



Academy puts the case for university research and scholarship

The Academy has urged the Federal Government to favour university research and scholarship in its plans for higher education.

In its submission, in April, to the Review of Higher Education Financing and Policy, the Academy emphasised the importance of research and scholarship and the vital contribution that science and technology have made to economic growth, the quality of life and the environment. The review was set up by the Minister of Employment, Education, Training and Youth Affairs, Senator Amanda Vanstone, and is being chaired by a retired Sydney school principal, Mr Roderick West.

The President of the Academy, Sir Gustav Nossal, stated, 'Our first concern was to highlight the vital role played by

the universities in basic research. Universities do most of Australia's basic research and without them the nation's infrastructure for innovation would be impoverished.

'We recognise the universities cannot stand still. The age of mass tertiary education has placed burdens on the universities and on their government paymasters that demand innovation in university management, research funding and teaching. However, the preponderance of the universities' funding must continue to come from the government, as it does in most comparable countries.

'The government's reduction of funding in last year's budget went far enough. There is no scope for further cuts.'

The Academy pointed out that the West committee needed to consider carefully which areas of research deserved assistance. It discouraged funding for individual academics who sought research assistance to improve their teaching. 'With the rapid advances in information technology, it can be argued that lectures are not the most suitable vehicle for transmitting information,' the submission stated. It should be possible for a good teacher to keep up with the implications of recent advances in knowledge without necessarily being involved in active research but they will need assistance to do so.

The Academy strongly supported a system of peer assessment of researchers

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Nobel poster launched

The joint winner of the 1996 Nobel Prize in physiology or medicine, Professor Peter Doherty, launched a poster describing his prize-winning work during the Australian Science Festival in Canberra in April.

Professor Doherty arrived at the National Press Club on an ACT Government bus decorated with his picture; the bus is being sponsored by the Institute of Advanced Studies at the Australian National University.

The major sponsor of the poster was the pharmaceutical firm, Eli Lilly Australia. Other sponsors were the Coordinating Commission for the Presence of Switzerland Abroad, the John Curtin School of Medical Research at the ANU, Novartis Australasia, the University of Queensland, the Australasian Society for Immunology, CSL Ltd, Reckitt and Colman Australia, AMRAD Corporation, Bristol-Myers Squibb Pharmaceuticals, and the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists.

Sir Gustav Nossal, left, Professor Peter Doherty and Ms Nancy Pritchard, of the Academy, with the Nobel Prize bus and poster.



The poster explains how Professor Doherty and Professor Rolf Zinkernagel discovered fundamental attributes of the immune system. It includes an interview with Professor Doherty. The aim is to help school students realise that Australian science can be world class.

Copies of the poster - which is free to schools - are being distributed through state, Catholic and independent school authorities and state science teacher associations.

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Published by the Australian Academy of Science, GPO Box 783, Canberra ACT 2601.

Honorary editor: Professor Neville Fletcher FAA; production by Green Words, Canberra. Other assistance: members of Academy committees and Academy staff.

Printed by Inprint, Brisbane.

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ISSN 1031-9204

Print Post Approved
PP 255003/00025

Database copyright workshop

A workshop on the World Intellectual Property Organisation's proposed treaty on the copyright of databases was held at the Academy on 18 April 1997. The workshop was organised by the International Copyright Section of the Attorney-General's Legal Practice and supported by the Academy.

Scientists fear that the proposed treaty would restrict researchers' access to information (see *AAS Newsletter* number 35). A discussion of the treaty

scheduled for an intellectual property meeting in Geneva in December 1996 was postponed. A committee of experts is due to meet in September 1997.

The workshop informed participants of the progress of the treaty, explained its purpose, scope and implications for the users and owners of databases, and provided a forum for the discussion of issues of concern. A full report will be in the next *AAS Newsletter*.

University research

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and research projects and was adamant that only the most gifted and able people, including junior academic staff, should qualify for funding to enable them to perform high quality and internationally significant research.

Rather than block grants for research infrastructure, the Academy favoured a system of competitive grants in this area based on research performance.

Recently the government increased and differentiated Higher Education Contribution Scheme fees. The submission warned that this could discourage worthy students from pursuing careers in science and engineering. The submission stated, 'It is crucial for the future international competitiveness of Australia that sufficient numbers of our best students are attracted into science and engineering courses'.

The Academy told the West committee that, while it favoured diversity in the university system, any vocational subjects offered in universities should have a rigorous academic foundation. Otherwise, such training should be the responsibility of TAFE or other non-academic colleges.

The submission argued that student demand and employer needs should determine the courses offered by a university. Management from a central bureaucracy must be avoided.

Chemists' submission

The Academy's National Committee for Chemistry prepared a separate submission to the review, addressing matters of particular concern to chemists. The chemists agreed with the Academy's submission on the substantial contribution that universities make to research, development and

innovation in Australia, and to international knowledge.

They stated that the country needs a mix of basic, strategic and applied research but the most important role for the higher education sector is to address basic research. There is a pressing need to upgrade basic research infrastructure.

The submission considered the importance of higher education to Australian society and the Australian economy, sources of finance for higher education, the structure of the university system and the shape of the new university.

The submission stated that an educated populace enables society to assess and process information, to discuss new developments which affect us, and to decide what to do in the future. The graduates of higher education institutions underpin the development of current industries and provide the initiative and ideas, in collaboration with others, for the creation of new industries.

However, the submission argues that, given our projected population growth, it is difficult to support the view that Australia needs 37 universities with full teaching and research roles. 'The higher education sector should not be unified,' the submission stated. 'There should be a national meritocracy supported by differential funding; not all universities should be funded equally.'

In the allocation of government funds, the chemists recommended that the nexus between student numbers and funding should be carefully re-examined and that different algorithms for university funding be investigated.

The submission also recommended incentives to produce quality secondary school science teachers.

Review of the public funding of research

In February the Academy wrote a letter to the Federal Government's review of publicly funded science and technology in Australia, suggesting mechanisms for the setting of priorities and the provision of policy advice. The review is being conducted by the Chief Scientist, Dr John Stocker, for the Minister for Science and Technology, Mr Peter McGauran.

In the letter, the President of the Academy, Sir Gustav Nossal, wrote, 'It is of the utmost importance that governments define in broad but clear terms the national goals that science and technology are to serve.'

No account of priority setting in science and technology was adequate unless it recognised the role of researchers, their organisations, funders and users in making informed decisions about the best use of resources. 'In other circumstances scientific quality should be the only criterion imposed by the resource providers, leaving it to the researchers to set the priorities in matters on which they are most expert.'

Some of the other points made in the letter were:

- Australia has a duty to add its portion to the growing body of the scientific understanding of the world. This is the cultural role of research.
- A sophisticated appreciation of the Australian economy is needed to understand the contribution of science and technology to innovation. In some cases Australians use new knowledge to generate new products, whether by manufacture in Australia or by licence to major firms overseas. More frequently, industry uses the expertise of people trained in high-quality research.
- The loss of the Factor (f) scheme for pharmaceutical research would not only reduce industry funding for research but would also throw into doubt the existing level of support for leading-edge biomedical research in Australia. A similar point can be made in relation to other industries.
- Within the bureaucracy there are strong constituencies for scientific expertise.

On the matter of expert advice on science policy, the letter said that the Prime Minister's Science and Engineering Council and the Chief Scientist needed the support of balanced, expert advice, on demand or in response to warnings of what was on the government's agenda. The Academy has recommended making the Australian Science, Technology and Engineering Council more like the US National Research Council. It would be more confined to the scientific and technical and would be driven by the experts, with less reliance on the initiatives of staff and consultants. It would be a private body working on long-term contract to the government.

Sir Gustav concluded, 'I also wonder whether the involvement of government departments in the delivery of programs aimed at increasing the public profile of science is appropriate. It would be more appropriate for the government to fund competent organisations to achieve their stated goals. Would the Nobel Prize be better conducted by the Swedish Government?'

Business needs science

The Academy has made a submission to the Federal Government's review of business programs emphasising the importance of research and development in keeping Australian business internationally competitive.

The Minister for Industry, Science and Technology, Mr John Moore, set up a review of the various forms of government assistance to industry in November 1996. The review is being chaired by the Chief Executive of TNT, Mr David Mortimer.

The Academy said that Australia can compete in the research business. Australia is increasingly seen as a low-cost research and development provider of excellence by some multinational companies.

In its submission, the Academy stated, 'The current trend towards short-term decision-making risks under-performance of research and development. Governments of developed and developing countries have recognised that they must support the whole continuum of

research from basic research to commercial development.'

The submission outlined the concept of market failure, which occurs when companies, which do not gain the full benefit of research, fail to invest in it. Governments have responded with incentives for private investment in research and with public funding for basic research in universities and research institutes. However, 'the declining infrastructure of our publicly funded research effort and the diminished career prospects of our best young researchers threaten the capacity of our basic and strategic research to support our economic and policy needs.'

The Academy argued that tax incentives are better for assisting research than subsidies or grants. The decision to reduce the 150 per cent tax deduction for research expenditure to 125 per cent had created uncertainty for businesses. A survey by Price Waterhouse showed that half the companies surveyed would reduce

their research expenditure by 20 per cent because of this change. This could also inhibit the interaction between scientists and industry in the Cooperative Research Centres Scheme.

The submission stated, 'Australia should note the policies of its economic peers and competitors and strengthen the programs that support technological innovation. In particular, the 150 per cent tax deduction for research and development expenditure should be restored or replaced by an equally beneficial tax credit scheme of the kind available in some other advanced economies, and the Factor (f) scheme maintained.' The Federal Government has announced a new five-year scheme to follow the Factor (f) scheme when it ends in 1999.

The submission said Australia can also derive benefit from technological innovation without starting new industries. Patented innovations can generate profits from deals with large companies.

Medals awarded at AGM

Seven medal winners were announced on the first day of the Academy's Annual General Meeting on 1 and 2 May 1997. Fellows elected in 1996 were admitted to Fellowship and new Fellows were elected. On the second day of the meeting, a symposium on information technology was held (see separate report).

Burnet Medal and Lecture

Professor Suzanne Cory received the Burnet Medal and delivered the Burnet Lecture. The medal is awarded every two years in honour of the Nobel Laureate Sir Macfarlane Burnet. Professor Cory's lecture was titled *Regulating cell proliferation and death: lessons from cancer*.

Professor Cory is Director of the Walter and Eliza Hall Institute of Medical Research and Research Professor of Molecular Oncology at the University of Melbourne.

Professor Cory is a molecular biologist whose research has ranged from basic questions about gene structure to the intricacies of the immune response and the development of cancer.

In 1976, using the new techniques of genetic engineering, she and her collaborator, Dr Jerry Adams, made a penetrating analysis of antibody genes which has helped to change the face of immunology. In 1981 they redirected their attention to the genetic accidents that cause cancer, discovering cancer-promoting genes. The current focus of her laboratory is the molecular regulation of cell death.

Professor Cory was elected a Fellow of the Academy in 1986 and of the Royal Society of London in 1992.

Lyle Medal

Professor Anthony Thomas was awarded the 1997 Thomas Ranken Lyle Medal. The medal is awarded once every two years to the author of outstanding research in mathematics or physics. The award was set up by the Australian National Research Council in 1931.

Professor Thomas has made important contributions to understanding the quark basis of nuclear physics. He and his collaborators predicted in 1983 that the \bar{d} distribution in the proton should be greater than the \bar{u} distribution;

this was confirmed experimentally in 1991.

His group developed a quark model basis for understanding the basis of finite nuclei, defined generalised polarizabilities of nucleons and proposed a practical way to extract them from data. This led to experimental programs in the United States and Europe.

Professor Thomas is Elder Professor of Physics and Mathematical Physics at the University of Adelaide and Director of the Special Research Centre for the Subatomic Structure of Matter. He was elected a Fellow of the Academy in 1990.

Hannan Medal

Professor Neil Trudinger won the 1997 Hannan Medal. The medal is for distinguished research in either statistical science, pure mathematics or applied and computational mathematics. It commemorates the research achievements of the late Professor Ted Hannan, a statistician.

Professor Trudinger has made major and influential contributions to mathematics. His early work on embeddings has led to what is now known as the 'Trudinger inequality' in current literature.

He was the first to identify the now-famous inconsistency in Yamabe's theorem and to rectify it in cases where the integral of the scalar curvature is negative or sufficiently small. His work here has led to a lot of important research including proof of the complete theorem.

He is Professor of Mathematics at the Australian National University Centre for Mathematics and its Applications and Dean of the School of Mathematical Science.

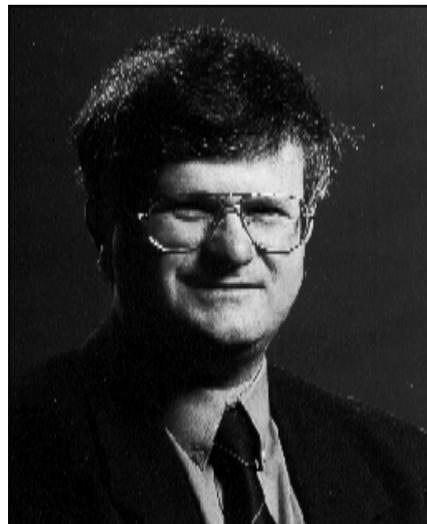
The medal will be presented to Professor Trudinger at an Academy function later this year.

Gottschalk Medal

The 1997 Gottschalk Medal was shared by Dr Peter Schofield and Dr Brandon Wainwright. The Gottschalk Medal commemorates the work of Alfred Gottschalk, who was a leading authority on glycoproteins. It is awarded annually for distinguished research in either the medical or biological sciences. Recipients are young scientists who are not Fellows of the Academy.



Professor Suzanne Cory



Professor Anthony Thomas



Dr Peter Schofield



Dr Brandon Wainwright

Dr Schofield, a principal research fellow at the Garvan Institute of Medical Research at St Vincent's Hospital in Sydney, has made many outstanding contributions to Australian biomedical research. He has established an international reputation in the field of neuroscience for his research on receptors and their ligands.

In 1990 he was rewarded for his work on molecular biology with the AW Campbell Award of the Australian Neuroscience Society.

Dr Wainwright is an associate professor in biochemistry at the University of Queensland and Deputy Director of the university's Centre for Molecular and Cellular Biology. He used genetic methods to locate the cystic fibrosis gene and continues to probe the molecular basis of the disease and means of ameliorating it. His group has studied other genetic defects which lead to human disease. They succeeded in isolating the gene responsible for the most common form of cancer, basal cell carcinoma of the skin.

He has worked extensively to disseminate information to the general public on human genetics. Since his arrival at the University of Queensland in 1990, his efforts have generated over \$2 million in project funding.

Pawsey Medal

Dr Murray Batchelor was awarded the Pawsey Medal. The medal is awarded each year to a young scientist for distinguished research in physics. It honours the work of Joseph Lade Pawsey, who was an astrophysicist.

Dr Batchelor is an expert in statistical mechanics at the Australian National University School of Mathematical Sciences. He has done ground-breaking work on reflection matrices. This has enabled surface properties to be calculated and their critical behaviour obtained. He has successfully applied these techniques to many of the solvable models in statistical mechanics.

Moran Medal

The Moran Medal was awarded to **Dr Matthew Wand**. This medal is awarded for distinguished work in statistics. It commemorates the contribution of Professor PAP Moran.

Statistical regression analysis aims to determine relationships between

quantities, based on observed measurements of these quantities. Classical regression models assume that these relationships are linear. Dr Wand has contributed to the development of non-linear regression models.

His contributions have been at several levels: theoretical, methodological, computational and in applications to medicine, engineering and finance.

Dr Wand is a senior lecturer at the Australian Graduate School of Management, University of New South Wales.

Life on earth

On 17 April Britain's Chief Scientist, Sir Robert May, a Corresponding Member of the Academy, delivered a public lecture at the Academy in Canberra on the topic, *The inventory of life on earth: past, present and likely future*. The entertaining lecture, delivered to a packed auditorium, was sponsored by the Academy and CSIRO.

Sir Robert, whose area of research is the dynamics of populations, addressed the following questions: Of all the species that have existed on the earth, what fraction are alive today? How many living species have been named and recorded, and how large might the real total be? How much of our heritage of biological diversity is likely to survive the next 100 years?

Sir Robert, a Corresponding Member of the Academy, was born in Australia. For a profile see AAS Newsletter number 34.

Italian Academy

The Academy has made an agreement with the Italian National Academy of the Lincei to allow for the exchange of scientists and other scientific cooperation. The agreement follows a meeting between the Scientific Attaché at the Embassy of Italy in Canberra, Professor Silvio Dottorini, and the Academy's former Foreign Secretary, Professor Roger Tanner. Professor Dottorini presented a signed copy of the agreement to the Academy on 6 May 1997.



Dr Murray Batchelor



Dr Matthew Wand

New members of Council

The Academy of Science has elected seven new members to its governing body, the Council.

Professor John White is the new Secretary (Science Policy). Professor White is Dean of the Research School of Chemistry at the Australian National University. In his research he has used neutron scattering to unravel the structure and dynamics of molecular liquids, absorbed phases, polymers and the templates used in the synthesis of chemical and biological materials.

Professor Michael Pitman was elected Foreign Secretary. Professor Pitman is an Honorary Professor in applied science at the University of Canberra. He is a plant physiologist who was formerly Australia's Chief Scientist and, before that, Director of the CSIRO Institute of Biological Resources.

Professor Athel Beckwith is the new Treasurer. He is an Emeritus Professor of the Australian National University whose research in chemistry has ranged from theoretical calculations to the synthesis of complex organic molecules. He is best known for his work on the structure and behaviour of organic free radicals.

Professor Michael Barber represents the physical sciences. He is Pro Vice-Chancellor (Research) at the University of Western Australia. His research interest is the application of statistical mechanics to materials science, particularly fracture and crack propagation.

Dr Angus McEwan also represents the physical sciences. He is a former Chief of the CSIRO Division of Oceanography. He advises the CSIRO and the Bureau of Meteorology on oceanography and participates in the work of several international scientific committees.

Professor Robert Symons represents the biological sciences. Professor Symons is a plant molecular biologist at the Waite Institute in South Australia. His research concerns the plant viruses that infect crops and grape vines.

Dr Elizabeth Truswell represents the biological sciences. She was formerly Chief Research Scientist at the Australian Geological Survey Organisation. She serves on a number of science advisory bodies.

Teachers and scientists meet



Teachers from around Australia with Sir Gustav Nossal at the Academy's symposium.

Twenty-one science teachers from across Australia exchanged views with Australia's leading scientists at the Academy's Annual General Meeting in Canberra on 1 and 2 May 1997.

They attended the symposium (see article opposite) and a special workshop on the applications of information technology in teaching science, sponsored by Ericsson Australia, with support from Alcatel.

The President of the Academy, Sir Gustav Nossal, said that the event

enabled teachers to appreciate the extent of Australia's involvement in the international scientific effort. He said, 'As scientists, we also value the opportunity to learn from science teachers. They provide the first contact and inspiration for students who may want to choose science as a career. It is important to find out how we can support them.'

Supported by the Australian Foundation for Science

New Fellows

At its Annual General Meeting in May, the Academy elected 13 new Fellows. They are:

Dr Robin Bedding, Chief Research Scientist in the CSIRO Division of Entomology, Canberra

Professor Ian Dance, Professor of Inorganic Chemistry at the University of New South Wales

Professor George Dracoulis, Head of the Department of Nuclear Physics at the Australian National University

Professor Graham Goodwin, Dean of the Faculty of Engineering at the University of Newcastle

Dr Adrienne Hardham, Senior Fellow in the Plant Cell Biology Group at the Australian National University

Professor Philip Kuchel, Professor of Biochemistry at the University of Sydney

Dr Trevor McDougall, Chief Research Scientist in the CSIRO Division of Oceanography, Hobart

Dr Brendan McKay, Reader in Computer Science at the Australian National University

Professor Elspeth McLachlan, Senior Principal Research Fellow at the Prince of Wales Medical Research Institute in Sydney

Professor Marilyn Renfree, Head of the Department of Zoology at the University of Melbourne

Professor Colin Sullivan, Head of the Centre for Respiratory Failure and Sleep Disorders at Royal Prince Alfred Hospital in Sydney

Professor Grant Sutherland, Director of the Department of Cytogenetics and Molecular Genetics at the Adelaide Children's Hospital.

Special election

Emeritus Professor Sir Rupert Myers, former Professor of Metallurgy and Vice-Chancellor at the University of New South Wales.

There will be more on the new Fellows in the next issue of AAS Newsletter.

Symposium on information science

The next breakthroughs in computing will be driven by our need to communicate with increasingly complex software systems, says Dr Robert Dale of the Microsoft Research Institute in Sydney.

He was speaking at the Academy's symposium on information science and technology on 2 May. The symposium was organised by Dr Bob Frater, CSIRO's Deputy Chief Executive responsible for information technology, manufacturing and services, and Professor David Skellern, the Head of the Department of Electronics at Macquarie University and Chair of the Academy's National Committee for Radio Science.

Machines are becoming more intelligent and will need to communicate with us, Dr Dale told the symposium during his presentation. The other area of concern he identified was the problem of information overload due to the ever-increasing bulk of digitally encoded information everywhere, especially on the Internet.

The solutions to these problems could come from an area of research known as human language technology, which uses knowledge about language to provide practical solutions to more narrowly focused problems.

Communications is at the heart of what distinguishes a society from an individual and hence the recent emergence of the computer as an important tool for communications. The Internet was surely a turning point for society and civilisation, Professor David Messerschmitt, Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley, told the symposium.

In his paper, *The Internet: fantastic success or impending failure*, Professor Messerschmitt summarised the characteristics that have made the Internet so successful and an inspiration for future technologies. He stressed the importance of government-sponsored research in this field.

Partly due its intellectual and financial origins, and to its immaturity, the Internet also faces serious problems as a long-term commercial entity. Professor Messerschmitt outlined these problems and said the solutions lay in the careful consideration of social and economic issues surrounding the development of new technologies.

The Professor of Telecommunications at Curtin University of Technology, Professor Tony Cantoni, took the symposium on a high-speed tour of the side streets and back alleys of the information highway. We may well be experiencing a three-day tour of Europe with a glimpse of the countryside but very little access to the information-rich culture of towns, villages and cities.

Professor Cantoni examined the network topologies and technologies that are creating new opportunities for improving performance on the superhighways.

The Coordinator of the Telecommunications Research Group at the University of Melbourne, Professor Rodney Tucker, gave an overview of the impact of lightwave technology on communications and looked at growth trends in telecommunication systems.

Advances in optical fibre telecommunications have led to remarkable increases in the capacity of telecommunication systems. The single-mode optical fibre, the semiconductor laser and the optical fibre amplifier were key components of a cost effective technology base that is increasing the available capacity of telecommunication systems.

With this technology, large global, national and regional networks, in which huge data rates could be offered to all customers, was conceivable.

The Professor of Microelectronic Systems at Macquarie University, Professor Neil Weste, formerly of Bell Laboratories Research, spoke on the scientific challenges that face the microelectronics industry.

The last 30 years have seen massive improvement in the speed, density, power and cost of integrated circuits. Currently, tens of millions of transistors can be put on a single chip, which can run at high speeds.

Professor Weste told the symposium that the hardware-oriented integrated design team has to become a software design team to improve productivity through the use of computer-aided design tools or programmable design approaches to building hardware.

The Professor of Information Technology at Macquarie University, Professor Ray Offen, explored the need to better understand and capitalise on the human aspect of computer systems engineering.

Computers and networks provided the technology, software the functionality, while other softer social disciplines illuminated the intersection between the system and the user's needs and perceptions. This people-centred, socio-technical perspective was all too often missing in systems development, frequently with unfortunate consequences, Professor Offen explained.

As electronic commerce becomes more and more widespread, the need for privacy and security of electronic transactions grows as well. The Professor of Computer Science at the University of Wollongong, Professor Jennifer Seberry, told the symposium that classical cryptography had always wrestled with the problem of key distribution. Until recently it seemed that factoring big numbers would remain beyond the capabilities of any computing devices.

However, if a quantum computer can be built, Professor Seberry said it would be the end of cryptography as we know it.

Science festival in Canberra

Fellows of the Academy were prominent at the Australian Science Festival held in Canberra from 12 to 20 April. The ABC science presenter (a Fellow), Robyn Williams, hosted a forum called *Chaos, sex and the end of science* which featured Britain's Chief Science, Sir Robert May, a Corresponding Member, among others.

The Nobel Prize winner and Australian of the Year, Professor Peter Doherty, spoke at a National Press Club lunch, an ABC radio broadcast and on other occasions. Following the lunch, the President of the Academy, Sir Gustav Nossal, and the Chief of the CSIRO Division of Plant Industry (another Fellow), Dr Jim Peacock, were panellists at a seminar called *Communicating for cash: new sources of science funding*.

The Academy distributed copies of its Science and Technology Bicycle Trail Map, and screened five interviews from its Video Histories of Australian Scientists program.

Supported by the Australian Foundation for Science.

Korean synchrotron workshop

In recent years Australian use of overseas synchrotron radiation sources has been growing rapidly. The Pohang Light Source, a world-class third-generation synchrotron, opened in 1995 at the Pohang Science and Technical University in Korea. This raised the possibility of a workshop bringing together scientists from the two countries.

The Korean-Australian workshop on applications of synchrotron radiation was held in Pohang from 24 to 27 February 1997, in association with a meeting of Korean synchrotron radiation users from universities and technical institutes. Australian delegates from universities, CSIRO, the Australian Nuclear Science and Technology Organisation, and BHP attended.

The workshop was sponsored by the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering and the Korea Science and Engineering Foundation. The coordinators were Professors Tong Nyong Lee and Ki Bong Lee from the Pohang Science and Technical University and Professor John Boldeman from the Australian Synchrotron Research Program at the Australian Nuclear Science and Technology Organisation. The Australian Synchrotron Research Program operates the Australian National Beamline Facility at the Photon Factory in Japan and also deals with the Advanced Photon Source in the USA.

The program comprised several days of formal presentations, poster sessions, tours of the Pohang Light Source and other facilities in Pohang, and a round table discussion exploring potential areas for collaboration between Australian and Korean scientists.

The Pohang Light Source cost about US\$180 million to build and employs about 100 staff. A linear accelerator accelerates electrons to an energy of 2 GeV before deflection into the storage ring. The members of the Australian delegation were extremely impressed with the foresight, skill and dedication that had been needed to construct the synchrotron. Professor Boldeman reported that the performance of the facility was outstanding and

commensurate with other third-generation facilities. Use of the synchrotron has grown rapidly.

Everyone agreed that the workshop had been extremely successful; delegates were surprised by the wide range of future collaborations that emerged. The Koreans' recent experience of construction of a synchrotron places them in an excellent position to advise Australian engineers and scientists on the design of a synchrotron and related devices in Australia. Australian scientists and engineers can help the Koreans design instruments for use with the beams of radiation.

Australian synchrotron users have valuable international experience which they can share with the relatively young Koreans. The exchange of young scientists and publications was planned. Collaboration in specific areas – studies of reflectivity, polyurethane, x-ray scattering, topography and mineralogy – will proceed. Potential industry involvement could come from a Korean company, Hanwa, which operates a zirconia powder plant near Perth.

Reports of the papers presented at the workshop are available from Yuko Kawano at the Academy, email is@science.org.au.

First stratospheric meeting

The first General Assembly of the International SPARC project (Stratospheric Processes and their Role in Climate Processes) was held at the University of Melbourne in December 1996. The SPARC project was set up by the World Climate Research Program, part of the International Council of Scientific Unions, in 1992.

Over 200 people from 20 countries attended. The conference was hosted by the Cooperative Research Centre for Southern Hemisphere Meteorology at Monash University.

Dr Marie-Lise Chanin, from the SPARC office, Dr John Zillman, President of the World Meteorological Organization, and Professor David Karoly, Director of the Meteorology Cooperative Research Centre, opened the assembly.

The assembly focused on how the stratosphere affects climate, considering topics such as circulation models, climatology, gravity waves, transport, chemistry, ultraviolet radiation and other aspects of stratospheric processes. Professor Mario Molina, who shared the 1995 Nobel Prize for chemistry for research into the depletion of the ozone layer, attracted considerable interest.

Second climate forum

A second National Academies' Forum on the world's changing climate was held at the Australian National University on 29 and 30 April 1997. The first forum, held in November 1996 (see *AAS Newsletter* number 35), focused on the science of climate change; the second dealt with specific public policy issues.

Speakers from a range of disciplines considered how Australia should respond to climate change. Speakers included Dr Graeme Pearman, the Chief of the CSIRO Division of Atmospheric Research, Professor Tony Chisholm, an agricultural and resource economist from La Trobe University, Associate Professor Jeff Bennett, a lecturer in economics and management from the Australian Defence Force Academy, Professor Warwick

McKibbin, from the Research School of Pacific and Asian Studies at the Australian National University, Dr Clive Hamilton from the Australia Institute, Professor Aynsley Kellow, an environmental scientist from Griffith University, and officials from government agencies.

The Australian forums are preparation for an international conference on climate change to be held in Japan later in 1997.

The forum was convened by Professor Stuart Harris. The National Academies' Forum was set up by the Academy of Science, the Academy of the Social Sciences in Australia, the Australian Academy of the Humanities and the Australian Academy of Technological Sciences and Engineering.



Students from St Thomas the Apostle School, Kambah ACT, participating in the Primary Investigations program, invent a device to guide a marble along an obstacle course and into a container.

Primary Investigations training package

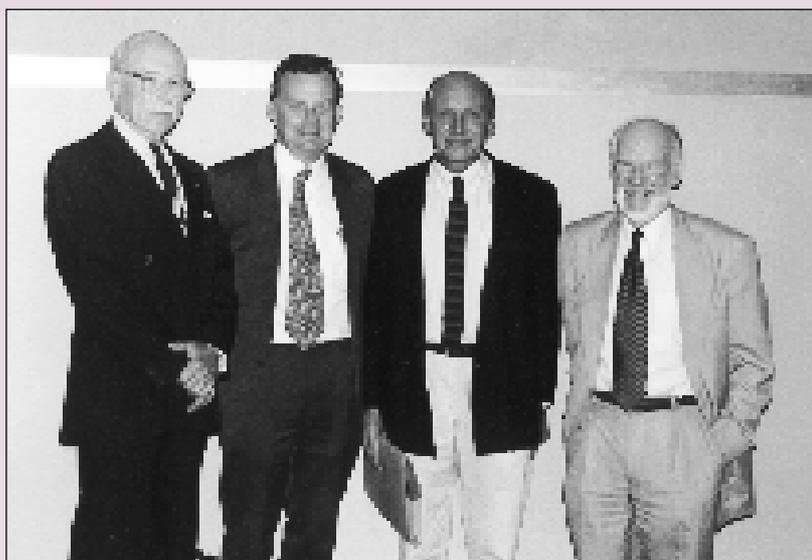
The Science and Technology Awareness Program of the Commonwealth Department of Industry, Science and Tourism has granted \$30 000 towards developing a video training package for the Academy's *Primary Investigations* program. The training package will enable teachers in country primary schools to learn how to use *Primary Investigations* in their classrooms.

Work with the Victorian Department of Education's STEP program is continuing on a series of four television satellite broadcasts scheduled for August and September.

Primary Investigations has been discussed on the ABC's radio program, *The Science Show*. In an interview on science education in Western Australia, Ruth Hickey, from Murdoch University, talked about the value of *Primary Investigations*.

The James N Kirby Foundation has provided funding over two years to provide starter grants for schools with special needs to take up the *Primary Investigations* program.

Supported by the Australian Foundation for Science



At the University of Melbourne for the Selby Lecture on 6 March are Mr Benn Selby, left, Professor Bruce McKellar, Professor James Barber, the Selby Fellow, and Professor Jim Pittard, the Academy's Secretary (Biological Sciences).

Selby Fellowship

The Ernst Chain Professor of Biochemistry at Imperial College, London, Professor James Barber, presented the 1996 Selby Lectures in Brisbane, Canberra, Melbourne, Sydney and Townsville. The topics included *Solar energy – its capture and conversion in biology* and *Photosystem II: the engine of life*.

The Selby Lectures are supported by the Selby Scientific Foundation. They provide opportunities for distinguished overseas scientists to visit Australia for public lecture and seminar tours and to visit scientific centres.

Fluorescence spectroscopy

In an initiative aimed to involve young scientists in the work of its National Committees, the Academy, through its National Committee for Biophysics, has provided funds to enable postgraduate students from around Australia to attend a specialist workshop in Melbourne. The workshop, on fluorescence spectroscopy for the biosciences, was held at the University of Melbourne from 5 to 9 February 1997.

The workshop was designed to provide advanced training in fluorescence spectroscopy as it is applied in biochemistry and cell biology. Morning lectures were followed by afternoon laboratory sessions.

Overseas speakers assisted the workshop: Professor Enrico Gratton from the University of Illinois, Dr Robert Clegg from the Max Planck

Institute for Biophysical Chemistry and Dr David Jameson from the University of Hawaii.

Forty-five people attended the lectures, the laboratory sessions were limited to 25. The response from participants was extremely favourable. There was general agreement that the workshop had provided valuable practical experience and should be repeated in two or three years.

The workshop was organised by the Australian Society for Biophysics and two members of the National Committee for Biophysics, Professor Bill Sawyer from the University of Melbourne and Dr Cris dos Remedios from the University of Sydney. Laboratory sessions were supported by four major equipment companies: Rofin Australia (SPEX), MEECO Holdings (Hitachi), Perkin Elmer Australia and Beckman Australia.

Honours for Fellows

The Royal Australian Chemical Institute has awarded its 1997 Leighton Memorial Medal to **Professor Athel Beckwith**, an Emeritus Professor of the Research School of Chemistry at the Australian National University. The award is the institute's most prestigious medal and is made in recognition of eminent services to chemistry in Australia.

Professor Suzanne Cory, the Director of the Walter and Eliza Hall Institute of Medical Research in Melbourne, has been elected a Foreign Associate of the US National Academy of Sciences.

Belgium's Université Catholique de Louvain has awarded an honorary doctorate to **Professor Peter Hall**. Professor Hall, of the ANU Centre for Mathematics and its Applications, was recognised for his many contributions to probability and statistics. He was also elected Fellow of the American Statistical Association at the Joint Statistical Meetings in Chicago recently.

Professor Jörg Imberger, Chairman of the Centre for Water Research at the University of Western Australia, was

named Citizen of the Year for the Professions in the Western Australian Foundation Day Awards for his work on algal bloom and other water quality problems.

La Trobe University has awarded **Sir Gustav Nossal** an honorary doctorate of science.

The Korean Academy of Science and Technology has elected **Professor Ralph Slatyer** as an Honorary Foreign Member. Professor Slatyer is an Emeritus Professor of the Research School of Biological Sciences at the

Australian National University.

Professor Neil Trudinger has been awarded a Senior Humboldt Fellowship for 1997. He is Dean of the School of Mathematical Sciences at the Australian National University.

The Dean of the Research School of Chemistry at the Australian National University, **Professor John White**, has won the HG Smith Memorial Medal of the Royal Australian Chemical Institute. This annual award recognises the most significant contribution to published research in chemical science.



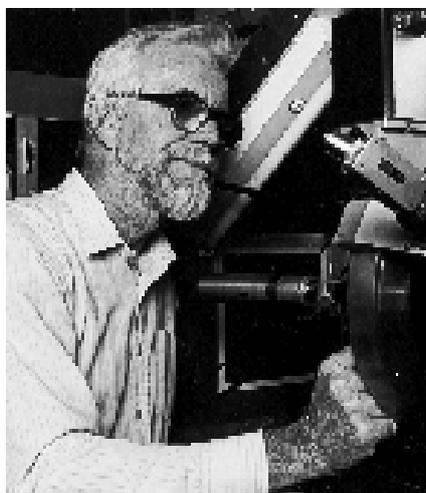
Bye Bonnie

In April, Fellows, diplomats and friends gathered at the Academy to farewell Ms Bonnie Bauld, the Academy's International Programs Officer for 14 years. She is pictured, right, with the President, Sir Gustav Nossal, and her successor, Ms Thérèse Lewis.

Ted Maslen

On 2 February 1997, the distinguished Western Australian physicist, Dr Ted Maslen, died suddenly. He was 61.

Maslen was born in East Coolgardie, Western Australia, on 8 August 1935; 12 years later his family moved to the northern coastal town of Geraldton where he completed his secondary



Ted Maslen

education at St Patrick's College.

In 1952 his tertiary education began well at the University of Western Australia when he won the first-year geology prize. Four years later he graduated with a BSc Honours in physics. With the Rhodes Scholarship at Oxford University he gained a DPhil in chemical crystallography in 1960.

In postgraduate studies while at Oxford, he determined the molecular conformation and crystal structure of cephalosporin C, a successful antibiotic marketed under the name Cephonin. He was supervised by Professor Dorothy Hodgkin, who later won the Nobel Prize for research in the same area.

He became a physics lecturer at the University of Western Australia in 1960 and was promoted to senior lecturer three years later. In 1972 he became the foundation Director of the Crystallography Centre at the university. By 1993 he was Head of the university's Department of Physics.

Maslen is recognised internationally

for his contributions to high-resolution x-ray diffraction imaging of the three-dimensional electron density distribution in crystals. Early in his career, his objective was to assess whether the measurement of electron density redistribution in chemical bonding was feasible. High precision measurements of such redistribution have been compared with weighing a ship's captain by subtracting the weight of the ship from that of the ship plus the captain.

After identifying some major obstacles, Maslen succeeded in making important progress. Most significant was his use of synchrotron radiation to measure diffraction which improved the precision for the weaker reflections so dramatically that very small crystals could be studied.

His extracurricular activities included sport, particularly rowing, and local politics. He served four terms on the South Perth City Council from 1976 to 1996.



Dorothy Hill in 1975

Dorothy Hill

One of the pioneers of Australian palaeontology and a former President of the Academy, Dorothy Hill, died in Brisbane on 23 April 1997.

Dorothy Hill was born in Brisbane in 1907. She went to Brisbane Girls Grammar School and the University of Queensland, studying geology rather than her first preference, medicine. She won the University Gold Medal in geology and an Australian universities blue in hockey. In her field work she mapped the coal resources in the upper Brisbane valley. Near the town of Munduberra she discovered a rich collection of fossil corals, a find which changed the course of her research.

In 1930 she won a scholarship to Cambridge University where she studied Australian carboniferous corals. She spent seven years at Cambridge, gaining a PhD and being elected a Fellow of Newnham College. She did further studies of fossil corals in Britain and elsewhere.

The climate at Cambridge did not agree with her; a grant from the

Council for Scientific and Industrial Research brought her back to the University of Queensland in 1937. There she studied the palaeontology and stratigraphy of the Great Barrier Reef.

Hill had gained her pilot's A licence in 1936. During the war she was on the operations staff of Royal Australian Navy, deciphering communications.

After the war she was appointed lecturer in geology at the University of Queensland. Her aims were to build up a school of palaeontology with emphasis on stratigraphic and tectonic applications, to produce geological maps of Queensland, to build up the departmental library and to study sedimentary petrology. She also acted as a consultant to the Bureau of Mineral Resources and oil exploration companies.

In a recent article in *The Australian*, Professor Ken Campbell, a former student of Hill's, wrote, 'When research in Australian universities was at a very low ebb, and the University of

Queensland was among the poorer performers even in this undistinguished company, she insisted that good teaching and good research went hand in hand.'

During the 1950s Hill began winning international recognition for her research. She was invited to write on palaeozoic corals for the Anglo-American *International Treatise of Invertebrate Palaeontology*. She also prepared a textbook on Australian invertebrate palaeontology, a paper on the Gondwana system in Queensland, a confidential review of the oil potential of the Great Barrier Reef and many journal articles.

Hill broke new ground as a woman in science. In 1956 she was the first woman elected a Fellow of the Australian Academy of Science. In 1959 she was appointed research professor at the university and in 1960 full professor.

Following a visit to Moscow in 1960 Hill became more interested in a group that lived briefly, forming reefs in the Cambrian seas, the archaeocyathids. She published a definitive review of archaeocyathids from Antarctica in 1965.

During the 1960s and 1970s Hill won many medals and other honours, joined editorial committees, chaired university boards and led scientific societies. In 1965 she was elected a Fellow of the Royal Society of London. In 1970 she became the first woman President of the Australian Academy. She became Commander of the Order of the British Empire in 1971 and Companion of the Order of Australia in 1993.

Professor Campbell wrote, 'Despite her many achievements, she was always approachable and friendly, and to the end of her teaching career attracted students by the warmth of her personality as much as by her academic reputation.'

Closing dates 1997

France exchange	1 June
UK exchange	1 July
Korea exchange	1 August
Taiwan exchange	1 August
Japan postdoctoral and short-term fellowships	1 September
China exchange	1 October
Germany program	1 October

For further information, email Thérèse Lewis on io@science.org.au or consult <http://www.science.org.au/internat/exchange/contscix.htm>.

National Science and Industry Forum

Monday 14 July 1997
Australian Academy of Science
(the Dome), Canberra

Automation in the mining industry: which way forward?

Please contact Faye Nicholas for information: phone (06) 247 5777, fax (06) 257 4620, email faye.nicholas@science.org.au.

John Eccles

The Nobel Laureate and second President of the Academy, Sir John Eccles, died in Switzerland on 2 May 1997. A summary of his career will appear in the next issue of AAS Newsletter.

Lambeck wins top European award

The European Union of Geosciences has awarded the Alfred Wegener Medal, one of the most prestigious international awards for scientific achievement in the earth sciences, to the Professor of Geophysics at the Australian National University in Canberra, Professor Kurt Lambeck.

The Alfred Wegener Medal is awarded every two years for successfully bringing together various fields of the earth sciences in order to solve geodynamic problems in the spirit of Wegener. Wegener was a German meteorologist who successfully developed the concept of continental drift in the first quarter of this century. He brought together a powerful range of disciplines to argue his case for the drifting of continents across the earth's surface on geological time scales.

The medal has been awarded previously to the leading earth scientists of Europe and North America; this is the first time that it has

gone to an Australian scientist.

Professor Lambeck's work has contributed to our understanding of the physical properties of the earth and the processes that occur in it. He has used satellite data for the determination of the geoid and gravity field of the earth. He has studied the variations in the rotation rate of the earth. His research into the deformation of the crust and lithosphere has shown much about the viscosity of the earth. His book, *Geophysical Geodesy*, received acclaim for its comprehensiveness and originality.

Professor Lambeck is Secretary (Physical Sciences) of the Academy of Science and winner of the Academy's 1996 Jaeger Medal for research into the solid earth or its oceans, as well as other Australian and international awards.

The medal was awarded at the meeting of the European Union of Geosciences in Strasbourg in March.



Professor Kurt Lambeck

Professor Lambeck will deliver three Wegener Lectures at the University of Oxford, the Institut de Physique du Globe de Paris and the University of Utrecht in May.



The Minister for Science and Technology, Mr Peter McGauran, left, Sir Gustav Nossal, and Mr Phillip Dean, from BHP, at the launch of the Nova World Wide Web site.

Nova weaves science Web

The Academy launched its new World Wide Web site, *Nova: Science in the news* (<http://www.science.org.au/nova/>) on 8 April 1997.

The Minister for Science and Technology, Mr Peter McGauran, launched *Nova* at Parliament House, Canberra. He said that the site was a

one-stop science shop for reliable and up-to-date material, and that it bridged the gap between classroom theory and real-life science. He called it 'a potent weapon in the battle to encourage more young people into science careers'.

The President of the Academy, Sir Gustav Nossal, said that the purpose of

Nova was to provide accurate and up-to-date information about the scientific, health and environmental issues covered in the news media. 'The site is aimed at teachers, but it is useful to anyone with an interest in modern science.'

Topics now available include cloning, mad cow disease, rabbit calicivirus, the Human Genome Project, ozone depletion, uranium mining in Australia, direct solar energy, threatened species, and gene technology and plants.

The site was developed with funding from the Australian Foundation for Science, the Science and Technology Awareness Program of the Department of Industry, Science and Tourism, and BHP. Other organisations, including ACT Healthpact, the Walter and Eliza Hall Institute of Medical Research, the CSIRO Division of Plant Industry, the CSIRO Division of Biomolecular Engineering and the Biomolecular Research Institute, the Institute of Advanced Studies at the Australian National University and the Mazda Foundation, have contributed to particular topics.

Supported by the Australian Foundation for Science