculties and approved by the Board of Graduate Studies, but were still under consideration by Council at the end of the year. In December, Council created the office of Dean of the School, and appointed to it Professor Sawyer, who had acted as Chairman of the School for two years previously.

As a result of the arrival of the first considerable group of students in March, this School and the School of Pacific Studies drew up the first tentative scheme of students' courses. The central feature of a Ph.D. or M.A. course is necessarily the pursuit of an approved piece of research, and the preparation of a thesis embodying the results of that research. But in the Social Sciences, it is felt particularly desirable that the degree of specialization involved in such research should be modified by requiring the student to relate his specialty to some broader or integrating system of principles. Hence provisional regulations have been adopted which require students to attend courses of seminars or discussion groups; in the case of Ph.D. students, four courses are required, of which two must be in fields of study related to but not directly concerned with the subject of the research thesis. Such courses may be provided on an individual basis where a student's requirements are unique, but it was found possible in 1952 to organize two general courses (on Social Control and on Historical Sources and Techniques) which suited the needs of many students in both Social Science Schools, and in which staff from several departments in both Schools collaborated. Such joint activities proved valuable for staff as well as for students, being a method of developing a synthesis of information and theory from sociology, history, political science, law, &c. At the same time, departments organized more specialized courses directly related to students' research theses. However, it is realized that we must be alert to prevent seminar activities of this kind from becoming a burden on students' time, and a distraction from the primary research activities of both staff and students. At the end of the year, the students submitted observations on the scheme based upon their experience, and this memorandum will be considered in the future development of such seminars.

Detailed departmental reports follow, which include staff lists. Dates are given where staff commenced or concluded duty during the year, otherwise staff members were with the departments for the entire year.

DEPARTMENT OF ECONOMICS.

1. STAFF.

Professor T. W. Swan, B.Ec. (Syd.).

Reader in Economic Statistics H. P. Brown, B.A. (Melb.).

Senior Research Fellow in Economic History N. G. Butlin, B.Ec. (Syd.).

Research Fellows .. A. R. Hall, B.Ec. (Syd.), Ph.D. (Lond.); D. W. Oxnam, M.A. (N.Z.) (appointed March, 1952); B. M. Cheek, M.A. (Adel.) (appointed August, 1952).

Research Assistants .. H. de Meel, M.A. (Econ.) (Leyden); Valerie Munro, B.Ec. (Syd.) (appointed February, 1952).

Mr. H. P. Brown was elected an ordinary member of the International Statistical Institute.

2. STUDENTS.

The following students worked in the Department during 1952 as candidates for the Ph.D. degree under scholarships awarded by the University:—

- A. Barnard, B.Ec. (Syd.) (Supervisor N. G. Butlin).
- E. C. Fry, B.Ec., B.A. (Syd.) (Supervisor N. G. Butlin).
- C. S. Soper, B.Com. (Melb.) (Supervisor T. W. Swan).

In addition, the work of Mr. E. S. Crawcour in the Department of Far Eastern History was supervised by Professor Swan jointly with Mr. C. P. Fitzgerald.

3. SEMINARS.

Mr. Butlin organized two seminar courses—

- “Facts and Theories of Economic History.”
- “A Statistical Approach to Australian Economic History.”

Paper discussed in the first of these courses included several contributed by visitors from other Universities (Professors Arndt, Burton, Hartwell and La Nauze and Messrs. Dunsdorfs and Rutherford).

4. RESEARCH PROGRAMME.

The broad programme of work being undertaken in the Department was set out in the last Annual Report. Briefly, the Department's central interest is the study of changing economic structures and levels of activity, with particular reference to the development of the Australian economy. This study is being carried out through a range of statistical, historical and theoretical inquiries. Work is still proceeding under each of the major headings listed in the previous Report. In several fields, results are expected to become available for publication in 1953.

An indication of progress in the assembly and analysis of statistical and historical data is provided by the following notes.

Economic Statistics (Mr. Brown).—Activities during 1952 were as follows:—

- (a) *General Economic Statistics.*—Regular examination of published statistics with a view to suggesting improvements and developments. Preparation of a general programme for the development of Australian statistics published in the *I.P.A. Review*, Vol. VI., No. 3, May-June, 1952.
- (b) *Maternity Allowance Claims.*—A statistical analysis of 50,000 New South Wales maternity allowance claim forms carried out with the co-operation of the Department of Social Services and the Bureau of Census and Statistics.
- (c) *Social Accounting.*—Examination of the principles of social accounting and the significance of the Australian estimates. Preparation of a general survey of the purposes of social accounts read at A.N.Z.A.A.S. Sydney meeting in August, 1952.
- (d) *Commonwealth Arbitration Court.*—Preliminary survey of the Australian economy and the principles of wage fixation, in preparation for a statement to be made to the Court in the current basic wage case.

Economic History (Mr. Butlin).—The general investigation which has been attempted during 1952 is the relations between Australian capital formation and economic change since 1860. Provisionally, the end-point of this study has been set at 1900. The project has been divided into three main parts—

- (a) *Estimates of Public Capital Formation, 1860-1900.*—Annual series of gross and net public capital formation have been estimated for separate governments and local authorities, classifying outlays into major types of expenditure. These estimates have been made from detailed annual data in Public Accounts, Departmental Reports, Parliamentary Papers and individual accounts of enterprises and institutions. The work is complete and final results are now being written up under the names of Messrs. N. G. Butlin and H. de Meel.
- (b) *Estimates of Private Capital Formation, 1860-1900.*—Preliminary work has been undertaken on certain restricted data of private capital formation, chiefly house construction and pastoral investment.
- (c) *Indexes of Australian Economic Activity, 1860-1900.*—In the absence of aggregate measures of economic activity, recourse must be had to a variety of statistical series. Very few series are available for Australia as a whole before 1900, and a major task lies in the preparation of useful series. Some 55 series have been prepared and examined provisionally. Very preliminary results have been produced in the seminar course, “Statistical Approach to Australian Economic History”.

Mr. Butlin also arranged two field surveys of historical material—

- (a) *Manuscript Statistical Series*.—The main field project undertaken was an attempt to locate and catalogue extant manuscript statistical series of the Australian Colonial Governments. This involved work in several capital cities and in a considerable number of institutions in which these documents are housed. Thanks to the co-operation of all concerned, cataloguing is virtually completed and, except where permission of Trustees or other authorities has yet to be given, photographic copying of the more important and manageable series has been commenced. In this way, a major collection of historical material, not easily accessible to research workers, will be assembled in the University Library.
- (b) *Records of Pastoral Properties*.—Preliminary explorations into the problem of locating records of pastoral properties have been made, using a very small sample of large properties. Promising results of these explorations suggest that field work in this area may pay rich dividends in locating considerable masses of private records not previously utilized for research purposes.

The Australian Capital Market (Dr. Hall).—Collection of data on the working of the Australian capital market since 1946 was substantially completed under the first two of the following headings, and considerable progress made under the third:—

- (a) *New Issues*.—No adequate series of new issue statistics exists for Australia and an attempt was made to fill this gap for the years since June, 1946. The aim was to provide a series which included only those issues which raised new money from the public. The series was classified according to the type of borrower (Commonwealth Government, semi-governmental authorities, public companies). Company issues were further subdivided according to industry and to the form of security issued. The final analysis of this series awaits the completion of the balance-sheet series described below.
- (b) *Costs of Issue*.—A sample survey was made of company prospectuses filed in the Sydney Stock Exchange with a view to determining the costs of issuing securities. Further work needs to be done to verify some of the conclusions which arose from this study.
- (c) *Sources and Uses of Funds*.—A detailed analysis of company balance sheets from 1946 to 1951 was commenced. A uniform treatment of balance sheet items was decided upon, companies were classified according to industry and then added together to form aggregate balance sheets. From these aggregate balance sheets series are being derived showing the sources and uses of funds. This information will throw considerable light on the financial structure of Australian public companies and on the different types of financing employed by different sectors of the economy.

Wages and Wage Regulation in Australia (Mr. Oxnam).—This project aims at a comprehensive survey of the movement and structure of Australian wages, under the following headings:—

- (a) Development of Wage Regulation;
- (b) Procedures and Principles of Wage Regulation;
- (c) The Nature of Wages;
- (d) Money Wages (1891-1951-2);
- (e) Prices (1891-1951-2);
- (f) Real Wages (1891-1951-2);
- (g) Distribution;
- (h) Relative Wages (1891-1951-2);
- (i) Methods of Wage Payment;
- (j) Hours of Work;
- (k) Impact of Wage Regulation on Industrial Relations;
- (l) Wage Policy.

The assembly of basic statistical material and other data was almost completed in 1952 and the writing-up of the whole study is expected to be completed by the end of 1953. A paper by Mr. Oxnam, "Some Economic and Social Consequences of the Australian System of Wage Regulation", was presented to the Winter Forum of the Australian Institute of Political Science in July, 1952 and subsequently published as Chapter III. of "What Shall We Do With the Australian Wages System?" Other preliminary results were presented in the form of papers read before various bodies.

Profit Margins and Competitive Structure of Australian Industry (Mr. Chesk).—In August, work was begun on an investigation of gross profit margins in manufacturing industry for the years 1890-1952. This is expected to contribute information relevant to an understanding of the pricing mechanism and of the behaviour of prices and incomes in short and long periods. So far, the statistical work done includes:—

- (a) *Computation of Margins*.—Profit margins have been calculated back to 1925 for manufactures as a whole, the fifteen main classes into which they are divided, and many sub-classes. The basic statistics are given in the Production Bulletins of the Commonwealth Bureau of Census and Statistics.

- (b) *Accuracy of Statistics.*—An attempt has been made to check the significance of the Production Bulletin statistics. Profit margins for 50 industries (1938-47) were submitted to the Office of the Commonwealth Prices Consultant for checking against records of war-time profit margins. The comparison has revealed several pitfalls but has shown the general reliability of the data.

Work of Students.

Under Mr. Butlin's supervision, two students worked in economic history during 1952. Mr. E. C. Fry's work was preliminary to research in the Department of Australian History, to which he has since transferred. Mr. A. Barnard began work on his thesis topic "The Development of Australian Commodity Markets", and has secured the co-operation of a number of business firms and associations in Sydney and Melbourne in making available new data relating to the history of the wool and other markets.

Mr. C. S. Soper spent the latter part of 1952 in the Universities of Stockholm and Uppsala studying Swedish methods of economic analysis and will return in mid-1953 to carry out a study involving the application of these methods to the development of the Australian economy since 1945.

The New Guinea Economy: Collaboration with School of Pacific Studies.

The Department collaborated with the School of Pacific Studies in preparing a report on the economic structure and development of New Guinea at the request of the Minister for Territories, through a working committee consisting of Professor Spate, Dr. Belshaw and Professor Swan. For this purpose, and as an experiment in the application of social accounting techniques to the problems of "under-developed" regions, estimates were made of the Social Accounts of the New Guinea market economy for the years 1949-50 and 1950-51.

DEPARTMENT OF POLITICAL SCIENCE.

1. STAFF.

Reader	..	Mr. L. C. Webb, M.A. (N.Z.).
Research Fellow	..	Dr. W. K. Rolph (August, 1952) B.A. (Toronto), A.M., Ph.D. (Brown).
Research Assistants	..	Miss S. Liesching, B.A. (Oxon.).
		Miss F. Rheinstein, B.A. (Syd.).

2. STUDENTS.

Mr. R. Goodman, B.Ed. (Melb.), a Ph.D. candidate, is preparing a thesis on the status of teachers in the Australian Commonwealth.

Mr. Howard Scarrow, a Fulbright student, is working on a survey of the higher civil service of the Commonwealth.

3. RESEARCH IN PROGRESS.

The survey of the 1951 referendum campaign, initiated by Mr. Webb, has been delayed by a staff replacement and by the availability of further electoral material. It should be completed by mid-1953.

Dr. Rolph is working on a study of the Australian Country Party.

Miss Liesching is working on a study of relations between Church and State in Australia.

Mr. Webb has written a survey of Public Corporations in New Zealand for a forthcoming volume edited by Professor Friedmann, University of Toronto.

4. RESEARCH PROGRAMME.

The delimiting of the research programme is a difficult problem, partly owing to the special advantages and limitations of Canberra as a research centre and partly owing to the relatively small amount of political science research so far carried out in Australia. Lack of historical material dealing with political parties, parliamentary government, local government, and the development of administrative institutions is a particularly serious handicap which can be overcome only gradually by the development of a keener interest throughout Australia in Australian political history. Initially, the Department hopes to concentrate its research activities mainly in the following fields:—

- (1) *The Party System in Australia.*—This will involve studying the roles of the main parties and the effects of federalism on party structures. The ultimate objective is a re-examination of theories of party government in the light of Australian experience.
- (2) *Electoral Systems and their Relation to Political Life.*—This will be closely related to (1) above, since electoral systems affect the structures and methods of political parties.
- (3) *Groups and the State.*—Changes now taking place in the theory and structure of the State are in a large measure due to the increasing importance of other social groups and the tendency of certain types of groups (e.g. trade unions and groups of producers) to become drawn into the governmental process. The Department, in collaboration with the

National Library, is building up material for a study of relations between trade unions and the State. A study of Church-State relations in Australia is under way, one of its purposes being to provide a basis for a tentative theory of group-State relations.

- (4) *Public Administration*.—This involves a study of the role of the bureaucracy in government and of the relationship between administrative forms and practices and the changing content of government. Fields to which it is hoped to pay particular attention are the development of Commonwealth marketing schemes and the work of statutory authorities. Work will be confined mainly to the Commonwealth sphere.
- (5) *Area Surveys*.—One disadvantage of much political science research is that it involves isolating certain aspects of the political process. The Department's aim is to correct this by means of surveys designed to show the whole political life of local communities. An area in New South Wales has been tentatively selected and a reconnaissance survey made.

The research programme has been drawn up having regard to the plans of other departments. For instance, the Law Department's main project—an examination of the interrelation between Australian Federal politics and the Constitution—will fill one of the main gaps in Australian political research.

DEPARTMENT OF HISTORY.

1. STAFF.

Reader Mr. L. F. Fitzhardinge, B.A. (Syd.), B.Litt., M.A. (Oxon.).
 Research Fellow Mr. K. A. MacKirdy, M.A. (British Columbia).
 Research Assistants Mr. L. S. Bethel, B.A. (Oxon.) (appointed April, 1952); Mr. K. W. Thompson, B.A. (Melb.) (appointed July, 1952).

2. STUDENTS AND TEACHING.

Mr. A. W. Martin, B.A., Dip.Ed. (Syd.), was working under the supervision of Mr. Fitzhardinge on "New South Wales Politics, 1866-1901".

A weekly seminar was conducted by Mr. Fitzhardinge during the first half of the year on "Historical Sources and Techniques, with special reference to Australian History". Texts or summaries of the papers read are available in mimeographed form from the Department.

3. RESEARCH.

During the year considerable progress was made with the planning and organization of a "Survey of Historical Manuscripts in Australian Collections", which is being carried out with the co-operation of scholars and repository authorities throughout Australia. Working procedures were evolved and two pilot projects put in hand.

Mr. Fitzhardinge continued work on his edition of *Tench*, and commenced work on the official biography of the late W. M. Hughes.

Mr. MacKirdy continued his studies on sectional sentiment in Australia since Federation for the purpose of a comparative study of Australian and Canadian developments. A paper arising from this work was read at the Sydney meeting of A.N.Z.A.A.S., and a number of articles are in course of preparation.

4. PUBLICATIONS.

L. F. Fitzhardinge. "Writings on Australian History, 1951." (*Historical Studies*, v. 5, No. 18, May, 1952.) "Australia", by R. M. Crawford; "New Zealand", by Harold Miller (review). (*Historical Studies*, v. 5, No. 19, November, 1952.)

K. A. McKirdy. "Adjustment problems in Nation Building: Tasmania and the Canadian Maritime Provinces", a paper read before Section E (History) at the 29th meeting of A.N.Z.A.A.S., Sydney, August, 1952 (mimeographed).

DEPARTMENT OF DEMOGRAPHY.

1. STAFF.

Reader Mr. W. D. Borrie, M.A. (N.Z.).
 Research Fellows Dr. C. A. Price, B.A. (Adel. and Oxon.), D.Phil. (Oxon.); Dr. Norma R. McArthur, B.A. (Melb.), Ph.D. (Lond.).
 Research Assistants Mr. D. R. G. Packer, M.A. (Melb.); Miss K. M. Jupp, B.A., B.Ec. (Syd.).

Dr. Price, who was appointed in December, 1951, arrived in Australia from Oxford in March and took up residence in Canberra in May. Dr. McArthur, whose appointment was also approved in December, 1951, was given permission to defer her Fellowship to enable her to complete research and teaching obligations as Assistant Lecturer in the Department of Eugenics, Biometry and Genetics at University College, London. Dr. McArthur joined the staff in Canberra in October. Miss Jupp was appointed Research Assistant in August and came to Canberra in September.

In December, Mr. Packer, who had been Research Assistant since March, 1950, was awarded a University Scholarship in Demography which he will take up in March, 1953.

2. ORGANIZATION.

Until December, 1952, Demography had not the formal status of a department, although for budgetary and general administrative purposes it was treated as such and provision had been made since 1949 for the development of demographic studies in this School. Early in 1952, the position of Reader in Demography was advertised, and an appointment was made by the Council in August. In December the Council also approved the establishment of a separate Department of Demography in the Research School of Social Sciences under the direction of the Reader.

3. SEMINARS.

No seminar in Demography was held, but during the year the staff participated in courses of other departments and the following papers were read:—

"Source Material for the History of the Victorian Population during the Period of the Goldrushes", Mr. Packer. (History Seminar.)

"Immigration to the Australian Colonies 1861-1891: An appraisal of Official Statistics", Mr. Borrie. (Economic History Seminar.)

4. RESEARCH AND PUBLICATIONS.

(a) Research in Progress—

(i) Mr. Borrie, assisted by Mr. Packer—*The Demographic History of Australia*. (Continued from 1951. New work was concerned mainly with the analysis of annual migration records and censuses of the Australian colonies 1850-1900).

(ii) Dr. Price—

Historical and Demographic Study of non-British Europeans in Australia. (Commenced in May. Work to date has been mainly concerned with the analysis of census material and the extraction of data from naturalization records and other relevant official documents. We wish to express our appreciation of the co-operation of National Archives in this work.)

Survey of Official Material in Australia relating to Immigration. (Commenced in September. Current work relates to the records of South Australia and to Commonwealth records held in Canberra.)

(iii) Dr. McArthur—*The Demography of Pacific Island Populations*. (Commenced in November. The first phase of this work is a critical survey of existing demographic data relating to the populations of the South Pacific, beginning with the Bismarck Archipelago and thence eastwards to Samoa.)

(iv) Mr. Packer—*History of the Victorian Population during the Period of the Goldrushes, 1851-1861*. (The work has comprised: firstly a critical investigation of statistical source materials; and secondly, an analysis of the factors of population growth, with particular reference to inter-colonial migration.)

(b) Research completed—

(i) Mr. Borrie and Mr. Packer—*Italians and Germans in Australia: A Study of Assimilation*. MS. completed December, the Table of Contents being—

INTRODUCTION.				
Part A.—The Australian Background.				
Chapter	I.—The Characteristics of Australian Immigration Policy	..	..	Page. 12
Chapter	II.—A Note on Australian Social Structure and Attitudes	..	..	19
Chapter	III.—The Legal and Social Status of non-British Minorities in Australia	..	..	29
Chapter	IV.—Non-Britishers in Australia	..	..	36
Part B.—The Italians.				
Chapter	V.—The Pattern of Italian Settlement	..	..	55
Chapter	VI.—The Italians in Queensland: Demographic Analysis	..	..	73
Chapter	VII.—The Italians in Queensland: Cultural and Social Aspects	..	..	108
Chapter	VIII.—The Italians in Australia	..	..	142
Part C.—The Germans.				
Chapter	IX.—The Pattern of German Settlement	..	..	174
Chapter	X.—Statistical Aspects of Assimilation	..	..	195
Chapter	XI.—Social and Cultural Aspects of Assimilation	..	..	211
Part D.—Comparative Analysis.				
Chapter	XII.—The Assimilation Process in Perspective	..	..	231

This MS. has been prepared as one of an international series sponsored by the International Population Union with financial assistance from Unesco. Publication arrangements will be considered in 1953.

(ii) Mr. Borrie—*The Demography of Post War Immigration into Australia*. (Paper based on this material delivered to Section G of the Meeting of A.N.Z.A.A.S., August, 1952.)

(c) *Publications—*

Mr. Borrie—*Old and New Australians*, Current Affairs Bulletin, November, 1952, Vol. II, No. 3.

Mr. Borrie and Mr. Packer—*Annotated Bibliography of Literature in Australia and New Zealand relating to Migrant Assimilation*. (Revised for private circulation to libraries, universities and other interested bodies.)

5. OTHER ACTIVITIES.

During the year members of staff delivered the following lectures and papers in other Universities:—

- (i) Mr. Packer, "Changing Attitudes Towards German Settlers in South Australia, 1834-1914" (to History Seminar, Canberra University College).
- (ii) Dr. Price, "Some Aspects of the Maltese Population Problem" (to History Seminar, Canberra University College).
- (iii) Mr. Borrie, "The Spectre of Overpopulation". (Public Lecture, University of Sydney).

6. GENERAL.

The research programme of the Department is based on the assumptions that the research pursued by individual workers in an academic institution should be concerned with qualitative studies relating to broad social and historical aspects of population change as well as to formal demography, and that to-day much of the quantitative analyses of demographic data (e.g. arising from censuses) can best be handled by official agencies which have at their disposal adequate facilities for mechanical tabulations.

The current programme has two distinct aspects—

- (1) The demography of Pacific Islands populations.—While this work will cover an area and aspects of direct interest to historical and anthropological research being conducted in the Research School of Pacific Studies, it offers considerable scope for original and experimental analysis in formal demography.
- (2) The development of demographic studies relating to Australia.—This has been and will continue to be the major part of the Department's research programme. The central theme is the Demographic History of Australia, in which research has so far been concerned primarily with population development in the nineteenth century and in which immediate new work will concentrate upon trends in fertility and mortality with particular reference to the twentieth century. Dr. Price's study of minorities is designed to pursue further a field which will only be lightly touched upon in the History.

Following the formal establishment of the Department, preliminary discussions were held towards the end of the year to prepare a seminar programme for 1953 in which it is hoped to secure the co-operation of officers of the Commonwealth Bureau of Census and Statistics.

Finally, the members of staff of the Department wish to express their appreciation of the assistance rendered in various ways throughout the year by a number of outside persons and institutions, and particularly by officers of the Bureau of Census and Statistics, the Department of Immigration and the Commonwealth Archives.

DEPARTMENT OF STATISTICS.

1. STAFF.

Professor P. A. P. Moran, M.A. (Camb. & Oxon.), D.Sc. (Syd.).

The Professor of Statistics was appointed on the 1st January, 1952, and took up residence on the 20th April. The aims and policy of this Department have already been set out in a previous document (584/52). During the year a Senior Research Fellowship and a Research Fellowship were advertised. There were three candidates for the first position, two of whom had no degrees, whilst the third was an excellent statistician well known for his work on genetics as well as on mathematical statistics. By the time he was notified that he had been selected he had taken another position. The candidates for the Research Fellowship were not of a sufficiently high standard.

2. SEMINARS.

A lecture on research in statistics in England was given to the N.S.W. Statistical Society in March and another on the analysis of animal population data to A.N.Z.A.A.S. in August. A course of seminars on statistical methods in social science was given in the second and third terms at this University.

3. RESEARCH.

Work has been done with Dr. A. J. Nicholson of the C.S.I.R.O. on his series of experiments on flies. He has set up conditions in his laboratory in which an isolated population of flies shows large and sustained oscillations. A mathematical theory using non-linear difference equations has been developed to describe this and numerical examples reproduce all the phenomena observed in the experiments. This work will be published later.

Some work has been done on the formation of raindrops by coalescence, but the results are not suitable for practical computation and the C.S.I.R.O. Radiophysics Laboratory is now working on this problem by a different method. Calculations have also been made on the prediction of sunspot numbers by optimum linear predictors. The results, however, are very disappointing.

4. PUBLICATIONS.

Two papers listed below were accepted for publication during the year. The first is concerned with a particular problem in mathematical statistics which originated in some work of Professor M. Greenwood in epidemiology. The second paper is the first part of an investigation into the remarkable cyclic behaviour of the Canadian lynx population. Data on this population back to the eighteenth century have been published by C. S. Elton of Oxford and provide one of the outstanding unsolved problems of biology. In this first paper the series of trapping records is analysed as a stochastic process of the kind considered by econometricians. In a later paper, nearly completed, the relationship of the series to meteorological variations will be considered. Similar work on game birds in Scotland is also in progress. It is believed that this is the first time analyses of this kind have been made.

Papers published—

"A Characteristic Property of the Poisson Distribution." *Proc. Cam. Phil. Soc.* 48 (1952) 206.

"The Statistical Analysis of Game Bird Records." *Journal of Animal Ecology.* 21 (1952) 154.

"The Estimation of Death Rates from Capture—mark—Recapture Sampling." *Biometrika.* 39 (1952) 187.

DEPARTMENT OF LAW.

1. STAFF.

Professor Geoffrey Sawyer, B.A., LL.M. (Melb.).

No other academic staff was appointed during the year. Research Fellowships were advertised, but there were no applications from Australian students with legal training; overseas applications were of fair standard but none with the sort of interests which would enable them to do useful research work in Canberra.

2. STUDENTS.

No students were enrolled for courses in Canberra, but an extensive correspondence was carried on with Mr. R. Parsons, B.A., LL.B. (Syd.), who was holding a scholarship for travel abroad under the scholarship system which preceded the establishing of departments in Canberra. Mr. Parsons travelled in South Africa, France and Belgium, England and Scotland and the United States of America, concentrating on some problems of comparative law, in particular the influence of Roman and Common Law systems on each other in the field of torts; he published papers arising out of this work in 1952. *Tydskrif vir Hedendaagse Romeins-Hollandse Reg.*, p. 192, *Australian Outlook*, Vol. 6, p. 40, and *University of Western Australia Annual Law Review*, Vol. 2, p. 56. Mr. Parsons has now returned to his Senior Lectureship in the Faculty of Law at the University of Western Australia.

Mr. D. Benjafield, LL.B. (Syd.), another overseas law scholar, continued his Ph.D. course at Oxford; his scholarship was extended in order to compensate for a delay in his original arrival there.

3. RESEARCH.

The long-term investigation of Australian constitutional and related political history was continued throughout the year; in particular, the Federal parliamentary debates from 1901-1951 were perused with a view to preparing a summary legislative history and an account of political attitudes to constitutional questions. The papers delivered at the 1951 Jubilee Seminar on Federalism were prepared for publication. In September, a gathering of Australian law-school teachers was organized in Canberra, at which five papers were discussed (Criminology in Australia; A Therapeutic Approach to Sec. 92 of the Constitution; Interstate and International Divorce Recognition; Interstate Endorsement of Maintenance and Alimony Decrees). Officers of the Attorney-General's Department and the Department of Commerce attended relevant sessions, and the four papers last mentioned, revised in the light of the discussion, have since been published (*Australian Law Journal*, Vol. 26, pp. 400, 407, 518; *Res Judicatae*, Vol. 6, p. 27). A contribution was made to the costs of a trip to Indonesia by Dr. Hans Leyser, Senior Lecturer in Comparative Law at the University of Melbourne, for the purpose of organizing exchange of documentary material with Melbourne and with this University and of preparing a report on the organization of the legal system in Indonesia's transitional position. A report on Australian statutory corporations was prepared for the Toronto University Law School Comparative Law Centre.

4. TEACHING.

A term course on general jurisprudence was provided in the inter-School course on Social Control, a seminar on evidence in the History course, and individual assistance on legal matters was given to students in economics and political science.

5. PUBLICATIONS.

Australian Government To-day, 4th ed. rev. (Melbourne University Press.)

"The Record of Judicial Review" in *Federalism*, an Australian Jubilee Study. (Cheshires.)

"Judicial Power under the Constitution" in *Essays on the Australian Constitution*. (Law Book Co. of Australasia.)

"A Uniform Limitation of Actions Law." (*Australian Law Journal*, Vol. 26, p. 375.)

DEPARTMENT OF SOCIAL PHILOSOPHY.

Professor P. H. Partridge, M.A. (Syd.), took up his appointment in September, 1952. Arrangements were made for him to spend the greater part of 1953 abroad, and the organization of his Department awaits the outcome of that visit.

RESEARCH SCHOOL OF PACIFIC STUDIES.

ANNUAL REPORT FOR 1952.

I. General.

Being the first year during which the School functioned as a whole, with its full complement of Departments, 1952 was inevitably also a year of some experimenting—in methods of instruction and training, in inter-departmental collaboration, and so forth. If these "experiments" were all more or less consciously planned, with a view to gaining necessary experience, in one respect the School was faced with a form of experimentation which had all the marks of an accident. It concerned the School's administrative leadership.

The year began with the School's Adviser and Acting Director (Professor Firth) away on field work. In the middle of the year the Acting Director returned and for a while seemed destined to become a full Director. By the end of the year the prospect of a Director had receded and a Dean took over, ambiguously briefed as a locum tenens and as the holder of a new office on trial. In the various interim periods the School was headed by a somewhat reluctant "Chairman".

Though these vicissitudes imposed a considerable strain upon the organization of the School they had little effect on strictly academic development, save perhaps in delaying somewhat the emergence of truly co-ordinated research. The broad pattern of the School of Pacific Studies had already taken shape fairly firmly in the preceding year. Thus developments in 1952 were mainly in the nature of consolidation and of a gradual "filling-in" of gaps in establishment and research plans. This over-all progress unhappily suffered a set-back with the appointment of Professor Crocker as High Commissioner in India, which deprived the Department of International Relations of his leadership, and his small group of colleagues of a valuable member.

The diversity of interests represented in the School makes it difficult to measure the development in the different Departments by a common standard. This applies to the crystallization of specific research projects no less than to the size of the Departments and their numbers of students. Another reason relevant in this respect is the fact that certain Departments have a more conventional scope than others, generally or in regard to the Australian academic scene. Thus "International Relations" and "Pacific History" represent disciplines of a relatively novel character when compared with Anthropology or Geography; also, like "Far Eastern History", they have no exact counterpart in the other Australian Universities. In consequence, these Departments cannot as easily count on a regular intake of students with uniform background or predictable research experience; which means, in turn, that these Departments often have to adjust their research programme to the varied qualifications of such candidates as happen to offer.

As regards the body of students it should be noted that a category prevalent in the earlier years—the student who merely held a University scholarship while working in other Universities—was gradually disappearing. In 1952 only five students of this type remained. All others were working for a degree in this University, being resident in Canberra or engaged in research supervised from Canberra. Their total number was 10, the majority also holding University scholarships, distributed as follows:—Anthropology 6, Geography 2, Pacific History (including Far Eastern History) 2, International Relations 0. The wide variety of Universities from which the students came deserves mention; it demonstrates, so early in the history of the School of Pacific Studies, its international reputation. The Universities in question were—Sydney, Melbourne, Oxford, Cambridge, London, Manchester, New Zealand, Harvard, Chicago and California.

In this early stage training and instruction had to be kept widely flexible to accord with the diversity of research interests and requirements. But a more uniform method was gradually emerging, in the form of seminar courses combining lectures with discussions. These were in many cases interdisciplinary, being attended by students (and staff) from different departments, and in certain cases implied also collaboration with the School of Social Sciences. For example, the historians in both Schools joined forces in a seminar

course on "Methods of History", as did the anthropologist, political scientist, and lawyer in a course on "Social Control". The interdisciplinary approach, though it seemed to meet certain problems peculiar to a research University like ours, also raised new problems of method and technique, not all of which have yet been resolved.

The members of the School have throughout been keenly aware of the special position of the National University among the other academic institutions in Australia and of their responsibility to cement friendly relations with the State Universities. It can confidently be said that these efforts were successful in every respect. Visits to other Universities, lectures on topics representing the special interests and competences of the members of the School, and advice or help readily given, established close and mutually beneficial collaboration. Equally, members of the School participated in the activities of scientific and educational bodies in Australia. The various "outside activities" will be mentioned later, in the sections dealing with the different Departments; one instance of a more special kind, bearing on the collaboration of the University with a Government Department, may here be noted. It refers to a joint study undertaken on behalf of the Department of Territories by a small working group composed of a geographer (Professor Spate, also acting as "convener"), an economist (Professor Swan), and an anthropologist (Dr. Belshaw). The study, of "Some problems of Development in New Guinea", has since been completed and embodied in a comprehensive report.

This account would be incomplete without the mention of the physical conditions in which the School was working or forced to work. The choice of words already indicates that the conditions were far from ideal. Indeed it is no exaggeration to say that accommodation for staff and students presented an everlasting problem, which could be met only by makeshift measures, none of them wholly satisfactory or more than temporary. It could only be hoped that another year gone meant another year nearer the final solution.

II. ANTHROPOLOGY.

STAFF.

Head of Department . .	Professor S. F. Nadel.
Reader	Dr. W. E. H. Stanner.
Research Fellows . .	Dr. C. S. Belshaw; Mr. R. Penny; Dr. K. E. Read (resigned May, 1953).
Research Assistants . .	Dr. P. Lawrence; Miss J. I. Craig.

ORGANIZATION.

In its "blueprint" form the organization of the Department was in the main designed to meet two requirements; first, to combine theoretical research, concerned with the principles and methods of anthropology, with specialized research in particular areas of the Pacific; secondly, to include certain auxiliary disciplines which have become indispensable in modern anthropological research. The balanced representation of all these interests, as relevant in actual research as in the training of research workers, has not yet been achieved. At the moment the general theoretical approach is well represented; so are certain area interests (New Guinea, the Solomons, Fiji) and two "auxiliary" disciplines (primitive economics and social psychology). But the Department lacks as yet an expert on one or the other South-East Asian society as well as a linguistic specialist, gaps which may for some time remain unfilled.

The broad research interests pursued in the Department, which also extend to the study of modern society, received official recognition when Council agreed to rename the Department of Anthropology "Department of Anthropology and Sociology". The combination of the two subjects, common in American universities, recommended itself for several reasons. Methodologically, the two disciplines are closely allied, methods developed in one field being frequently used in the other. Since no other university in Australia has a Department of Sociology, it seemed desirable that the National University should make a beginning in this field, enabling interested scholars to acquire the necessary training and research experience. It was not contemplated that sociology should for ever be tied to anthropology; but for the initial period, during which the new subject could be "put on the map", its combination with anthropology seemed the best solution.

RESEARCH.

Field research centred primarily upon New Guinea and the Islands, and upon the problems of social organization and control, and of culture change and contact. The study of social organization was intended to lead gradually to a typology of the social systems existing in the Central Highlands; the study of one type of society has been completed (in the course of two expeditions by Dr. Read), another was started towards the end of the year (by a scholar, Mr. Salisbury-Rowswell). The study of social change had two foci: one was on economic change; here a field investigation previously carried out (by Dr. Belshaw) had reached the "writing-up" stage. The second focus was on a religious "contact" phenomenon, the Cargo Cult of New Guinea. It was studied in three areas, one in the centre of the main

spread of the cult, the other two bracketing that area (the investigations being by Dr. Lawrence, a former scholar and present Research Assistant, and another scholar, Mr. Burridge). A further study of social organization, in an area which had suffered marked depopulation—New Ireland—was due to begin (carried out by a student, Miss Ballingall).

Two field studies were independent of this specific research programme. The first, concerned with the social organization of the Australian aborigines of Groote Eylandt, was undertaken by a scholar of the Department (Mr. Worsley), whose projected field work in New Guinea was made impossible by practical reasons. The second investigation, by Dr. Stanner, was the re-study of an Australian aborigine tribe whose social organization he had investigated some fifteen years previously. Here a related project may be mentioned which, though it did not properly belong to the activities of the Department, was undertaken so-to-speak with its blessing and under the auspices of the University. It was carried out by the Adviser of the School of Pacific Studies, Professor Firth, helped by an assistant, and consisted once more in a re-study, namely, of Tikopia, the scene of Professor Firth's first field work. Both Professor Firth's and Dr. Stanner's studies may be expected to provide valuable information on the general problem of social change.

The final research projects of the Department were of a more strictly sociological nature. The first (in which Miss Craig took a leading part) was concerned with the cultural assimilation and social integration of European migrants. At the end of the year the pilot stage of the study was completed, having provided a first set of data, based on interviews and questionnaires; this, in turn, made possible a more precise definition of the salient problems as well as improvements in the method. The second project was aimed at the study of "social communication" and had only reached its first phase—a pilot study (carried out by Mr. Penny) in a Victorian rural community. The pilot study, dealing with a relatively simple situation, in a community governed by largely uniform interests, was again meant to lay the foundations for a more precise conception of problems and methods.

OUTSIDE ACTIVITIES.

Members of the Department contributed in various ways to the work of scientific organizations in Australia and abroad, and were also, in some cases, called upon to carry out research for or offer advice to Government bodies.

Nearly all members of the Department took part in the A.N.Z.A.A.S. meeting in Sydney, reading papers on a number of subjects. Miss Craig represented the Department at a meeting of the Summer School of Political Science in Canberra. Professor Nadel, on the invitation of the Wenner-Gren Foundation, attended the International Symposium on Anthropology in New York, in June, 1952. He was also commissioned by the Social Science Research Council to prepare a report on current sociological research in Australia, to be submitted to the International Sociological Organization. The preparation of the report served indirectly to establish closer contacts between the Department of Anthropology and Sociology and all the Departments in the State Universities concerned with research of a broadly sociological kind.

Dr. Stanner was invited to give evidence before the Papua and New Guinea Customs Inquiry Committee. The Government of Fiji sought the help of the Department for research in rural indebtedness; though the project could not at once be undertaken, it remained "on the books" of the Department. The South Pacific Commission similarly entrusted the Department with a study of Native Entrepreneurship in the Pacific Islands, the execution of which lies yet in the future.

PUBLICATIONS.

- C. S. Belshaw.—"Community Development in Papua." *Australian Outlook*, vol. 6, No. 1.
 C. S. Belshaw.—"Port Moresby Canoe Traders." *Oceania*, vol. XXIII, No. 1.
 S. F. Nadel.—"Witchcraft in Four African Societies." *American Anthropologist*, vol. 54, No. 1.
 K. E. Read.—"The Nama Cult of the Central Highlands, New Guinea." *Oceania*, vol. XXIII, No. 1.
 W. E. H. Stanner.—"The Need for Departments of Sociology in Australian Universities." *Australian Quarterly*, vol. XXIX, No. 1.
 W. E. H. Stanner.—"On the Next Phase of British Colonial Policy." *Australian Outlook*, vol. 6, No. 2.
 P. M. Worsley.—"N. N. Mikloukho-Maclay, Pioneer of Pacific Anthropology." *Oceania*, vol. XXII, No. 4.

III. GEOGRAPHY.

STAFF.

Head of Department.. Professor O. H. K. Spate.
 Reader in Geomorpho- Mr. J. N. Jennings.
 logy
 Research Fellow .. Mr. H. W. King.

ORGANIZATION.

The Department in 1952 was still in the preliminary stages of organization and reconnaissance, which at the time of writing (May, 1953) are beginning to bear fruit in solid work. Nevertheless, as will be seen below, a beginning was made on actual research. The appointment, in October, of a Reader in Geomorphology, marked an important step in the development of the Department. The map collection was built up to over 3,000 sheets, and a preliminary catalogue compiled; much cartographic and surveying equipment was purchased or ordered—so much that the problem of storage and working accommodation is already becoming acute. Outside contacts were numerous and fruitful, and the Department may claim to have already made its mark in the small world of Australian professional geography.

RESEARCH.

The activities of the Department are envisaged as falling under two main heads: the Pacific proper, and the Australian mainland.

It has proved difficult to find personnel of sufficient competence and general experience to be launched out into the Pacific on their own. Professor Spate visited New Guinea again in April for the Department of Territories, and this reconnaissance at least served to indicate two feasible and useful short-term pieces of research (European farmers of the Lower Markham; agricultural geography of the Gazelle Peninsula) which will probably be carried out early in 1954. Professor Spate also began the preliminary investigations for a long-term project, the history of the Australian "cultural landscape".

Geography in Australia has developed a marked bias towards agricultural economics. This is a very important aspect of the subject and must not be neglected; at the same time geography has far wider cultural implications and the Department should proclaim and maintain a strong interest in the less strictly applied branches of the subject.

Work is in progress on both the agro-geographical and the less utilitarian aspects. Mr. R. K. Wilson (a Scholar) is studying the principles of land-use classification, with special reference to Victoria. The standard world-classifications are mainly American in origin, and for much of the world they have been applied in a somewhat rough-and-ready way. The intensive study of the modifications necessary in Australian conditions may well raise some points of general principle. In order to get first-hand acquaintance with American workers and their methods, Mr. Wilson left in December for a six months' visit to the United States. He has been mainly at the Department of Geography in the University of Wisconsin (one of the three or four leading departments in the U.S.A.), and is visiting other Universities as well as the Bureau of Agriculture in Washington.

Mr. H. W. King is working on urban geography in south-east Australia. This involves (i) an intensive study of almost every settlement, other than homesteads, within an arbitrarily defined area of the Southern Tablelands (Yass-Goulburn-Braidwood-Cooma) and (ii) sample studies of types of urban development, such as coastal resorts, not represented in the main area. Some of the maps required in the presentation employ interesting and original cartographic devices.

Mr. F. H. Bauer (a Fulbright Scholar) is engaged on the physical, human, and historical geography of Kangaroo Island, South Australia. Mr. Bauer was trained under Professor Carl Sauer (University of California) whose School has produced perhaps the most stimulating and fundamental geographical thinking of the English-speaking world. Kangaroo Island is an area of great physical and historical interest; the application of Sauer's principles to the intensive study of such an area cannot fail to be of great interest to geographers generally. It would be ungracious not to express gratitude to the Department of Geography at Adelaide for unstinted co-operation in this project; without the base-facilities offered by that Department Mr. Bauer's task would be much more difficult.

The Department's share in the general training and teaching programme of the School presented a number of technical problems. Apart from some general lectures it proved difficult to meet the diverse needs and interests represented in the University. In the light of the year's experience it was planned to concentrate in the future, apart from occasional lectures, on the provision of elementary technical instruction of use to students of other disciplines; e.g., cartographic method for demographers, simple survey for anthropologists, &c.

OUTSIDE ACTIVITIES.

For a continent so geographically conditioned in its everyday life, Australia has been extraordinarily late in developing academic geography. In the last two years there has been a most encouraging change in this respect, of which the establishment of a Chair in the Research School of Pacific Studies is itself an evidence. From the beginning it has been realized that by its location and its freedom from undergraduate teaching burdens, the Department is well fitted to assist in the building up of strong Departments in the State Universities as well as in supporting general interest in geography. These efforts were pursued keenly and fruitfully.

At the A.N.Z.A.A.S. meeting in Sydney members of the Department presented several papers. A final, and important "outside activity" has been Professor Spate's joint editorship of *The Australian Geographer*, the journal of the Geographic Society of New South Wales. This is the only "professional" geographical periodical in Australia, and the main outlet for the work of the increasing number of Australian academic geographers.

PUBLICATIONS.

J. N. Jennings.—"Snaefell, East Iceland." *Journal of Glaciology*, Vol. II., No. 12.

O. H. K. Spate.—"The Indian Village." *Geography*, Vol. XXXVII., Part 3.

O. H. K. Spate.—"Geomorphological Problems in India." Indian Geographical Society Silver Jubilee Volume.

O. H. K. Spate.—"A suggested Regional Division of the Indian Sub-Continent." *Indian Geographical Journal*, Vol. XXVI., Part 1.

O. H. K. Spate.—"Toynbee and Huntington: A Study in Determinism." *Geographical Journal*, Vol. CXVIII., Part 4.

IV. PACIFIC HISTORY.

STAFF.

Head of Department ..	Professor J. W. Davidson.
Research Fellow ..	Mr. R. P. Gilson.
Research Fellow ..	Dr. F. J. West.
Research Assistant ..	Miss D. F. Crozier.

ORGANIZATION.

During the year under review the University had a joint department of Pacific and Far Eastern History, though for academic, as distinct from administrative, purposes it functioned in two sections. Towards the end of the year the initial steps were taken towards separating the two sections also administratively and creating an independent department of Far Eastern History, with Mr. Fitzgerald as head. At the same time, the University took note of the informal collaboration which had been established between the two sections of the department and the Department of Australian History in the School of Social Sciences. The Board of Graduate Studies agreed that, with the completion of the change, a more formal recognition should be given to this History Committee, as the principal means of co-ordinating matters of organization, teaching and research in the historical field.

At the beginning of the year the academic staff of the department consisted of Professor Davidson and Miss Dorothy Crozier (Research Assistant). Two Research Fellows, Dr. F. J. West and Mr. R. P. Gilson, were appointed during the year. At the time of his appointment, Dr. West was engaged in research at Cambridge on the administrative history of Anglo-Norman England. He has come to Canberra to study the impact of Western political and administrative institutions on Pacific Islands societies. Mr. Gilson, whose earlier academic training had been primarily in the fields of political science and anthropology, had already been working for several years within the field of the department's research interests. At the time of his appointment he was on the point of completing, in London, a study of the administrative history of the Cook Islands.

Three Scholars appointed before the formation of the department continued their research in other universities: Messrs. R. B. Joyce and D. J. Mulvaney at Cambridge; and Mr. G. H. Nadel at Harvard. Mr. E. S. Crawcour had been elected to a Scholarship in the department during 1951 but the supervision of his research was transferred to the Far Eastern History section in 1952 owing to the character of his research topic. Mr. Gilson was a Scholar-elect until his appointment to a Research Fellowship.

The approved establishment of the department provides, in addition to the staff appointments mentioned, for a Reader, a Senior Research Fellow, and a further Research Fellow. These positions were still unfilled at the end of the year, no persons with the appropriate qualifications having become available. The appointment of a Research Fellow has, however, since been made, and it is hoped to make a further, senior, appointment during 1953.

RESEARCH.

The Department of Pacific History intends, in the course of time, to cover the history of the Pacific Islands fairly comprehensively and to enter the field of South-East Asian history selectively, with special attention to problems analogous to those also found in the islands. The emphasis in all cases will be upon problems relating to the contact between Western and indigenous cultures. Members of the department, both staff and students, will be concerned with the adaptation of ideas and institutions resulting on both sides from this interaction. From the point of view of method, the department is specially interested in devising ways of gaining a fuller understanding of such contact situations than is possible by using normal historical techniques alone. This involves the study of the attitudes and forms of organization of

indigenous peoples whose experiences are only imperfectly recorded in written documents and imperfectly expressible in Western concepts. It brings the department into close contact with colleagues in other disciplines, especially anthropology. In many cases, it will require the supplementation of documentary research by field research.

The present projects of the department are in line with this general definition. Professor Davidson, apart from completing studies begun before coming to Canberra, is undertaking research into the evolution of political institutions in Western Samoa since the first arrival of Europeans in that area. Miss Crozier is undertaking a similar study in relation to Tonga, but with the primary emphasis upon social and economic, rather than political, factors. Mr. Gilson has begun a study of changes in leadership in Samoan society in the period of European contact. Dr. West is studying the establishment of administrative control in the New Guinea central highlands. Other projects already envisaged will carry this type of study into further areas of the Pacific during 1953.

OUTSIDE ACTIVITIES.

Professor Davidson visited New Zealand in August as guest speaker at the Convention of the New Zealand Institute of Public Administration. He also read a paper to the History Section at the Sydney meeting of A.N.Z.A.A.S. and lectured for the History Department in the University of Melbourne.

Miss Crozier went to Fiji in May for a year to undertake a survey of the Western Pacific High Commission archives. This project was worked out jointly by the University and the High Commission. Miss Crozier remains a member of the department, but the University is partially reimbursed by the High Commission for the expenditure involved. Miss Crozier will present the High Commission with calendars or lists of some of the more important series of documents in its custody and a plan for the future organization and custody of its archives. From the point of view of the University, Miss Crozier's work is of direct value to research. It is also regarded as a trial project, which, it is hoped, will interest other territorial administrations in archives work. A large body of historically valuable records exists in the Pacific territories. Little of it is properly classified or even adequately cared for. The department hopes to be able to give encouragement and technical assistance to governments willing to take steps to remedy this situation.

PUBLICATIONS.

J. W. Davidson.—"The Price of Political Dependency." *Australian Outlook*, vol. VI., No. 2.

J. W. Davidson.—"The Administrative Consequences of Modern Colonial Policies." *New Zealand Journal of Public Administration*, vol. XV., No. 1.

V. FAR EASTERN HISTORY.

STAFF.

Reader	..	Mr. C. P. FitzGerald.
Research Fellow	..	Dr. J. Ackroyd.
Research Assistant	..	Miss S. Rimsky-Korsakoff.

ORGANIZATION.

During the year 1952 the present Department of Far Eastern History functioned as a sub-department of Pacific History. Though administratively only a section of another department, Far Eastern History was independent in its research programme and recruited its own staff. The staff was augmented at the beginning of the year by the appointment of Dr. Ackroyd as a Research Fellow specializing in Japanese studies. In July Miss Rimsky-Korsakoff joined the Department, her duties including the translation of articles from the Chinese periodical press so as to furnish the Department with current information on Chinese affairs. In the case of subjects of wider interest, the translations were circulated in the University to interested Departments. There has, in recent months, been increasing difficulty in receiving a continuous supply of such periodicals but it is hoped that this can be overcome in the present year.

A further appointment was made towards the end of the year; Mr. B. McKillop a new Research Fellow, comes from Cambridge and is expected to take up his appointment early in 1953.

RESEARCH.

The research of the Department covered a variety of subjects which, at this early stage of its development, were not yet fully integrated into a coherent programme, though this will no doubt gradually evolve.

Dr. Ackroyd was working on 19th century Japanese history and was preparing to continue her research in libraries and archives in Japan. A Scholar (Mr. E. S. Crawcour) was working in Japan to collect material for his research on the Role of Small-Scale Industry in the Japanese Economy. Another Scholar (Mr. N. Barnard) carried out research on Feudalism in Ancient China. Mr. McKillop is expected to continue his study of the Sung period.

Mr. FitzGerald completed a study concerned with the Chinese 7th century Empress Wu, on which he had been working for some time previously. He also carried out preliminary investigations into the history and origin of an image of a Chinese deity unearthed in Darwin some years ago. There seems reason to suppose that this discovery, whose significance had hitherto been neglected, may be evidence of an early visit to the shores of Australia by Chinese vessels, possibly in the 16th century or even earlier. Research on this subject is continuing and it is hoped to examine and compare material in museums in other parts of the world in order to establish a date for the discovery in Darwin.

OUTSIDE ACTIVITIES.

Mr. FitzGerald gave two short series of lectures on Chinese History in the University of Melbourne, in the Department of History and the Department of Political Science.

PUBLICATIONS.

C. P. Fitzgerald.—*Revolution in China*. Cresset Press, London.

VI. INTERNATIONAL RELATIONS.

STAFF.

On leave	..	..	Professor W. R. Crocker.
Senior Research Fellow			Lord Lindsay of Birker.
Research Fellow	..		Mr. G. R. Storry.

ORGANIZATION.

The staff position altered considerably during the year. Professor Crocker, the Head of the Department, left in May, 1952, on two years' leave of absence to take up the position of Australian High Commissioner in India, and Lord Lindsay became acting Head of the Department. The former Research Assistant, Mr. K. W. Thompson, left the department at the same time. Mr. Storry, a former Scholar, was appointed to a Research Fellowship in January and took up his position in Canberra in June, 1952.

RESEARCH.

The work of the Department of International Relations differs somewhat from that of other departments in that International Relations is not really an academic discipline with its own methods or body of theory, but a field of study in which there are many problems of both practical importance and theoretical interest which, considered by themselves, might as logically be classified under some other subject, such as contemporary history or social philosophy. For example, both Mr. Storry's thesis (written when a Scholar) on the development of extremist groups in pre-war Japan and his present study of the development of Japanese political parties in the post-war period are, strictly speaking, in the field of recent and contemporary Japanese history; but they have a very direct relevance to international affairs because these internal developments in Japan have had and are likely to have a decisive influence on Japanese foreign policy. Again, Lord Lindsay's study of the development of the Chinese Communist Party is, strictly speaking, within the field of recent Chinese history; but in fact these developments turn largely on the relations between two rival régimes in China and the actions in China of Japan, the United States and Russia. Also, these historical developments are important as determinants of present policies, both Chinese and American, in the Far East. Professor Crocker's work on the setting-up and organization of the United Nations overlaps less with other subjects. However, his projected study of "force" in international affairs closely bears on Social Philosophy; so does the research into political extremism on which Lord Lindsay has been starting.

In the circumstances the general policy of the Department has been to choose topics for research according to their practical importance and their relevance for Australia. Thus, the contemporary history problems selected have been and are likely to be those connected with the Pacific area and with the countries north of Australia.

As regards detailed work, Professor Crocker, before his departure, completed the manuscript of a work on the establishment and organization of the United Nations. Lord Lindsay was working on a study of the development of the Chinese Communist Party since 1937. He also wrote a number of papers on current problems (some of which are now being revised for publication). Mr. Storry revised his thesis on the rise of Japanese extremist movements in the pre-war period to make it more suitable for publication and started on his new study of political parties in post-war Japan.

OUTSIDE ACTIVITIES.

Because the work of the department is connected with contemporary international problems, its members are often called on for outside work. In 1952, Professor Crocker was compelled to cut down engagements for lectures because he was fully occupied with work in preparation for his new position. Lord Lindsay read a paper to the A.N.Z.A.A.S. meeting at Sydney on "Rationality and Extremism in International Affairs", and gave lectures to branches of the A.I.I.A., university groups and other organizations. Mr. Storry gave several lectures to A.I.I.A. branches and other groups.

THE LIBRARY.

ACCESSIONS.

(a) *Books and Pamphlets in Western languages—*

In library at 31st December, 1951	..	..	..	..	..	50,405
Accessions during 1952	..	..	..	..	..	12,869
In library at 31st December, 1952	..	..	..	..	..	63,274
Gift material totalled 3,543 items.						

(b) *Books and Pamphlets in Oriental Languages.*—During the year small additions were made to the original collection noted in the previous report. Following on the appointment of Mr. K. C. Ho as Librarian-in-charge of Oriental Books and Manuscripts, steps are being taken towards compiling an accurate check list of the contents of the Oriental collection.

GIFTS.

The amount of gift material received—the 1952 figures were nearly double those for 1951—will undoubtedly tend to increase as the University becomes more widely known. The publication of a university research journal would enable the Library to establish exchange relations with many institutions but it is fully realized that this of itself is no valid reason for the establishment of such a journal. An interesting bequest to the Library was a collection of material from the estate of the late Alexander James Macdonald. Mr. Macdonald was at one time Assistant to Walter B. Griffin, Federal Director of Design and Construction (of the Federal Capital), and the bequest comprises articles in periodicals by various authors including Mr. Griffin, parliamentary papers, private papers, and plans, dealing with the selection of Canberra as the site of the Federal Capital, the various designs submitted, problems of water power, &c.

Working through the University's representative in London, the Library has obtained from the British National Book Centre useful works from the duplicate collections of various British libraries.

The following gifts were outstanding:—

- (a) The Librarian, University of Queensland.—Five hundred and twenty-three volumes comprising Debates, Papers, Votes and Proceedings of the Parliaments of Queensland and New South Wales.
- (b) The Clerk of the Legislative Assembly, Victoria.—Two hundred and sixty volumes comprising Votes and Proceedings, Papers, &c., of the Parliament of Victoria.
- (c) Australian and New Zealand Bank.—*Australasian Insurance and Banking Record*, Vols. 1-74: 1877-1950. Bound.
- (d) Professor P. A. Moran.—Approximately 100 volumes of important mathematical works.
- (e) Baker Library, Harvard University.—Approximately 300 volumes, mainly economic. (Through the interest of Mr. N. G. Butlin.)
- (f) Library of Congress.—Several hundred volumes, mainly economic.
- (g) Carnegie Endowment for International Peace.—Eighty-eight volumes.
- (h) The Librarian, Johns Hopkins University.—Collection of Johns Hopkins University studies.

SERIALS.

In the last report it was stated that the requirements of the Research School of Physical Sciences for serial literature were for the most part satisfied. However, the subsequent establishment of a Department of Geophysics within the School created a demand for periodicals in the fields of geology, geophysics and mathematics and active steps were taken to meet requirements. Current subscriptions were placed and by the end of the year back sets of a number of the more important titles had been acquired. It is interesting to note that much of this material is of importance to the Department of Statistics (Research School of Social Sciences) and Geography (Research School of Pacific Studies).

The Library made considerable progress in meeting the requirements of the John Curtin School of Medical Research, and by the end of 1952, of a list of just over 300 serials originally submitted by heads of Departments, full requirements to date had been met in all but about twenty titles.

Prior to 1952 it had been particularly difficult to determine the serials requirements of the Research School of Social Sciences and the Research School of Pacific Studies. With the coming of academic staff the departmental pattern is becoming clearer, and having regard to the holdings of the Commonwealth National Library, the Library is endeavouring to obtain sets considered essential for the proper working of these schools.

LOANS.

The number of recorded loans is some measure of the use made of the Library. In 1952 they numbered 6,100 (3,200 in 1951). Books borrowed from other libraries for the use of the staff amounted to 465, just over one-half of which were obtained from the Commonwealth National Library.

PRESENT ACCOMMODATION.

In the later half of 1952 it became apparent that the accommodation for books in the Old Hospital Buildings would soon be completely occupied. December saw the completion and handing over to the Library of the two Romney huts, each 96 feet by 35 feet, referred to in the previous Report. I decided to use these huts for the storage of bound sets of serials, and to use the stacks in the Old Hospital Buildings entirely for the storage of books. By the end of December the serials had all been moved to the huts and re-arrangement of the book shelves will take place early in 1953. It is estimated that the present buildings will provide room for accessions for the next four years by which time it is hoped that permanent quarters will be built. The huts are lined and it is anticipated that the books will not suffer from extremes of heat and cold and humidity.

Following the transfer of the staff of the Research School of Physical Sciences from its original quarters to its permanent building the Library obtained the use of two additional rooms. The Oriental collection which formerly could not be displayed was transferred to one of the rooms and preliminary steps were taken to fit up the second room as a statistical library in which persons working on statistical material would have first-class accommodation. It is intended to transfer to this room all parliamentary papers, statistical records, &c., most of which are folio in size and therefore bulky, to provide workers with tables large enough to enable them to use several volumes at one time, and to provide space for a computing machine. The room is expected to be available early in 1953. This innovation in Australian university library practice will be warmly welcomed.

FUTURE ACCOMMODATION.

The immediate space difficulties of the Library have now been relieved but within a few years the University must provide a permanent library building. There is no need to stress the fire hazard—it is conceivable that the fire brigade's water would be even more damaging than fire itself. Although still a comparatively small one the book collection is extremely valuable even in terms of money and its loss would be irreparable. The remarks of those who see the Library for the first time are convincing evidence that the University has been fortunate in obtaining, at this late stage, much of the material to be found within its walls, and most of it would be difficult if not impossible to replace. The fire risk, however, is only one aspect of the matter. It is a fact that in the present buildings, however successful in some respects adaptation has proved, the Library staff cannot adequately provide a number of desirable services. Chief among these are adequate reading space within the stack area and proper space for the display of reference material and reference-room service. The University must first select a site. The present report is not the place for discussion of this question but it is hoped that a site will be finally determined in 1953 and that as soon as practicable the University will appoint an architect for the building.

LOSSES.

A complete stock-taking of the Library was done in February, 1952. Eight volumes could not be accounted for but following usual library practice they will not be written-off unless they are still missing in 1953. Members of the academic staff have freely expressed their appreciation of the absence of restrictive rules, and to avoid the necessity for such it is hoped that losses will remain at a minimum.

BINDING.

Because of staff difficulties and shortage of materials binding firms were not anxious for new business in the immediate post-war period. In common with other libraries the Library of this University experienced trouble in keeping binding up to date. In 1952 the position eased considerably and arrears in binding were being rapidly overtaken.

STAFF.

There were two resignations at the end of the year and it was expected that the vacancies would be filled by local residents who had recently matriculated. Including the Librarian-in-charge of Oriental books, the Secretary to the Library, and a typist the staff numbered nineteen, of whom ten were university graduates. One member of the staff holds the Qualifying Certificate of the Library Association of Australia, four the Preliminary Certificate, and one the Fellowship of the Library Association (Great Britain). Two others have qualified in part for the Qualifying Certificate.

It is generally recognized that the efficiency of the Library is largely a direct function of the efficiency of those employed in book selection, cataloguing and classifying. The officers concerned rarely come into direct contact with users of the Library but their work demands considerable knowledge, judgment and skill, which have been freely given.

It is pleasing to note the added awareness of the academic staff that members of the Library staff are much more than managers of books. The inquiry room is inadequate in size to house the reference material which is needed there but the demands on the officer on duty are continually increasing. It is already evident that an adequate reference and inquiry room must be a feature of the permanent building.

The Librarian wishes to pay tribute to the work of members of the staff and in particular to thank the Deputy Librarian and Head of the Cataloguing Department for their devotion to the welfare of the Library.

THE AUSTRALIAN NATIONAL UNIVERSITY.
BALANCE-SHEET AS AT 31ST DECEMBER, 1952.

<i>Liabilities.</i>				<i>Assets.</i>			
	£	s.	d.		£	s.	d.
Current Liabilities—				Fixed Assets—			
Sundry Creditors	..	..	..	Buildings and Properties—			
Accumulated Funds—				Buildings ..	632,884	1	5
Capital Works—				Dwellings ..	500,455	8	11
As at 1st January, 1952	..	£	s. d.	Service Installations ..	..	..	1,133,339 10 4
Add—Grant Received 1952	..	2,146,525	19 9	Research Equipment—	..	..	79,199 9 5
Special Appropriation—				The John Curtin School of Medical Research	114,530	15	2
As at 1st January, 1952	..	291,671	19 4	The Research School of Physical Sciences	318,832	19 4	
Add—Transfer from Income and Expenditure	..	1,216,525	19 9	The Research School of Social Sciences ..	1,238	1	3
Account ..	..	107,254	3 7	The Research School of Pacific Studies ..	1,216	3	11
				The Library—	..	..	
Trust and Special Funds—				Books and Periodicals ..	141,111	15	5
Reserves ..	..	398,926	2 11	Library Equipment and Shelving	12,071	15	8
					153,183	11	1
				Furniture, Fittings and Office Equipment—			589,001 10 9
				Residential Properties ..	11,044	7	6
				Office and Research Buildings ..	72,066	11	5
				Halls of Residence—			83,110 18 11
				University House—			
				Buildings ..	473,011	2	6
				Furniture and Equipment ..	85,437	4	3
				Brassey House ..	17,348	5	2
				Motor Vehicles ..	..	..	575,796 11 11
				Miscellaneous Equipment ..	..	..	11,359 19 7
				Cafeteria ..	..	..	2,535 14 4
				Current Assets—	..	..	79 11 4
				Sundry Debtors and Income Due	..	..	6,646 16 7
				Stock—Central Store ..	..	..	28,896 8 10
				Cash—	..	..	
				Commonwealth Bank of Australia, Canberra	24,086	1	10
				Commonwealth Bank of Australia, London	1,357	16	2
				Held in Imprests ..	1,882	18	4
				Repayments ..	..	..	27,326 16 4
				Advances ..	..	..	11,640 9 5
				Special Advance—Department of Works	..	..	5,869 2 3
				Trust and Special Funds—	..	..	25,000 0 0
				(Cash and Investments)	..	..	34,629 2 10
							2,614,432 2 10

(Sgd.) M. L. OLIPHANT,
Acting Vice-Chancellor.

(Sgd.) R. A. HOHNEN,
Registrar.

THE AUSTRALIAN NATIONAL UNIVERSITY.

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31ST DECEMBER, 1952.

	£	s.	d.	£	s.	d.	£	s.	d.	Running Expenses. £ s. d.	Capital Works. £ s. d.
Income—											
Commonwealth Grants	..	..	..	..	..	..	..	..	..	525,000 0 0	930,000 0 0
Rentals Received	..	..	..	..	..	..	..	..	..	8,892 17 9	
Students' Fees Received	..	..	..	..	..	..	..	..	..	227 10 0	
Interest on Sale of Property	..	..	..	..	..	..	..	..	..	82 2 9	
									Total Income ..	534,202 10 6	930,000 0 0
Expenditure—											
Research Schools—(See analyses attached)—											
The John Curtin School of Medical Research	..	..	..	..	..	..	..	..	..	104,419 11 10	
The Research School of Physical Sciences	..	..	..	119,513	13	7					
The Research School of Social Sciences	..	..	..	47,351	18	7					
The Research School of Pacific Studies	..	..	..	51,697	19	3					
									322,983 3 3		
Scholarships and Seminars—											
Scholarships (General)	..	..	..	5,240	16	1					
Research Fellows in the Social Sciences	..	..	..	96	4	10					
Visiting Distinguished Scholars and Seminars	..	..	..	2,692	1	1					
									8,029 2 0		
The Library—											
Salaries and Allowances	..	..	..	13,841	14	11					
Provision for Superannuation	..	..	..	913	14	4					
Travelling Expenses	..	..	..	59	14	1					
Binding Charges	..	..	..	3,531	1	0					
Administrative Expenses	..	..	..	2,297	15	2					
									20,643 19 6		
Other Activities—											
General—											
Council Installation and Degree Expenses	..	..	..	3,429	13	8					
Communal Expenses, Old Hospital Building	..	..	..	302	19	0					
Cafeteria Expenses	..	..	..	215	6	2					
University "News"	..	..	..	126	17	11					
Subscriptions and Donations	..	..	..	713	0	7					
Art Fund Subvention	..	..	..	200	0	0					
Publications Subvention	..	..	..	500	0	0					
									5,487 17 4		
Administration Section, Canberra—											
Salaries and Allowances	..	..	..	37,720	17	4					
Provision for Superannuation	..	..	..	2,526	8	4					
Travelling Expenses	..	..	..	2,782	1	0					
Administrative Expenses	..	..	..	10,245	3	7					
									53,274 10 3		
London Office—											
Salaries and Allowances	..	..	..	3,638	0	4					
Provision for Superannuation	..	..	..	180	18	3					
Travelling Expenses	..	..	..	15	6	7					
Administrative Expenses	..	..	..	1,892	15	11					
									5,727 1 1		
Buildings and Transport—											
Travelling Expenses and Allowances (Architects and Technical Advisers)	..	..	..	758	0	1					
Ground Rents, Rates and Sundries	..	..	..	1,071	11	3					
Repairs and Maintenance	..	..	..	3,307	7	10					
Storage	..	..	..	514	12	6					
Rentals Paid	..	..	..	261	16	7					
Models, Plans and Sketches	..	..	..	7	8	4					
Operating Costs, Motor Vehicles	..	..	..	2,924	14	7					
Motor Transport Pool Expense	..	..	..	627	12	4					
Maintenance Pool Expenses	..	..	..	163	7	0					
Operating Costs, Power House	..	..	..	1,166	3	0					
									10,802 13 6		
									75,292 2 2		
									426,948 6 11		
									107,254 3 7		
Balances—											
Transferred to Accumulated Funds in Balance-Sheets as contra to asset acquisitions	..	..	..							107,254 3 7	930,000 0 0

THE AUSTRALIAN NATIONAL UNIVERSITY.

RESEARCH SCHOOLS—ANALYSES OF EXPENDITURE FOR THE YEAR ENDED 31ST DECEMBER, 1952.

	Expendable Research Materials.	Salaries and Honoraria.	Provision for Super- annuation.	Travelling Expenses.	Field Research Expenses.	Administration and Service Expenses.	School Scholarship Expenses.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ d. s.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
The John Curtin School of Medical Research—								
Biochemistry ..	1,569 13 4	9,804 4 0	532 5 7	238 7 8	..	913 18 8	..	13,058 9 3
Medical Chemistry ..	2,017 6 9	11,517 13 3	700 4 9	943 2 7	..	124 10 5	..	15,302 17 9
Microbiology ..	2,426 16 8	8,635 0 4	561 17 8	544 9 11	..	87 9 6	..	12,255 14 1
Physiology ..	2,266 16 10	5,487 10 1	367 17 6	214 2 3	..	12 4 11	..	8,348 11 7
Experimental Path- ology ..	..	3,407 7 10	218 15 4	11 2 1	..	..	..	3,637 5 3
Animal Breeding Establishment ..	71 7 4	3,751 12 10	246 6 0	206 17 0	..	1,076 5 4	..	5,352 8 6
School Workshops ..	4,397 4 1	7,576 8 10	497 19 2	166 6 4	..	456 13 5	..	13,094 11 10
School Adminis- tration ..	..	7,355 13 1	249 13 8	308 9 10	..	15,216 3 11	10,239 13 1	33,369 13 7
Total, School	12,749 5 0	57,535 10 3	3,374 19 8	2,632 17 8	..	17,887 6 2	10,239 13 1	104,419 11 10
Research School of Physical Scien- ces—								
Experimental Phys- ics ..	10,421 7 3	18,214 2 4	1,394 5 8	335 5 8	..	791 15 11	..	31,156 16 10
Theoretical Physics ..	..	1,140 18 5	99 0 0	1 7 5	..	2 0 0	..	1,243 5 10
Geophysics ..	6,355 5 8	4,995 3 11	380 15 3	372 4 9	37 6 4	12 17 4	..	12,153 13 3
Radiochemistry ..	5,339 10 2	2,566 5 8	270 18 2	181 1 4	..	..	..	8,357 15 4
Astronomy ..	..	1,380 2 6	101 5 10	15 14 11	..	..	..	1,497 3 3
Administration and Workshops ..	22,082 9 0	24,859 13 9	1,724 17 0	1,489 3 5	..	11,148 16 3	3,799 19 8	65,104 19 1
Total, School	44,198 12 1	53,156 6 7	3,971 1 11	2,394 17 6	37 6 4	11,955 9 6	3,799 19 8	119,513 13 7
Research School of Social Sciences—								
Law ..	..	3,200 10 10	234 0 0	36 17 4	..	491 1 11	..	3,962 10 1
Economics ..	..	10,678 10 2	663 14 0	600 10 8	..	31 17 9	..	11,974 12 7
Political Science ..	0 8 0	4,006 6 2	80 2 10	62 3 2	..	..	..	4,149 0 2
History ..	..	4,130 7 9	276 12 4	173 9 6	..	..	..	4,580 9 7
Demography ..	7 4 0	4,307 10 7	368 15 0	99 1 0	83 13 9	..	..	4,866 4 4
Statistics ..	..	2,679 5 2	233 10 2	1 10 5	..	..	..	2,914 5 9
Social Philosophy ..	..	1,240 2 8	99 1 1	10 16 0	..	..	..	1,349 19 9
General Adminis- tration ..	..	1,200 8 0	25 15 0	4 18 4	..	6,604 4 11	5,719 10 1	13,554 16 4
Total, School	7 12 0	31,443 1 4	1,981 10 5	989 6 5	83 13 9	7,127 4 7	5,719 10 1	47,351 18 7
Research School of Pacific Studies—								
Anthropology ..	24 9 3	9,938 1 11	752 15 4	270 4 3	1,445 3 6	22 14 0	..	12,453 8 3
International Rela- tions ..	..	4,613 11 10	394 7 7	283 3 10	..	..	..	5,291 3 3
Pacific History ..	..	7,573 8 2	569 16 4	70 19 4	12 17 9	19 18 7	..	8,247 0 2
Geography ..	75 15 0	4,745 6 10	413 0 9	176 10 4	64 5 5	Cr. 17 14 5	..	5,457 3 11
School Adminis- tration ..	..	4,522 12 3	266 15 8	495 14 8	1,383 4 8	5,751 15 5	7,829 1 0	20,249 3 8
Total, School	100 4 3	31,393 1 0	2,396 15 8	1,296 12 5	2,905 11 4	5,776 13 7	7,829 1 0	51,697 19 3
Total, All Schools	57,055 13 4	173,527 19 2	11,724 7 8	7,313 14 0	3,026 11 5	42,746 13 10	27,588 3 10	322,983 3 3

BRASSEY HOUSE.

COMBINED TRADING AND PROFIT AND LOSS STATEMENT FOR THE YEAR ENDED 31ST DECEMBER, 1952.

	£	s.	d.	£	s.	d.
Total Income—						
Accommodation—Guests				13,510	11	4
Service Commissions				14	11	6
Staff Reimbursements—Board				1,084	10	4
				14,609	13	2
Less OPERATING COSTS—						
	Percentage of Income.					
Cost of Foodstuffs	25.08			3,664	11	7
Fuel	4.23			618	10	3
Hostel Maintenance and Cleaning	2.01			293	18	1
Domestic Staff Wages	48.65			7,108	2	9
Losses, Breakages and Replacements	.12			16	17	7
Laundry	2.96			433	1	4
Light and Power	1.41			205	15	7
Uniforms—Staff	.25			36	5	11
	84.71			12,377	3	1
Administration Expenses—				2,232	10	1
Administrative Salaries	3.30			488	10	1
Pay-Roll Tax	1.45			211	12	9
Insurance	.14			20	16	3
Workers Compensation Insurance	.64			93	5	8
Freight, Cartage and Travelling Expenses	.40			58	8	5
Posts and Telegrams	.05			6	14	6
Stationery and Printing	.56			81	7	7
Advertising	.05			7	13	6
Miscellaneous Expenses	.22			32	1	11
Telephone	.62			90	0	4
	7.43			1,090	11	0
Property Maintenance Rents and Services—				1,141	19	1
Rents, Rates and Services	7.05			1,030	15	3
Repairs and Maintenance	.75			109	7	5
	7.80			1,140	2	8
				Operating Profit	1	16
Less APPROPRIATIONS—						
Depreciation on Leasehold Improvements	1.49			217	15	2
Transition Expenses written back	2.29			334	9	3
	3.78			552	4	5
Transfers to Reserve Fund—				Loss	550	8
Leasehold Redemption Fund	2.55			373	5	8
Asset Replacement Fund	5.29			772	16	0
	7.84			1,146	1	8
				Net Loss	1,696	9
Details of Asset Replacement Fund—						
	£	s.	d.	%		
Bedding and Linen	1,984	17	5	10	198	9
China and Crockery	495	6	6	15	74	6
Silverware and Cutlery	130	5	0	5	6	10
Kitchen Equipment	580	2	5	5	29	0
Household Equipment	408	7	2	10	40	16
Office Equipment	66	3	0	5	3	6
Maintenance Equipment	27	19	0	5	1	8
Furniture and Fittings	4,189	9	9	10	418	19
					772	16

THE AUSTRALIAN NATIONAL UNIVERSITY.

BRASSEY HOUSE.

BALANCE-SHEET AS AT 31ST DECEMBER, 1952.

			<i>Liabilities.</i>			<i>Assets.</i>					
				£	s. d.	£	s. d.	£	s. d.	£	s. d.
Current Liabilities—											
Sundry Creditors	..	..	..	..	897 6 11	..	..	..	..	30 9 7	..
Total Current Liabilities	..	..	..	..	897 6 11	..	..	..	..	2 8 1	..
Reserve for Leasehold Redemption	..	..	..	..	653 4 11	..	..	..	..	364 6 5	..
Reserve for Asset Replacement	..	..	..	..	877 8 6	..	..	..	..	..	..
University Investment in Brassey House	..	..	..	..	1,530 13 5	..	..	..	..	273 9 9	..
Plus Accumulated Profits to 31.12.51	..	..	..	..	17,348 5 2	..	..	..	..	78 12 11	..
					775 6 1	..	..	..	..	432 15 0	..
					18,123 11 3	..	..	..	..	784 17 8	..
Less Loss on Trading, 1952	..	..	..	..	1,696 9 8	..	..	..	..	35 0 0	..
					16,427 1 7	..	..	..	..	..	1,217 1 9
						Fixed Assets—	..	..	..	..	1,217 1 9
						Bedding and Linen	..	..	..	..	..
						China and Crockery	..	..	..	3,023 5 3	..
						Cutlery and Silverware	..	..	..	528 19 6	..
						Kitchen Equipment	..	..	..	616 10 6	..
						Household Equipment	..	..	..	666 15 1	..
						Furniture and Fittings	..	..	..	493 6 3	..
						Office Furniture and Fittings	..	..	..	5,567 6 5	..
						Maintenance Equipment	..	..	..	67 16 0	..
							..	..	..	36 1 10	..
						Total Fixed Assets	..	..	..	..	11,000 0 10
						Intangible Assets—	..	..	..	..	..
						Leasehold Premium Unexpired	..	..	..	3,608 7 10	..
						Leasehold Improvements	..	..	..	1,669 9 5	..
						Transition Expenses	..	..	..	975 10 4	..
						Subsidy Account	..	..	..	384 11 9	..
						Total Intangible Assets	..	..	..	..	6,637 19 4
										..	..
										18,855 1 11	..