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#### DISCLAIMER

Users are warned that this historic issue of this publication series may contain language or views which, reflecting the authors' attitudes or that of the period in which the item was written, may be considered to be inappropriate or offensive today.

### Historic Memorials Committee

The Historic Memorials Committee was established in 1911 for the purpose of securing portraits of distinguished Australians who had taken an active part in Federation. Later the Committee decided to obtain portraits of all Governors-General, Prime Ministers, Presidents of the Senate, Speakers of the House of Representatives, and other notable Australians. In addition the Committee may commission, and has in fact commissioned, paintings recording special events connected with the Commonwealth Parliament.

The Committee comprises the Prime Minister (Chairman), the President of the Senate, the Speaker of the House of Representatives, the Vice-President of the Executive Council, the Leader of the Opposition, and the Leader of the Opposition in the Senate. An Art Advisory Board, comprising a group of artists, was established in 1912 to assist the Committee by advising on works of art to be commissioned by the Committee.

### Commonwealth Art Advisory Board

Since its beginning in 1912 the Art Advisory Board has always consisted of artists. At present there are five members. As well as assisting the Historic Memorials Committee the Board also advises the Government on the purchase of works of art for inclusion in the National Collection. In 1966-67, \$50,000 was provided for this purpose. The National Collection now contains over 1,200 works of art.

The Board, on behalf of the Government, also organises and finances exhibitions of Australian art in overseas countries. In addition, it financially assists the showing in State Art Galleries of major exhibitions from abroad or assembled by one or more State Art Galleries. In 1966-67, \$12,000 was provided to meet the costs involved in these exhibitions.

### SCIENTIFIC RESEARCH

A special article on Science and Technology in Australia, prepared by the Commonwealth Scientific and Industrial Research Organization of Australia, was included in Year Book No. 49 (see page 781).

### Outline of Research in Australia

#### Scientific research in Australia prior to the 1939-45 War

Interest in science goes back to the beginning of Australian history. Captain James Cook discovered the east coast of Australia when returning from a scientific expedition to the South Pacific, and one of his passengers was the President of the Royal Society, Sir Joseph Banks, who was the first of many naturalists to be fascinated by the unique flora and fauna of the continent. The Stone Age culture of the Aborigines drew the early attention of anthropologists. The Aboriginal boomerang was a source of interest to the Surveyor-General of New South Wales, Sir Thomas Mitchell, who attempted to apply its spinning characteristics in a 'boomerang propellor' for driving steamships.

Until the 1914-18 War Australian science rested on the individual accomplishments of a few outstanding men, working largely in isolation. Three names stand out in this period—Farrer, Hargrave and Mitchell. After years of patient work as a plant breeder, Farrer developed the first successful strain of rust-resistant wheat. Hargrave's experiments in aviation attracted world-wide attention. Mitchell, a hydraulic engineer, invented a thrust bearing which made it possible to increase greatly the motive power of ocean-going screw steamships.

During the first world war Australia followed the British example and set up, in 1916, the Commonwealth Advisory Council for Science and Industry which finally became the Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.). The Munitions Supply Laboratories formed in 1916 under the Ministry of Defence provided scientific services and undertook development tasks related to the supply of military material. Between the two world wars most of the systematic research done in Australia was carried out in the Council's laboratories. A little was done by some State departments of agriculture, but very little in the universities, which had not yet come to be regarded as research centres. Many of the most able Australian scientists were attracted to posts abroad.

#### Scientific research during and following the 1939-45 War

The situation changed with the onset of the 1939-45 War and the economic expansion which followed it. Until 1939 the activities of the Council for Scientific and Industrial Research had been concentrated in the biological sciences, stimulated by the needs of primary industry. With the war C.S.I.R.'s work expanded greatly and spread into the physical sciences, with particular attention to the technical problems of industrial production. Many products previously

imported, such as drugs and precision instruments, had to be manufactured locally, and much research and developmental work was necessary before this could be done. The work was carried out by C.S.I.R., by the Department of Supply, by university science departments, and by industrial firms. These wartime activities had permanent effects, particularly in the universities and in C.S.I.R.

As the following paragraphs indicate, Australian research continued to expand after the war, with the Commonwealth Government taking a significant role both in its own research activities and in furthering research in general. The establishment in December 1966 of the Commonwealth Department of Education and Science indicates the importance placed on research by the Federal authorities. There is no section of non-government research (universities, independent research institutions, industrial research, and individual research, workers) for which Government support is not now provided, although some of the schemes are as yet in their infancy.

#### **Australian National University and other university research**

In 1946 the Commonwealth Government established the Australian National University, whose statutory functions required it to 'encourage and provide facilities for post-graduate research and study, both generally and in relation to subjects of national importance to Australia'. The University's Institute of Advanced Studies is devoted to research and post-graduate training. The Institute comprises the John Curtin School of Medical Research and the Research Schools of Physical Sciences, Social Sciences, Pacific Studies, and Chemistry. The research activities of a teaching university are carried out in the University's School of General Studies. The growth of the National University, with its major emphasis on research and post-graduate training, introduced a new influence on the university scene which, apart from its own research activities, has provided an important stimulus, indirectly, for the growth of research in other universities. This was made financially possible by increased grants from the Commonwealth. Until 1936 only small *ad hoc* research grants had been made to the universities. In 1936 a five-year programme was inaugurated by which \$60,000 was spent annually on grants for research in the physical and biological sciences. This figure had grown to \$200,000 in 1950, after which the amount was absorbed in the new system of Commonwealth grants to the States for university purposes. In 1957 the report of the Committee on Australian Universities (the Murray Report) recommended increases in research funds and drew attention to the small number of post-graduate students. A further increase was approved in 1963, following the second report of the Australian Universities Commission. In 1965 the Commonwealth established the Australian Research Grants Committee to recommend and administer grants for individual research projects, mostly in universities. In 1964 the Commonwealth Government established the Queen Elizabeth II Fellowship Scheme for post-doctoral studies in the physical or biological sciences. Ten fellowships may be awarded annually to young scientists of exceptional promise and proved capacity for original work. The fellowships, which may be awarded to Australian or United Kingdom citizens, are tenable in an Australian university or approved research institution normally for two years.

The growth of university research is reflected in the increase of post-graduate studies. The Ph.D. degree was introduced into Australia only after the second world war, and the first such award was made by the University of Melbourne in 1948. Between 1948 and 1966 inclusive more than 1,900 Ph.D.'s were awarded in Australian universities. Some 600 higher doctoral degrees were awarded over the same period. During the year ended 31 July 1966, 336 Ph.D. degrees and 47 higher doctorates were awarded.

Research in the universities is mostly of a 'pure' or 'fundamental' character, although universities have also concerned themselves with 'applied' research directed to the solution of practical problems, e.g. in metallurgy, chemical industry, agriculture, and food processing. A recent example of co-operation between a university and a State government agency was the investigation carried out by the University of Melbourne into the production of town gas from the lignite of the Yallourn-Morwell deposits in Gippsland, Victoria. In 1959 the University of New South Wales established Unisearch Ltd., with the purpose of assisting by research and other suitable means the advancement, development and practical application of science to industry and commerce.

#### **Research by Government agencies**

The post-war growth of C.S.I.R.O. has proceeded in both pure and applied science. Although increasing attention is being paid to industrial problems, the major impact of C.S.I.R.O. activities is still in the field of primary production. Research on pasture improvement, for example, is estimated to have brought about a doubling of the high-quality pasture in the decade 1948-58, and the successful programme of rabbit control that followed C.S.I.R.O.'s work on myxomatosis brought about a notable increase in the numbers of sheep during the same period. Apart from C.S.I.R.O., the research activities of other Commonwealth agencies have grown substantially since the war. These include the Long Range Weapons Research Establishment set up in 1947 under an agreement with the Government of the United Kingdom and reorganised in 1955 as

the Weapons Research Establishment; the Munitions Supply Laboratories, later renamed the Defence Standards Laboratories; and the C.S.I.R.O.'s Division of Aeronautics which was transferred to the Department of Supply and renamed the Aeronautical Research Laboratories. (Details of the research activities of these establishments are given in Chapter 4, Defence, pages 86-8.) In 1954 the Atomic Energy Commission decided to set up its own research establishment at Lucas Heights, near Sydney. The Royal Australian Navy also maintains an experimental laboratory. Other agencies engaged in research include the Bureau of Meteorology, the Ionospheric Prediction Service and the Bureau of Mineral Resources, Geology and Geophysics. Attached to the Commonwealth Health Department are several institutions doing research work, e.g. the Commonwealth Serum Laboratories, The School of Public Health and Tropical Medicine, The Commonwealth Acoustic Laboratories, The Bureau of Dental Standards, The Commonwealth Health Laboratories, The National Biological Standards Laboratory, and the Commonwealth X-ray and Radium Laboratory. (Further particulars of these research establishments will be found in Chapter 16, Public Health, pages 561-6.)

Research work by State Government remains largely in the field of agriculture. In Queensland the great importance of the sugar industry is reflected in the work of the Bureau of Sugar Experiment Stations. Some co-ordination of research in agriculture is exercised through the Standing Committee on Agriculture, a joint Commonwealth-State body. In recent years some interest has also been shown in problems related to power generation, public health and water supply.

#### **Research in industry**

Research in industry has also expanded, though not at the same rate as in government agencies or the universities. Since 1955 several large firms have established their own central laboratories, and appreciable sums are being spent on research in the chemical, metals, sugar, and paper industries. To encourage this trend the Commonwealth Government has announced that it will make available a sum of \$6,000,000 a year for grants to firms willing to increase their expenditure on research and development. Special tax concessions apply to expenditure on research and development.

#### **Research in social sciences**

Research in the social sciences has developed largely since the war. Before 1939 such work was virtually confined to anthropology and economics, although educational research was carried out by the State education departments and by the Australian Council for Educational Research. The latter, which was established in 1930, is now mainly supported by Commonwealth and State financial grants. The need for a much wider scale of activity was one of the motives for the establishment of the Australian National University, with a Research School of Social Sciences and a Research School of Pacific Studies. In 1952 the Social Science Research Council was established, with support from the Carnegie Corporation and the Commonwealth Government, to encourage the advancement of the social sciences, to foster research and to subsidise the publication of studies. The Institute of Applied Economic Research, supported by private funds, was set up at the University of Melbourne in December 1962; its work ranges from the economics of industry to the economics of welfare. In 1961 the Australian National University set up the New Guinea Research Unit, based in Port Moresby, which is carrying out a range of investigations into economic and social change in the Territory of Papua and New Guinea. The first election held in the Territory in 1964 was the subject of a full-scale study. In 1961 the Commonwealth established the Australian Institute of Aboriginal Studies, for the organisation and finance of research on Aboriginal matters, largely within Australian universities. The Institute's own staff is small although its annual budget currently exceeds \$300,000. Despite these developments, the growth of research in the social sciences has been considerably slower than in the natural sciences. Its growth has, however, been stimulated by the establishment of new universities with strong interests in the social sciences, and by the increased demand for information about social changes arising from both public and private sources.

#### **Distribution of Australian research work**

Research in Australia has not, on the whole, been strongly concentrated in particular fields. Nevertheless, some fields have attracted more attention than others, either because of their special economic or social importance or because Australia offers particular facilities for pursuing them. The wool industry, mineral processing and the manufacture of paper from native hardwoods are examples of the former. The most notable example of the latter is radio-astronomy, for which Australia has special advantages because of its geographical position. The projected installation of one of the world's largest optical telescopes, to work in conjunction with radio-astronomical observations, will enable the exploitation of Australia's climatic advantages for optical astronomy. The combination will give Australia a premier position in this field of physical science. Hitherto the most notable achievements of Australian scientists have been in the biological sciences, as shown by the three Nobel Prizes won by Australians—Lord Florey for work on penicillin, Sir Macfarlane Burnet for immunology and Sir John Eccles for neuro-physiology.