



# Mortimer report savages science

The Academy of Science has welcomed the Mortimer review's approach to economic development but expressed strong reservations about its ideas on research. The report, which examined Federal Government assistance to industry, was released in July 1997.

The President of the Academy, Sir Gustav Nossal, said, 'We welcome the review's strategy. Governments should have long-term plans for developing the industries that will provide wealth and jobs for our future.'

He also welcomed the proposed rationalisation of the tax deduction scheme for business research and development.

'However, there are some regrettable gaps in the review's logic, perhaps because they have failed to distinguish basic and strategic research from application. Almost as a by-product of its plans for industry, the Mortimer review has proposed a substantial cut to Australia's basic scientific research effort,

and an equally severe cut to the strategic research of CSIRO.'

Sir Gustav said that the report's proposals would destroy the CRC program, leaving a rump of \$20 million for public-good research. This was a curious conclusion, given that the review accepted that business underinvests in research unless governments intervene, and that the CRC program has successfully brought researchers together with industry, bringing benefits exceeding the amount spent on it.

'The only reason given for abandoning this successful initiative is a doctrinaire and formal one – it is inconsistent with the review's program design principles. The customer-contractor principle is one way of proceeding but is not applicable in this case. The CRCs have built up a momentum of cultural change in research and industry that must not be slowed or halted.'

The review also targeted universities,

CSIRO and rural research funds for further cuts in public funding and a requirement to gain extra outside funding. Sir Gustav said, 'Universities are under great financial stress at present; further cuts would be total folly. The higher external funding targets for CSIRO are not achievable in the short term without cutting further into its public-good role and the strategic research it performs for industry in general. The withdrawal of public money from the rural research funds is unjustified and unjustifiable.'

The combined effects of the cuts in funding for basic research would be a drastic loss of opportunity for younger researchers. Sir Gustav predicted that several hundred positions in the CRCs, universities and CSIRO would disappear.

The Departments of Finance and Industry, Science and Tourism are reviewing the CRC program. The Academy is preparing a submission.



## President addresses science teachers

The President of the Academy, Sir Gustav Nossal, gave the Stanhope Oration at the national conference of the Australian Science Teachers Association in Melbourne in July 1997. He is pictured with the President-elect of the association, Jane Wright, left, the past President, Anne Semple, and the current President, Deb Smith, right.

## Science enters Cabinet

The Academy welcomed the promotion of the science and technology portfolio to the Federal Cabinet in October. The portfolio has been allocated to the Minister for Industry, Science and Tourism, Mr John Moore.

The President of the Academy, Sir Gustav Nossal, said, 'The science and technology portfolio is a natural addition to Mr Moore's responsibilities for industry policy. I look forward to working with Mr Moore to enhance science and technology's contribution to technological innovation in Australia.'

Sir Gustav earlier commented on the resignation of Mr Peter McGauran from the science and technology portfolio.

He said, 'The Academy is grateful to Mr McGauran for his excellent work as Minister for Science and Technology. While I

make no comment on current political events, I have no doubt that he will make a speedy return to a leadership role within the Coalition.'

### STOP PRESS

## Nova wins award

The Academy's *Nova* web site was judged the best science site at the Australian Internet Awards on 10 November. The judges said that 'the *Nova* site had strong competition but won out in its category because of the depth of its content, the many resources it made accessible and its very approachable style of presentation.'

See the earlier report on page 5.

## Office-bearers of the Academy

### President

Professor Sir Gustav Nossal

### Secretary (Physical Sciences)

Professor Kurt Lambeck

### Secretary (Biological Sciences)

Professor James Pittard

### Secretary (Science Policy)

Professor John White

### Foreign Secretary

Professor Michael Pitman

### Treasurer

Professor Athel Beckwith

## Telephone numbers

Executive Secretary (02) 6247 5777

Publications (02) 6247 5385

Awards (02) 6247 5777

Finance (02) 6249 1362

Fellowship administration (02) 6247 3966

National Committees (02) 6247 3966

International programs (02) 6247 3966

Library (02) 6247 3966

Australian Foundation for Science (02) 6247 5777

Facsimile (02) 6257 4620

### Email

[aas@science.org.au](mailto:aas@science.org.au)

### World Wide Web

<http://www.science.org.au>

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.

The material in this newsletter is copyright but may be reproduced with acknowledgment. To receive a regular copy of the newsletter, to contribute an item of interest, or to respond to material in the newsletter, write to the Executive Secretary at the Academy.

ISSN 1031-9204

Print Post Approved PP 255003/00025

## New year book

The Australian Academy of Science *Year Book 1997-98* is now available. The year book contains a complete list of Fellows and Corresponding Members, lists of the members of committees and other bodies, the Academy's charter and bye-laws, details of awards and fellowships, the report of the Council for the previous year, financial statements and a useful list of abbreviations for international scientific bodies.

The year book is an essential reference for anyone with an interest in Australia's leading organisation for the advancement of science.

Copies may be obtained from the Publications section of the Academy. Please send a cheque for \$34.95 to Publications, Australian Academy of Science, GPO Box 783, Canberra ACT 2601 or fax an order with your credit card details to (02) 6257 4620.

### Forthcoming events

The annual general meeting and the Advisors Committee meeting of the **Australian Foundation for Science** will be held in Canberra on 25 November 1997.

The next **Fenner Conference on the Environment** will be held at the Academy in Canberra on 26 to 28 November 1997 on the topic, *Ethics of research and management practices in World Heritage and other environmentally sensitive areas: policy and practice*. See page 12.

### Recent publications

The Australian Academy of Science *Year Book 1997-98*, \$34.95. See above.

*Primary Investigations Do-it-yourself inservice workshop*, video and booklet, \$29.95. See page 5. The address of the *Primary Investigations* web site is <http://www.science.org.au/pi>.

*AAS Newsletter* is now available from the Academy's web site in Acrobat format. You can download a free copy of Acrobat Reader from the site (<http://www.science.org.au/academy/newslett/newslett.htm>).

For more information on publications email [aas@science.org.au](mailto:aas@science.org.au).

## New head for ARC

Professor Vicki Sara has succeeded Professor Max Brennan as Chair of the Australian Research Council (ARC).

The President of the Academy, Sir Gustav Nossal, welcomed the appointment and emphasised the importance of the council. 'More of the funds that university staff, in particular, use to conduct research now come from the ARC and relatively less from the universities' own budgets,' said Sir Gustav. 'This has enhanced the policy significance of the ARC's decisions and places a greater burden on its honorary members and on its Chair.'

He said that the Academy considered the council's mission of paramount importance for the welfare of basic scientific research in Australia. He looked forward to working with Professor Sara in developing the policies to guide research funding at a time of unprecedented competition for funds.

### The Basser Library

Anyone wishing to use the Basser Library should contact the librarian, Rosanne Walker, telephone (02) 6247 3966 or email [Rosanne.Walker@asap.unimelb.edu.au](mailto:Rosanne.Walker@asap.unimelb.edu.au).

### New topics on Nova

- How many Australians can our environment support?
- Immunisation – protecting our children from disease
- Enhanced greenhouse effect – a hot international issue
- Toxic algal blooms – a sign of rivers under stress
- Local air pollution begins at home

The address of *Nova: Science in the news* is <http://www.science.org.au/nova/>.

### Conferences

The Academy's web site has a list of forthcoming conferences in Australia and New Zealand. Press the 'Conference database' button on the Academy's home page (<http://www.science.org.au>).

### Gifts to the Academy

If you would like to make a gift or a bequest to the Academy of Science or the Australian Foundation for Science, please contact the Executive Secretary or the Development Officer, telephone (02) 6247 5777.



The Chairman, Professor John White, left, and other members of the National Committee for Crystallography at a meeting at the Academy on 3 September 1997.

## Academy supports new reactor

The Academy has welcomed the Federal Government's decision to build a new nuclear research reactor at Lucas Heights south of Sydney. The decision was considered in September by the Academy's National Committee for Crystallography.

The Chairman of the committee and Secretary (Science Policy) of the Academy, Professor John White, said a new reactor was 'essential for developing national capacities in nuclear medicine and materials technology as well as for maintaining a number of critical research competencies.'

The reactor's neutron source would complement rather than replace other radiation sources to which scientists currently have access. Appropriate instruments at the reactor would give Australia a capacity to do world-class research, attracting researchers from other parts of the world.

Professor White said that the reactor should meet stringent safety standards.

The Academy awaited details of specifications and instrumentation and looked forward to assisting further development of the proposal.

## Biological study at risk

Budget cuts threaten the viability of the Australian Biological Resources Study (ABRS), which has been documenting the diversity of Australia's flora and fauna for more than 20 years.

The study arose from Academy recommendations made in 1969. ABRS collaborates with museums, herbariums, universities and the CSIRO in a cost-effective way to describe and catalogue plants and animals.

The President of the Academy, Sir Gustav Nossal, has advised the Minister for the Environment, Senator Robert Hill, of the scientific community's growing concern about the reduction in funding for the study.

He pointed to a 1991 Academy workshop on Australia's biota which showed the problems of a diminishing workforce of taxonomists. Further cuts will make it difficult for Australia to manage its biological diversity and meet its international commitments.

In quarantine, for example, speedy identification is crucial in the face of a pest invasion. Taxonomists are the scientists who collect and analyse the data needed to identify native and foreign species of plants and animals.

Sir Gustav suggested that a small amount of money, possibly through the Natural Heritage Trust, would help maintain the viability and relevance of the ABRS.

## Likely demise of ANZAAS

The annual general meeting of the Australian and New Zealand Association for the Advancement of Science (ANZAAS) has recommended that the association be wound up. The meeting was held in September during the latest ANZAAS congress at the University of Adelaide. A decision will be made at a general meeting in December.

The President of the Academy, Sir Gustav Nossal, commented, 'I am saddened at the prospect of losing what has been an important part of Australian science for over a century. Its contribution to discussion among scientists, and between scientists and the public, has been enormous.'

'I first became familiar with ANZAAS as a student in 1947 and found it immensely stimulating. In the following 50 years I have had the privilege of being ANZAAS's President on two occasions.'

'Like its counterparts overseas, ANZAAS has been left floundering for a role as science continues to break into more and more specialisations, as more institutions have been created for promoting and deliberating on science, and as other sources of information about science have grown.'

'The ANZAAS board has given itself the task of finding ways of keeping alive some of ANZAAS's most enduring contributions. Open public discussion of science and its implications is more important than ever. Youth ANZAAS at its best has been a great success. New forms and sponsors may be found for these.'

'The monthly magazine *Search* has helped to promote discussion and to inform interested people about science and science policy. I hope that it will continue in its own right.'

'Above all, if ANZAAS is laid to rest, those scientists interested in broader questions raised by science will need to find a common meeting ground with others who share that interest.'

The Academy of Science endeavours to contribute to the two most important goals of ANZAAS, public awareness of science and interdisciplinary discussion of major scientific issues. It will be examining ways in which it can advance these areas.

## Funding biology

The Academy's National Committee for Biochemistry and Molecular Biology held its first meeting on 23 July 1997 in Melbourne. The Chair of the committee is Professor Nick Hoogenraad, from the School of Biochemistry at La Trobe University in Melbourne.

The committee decided it would represent the spectrum of scientists who use biochemical and molecular biological approaches to do research. The committee also considered the question of how Australia might best benefit from the international effort in gene sequencing.

The committee has prepared a submission to the Australian Research Council (ARC) on funding of the biological sciences. The submission said that Australian discoveries in biotechnology were in danger of being exported overseas, like many agricultural and mining products, without the benefit of having value added. The submission stated, 'Inevitably this problem can only be addressed by having adequate funding levels and, with the extremely low funding success rates experienced now in applications made to ARC programs, adequate funding equates to increased funding.'

The submission said that, in order to take advantage of international genome research, Australia needs biologists skilled in protein chemistry, recombinant DNA technology, molecular cell biology and bioinformatics. The committee suggested the ARC consider a program to fund new investigators – three-year grants to recent PhD graduates – and expand the special investigators awards to ensure long-term, stable funding.

The committee said that postgraduate training should be reviewed to ensure that the quality and quantity of postgraduates matched national needs and employment opportunities.

The submission also raised a problem with the system of peer review of grant applications. Senior scientists bear a high reviewing load for a number of grant bodies. 'Perhaps reviewers should be paid for their work and the ARC could then employ referees who do their job well.'

## Academy welcomes quarantine changes

The Academy has welcomed the Federal Government's changes to the administration of quarantine. The changes recognise the importance of community involvement in quarantine, the ecological as well as economic effects of pest introduction, and the importance of risk assessment procedures.

A new advisory structure has been established, with more emphasis on expert advice. The Quarantine and Exports Advisory Council will advise the Minister for Primary Industries and Energy on the implementation of the recommendations of the review of quarantine conducted by Professor Malcolm Nairn. Members of the council will be appointed for their expertise. There will also be a body to represent stakeholders in the wider community.

In a letter to the Minister for Primary Industries and Energy, Mr John Anderson, the President of the Academy, Sir Gustav Nossal, wrote that significant benefits should flow from the decisions. Sir Gustav welcomed the creation of the new advisory bodies and said, 'Priority setting in the immediate future will have to pay equal attention to the protection of native biota and ecosystems, as to the protection of primary industry.' He emphasised the importance of including on the

advisory council at least one scientist with expertise on the issues of the Australian biota and environment.

The letter expressed concern about the need for databases on insects for non-agricultural quarantine risk assessment. The government has not funded such databases. 'Without a strong taxonomic base you cannot expect to conduct adequate risk assessment analyses. In the field of taxonomy, experts cannot be quickly resurrected or trained anew; they have to be nurtured over many years as a national resource.'

Sir Gustav also suggested that funds gained from cost recovery be spent on environmental matters which were accepted in principle but not funded. These included Nairn report recommendations for scientific databases, environmental risk analysis, post-border monitoring and surveillance, and assessment of the route of entry of new incursions. These all depended on expert knowledge of Australian plants and animals and potential foreign pests.

'Australia is in grave danger of losing this expert knowledge because of the serious decline in support for taxonomic research in a range of institutions,' wrote Sir Gustav. 'You have the opportunity with the cost-recovered funds to redress this serious erosion.'

## Database copyright delayed

The World Intellectual Property Organisation has delayed further development of a treaty on intellectual property in databases following pressure from scientists (see *AAS Newsletter* number 37). The organisation held an information meeting on the proposal in Geneva from 17 to 19 September 1997.

The delay is to allow further national, regional and international consultation on the need for and impact of such a treaty. The European Community wanted early consideration of the treaty while the

USA firmly insisted on 'full discussion of the basic policy issues involved before any attempt to reach international consensus'. According to a report from the Commonwealth Attorney-General's Department, the US intervention, which had been clearly influenced by science interests, 'was gratefully seized on by many developing countries and, as a result, the agreed future work program till September 1998 consists only of further information exchanges and consultations.'

# Training for country teachers

On 19 August 1997 the former Federal Minister for Science and Technology, Mr Peter McGauran, launched the *Do-it-yourself inservice workshop* for training primary science teachers in rural and isolated schools. The workshop is based on the Academy's science, technology and environment program, *Primary Investigations*, which has been purchased by about 2600 primary schools.

'Australia has a challenge to match the best performers on science education,' Mr McGauran said. 'School programs like *Primary Investigations* are an important resource to help schools boost their science education. I hope this kit will lead many more primary schools to take the plunge into a user-friendly and effective form of science education.'

The package contains a video and booklet with overhead projection masters. Any teacher in the school can run the workshop.

The workshop was produced with assistance from the Science and Technology Awareness Program of the Commonwealth Department of Industry, Science and Tourism.

The workshop is available for \$29.95 from Publications, Australian Academy of Science, GPO Box 783, Canberra ACT 2601, facsimile (02) 6257 4620 or email [aas@science.org.au](mailto:aas@science.org.au).

## Schools with special needs

The patron of the South Australian Science Teachers Association, Ms Barbara Hardy, has made a donation to provide *Primary Investigations* books and training to a deserving school in South Australia. Cowell Area School was selected by the association from those that applied.

Other schools with special needs have received starter grants to purchase *Primary Investigations* from donations made by the following.

**Kirby Foundation** grants have gone to: Mandurang South Primary School in Victoria; St Gabriel's (Enfield), Newton, Kilburn, Peterborough and Christie Downs primary schools, Bowden Brompton Community School and Pedare Christian College in South Australia; and Carlisle, Bentley, Queens Park, Cloverdale and Belmay primary schools in Western Australia.

**Queensland Metals Corporation Ltd** grants have gone to: Gulf Christian



Four half-hour television programs based on *Primary Investigations*, pictured in production, were broadcast by satellite television to schools in Victoria during August and September. The programs were produced in collaboration with the staff of the Victorian Department of Education's Science and Technology in Primary Schools program.

College (Normanton), Serviceton South State School (Inala), and Mary MacKillop Catholic Primary School (Birkdale) in Queensland; and St Joseph's School in Katherine, Northern Territory.



The Director of the Walter and Eliza Hall Institute of Medical Research, Professor Suzanne Cory, at the launch of the *Primary Investigations Do-it-yourself inservice workshop*.

An anonymous donor has provided grants to New South Wales schools: St John's (Lambton), Stuarts Point, St Joseph's (Taree) and Minchinbury.

Supported by the Australian Foundation for Science

## Primary Investigations and Nova reach finals

The Academy of Science is one of five finalists for the 1997 Michael Daley Eureka Prize for its *Primary Investigations* program; and the *Nova: Science in the news* web site is one of three science finalists for the *Australian Financial Review/Telstra* 1997 Australian Internet Awards.

The Michael Daley Eureka Prize, administered by the Australian Museum, is awarded for making science and the results of scientific research known and understood by a broader public. The Academy was nominated as a finalist for the 'initiation, design and development of *Primary Investigations*, a well-structured and innovative science, technology and environment program for primary schools across Australia.'

The Australian Internet Award in science is for a web site that furthers or contributes to the resources available on any scientific subject or to a scientific endeavour, or which extends access to these resources or endeavours. The nomination stated: '*Nova* provides reliable, balanced information about current issues in science, health and the environment. It is aimed at secondary teachers (student activities are included), but the language level can be easily understood by high school students and anyone who is interested in science. The site is easy to navigate. There aren't a lot of bells and whistles, but it is a site you can trust.'

*Nova* was chosen as a science finalist from 23 nominations.

## Boden conferences on retina and genes

Two Boden Research Conferences were held in the Thredbo valley earlier this year on subjects of biological interest. The Academy established the conferences with funding from the late Alexander Boden FAA, former Governing Director of Hardman Australia Pty Ltd.

### Retinal biology and disease

Seventy-eight participants, including 22 overseas speakers, came to the Novotel Lake Crackenback from 30 January to 2 February to discuss retinal biology and retinal diseases.

The program covered development and differentiation, diseases, colour vision, cell biology, neuronal circuitry, electrophysiology and psychophysics. Professor Frank Werblin, from the University of California, Berkeley, delivered the Centre for Visual Sciences (Australian National University) Lecture on the topic: neuronal circuitry underlying dynamic edge enhancement in the salamander retina.

Many of the international visitors – from Britain, Germany, the USA and Hungary – were present because the conference was the occasion for a festschrift marking the retirement of Professor Bill Levick from the

Australian National University. Professor Levick is a Fellow of the Academy with an international reputation for his work on the neurophysiology of vision.

The conference was organised by Seong-Seng Tan, from the Howard Florey Institute at the University of Melbourne, David Vaney, from the University of Queensland, and Ian Favilla, from Monash University.

Sponsors were the Royal Australian College of Ophthalmologists, the Centre for Visual Sciences and the John Curtin School of Medical Research at the Australian National University, the Vision, Touch and Hearing Research Centre at the University of Queensland and the Australian Neuroscience Society.

The proceedings will be published in the *Journal of the Royal Australian College of Ophthalmologists*.

### Gene therapy

Fifty-two participants, including eight overseas speakers, met at Thredbo from 4 to 7 February to discuss gene therapy. The conference brought together a number of Australian groups experimenting with gene therapy in the treatment of disease and genetic disorders.

The conference heard about new methods for the efficient delivery of therapeutic genes, the regulation of gene functions, clinical trials, and specific diseases, particularly types of cancers.

The Australian Society for Biochemistry and Molecular Biology provided the organising committee. One of the organisers, Dr Gerald Both, said that everyone agreed the meeting was worthwhile.

He said, 'Each of the overseas speakers gave excellent presentations which in some cases were benchmark studies. It was also exciting to learn in the last session of the progress which is being made in bringing the experimental studies to the clinic.'

Overseas speakers included Dr Ian Dubé, from the University of Toronto in Canada, Dr Gary Nabel, from the University of Michigan Medical Center, Dr Paul Tolstoshev, from Gene Therapy Inc in Washington, and Dr Ken Culver, from the Methodist Medical Center in Des Moines, USA.

Sponsors of the meeting were the Academy, the Australian Cancer Society, the New South Wales Cancer Council, the Clinical Oncology Society of Australia, the University of Sydney, Amgen Australia, Johnson & Johnson, Schering Plough and ASBMB.

## President visits regional groups

The President of the Academy, Sir Gustav Nossal, and the Executive Secretary, Mr Peter Vallee, visited regional groups of Fellows in Hobart and Perth in July 1997. The meeting in Hobart was also attended by Tasmanian Fellows of the Australian Academy of Technological Sciences and Engineering.

Common topics of discussion were:

- the scope for regional groups of Fellows to promote science with state governments that are considering science policies
- the potential for further cooperation with the Australian Academy of Technological Sciences and Engineering
- how the role of the Academy's National Committees could be enhanced

- the ways of promoting the adoption of the *Primary Investigations* program by various states
- government policies, particularly the funding of universities and cooperative research centres.

In Perth, Sir Gustav attended a function organised by the Science Teachers Association of Western Australia for those who took part in writing, organising and supporting *Primary Investigations*.

Sir Gustav expressed his appreciation of the work they had done in making the program a success in Western Australia.



Sir Gustav Nossal at the gathering of Primary Investigations writers and trainers at the Science Teachers Association of Western Australia in July. He is pictured with the President of the association, Ms Shelley Yeo, to whom he presented a copy of the Do-it-yourself inservice workshop video and manual.

# Sex education in Australia and China

Professor Roger Short FAA, of the Department of Perinatal Medicine at the Royal Women's Hospital in Melbourne, delivered the Australian Foundation for Science Lecture at the 1997 ANZAAS Congress in Adelaide on 2 October 1997. The lecture, on adolescent sex education in Australia and China, was given jointly with Dr Yuan Gao, from the Perinatal Research Centre at the hospital.

Professor Short and Dr Gao said that peer-group sex education is the most effective way of getting safe-sex messages across to teenagers.

Numerous surveys have shown that most adolescents learn the facts of life from their peers, rather than from their parents or teachers.

'The challenge is therefore to give the peers the correct information to transmit to others. This is why we have chosen to use medical students as peer educators, for they are the best-informed group that it is possible to get. They are still young enough to relate to teenagers, yet old enough and experienced enough to know what they are talking about.'

Starting at Monash University in the late 1980s, Professor Short initiated an adolescent sex education program run by third-year pre-clinical medical students. The program is still evolving and has been extended to Melbourne University. It has involved:

- Running a Safe Sex Tent during Orientation Week. At the beginning of the academic year, new students can learn about the risks of acquiring sexually transmitted diseases and their consequences, and how best to protect themselves and their partners from sexually transmitted diseases and pregnancy by using condoms. The students made a video, *Safe Sex Tent*, which records these activities.
- Sending medical students to schools to take part in their sex education programs. A video of one of these sex education classes, filmed in Wesley College, Glen Waverley, and entitled *Safer Sex for Students*, is available from Ansell International, 530 Springvale Road, Glen Waverley, Victoria, 3150. This video is aimed at school teachers and demonstrates several innovative approaches for teaching safe sex in the classroom.



Professor Roger Short

- Teaching the teachers, with medical students giving lectures on safe sex education to students doing diplomas in education at the university. This is probably the most effective intervention of all in the long term, and the videos made by the medical students are excellent teaching aids.
- Informing the community. The medical students have made a video for teenagers entitled *Talking Double Dutch*. It describes the use of the oral contraceptive pill to give maximum protection against pregnancy, combined with the condom to give maximum protection against sexually transmitted diseases. A flier about this video has been mailed to every secondary school throughout Australia and over 400 copies of the video have been sold. It can be purchased for \$29 from Coherent Communications Systems in Sydney, phone (02) 9792 2777.

More recently, the medical students of Monash University and Melbourne University have joined forces to produce a new video entitled *Whose Move?* This is also designed for teenagers and is about negotiating contraception. It illustrates how to say 'no' to sex, how to discuss contraceptive choices with a partner before becoming sexually active, and how to make use of emergency, post-coital contraception if unprotected intercourse has occurred. It can also be purchased from Coherent Communications Systems, but has not yet been widely advertised.

- Providing international outreach. As a result of an invitation from the

Department of Health of the People's Republic of China, Professor Short and Dr Gao have initiated an adolescent sex education program in medical schools in Beijing and Shanghai, funded by three contraceptive makers: Schering AG, Organon and London International. The program started in April 1997 and will run for four years, when it will be evaluated. The Chinese have called this pilot project Spark and, if it proves successful, it will be upgraded to Bushfire throughout the country. The project could eventually bring safe-sex education to 300 million Chinese adolescents.

China has a minimum legal age for marriage of 24 years and social sanctions against sex before marriage. However, Professor Short said that younger people are breaking with tradition and becoming sexually active. Failure of contraception leads to about 8 million abortions per year in China.

Papers or abstracts of previous Australian Foundation for Science lectures are on the Academy's web site at <http://www.science.org.au/academy/foundati/anzcont.htm>.

Supported by the Australian Foundation for Science

## The future of algebra

The Executive Committee of the International Commission on Mathematical Instruction (ICMI) has accepted the proposal of its Australian Subcommittee to hold an ICMI study in Melbourne in 2000. ICMI studies are held once every two years or so; this will be the first in Australia.

The study, on the future of algebra, will focus on two issues: the algebra skills which will be of lasting value and the conditions under which algebra can best be learned.

According to the Chair of the Australian Subcommittee, Dr Jane Watson from the University of Tasmania, 'It is an opportunity to focus world attention on the mathematics education community in Australia.'

# Scientific exchanges with Asia and Europe

## South Korea

Four Australian scientists will travel to Korea in 1998 under the exchange program between the Australian Academies of Science and of Technological Sciences and Engineering and the Korea Science and Engineering Foundation.

**Associate Professor David Callen**, a geneticist from the Women's and Children's Hospital in Adelaide, will go to Seoul National University to work on the identification of a major gene involved in liver cancer.

**Dr Huu-Hao Ngo**, an environmental engineer at the University of Technology, Sydney, will travel to Chonnam National University in Kwangju to study organic removal by crossflow microfiltration with adsorption.

**Dr Srdjan Nesic**, from the Department of Mechanical Engineering at the University of Queensland, will go to Inha University at Incheon to do large eddy simulation modelling of turbulent mass transfer controlled corrosion.

**Associate Professor Arthur Ramer**, a computer scientist from the University of New South Wales, will visit the Korea Advanced Institute of Science and Technology in Taejeon to work on the formal treatment of uncertainty measures designed for fuzzy control and fuzzy logic.

## Taiwan

Five Australians will travel to Taiwan in 1998 under the exchange program between the Australian Academies of Science and of Technological Sciences and Engineering and the National Science Council of the Republic of China.

**Associate Professor Kuldeep Kumar**, from the School of Information Technology at Bond University in Queensland, will go to the National Chengchi University in Taipei to study non-linear time series modelling and forecasting.

**Dr Bin Wang**, from Deakin University in Geelong, will go to the National

Cheng Kung University to work on the optimisation of die design through numerical simulations.

**Dr Albert Tseng**, from the University of Technology, Sydney, will go to the Institute of Biological Chemistry in Taipei to perform the chemical synthesis of a chimaeric human phospholipase for mechanistic studies with two different kinds of inhibitors.

**Dr Min Gu**, from the Department of Applied Physics at the Victoria University of Technology, will go to the National Chung Cheng University to study enhanced evanescent waves by super-resolution microscopy.

**Dr Sebastian Meffre**, a geologist from the University of Tasmania, will go to the National Taiwan University to look at the tectonic evolution of the Vanuatu arc.

## United Kingdom

Ten Australians will travel to the United Kingdom in 1998 under the exchange program between the Australian Academies of Science and of Technological Sciences and Engineering and the Royal Society of London.

**Dr Chris Gehring**, from Deakin University in Geelong, will visit the University of Cambridge to investigate natriuretic peptide effects on cation transport in guard cells.

**Dr Penelope Gullan**, from the Australian National University, will go to the University of London to study the systematics of Australian soft scales.

**Dr Dan Nicolau**, from the RT Technology Development Group in Perth, will go to the Marie Curie Institute in Surrey to study the artificial nano-architectures of molecular motors.

**Dr David Milton**, from the CSIRO Division of Marine Research in Queensland, will go to the British Geological Survey in Nottingham to determine the relative importance of water and diet as sources of trace metals in fish earbones and their use in determining the environmental history of the fish.

**Associate Professor AJ Lowery**, from the University of Melbourne, will visit the University of Bristol to look at the design and fabrication of optoelectronic integrated circuits.

**Dr Peter Cranston**, from the CSIRO Division of Entomology in Canberra, will visit the Natural History Museum in London to study the evolution and biogeography of Australian gondwanan midges.

**Dr Margaret Harding**, from the University of Sydney, will go to the University of Warwick to apply optical spectroscopy to the study of ligand DNA interactions.

**Dr Robert Herd**, from the University of New England in Armidale, will visit the Roslin Institute in Scotland, to look at ways of reducing the feed cost of Australian beef production through the application of UK beef cattle testing technology.

**Dr Mahananda Dasgupta**, from the Department of Nuclear Physics at the Australian National University, will go to the University of Surrey to interpret fusion probabilities.

**Dr Gail Risbridger**, from Monash Medical Centre in Melbourne, will travel to Oxford Brookes University in Oxford to study the predictive value of follistatin measurement in men with high grade prostate cancer.

## Medical exchange with India

The Academy will administer a scheme, funded by the Australia-India Council, to support visits by Australian medical researchers to their colleagues in India. The Indian National Science Academy will be invited to reciprocate.



# Sugar blocks cancer cell growth

A scientist visiting France under the Academy's Bede Morris Fellowship Scheme has made significant progress in research into the use of sugar fragments to interfere with the growth of breast cancer cells. He has also learnt new techniques which he hopes to introduce to his laboratory at the University of Melbourne.

Dr Victor Nurcombe, the Rhône-Poulenc Fellow, went from the Department of Anatomy and Cell Biology at the University of Melbourne to the Centre de Biologie Cellulaire at the Université des Sciences et Technologies de Lille in northern France from February to April 1997. There he met French scientists, found out what they were doing and conducted original research.

During his trip he delivered seminars on his research at laboratories in Bangkok, Hong Kong, Birmingham, London, Paris and Vitry-sur-Seine.

Dr Nurcombe's research centred on the effects of a heparan sulphate sugar, originally extracted from embryonic brain cells, on the way fast-growing cancer cells pick up and use potent growth factors that the cells themselves produce. Work in Melbourne had demonstrated that cells use these kinds of sugars to bind to such growth factors, protect them from protein-destroying enzymes and deliver them to the cell surface where they interact with their specific receptors.

He hopes that, if the sugar fragments enhance growth, smaller fragments made from them may act to



*Dr Victor Nurcombe in Paris after delivering a seminar at the headquarters of the pharmaceutical company sponsoring his visit, Rhône-Poulenc Rôrer.*

block the growth-enhancing function and so slow down rates of cancer cell growth.

In France he was able to show that a particular heparan sulphate sugar fragment 18 saccharide units long increased breast cancer cell growth in response to a growth factor. He also showed that fragments of 12 and 6 saccharide units made from the intact sugar interfered with the actions of the sugar and normal cell growth.

He found the research environment, one of the premier growth factor laboratories in the world, stimulating and exciting. He cemented a collaboration previously existing on fax and email. He spent a day with the renowned sugar scientist, Dr André Uzan, who created the blood thinning

agent, enoxyparin, for Rhône-Poulenc. Enoxyparin is used in hospitals around the world.

Another benefit of the visit was being in the right place at the right time. He found a related Lille laboratory – that of Dr André Verbert – which is pioneering ways of deciphering sugar structures on biological and cell membranes. Thus another laboratory was drawn into the studies. He hopes to bring two new techniques – two-dimensional gel electrophoresis for glycoconjugates and double-layer mass spectrometry for proteins – to the University of Melbourne.

Dr Nurcombe reported, 'By and large the morale of both the French and UK scientists that I met in both Lille and London was not particularly high. Bearing in mind that I was working in a French laboratory with a fine research record and an excellent level of funding, this lack of optimism was striking.'

The needs of universities in Paris were placed ahead of those in the provinces. The University of Lille was starved of infrastructure funds and was not good at seeking corporate support. Options for scientists in mid-career looked quite restricted.

However, he said the trip was an unqualified success. In fact, enough interesting data was collected to have him elected as Distinguished Foreign Scholar for 1998 at the university; so he will be returning at least twice more to deepen and strengthen the links already made.

## Regulating energy in cells



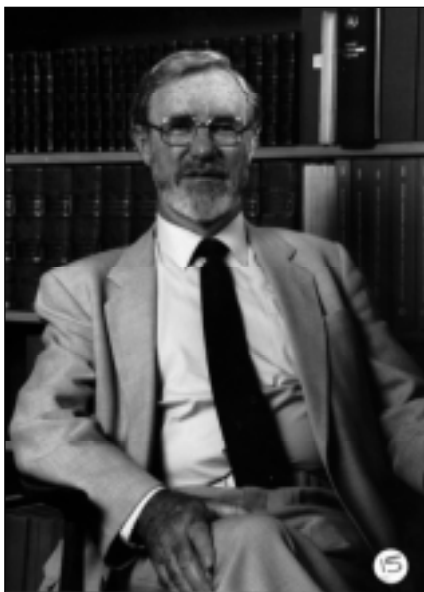
*Dr Martin Brand*

Dr Martin Brand was the Academy's 1997–98 Rudi Lemberg Travelling Fellow. Dr Brand, a biochemist from Cambridge University, visited Hobart, Sydney, Wollongong, Perth and Darwin in July and August 1997.

Dr Brand is an international authority on mitochondria and the energy metabolism of living cells. On the tour he gave lectures on cellular energy conservation, the regulation analysis of biochemical pathways and the mechanism of mitochondrial proton leak. These topics are relevant to sports medicine, obesity, ageing and the study of aestivation and activity in native wildlife.

He also conducted collaborative experiments: in Hobart, on the biochemistry of muscle efficiency, and in Darwin, on the efficiency of energy metabolism in Australian reptiles.

## Deaths



Lawrie Johnson

### Lawrie Johnson

The former Director of the Royal Botanic Gardens in Sydney, Dr Lawrie Johnson, died on 1 August 1997.

Lawrence Alexander Sidney Johnson was born in Sydney on 26 June 1925. He was dux of Beecroft Public School in 1936 and, when he did the Leaving Certificate at Parramatta High School in 1941, was equal first in New South Wales for chemistry. On a Liversidge Scholarship at the University of Sydney, he devoted himself to botany, graduating with first class honours in 1948.

After completing his degree he became assistant botanist at the National Herbarium at the Royal Botanic Gardens. Apart from 15 months at the Royal Botanic Gardens in Kew in the early 1960s, Dr Johnson spent the rest of his career at the Sydney Botanic Gardens. He was appointed Director in 1972.

As a botanist Dr Johnson was a world authority on the taxonomy (the naming and relationships) and evolution of Australian plants, particularly waratahs, eucalypts, bottle-brushes, paperbarks, casuarinas and cycads. He was the principal authority on the classification of more than 700 species of *Eucalyptus*. He assessed the relationships between plants in the light of evolutionary processes, geography, floristic history and functional adaptation.

He also contributed to the theory of biological classification. His 1968 Presidential Address to the Linnean Society of New South Wales, 'Rainbow's end: the quest for an optimal taxonomy', was republished in 1975 in the leading international journal on biological classification, *Systematic Zoology* – a rare honour.

As Director of the Royal Botanic Gardens he planned and built a new herbarium, developed the Mount Tomah cool-climate garden in the Blue Mountains, planned the Mount Annan native plant garden near Campbelltown, initiated community and school education programs, and strengthened the environmental program of the herbarium. He maintained the standards of botanical documentation of the herbarium collections, thereby contributing to the public and scientific role of the institution.

He advised governments on conservation issues and the need to preserve biodiversity.

He gained a DSc from the University of Sydney in 1971 for published work collected as *Systematic studies: botanical and theoretical*. He won the Clarke Memorial Medal of the Royal Society of New South Wales in 1980 and the Mueller Medal of ANZAAS in 1984. He was elected to Fellowship of the Academy of Science in 1986.

He is survived by his wife, Merle, and five children.

### Bruce Knox

The Professor of Botany at the University of Melbourne, Professor Bruce Knox, died on 30 August 1997.

Robert Bruce Knox was born in Edinburgh on 5 March 1938. He gained an honours degree in botany at the University of Edinburgh in 1959 and, following some study at Queen's University in Belfast, gained his PhD from the University of Birmingham in 1962. His doctoral research looked at the experimental control of asexual and sexual reproduction, male sterility and fertility in a tropical grass (of the *Andropogoneae*).

Dr Knox came to Australia in 1963 when he was awarded the NATO Research Fellowship to do research at the CSIRO Division of Plant Industry



Bruce Knox

in Canberra. In 1964 he was appointed lecturer in botany at the Australian National University. His early research in Australia concerned the environmental control of asexual reproduction in a number of grasses.

He developed a major interest in the cell biology of reproduction, focusing on the structure and function of pollen grains, the male element of plants. He adapted new tools from the disciplines of aerobiology, allergy, biochemistry, genetics, immunology and microscopy, becoming one of the foremost world authorities on pollen biology and plant reproduction.

In the 1970s he established principles of cell-cell recognition in plants with experiments identifying the chemical components of the interacting surfaces of pollen and stigma. This immunochemistry had implications for the understanding of hay fever and seasonal asthma, diseases often stimulated by a protein allergen in ryegrass pollen.

Dr Knox was appointed to the Chair of Botany at the University of Melbourne in 1974 and became Co-director of the university's Plant Cell Biology Research Centre in 1982. One of his research projects at the university was to isolate and clone the gene for the ryegrass allergen and so understand why this protein causes hay fever.

He employed the concept of male reproductive success to explore the cell biology of every stage of fertilisation. This research has implications for overcoming incompatibility barriers to

## Aquaculture in Taiwan

produce new hybrids of crop plants and native plants.

Another research interest was the natural history of pollination in Australian flowering plants. He observed bees and birds at work on two wattle species and nocturnal marsupials eating the tubular flowers of honeypot heath, *Acrotriche serrulata*, and exposing the stigmas for pollination.

Professor Knox was a member of a number of scientific bodies and advisory boards, including the Medical and Scientific Committee of the Asthma Foundation of Victoria. He was elected to Fellowship of the Academy in 1989.

He is survived by his wife, Janice, and three children.

## Biographers appointed

Emeritus Professor Ken Campbell, of the Australian National University, Professor John Jell, from the University of Queensland, and Professor Bruce Runnegar, from the University of California, Los Angeles, will write a biographical memoir on the late **Dorothy Hill** for publication in *Historical records of Australian science* and *Biographical memoirs of Fellows of the Royal Society*.

Professor Donald Melrose, from the University of Sydney, will write a biographical memoir on the late **Jack Piddington**.

Professor John Challis, from the University of Toronto in Canada, Associate Professor Graham Jenkin, from Monash University, and Professor JS Robinson, from the University of Adelaide, will write a biographical memoir on the late **Geoffrey Thorburn**.

Two Australian fisheries biologists visited Taiwan earlier this year as part of the exchange program between the National Science Council of Taiwan and the Australian Academies of Science and of Technological Sciences and Engineering. The exchange follows contacts made at the Joint Australia-Taiwan Fisheries Management and Aquaculture Workshop held in Brisbane in August 1996 (see *AAS Newsletter* number 34).

Dr Adrian Collins, from the Bribie Island Aquaculture Research Centre in Queensland, visited in January and February 1997 to study the eel culture industry and particularly the recruitment of the Japanese glass eel, *Anguilla japonica*. Recently there has been a decline in the recruitment and catch of glass eels in Taiwan, China, Japan and Korea.

Because factories in Taiwan have had trouble finding enough live eels for processing, there has been increased emphasis on culture of the European eel, *Anguilla anguilla*. However, because the European eel cannot tolerate the warmer waters of southern Taiwan, culture of this species is limited to the country's cooler regions.

Dr Collins was looking at the opportunities for Australian eels on the Asian market. Trials in Queensland are

being planned with a Taiwanese company. Also, Australian species are being tried in Taiwan. He observed that Australian producers will need to make sure that their eels are free from muddy or off flavours to succeed in Japan, the main market.

Dr Collins visited the Keelung, Lukang and Tungkang branches of the Taiwan Fisheries Research Institute, reporting on research in Queensland and studying Taiwanese methods of propagation. He also studied farming and harvesting. As a result of the visit he proposed four collaborative research projects on the biology and propagation of eels.

His impressions of science in Taiwan were very positive. He also noted increasing awareness of the need to ensure the sustainability of the fisheries and aquaculture industries.

Dr Mike Rimmer, of the Queensland Department of Primary Industries, visited Taiwan in March and April to undertake research and a study tour with the Taiwan Fisheries Research Institute. At the Tungkang Marine Laboratory he carried out research into aspects of the larval rearing of gold-spot cod, *Epinephelus coioides*. This provided samples for a project to develop aquaculture techniques for snapper and grouper.

The trip gave Dr Rimmer an insight into techniques used by the Taiwanese aquaculture industry to produce snapper and grouper fingerlings. The production of fingerlings is currently the major bottleneck in culturing high value fish from these families.

The Taiwanese techniques have immediate application in Australia, since they are similar to those used for barramundi, *Lates calcarifer*. The technical information gained during his visit will be passed to Australian scientists and industry through a detailed technical report, seminars and articles in an industry magazine.

While he was in Taiwan, Dr Rimmer also presented seminars on the biological and economic aspects of stock enhancement of barramundi (sea bass) and other species in Queensland. He found the facilities to be world class and the researchers capable and helpful. He was impressed by the hospitality and assistance provided by staff of the Taiwan Fisheries Research Institute.

## Honours to Fellows

The Pro-Vice-Chancellor (Research) at the University of Western Australia, **Professor Michael Barber**, has been appointed to the Australian Research Council. Professor Barber's areas of interest are statistical mechanics, advanced computation and research policy. He is also a member of the Academy's Council.

The Meteoritical Society has awarded its 1998 Leonard Medal to the renowned explorer of the chemistry of the solar system, Emeritus **Professor Ross Taylor**. The medal, the premier award of the society, is given for distinguished contributions to the field of meteoritics. Professor Taylor has also been appointed International Secretary of the Geochemical Society.



A meeting was held in Seoul in October 1997 between the Academy's Foreign Secretary, Professor Michael Pitman, left, and President, Sir Gustav Nossal, and the President of the Korean Academy of Science and Technology, Professor Wan Kyoo Cho, and the Vice-President, Professor Yung Bog Chae, right.

## Science in Asia and the Pacific

The Academy has supported a vision for the Asia Pacific Economic Cooperation (APEC) forum as a means of promoting science and technology.

At an APEC ministers' conference on regional science and technology cooperation held in Seoul in November 1996, the participating countries agreed that maintaining the economic dynamism of the region could best be accomplished by enhancing the scientific and technological capabilities of the region. They agreed on the need for policies to enhance the mobility of scientists and technologists in the region, to promote the sharing of scientific information and research facilities, and to attract talented young people to take up careers in science and technology.

In a submission to the Senate Committee on Foreign Affairs, Defence and Trade, which is conducting an inquiry into APEC, the Academy stated that science and technology would help achieve the opportunities offered by APEC. It described how the European Community had built up large, centrally funded research programs.

'APEC offers a rich opportunity for linkage between strong and establishing groups in science and technology, and for smart partnerships in education and research and in establishing scientific infrastructure,' the submission stated. 'There is a realistic opportunity for APEC to develop a program of exchanges,

cooperative research and APEC research centres based on what is already available and current bilateral arrangements.'

Major facilities, such as telescopes and accelerators, could be shared. Research centres could study issues of regional significance, such as tropical diseases, el Niño or earthquakes.

The Academy already has scientific exchange programs with China, Japan, Taiwan and South Korea, and is a member of the Federation of Asian Scientific Academies and Societies. Its contacts in the region could be the source for building networks and setting up joint projects.

The Academy's Foreign Secretary, Professor Michael Pitman, appeared before the Senate Committee on 29 September 1997 to discuss these ideas further.

### Fenner Conference on environmental ethics

The next Fenner Conference on the Environment, to be held at the Academy in Canberra on 26 to 28 November, will be on the topic, *Ethics of research and management practices in World Heritage and other environmentally sensitive areas: policy and practice*. For more information telephone (02) 6281 6624.

## Why stars twinkle

The 1997 Elizabeth and Frederick White Conference addressed the topic of interstellar scintillation, that is, the twinkling of astronomical radio sources which results from propagation of the radio waves through the tenuous material that pervades interstellar space. The conference was hosted by the Special Research Centre for Theoretical Astrophysics at the University of Sydney on 24 and 25 July.

The Academy's support enabled the conference to attract a number of distinguished overseas visitors – Professor JM Cordes from Cornell University, Professor C Gwinn from the University of California, Santa Barbara, and Professor BJ Rickett from the University of California, San Diego – and about 40 Australian participants.

The scientific themes considered were: intra-day variability of radio quasars, astronomical masers, the spatial distribution of scattering material in the galaxy, ultra-resolution of pulsar magnetospheres, and the periastron passage of the pulsar B1259-63. Each of these topics spawned lively debate which, despite generous allocations of discussion time in the program, invariably continued past the scheduled end of the session and into the time for drinking coffee and tea.

On the first day of the meeting, D Jauncey from the CSIRO Australia Telescope and L Kedziora-Chudczer from the University of Sydney reported observations of the radio quasar PKS0405-385, which exhibited large variations on time-scales as short as one hour even though the object itself is one light-month in size. An interpretation in terms of radio wave scintillation was offered, with Professor Rickett providing an expert perspective on the wave propagation aspects, and Professor Donald Melrose, from the University of Sydney, reporting on the implications for the physics of the source itself.

The second day saw a spirited discussion of attempts to understand the mechanism of pulsar radio emissions. Also, J Reynolds, of the Australia Telescope, offered the first tentative observation of radio wave scattering by an extragalactic plasma, thus extending the realm of scintillation and scattering phenomena from the solar system, beyond our galaxy to the distant universe.