AUSTRALIAN ACADEMY OF SCIENCE

NEWSLETTER

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From droughts to dancing: talking water

Futuristic cities integrating biodiverse wetlands, new uses for groundwater and Indigenous water culture were just some of the diverse topics examined at the Academy's monthly public lecture series, *Water management options for urban and rural Australia*. The popular series explored the role of science in developing innovative management options and showcased practical, environmentally responsible water management solutions. The first three lectures of the series, held in 2009, were reported in the Academy's March 2010 newsletter. Here, we summarise the 2010 lectures.

Photo: iStockphoto

The sun sets on the Academy's public lecture *Water* series – Cooper Creek, South Australia in flood

In February, Associate Professor Rebekah Brown from Monash University delivered the fourth lecture for the series. Rebekah spoke about **building water sensitive cities**, the social amenity of waterways, sustainable cities and environmental protection. While many of the technological advances required to enable such cities are not yet mainstream practice, Rebekah mentioned demonstration projects where wetlands and biofiltration systems have been integrated into the urban landscape.

In March, Dr Rob Vertessy from the Bureau of Meteorology discussed **leveraging Australia's water information** to accurately monitor, assess and forecast the availability, condition and use of Australia's water resources. Transparently accounting for how water is shared among the economy, critical human needs and the environment is crucial as the competition for water resources increases. The Bureau of Meteorology's water information program will significantly improve the accessibility and utility of water information, and lead to improved water resource management.

Ken Matthews from the National Water Commission summarised Australia's **recent progress in water reform** at the April lecture. Ken discussed 60 far-reaching recommendations for improved water management from the Commission's biennial assessment. Ken also proposed forming a coalition of national water science providers, to advise government on water resource allocation and science priorities.

Peter Dillon from CSIRO Land and Water continued the series in June with a talk on **recycled stormwater** and the aquifer recharge method. Drought and the need to secure urban water supplies have accelerated use of managed aquifer recharge (MAR) in Australia. MAR recycled stormwater has largely been used in urban areas for irrigation, toilet flushing and industry, however, drinking water supplies are now also being developed using these methods. Peter noted that river water and reclaimed water can be stored in aquifers during the wet season to supply irrigation water in the dry season, in rural areas.

Adjunct Professor Leith Boully from the University of New England presented **the water dance** in July, describing the challenge of 'dancing' through water policy reform. Leith discussed the rural–urban divide in managing water resources, and the complexity of integrated land and water management options required to deliver healthy river systems. Leith emphasised the value of engaging communities in developing plans to address trade-offs between environmental, social and economic concerns.

Professor Lin Crase from La Trobe University described the **'spin' and economics of irrigation infrastructure policy** in Australia at the August lecture. Professor Crase talked about how the direction of water policy in Australia has been fundamentally altered with the release of the Howard government's National *Plan for water security* and the Rudd government's subsequent *Water for the future* manifesto, citing the major shift embodied in these policies as the return of public subsidy for irrigation infrastructure. Professor Crase explored the discourse around this policy shift to raise awareness of the biased

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Message from the President

In recent months, the Academy has lost five Fellows: Frank Fenner, Gavin Brown, Keith Cole, Bill Ellis and Brian Womersley, each of whom made enormous contributions to the Academy and Australian science. Sadly, we say farewell but they will not be forgotten…

In my last President's Note, I highlighted health, energy, water, climate change, sustainable agriculture and preservation of biodiversity as looming challenges for the nation. Our attention has been drawn to the reality of these challenges recently with catastrophic flooding, cyclones and fire taking such a toll across large parts of Australia. The need for cross disciplinary scientific expertise and insight and cross jurisdictional planning for recovery and future mitigation has never been greater.

Professor Penny Sackett recently acknowledged the timeliness of the Academy's publication *Climate change: Questions and answers* as she explored some of the big questions surrounding these events in an opinion piece in *The Sydney Morning Herald*. Professor Sackett indicated that we must learn from such devastation, adapt and build resilience for future events.

The Academy was pleased to have Professor Sackett launch *To live within Earth's limits: An Australian plan to develop a science of the whole Earth system*, at the first Australian Earth System Outlook Conference, in December at the Shine Dome. The proceedings of that important event are outlined in this newsletter.

I was sorry to hear of Professor Sackett's recent resignation as Australia's Chief Scientist. She invested a great deal of energy into promoting science and research, advancing important scientific issues and enhancing relationships between scientists and the broader community. In her departing comments, she questioned the relationship between the Chief Scientist and the Government and this issue is sure to provoke vigorous discussion in coming weeks.

The key outcome of our 2010 Theo Murphy High Flyers Think Tank, *Searching the deep Earth: The future of Australian resource discovery and utilisation* was the recommendation for a national road map for deep Earth exploration. In launching the proceedings, Minister Ferguson declared 'the Academy could not have chosen a more timely or important subject'.

The Academy continues to vigorously support international linkages. The inaugural meeting of the Australia–US Science and Technology Joint Commission Committee Meeting was held in February in Washington DC and I attended the meeting and workshops along with four other Academy Fellows. In a recent ceremony at Parliament House, I signed a Scientific Cooperation Agreement between the Australian Academy of Science and the Mongolian Academy of Sciences.

The Academy's public lecture series, which we now stream live from our website, enables us to inform the wider community about important scientific issues. In this newsletter we wrap up the 2010 public lecture series on water and introduce the 2011 series, *Fenner's science today and tomorrow*, which began in February with a tribute symposium to honour Frank Fenner. We note that the National Health and Medical Research Council has also announced a fellowship in honour of his pioneering research and contributions.

Suzanne Cory

Nominations for the Prime Minister's Prizes for Science close on Friday 13 May 2011. I ask Fellows to nominate strong candidates for these important prizes.

Looking ahead, the Academy is busy readying for the annual *Science at the Shine Dome* meeting, from 4 to 6 May 2011. We look forward to welcoming new Fellows and celebrating our 2011 award winners at the Academy's flagship event. We expect this year's very topical theme, *Australia 2050: Population challenges to sustainability*, to generate much interest.

I look forward to seeing you there!

Professor Suzanne Cory AC PresAA FRS

IMPORTANT DATES

Public lectures in the *Fenner's science today and tomorrow* series

Malaria: the plant connection
Professor Geoffrey McFadden
Shine Dome **5 April 2011**

The history of science and 'The two cultures'
Dr Ann Moyal
Shine Dome **5 July 2011**

Science at the Shine Dome
An annual three-day event held by the Australian Academy of Science – incorporating the annual general meeting, induction of new Fellows, presentation of awards, teachers program and a scientific symposium
Shine Dome **4–6 May 2011**

WATCH ACADEMY LECTURES ON THE WEB

The Academy celebrated the first lecture in the *Fenner's science today and tomorrow* series by live streaming the event for the very first time. Future lectures will also be streamed live from the Academy website **www.science.org.au/events/public lectures/fs/index.html**

Honours to Fellows

CHEMIST RANKS IN WORLD TOP 20

Academy Fellow Dr Ezio Rizzardo FAA has been named as one of the top 100 chemists in the world in a list by Thomson Reuters marking International Year of Chemistry 2011. Dr Rizzardo was ranked 18th in the world for research on developing methods for controlling free radical polymerisation. Dr Rizzardo, from CSIRO, published 52 papers with 91.2 citations per paper between 2000 and 2010. He was the only Australian to be ranked in the top 20.

Professor Fiona Stanley AC FAA was inducted into the Western Australian Science Hall of Fame on 1 December 2010. The award recognises her work on Aboriginal health, which has encouraged a renewed focus on epidemiology and public health, and the use of population data to provide significant health, social and economic benefits to the community.

Professor Chris Goodnow FAA FRS was awarded the 2010 Ramaciotti Foundations' Medal for Excellence in Biomedical Research. The medal recognises his research on understanding how the immune system selectively attacks and repels invading bacteria and viruses without damaging tissues and organs.

2011 Honorific awards for scientific excellence

The Academy is pleased to announce the 2011 awards for scientific excellence have been awarded to the following researchers:

Career awards

Professor Ian Dance FAA, The University of New South Wales – David Craig Medal for research in chemistry

Professor Colin Rogers FAA, The University of New South Wales – Hannan Medal for research in applied mathematics and computation mathematics

Professor Ian Jackson, Australian National University – Jaeger Medal for research into Earth sciences

Professor James Williams FAA, Australian National University – Thomas Ranken Lyle Medal for research in mathematics or physics

Professor Ruth Hall FAA, University of Sydney – 2012 Macfarlane Burnet Medal and Lecture for research in the biological sciences

Early career awards

Dr Bryan Fry, University of Melbourne – Fenner Medal for research in biology (excluding the biomedical sciences)

Dr Alicia Oshlack, Walter and Eliza Hall Institute of Medical Research – Ruth Stephens Gani Medal for research in human genetics

Dr Stuart Tangye, Garvan Institute of Medical Research – Gottschalk Medal for research in the medical sciences

Professor Craig Simmons, Flinders University – Anton Hales Medal for research in Earth sciences

Dr Anthony Henderson, University of Sydney – inaugural Christopher Heyde Medal for research in pure mathematics

Dr Kirsten Benkendorff, Southern Cross University – Dorothy Hill Award for female researchers in the Earth sciences including reef science, ocean drilling, marine science and taxonomy

Associate Professor Martina Stenzel, The University of New South Wales – Le Fèvre Memorial Prize for research in basic chemistry

Dr Scott Sisson and **Dr Mark Tanaka**, The University of New South Wales – Moran Medal for research in statistics

Professor Bryan Gaensler, University of Sydney – Pawsey Medal for research in physics

Research support awards

Dr Daniel Ramp, The University of New South Wales, is the winner of the WH Gladstones Population and Environment Fund award. Engagement of a growing Australian population with kangaroos – modelling for sustainable futures.

The following researchers will receive research support under the **Margaret Middleton Fund for endangered Australian native vertebrate animals**:

Greta Frankham, University of Melbourne. The phylogeography and population genetics of the long-nosed potoroo (*Potorous tridactylus*).

Dr Michale Letni, University of Western Sydney. How do dingoes provide conservation benefits for the dusky hopping mouse (*Notomys fuscus*)?

Dr Adam Polkinghome, Queensland University of Technology. Towards an effective conjugate vaccine to combat debilitating chlamydial disease in the koala.

Qamar Schuyler, University of Queensland. Sea turtles threatened by marine debris – do they have a choice in the matter?

Dr Arian Wallach and **Adam O'Neill**, C&A Environmental Services in Queensland. Restoring ecosystem function from the top.

Professor Dame Julia Higgins, Imperial College in London has also been awarded the Selby Travelling Fellowship.

For more information on awards and recipients visit **science.org.au/awards/**

Science Policy

Launch of the 2010 High Flyers Think Tank Proceedings

The printed proceedings of the 2010 Theo Murphy High Flyers Think Tank, were launched on 11 January 2011 by Resources, Energy and Tourism Minister Martin Ferguson. Minister Ferguson said, 'It is by no means an overstatement to say that *Searching the deep Earth: The future of Australian resource discovery and utilisation* is at the heart of our nation's continued prosperity.'

Phil McFadden and Martin Ferguson launch the 2010 High Flyers Think Tank proceedings

The document was the culmination of a workshop held at the Shine Dome in Canberra in August 2010, which brought together approximately 60 experts in minerals exploration from across Australia. The talented early and mid career researchers from a diverse range of disciplines came together to explore novel science and technology applications for issues of national significance, and to identify gaps in knowledge that should be addressed.

Dr Neil Williams PSM FTSE made it clear in his keynote address that explorers' main challenge is finding more deeply buried ore deposits to replace the declining number of outcropping and near surface ore deposits. For this reason, a new approach to minerals exploration is needed. Australia potentially has many more high quality ore deposits that are suitable for mining, but identifying these will require innovative use of existing data, the collection of new data and the development of technologies to exploit this information.

The key outcome of the workshop was the recommendation for a national road map for deep Earth exploration that integrates components of the national innovation effort in a coherent deep Earth mapping program. The proposed road map would be underpinned by six initiatives that would open up new frontiers for mineral exploration and enable the private sector to undertake Australia's next phase of exploration competitively. The data and knowledge created through these initiatives will also assist in further defining Australia's water, energy and land resources.

Proceedings have been distributed to a diverse range of community groups and interested parties and are available from **science.org.au/events/thinktank/thinktank2010/index.html**

The Minister's speech can be found at **minister.ret.gov.au/MediaCentre/Speeches/Pages/Speeches.aspx**

Gladstones' Population and Environment Fund

It is with great sadness that we announce the sudden death in December of Dr WH Gladstones. Donations from Bill Gladstones established the Academy's Population and Environment Fund in 1997. The fund was established to support empirical research into how Australia's population is likely to affect our environment – not only our land and landscape, but also social cohesion, health, the economy and defence.

The first initiative of the Fund was *Population and environment in Australia: 2003*, by Dr Colin Butler, an overview of research into population and environment in Australia. This report became the basis for an online conference on population and environment in Australia conducted prior to the 2004 Fenner Conference on the Environment, *Understanding the population–environment debate: Bridging disciplinary divides* that was held as part of the Academy's 50th anniversary celebrations. In 2007, the Fund sponsored the development of a *Nova: Science in the News* topic, *Population and environment – what's the connection?* which was the most frequently viewed *Nova* topic at that time and remains popular today.

Just before his death, Bill established a new purpose for the Fund – the WH Gladstones Population and Environment Fund Grant – to directly support early career researchers whose research aims to quantify various aspects of the human footprint, and to model likely ecological and other consequences. The inaugural grant was awarded to Dr Daniel Ramp, Senior Research Fellow, Australian Wetlands and Rivers Centre, The University of New South Wales, for his project *Engagement of a growing Australian population with kangaroos – modelling for sustainable futures*.

The Population and Environment Fund and the science it supports will continue to honour Bill's extraordinary generosity and interest in population growth and its impact on our environment.

Science at the Shine Dome

The Academy's annual celebration of science and AGM will be held from 4 to 6 May 2011. The event will begin with the Matthew Flinders Medal and Lecture and the new Fellows seminar. Highlights include the admission of new Fellows and presentations by 2011 award winners. Special programs will also be held for teachers and early career researchers. The annual symposium, on Friday 6 May, brings together leading biologists, population scientists and social scientists to examine the core theme, *Australia 2050: Population challenges to sustainability*.

As human populations grow, it is predicted that we will be faced with many new physical, biological, and social challenges. Scientists will discuss the implications of population growth for areas such as health, water, soil, agriculture and energy.

TEACHERS PROGRAM

The Academy is offering a special program for science teachers at the *Science at the Shine Dome* conference. Delegates will have the opportunity to learn about the latest research across a range of science disciplines, meet and talk with renowned scientists, young researchers and interstate colleagues, attend the new Fellows seminar and other *Science at the Shine Dome* events and participate in an education workshop. Both primary and secondary teachers are encouraged to register.

Further information and application forms are available from **science.org.au/events/sats/sats2011/ta.html**.

Photo: Irene Dowdy

Teacher Award winners from 2010

Fenner's science today and tomorrow

The Academy's 2011 public lecture series, dedicated to the late Frank Fenner, commenced in February. The series is intended as both a tribute to Frank's work and an opportunity to hear about the latest scientific advances in the research areas that he pioneered. Frank Fenner's long career spanned many areas of science including malaria and tuberculosis research, the biological control of rabbit populations, the elimination of smallpox, epidemiology, population dynamics and the environment.

The series opened with a tribute symposium as a celebration of Fenner's life and science. Three eminent speakers provided insights into the health and environmental research that defined his career. Nobel Laureate Professor Peter Doherty AC FAA FRS spoke about Fenner the immunologist, focusing on the early part of his career, while Emeritus Professor Henry Nix AO primarily looked at his environmental interests. Professor Adrian Gibbs FAA ended the symposium with a review of Fenner's impact on virology and his contribution to the eradication of smallpox. He also proposed ways in which the Academy could further Fenner's legacy. The symposium attracted a full house of 260, and was broadcast live to an international audience via the Academy's first real-time web stream. Future major Academy events will also be streamed live to the web.

Suzanne Cory, Peter Doherty, Henry Nix and Adrian Gibbs at the symposium

Professor Ian Ramshaw from the John Curtin School of Medical Research gave the second lecture in the series on 1 March: *Bioterrorism: Who do we need to fear the most, the terrorist or the research scientist?*

Video recordings of the series are available from **science.org.au/events/publiclectures/fs/index.html**

International

Australia–China Symposium

Fifty Australian and Chinese researchers shared ideas and formed connections at the 7th Annual Australia–China Symposium, on Agriculture and Food Security Relating to Health from 14 to 16 November 2010. The event was organised by the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering (ATSE) and the Chinese Academy of Sciences (CAS), on behalf of the Australian Government Department of Innovation, Industry, Science and Research (DIISR). The symposium was held at the Novotel Barossa Valley Resort in South Australia.

The three academy presidents – Professor Yongxiang Lu FAA (CAS), Professor Robin Batterham AO (ATSE) and the Academy's Professor Suzanne Cory AC PresAA FRS – jointly opened the event, at which participants explored collaborative opportunities in three concurrent workshops: climate change impacts on food security; food safety, food nutrition and human health, and; agricultural productivity, biosecurity and future demand for food. Each workshop was jointly convened by expert Australian and Chinese researchers.

As a direct result of the symposium, DIISR has provided funding for follow-up workshops to occur on the three symposium focus topics to further explore identified opportunities. These workshops will take place in China and Australia in 2011. The two day symposium was followed by a day of site visits for the Chinese delegation at the University of Adelaide's Waite Campus and the South Australian Research and Development Institute.

Professor Lu, accompanied by other members of CAS and Academy staff, spent a week visiting research organisations in Adelaide, Sydney, Canberra and Hobart, before returning to Beijing.

During his visit to Canberra, Professor Lu was an honoured guest at a lecture and dinner at the Academy's Shine Dome, in celebration of 30 years of science and technology relationships between Australia and China. Other special guests included Industry, Innovation, Science and Research Minister Kim Carr, 2011 Australian of the Year Award recipient and CSIRO Board Chair Simon McKeon, and His Excellency Mr Yuming Chen, Ambassador for the People's Republic of China.

Australia–China symposium delegates on a site visit

Victoria Hewitt at the bench

Adam J Berry Memorial Fund

The Adam J Berry Memorial Fund is co-managed on behalf of the Berry family by the Academy and the US National Institutes of Health Foundation. It aims to assist one early career Australian researcher to work in the US at an institute of the National Institutes of Health (NIH) each year. During their visit, scientists are expected to contribute to the institute's research program, while gaining valuable research experience for themselves.

The recipient for 2011 is a PhD student from Monash University. Victoria Hewitt will be visiting the National Institute of Diabetes and Digestive and Kidney Diseases of the NIH for 12 weeks to explore the insertion machinery of mitochondrial outer membrane proteins.

International Research Staff Exchange Scheme

The Marie Curie International Research Staff Exchange Scheme (IRSES) funds short period staff exchanges and networking activities between research organisations in European, and other countries – including Australia.

In 2010, the Academy received $225,400 to fund IRSES projects. Following a call for applications in October 2010, 12 successful applicants were awarded funding for 2011 to 2012. A list of successful applicants and a description of their projects is available from **science.org.au/internat/europe/irses-participants-2011-12.html**

Australia–US Science and Technology Meeting

The inaugural Australia–US Science and Technology Joint Commission committee meeting was held in Washington DC over two days in mid-February 2011. This meeting was announced during the visit of the US Secretary of State Hillary Clinton in November 2010, and took place under the auspices of the Agreement Relating to Scientific and Technical Cooperation between the Government of Australia and the Government of the Unites States of America, which came into force in February 2007.

Five Academy Fellows joined the delegation. Academy President Professor Suzanne Cory participated in the 'shared challenges in health' workshop, while Professors Graham Farquhar and Barry Osmond took part in the 'agriculture, water and food security' workshop. Professor Chris Goodnow participated in the 'enabling technologies' workshop and Dr Phil McFadden was involved in the 'climate and Earth observation' workshop.

MoU with Mongolia

On 22 February, in a ceremony attended by Prime Minister Julia Gillard, a formal agreement was signed for greater understanding and sharing of ideas between scientists in Australia and Mongolia.

The President of the Academy, Suzanne Cory, and the President of the Mongolian Academy of Sciences, Batbold Enkhtuvshin, met at Parliament House in Canberra to sign the Memorandum of Understanding.

The MoU formalises scientific linkages between the two academies. It is expected to help Australian scientists connect and strengthen ties with Mongolian scientists by exchanging ideas and reviewing collaborative opportunities in fields of common scientific interest, including natural resources and agriculture.

The Mongolian Academy of Sciences joins 18 other international science organisations having formal relationships with the Australian Academy of Science.

Photo: Howard Moffat, AUSPIC

Batbold Enkhtuvshin and Suzanne Cory sign the MoU between the Australian and Mongolian science academies, in a ceremony attended by Julia Gillard at Parliament House

National Committees

National Committee chairs have submitted annual reports and work plans for their committees. These are available from **science.org.au/natcoms/**

Astronomy

The National Committee for Astronomy held a series of town hall meetings in November 2010 as part of the mid-term review of the document *New Horizons: A decadal plan for Australian astronomy (2006–2015)*. The Chair of the Committee, Professor Elaine Sadler FAA, addressed the Annual General Meeting of Astronomy Australia Ltd on 8 November. The Committee met on 2 December at Ian Potter House. The draft report of the mid-term review sub-committee was a major item of business, as well as a report received from Astronomy Australia Ltd.

Chemistry

The National Committee for Chemistry met during the Royal Australian Chemical Institute annual meeting on Saturday 13 November 2010. The main area of focus for the committee is the International Year of Chemistry (IYC) which was launched at Parliament House in February 2011. The Australian website for the IYC is **iyc2011.org.au/**. This website has details of Australian events being organised to celebrate the art and science of chemistry.

Data in Science

Professor Jane Hunter, Deputy Chair of the National Committee for Data in Science, was Australia's voting delegate at the General Assembly of CODATA, the Committee on Data for Science and Technology of the International Council for Science. The General Assembly was held in Cape Town, South Africa from 24 to 27 October 2010.

Earth System Science

The National Committee for Earth System Science met on 3 November 2010 at Ian Potter House. Australian representatives of the International Geosphere Biosphere Programme also joined the meeting.

To live within Earth's limits: An Australian plan to develop a science of the whole Earth system was launched by the Chief Scientist of Australia, Professor Penny Sackett, on 9 December 2010 at the first Australian Earth System Outlook Conference at the Shine Dome. The conference was the first stage of implementation of the recommendations, and a vital step in forming a cohesive body of Earth system scientists in Australia. Copies of the publication are available from **science.org.au/natcoms/nc-ess.html** or contact **jeanette.mill@science.org.au**

History and Philosophy of Science

The National Committee for History and Philosophy of Science met on 25 January. The committee discussed plans for the 60th Anniversary of the Academy in 2014. They made initial plans for a workshop, to consider the current and future state of the discipline, to be held later in 2011. *The Encyclopedia of Australian Science* was discussed, **www.eoas.info/**

National Museum of Australia Student Prize

The deadline for entries to the National Museum of Australia Student Prize is now 25 March 2011. The prize is awarded for an essay on the history of Australian science or environmental history, from any period, based on original unpublished research undertaken whilst enrolled as a postgraduate or undergraduate student at any tertiary institution. More information is available from **science.org.au/natcoms/nc-hps/nc-hps-award-aeh.html**

Medicine

The National Committee for Medicine met via teleconference on 15 November 2010. Professor Warwick Anderson, CEO of the National Health and Medical Research Council joined the teleconference to discuss issues relating to the Council. Other items of discussion included Indigenous health, medical research strategic planning, advanced health research centres and funding for the indirect costs of research.

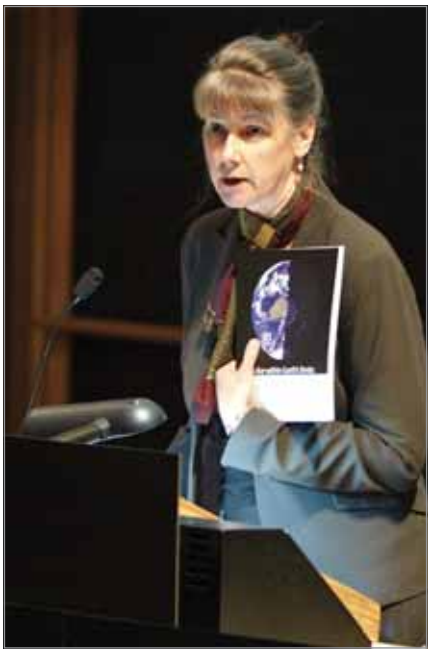

Photo: Andrew Sikorski

Penny Sackett, Chief Scientist of Australia, launches the Earth system plan

Quaternary Research

Professor Allan Chivas FAA is the new Chair of the National Committee for Quaternary Research. Allan Chivas is also President of the International Union of Quaternary Research (INQUA). A meeting of the Committee was held on Thursday 11 November 2010 at Ian Potter House. INQUA matters including the upcoming 18th INQUA Congress and General Assembly, to be held from 20 to 27 July 2011 in Bern, were discussed. National Committee representatives were identified to note what is happening in the various INQUA commissions for feedback to the Committee. Steps towards a strategic plan for Quaternary Research were also discussed.

Radio Science

The National Committee for Radio Science met on 29 November 2010. Major topics of discussion were Australia's relationship with the International Union for Radio Science and initial planning for the 2012 Workshop on Applications for Radio Science.

2010 Fenner Conference on the Environment

The 2010 Fenner Conference on the Environment – *Healthy climate, planet and people* – was held on 23 and 24 June at the Shine Dome.

More than 150 participants from research, policy, practice and industry joined the conference to exchange ideas with leading Australian and international researchers on the 'health co-benefits' arising from actions taken to stem climate change.

The conference was organised by the National Centre for Epidemiology and Population Health at the Australian National University (ANU), with support from the CSIRO Climate Adaptation Flagship and the National Climate Change Adaptation Research Facility.

Climate change affects health in many ways. In Australia, there are health impacts from more frequent and severe extreme weather events, such as heat waves and tropical storms, and indirect health impacts from changes to physical and biological processes, such as increased health risks from urban air pollution. There are also flow-on health impacts from social, demographic and economic disruptions, such as declining rural incomes from agricultural production. Responses to climate change can also affect health. The positive health impacts, termed 'health co-benefits', include benefits to both physical and mental health arising from active modes of travel (walking, cycling, mass transit), a vegetable-rich diet, and renewable energy generation. Such actions increase exercise and improve nutrition and air quality, while also reducing greenhouse gas emissions.

A COLLABORATION OF VISUAL ART AND SCIENCE

As part of the 2010 Fenner Conference, delegates enjoyed an opportunity to visit *The Contested Landscapes of Western Sydney* exhibition, led by John Reid, at the ANU School of Art adjacent to the Shine Dome **www.fieldstudies.com.au/category/contested-landscapes/**

Artwork: *Produce or Peril*
Rod Armstrong, 2010

In his opening keynote address, Professor Kirk Smith from the University of California, Berkeley provided an overview of the topic, emphasising the health and climate impacts of solid fuel use for cooking in low-income countries. Professor Sir Andrew Haines, Director of the London School of Hygiene and Tropical Medicine, presented the findings of a series of studies from sectoral perspectives, including low-carbon energy generation, urban land transport, and food and agriculture, published in *The Lancet* in November 2009. A panel session about systems approaches in urban research, chaired by Professor Anthony Capon, included policy input from Neil Savery, National President of the Planning Institute of Australia. Professor Stephen Boyden FAA introduced the concept of 'biosensitivity' – being sensitive to the health needs of people and the biosphere at the same time – in an interactive session led by Dr Barry Newell and Dr Katrina Proust. This lively session enabled participants to explore the dynamics and consequences of decision making.

The conference was closed by Professor Tony McMichael with a positive message that low-carbon ways of living are healthy ways of living. He encouraged policymakers to consider the implications of health co-benefits for decisions about carbon regulation. The conference has now stimulated new research collaborations and policy interest. Recordings of the proceedings and copies of presentations are available from **nceph.anu.edu.au/Fenner2010/index.php**

Interviews with Australian Scientists

Graham Farquhar (left) interviewed Garth Paltridge (right) at the Shine Dome in Canberra

The last two months of 2010 were busy for the *Interviews* project, with four new interviews filmed. These were kindly sponsored by CSIRO Materials Science and Engineering, Prince Henry's Institute and the University of Adelaide.

Dr Garth Paltridge FAA was interviewed in November by Professor Graham Farquhar FAA FRS. During the interview, Paltridge spoke about the 'fun' he has had in his career, including flying into thunderstorms to collect data and setting up research consortiums in the local pub. Paltridge is best known for his work on the maximum entropy production model and his recently published book *The Climate Caper*.

Dr Guy White FAA kindly shared the story of his life in science with Professor Neville Fletcher FAA in November. White discussed his field of low-temperature physics with interesting examples of practical applications, such as in the design of materials for use in hot-plates and cryo-coolers. He also spoke about the magic that can sometimes happen in the Shine Dome, with White describing how he met his wife at an Academy function.

Endocrinologist and former director of the Prince Henry's Institute, Professor Henry Burger FAA, was interviewed by Professor Rob McLachlan. In the interview, Burger reflected on his unique method of preparing for medical exams – two weeks skiing! Burger made his name in the study of menopause and the protein hormone inhibin, but he listed working on the photo-finish line at the 1956 Melbourne Olympics as one of his favourite jobs.

Professor Angas Hurst FAA met with Professor Bob Crompton FAA in Adelaide to film Hurst's interview in December. Hurst's wartime recollections of his time commanding a radar base in Papua New Guinea had Crompton and the crew enraptured. Moving on from the war, Hurst discussed a life in mathematical physics with frequent productive study leave trips overseas.

Transcripts from the interviews with Professor Andrew Cole FAA, Professor Christopher Heyde FAA FASSA, Professor John Lovering FAA FTSE, Dr Oliver Mayo FAA FTSE, Professor John Newton FAA and Dr Amanda Barnard are available along with 'teaser' length videos of Professor Robin Stokes FAA, Dr Bill Blevin FAA FTSE and Dr Nicole Webster from **science.org.au/scientists/index.html**

Nova: Science in the News

Asthma is a complex chronic disease that can cause airway walls to become inflamed, partially or completely blocked, and even cause permanent damage. Symptoms can be set off or made worse by airborne triggers such as pollen, dust mites, viruses or animal hair, and lead to an asthma attack.

Whilst Australia has one of the highest rates of asthma in the world, Australian researchers are uncovering more about its causes and finding potential new mechanisms with which to treat it. A recent major update of the *Nova* topic *The rise and rise of asthma* outlines some of the recent research findings from laboratories around the country.

A complete article highlighting Australian research and written in conjunction with Professor Patrick Holt, of the Telethon Institute for Child Health Research in Western Australia is available from the *Nova* website **science.org.au/nova/007/007box02.htm**

Photo: Woolcock Institute of Medical Research, Sydney © Chris L Jones

Stains are applied to sections of human lung tissue by a member of Judith Black's team at the University of Sydney, as part of a study of the cellular and molecular basis of lung diseases – such as asthma

AUSTRALIA–KOREA EARLY CAREER S&T RESEARCHERS PROGRAM 2011

The Australia–Korea Foundation (AKF), the Australian Academy of Science, the National Research Foundation of Korea and the Australian Academy of Technological Sciences and Engineering invite applications for the Early Career S&T Researchers Program. The program has been created to enhance Australia–Korea links in science and technology.

The program supports researchers who have recently completed postgraduate research qualifications and are currently employed in research or academic positions. More information and application forms are available from **science.org.au/internat/asia/akf-ecr.html**. Applications close 5.00 pm Friday 18 March 2011.

Science by Doing

Students investigating pond water at Telopea Park School, Canberra

During 2010, 28 high schools representing all Australian jurisdictions trialled the *Science by Doing* professional learning approach and associated resources. An independent evaluation of this trial conducted by Professor Léonie Rennie from Curtin University, the *Evaluation of the Science by Doing stage one professional learning approach 2010* revealed significant positive outcomes. Quantitative data on *Science by Doing*'s success in the implementation of professional learning communities and the improvement of pedagogical practice in trial schools is a genuine indicator of the effectiveness of *Science by Doing*. The full report is available from **science.org.au/sciencebydoing/research-evaluation/**

Revision of the *Science by Doing* curriculum and professional learning resources began in November 2010 after feedback was received from the schools involved in trialling. The invaluable feedback is assisting the revision, especially in relation to content suitability and ease of use. The new *Australian Curriculum: Science* provides a collaborative and flexible approach to its implementation. Final editions of the trial suite of curriculum and professional learning resources will be published in the second quarter of 2011.

During 2010, Project Director Professor Denis Goodrum and Project Deputy Director Amelia Druhan promoted *Science by Doing* to a broad range of stakeholders. Presentations were made at the state, national and international level and *Science by Doing* is now acknowledged as a pre-eminent inquiry-based secondary school science program. The Academy is seeking further funding to progress stage two of the project, which will ensure production of a comprehensive set of curriculum and professional learning resources, a teacher workshop program and a roll out of the *Science by Doing* professional learning approach across Australia.

Top left to right: Fiona Stanley, Peter Doherty and Elizabeth Blackburn. Bottom left to right: Graeme Pearman, Frank Fenner and Gus Nossal

Most highly regarded public intellectuals of 2010

A number of Academy Fellows and corresponding members have been nominated by prominent Australians as amongst the most highly regarded public intellectuals of 2010.

The Sunday Canberra Times asked prominent Australians to name highly regarded intellectuals for their ability to talk about complicated topics in understandable and accessible ways.

Tim Costello, Chief Executive Officer of World Vision, picked Professor Fiona Stanley AC FAA for being 'tireless, focused, and keeping children on the National mind'. The Hon Philip Ruddock MP also chose Fiona Stanley, saying 'she has the trust of Governments and the Australian people on health matters and she continues to lead the cause of improving the wellbeing of our youth'. Professor Glyn Davis AC, University of Melbourne Vice-Chancellor, selected Nobel Laureates Professor Peter Doherty AC FAA FRS and corresponding member Professor Elizabeth Blackburn AC FAA FRS. Senator Bob Brown also chose Elizabeth Blackburn, as well as picking Dr Graeme Pearman AM FAA FTSE and the late Professor Frank Fenner AC FAA FRS. ACT Chief Minister Jon Stanhope chose Sir Gus Nossal AC FAA FRS FTSE for 'leading research in the fields of medicine and science'.

A full listing is available from **www.canberratimes.com.au/news/local/news/general/our-great-minds-of-2010/2029556.aspx?storypage=0**

ROAD NAMED AFTER JACK DEEBLE

Jack Deeble OAM (1924 to 2003) has been honoured by having a street in Forde, ACT named after him. The naming of the street acknowledges Jack's role as the first executive secretary of the Academy from 1956 to 1975, followed by eight years of work on special projects for the Academy until his retirement in 1983. During his 27 years at the Academy, Jack was responsible for managing a number of initiatives, including all phases of construction of the Shine Dome and the production of the *Web of Life*, a highly successful school biology textbook. He also established and maintained close contacts with the secretariats of the Royal Society, the US National Academy of Sciences and the International Council for Science that continue today. The street name also recognises Jack's community service to scouting in Victoria and the ACT from 1934 to 2003. He received the Silver Kangaroo, scouting's highest award, in 1987 and in 2006 the Jack Deeble memorial scholarship was instigated in his honour. The ACT Planning and Land Authority place name search is available from **www.actpla.act.gov.au**

An interview with Jack about the design and construction of the Shine Dome is available from **science.org.au/dome/deeble.html**

FRANK FENNER EARLY CAREER FELLOWSHIP

The enormous achievements of Emeritus Professor Frank Fenner will be commemorated by a National Health and Medical Research Council (NHMRC) fellowship in honour of his pioneering research and contributions to health and medical research in Australia. The fellowship, announced in December 2010, will be awarded to early career researchers identified through the NHMRC's competitive peer-review process, whose research reflects Fenner's achievements in international health. The first NHMRC Frank Fenner Early Career Fellowship will be announced in 2011.

Fellows turn 90

Rupert Myers

Birthday greetings to Sir Rupert Myers, who turned 90 on 21 February. He was the first person to receive a PhD from an Australian university (University of Melbourne, 1948). He was foundation professor of metallurgy at The University of New South Wales (UNSW) from 1952, pro-vice-chancellor from 1961 and vice-chancellor and principal from 1969 to 1981. He then became a non-executive director of CSR Ltd from 1981 to 1993 and Energy Resources Australia Ltd from 1981 to 1997. In 1999 he took on the chairmanship of the Cooperative Research Centre for Greenhouse Accounting for four years. He was also a member of the Prime Minister's Science and Engineering Council from 1991 to 1995. Sir Rupert was elected to the Fellowship of the then Academy of Technological Sciences in 1979 and served as its president from 1989 to 1994. He was elected to the Australian Academy of Science by special election in 1997. Sir Rupert has been honoured with a CBE, KBE, AO and a Centenary Medal, and has a UNSW building and lecture hall named after him.

Robert Street

Birthday greetings to Bob Street, who turned 90 on 16 December. Bob was born and educated in the United Kingdom and came to Australia in 1960 to be foundation professor of physics at Monash University. While there he developed the Victorian physics curriculum. He moved to the Australian National University in 1974 as director of the Research School of Physical Sciences in the Institute of Advanced Studies and was one of six members of a committee established to oversee the development of the Anglo-Australian Telescope. In 1978 he took up the position of vice-chancellor of the University of Western Australia, retiring in 1986 as emeritus professor. His particular interest is magnetism, but he has also worked on the safe destruction of toxic wastes using mechano-chemical processes and studied problems such as the deterioration of railway lines in the Pilbara. Bob was elected to the Fellowship of the Academy in 1973, became an Officer of the Order of Australia in 1985 and was honoured by the University of Western Australia with a building and lecture theatre named after him in 2010.

BIOGRAPHIES OF ACADEMY FELLOWS

Biographers have been appointed for the following Fellows:

Professor Athel Beckwith
Biographer: Professor Ian Rae

Professor Charles Birch
Biographer: Peter Farleigh

Professor Ron Brown
Biographers: Professor Frank Larkins (replacement author) and Professor John Swan

Professor Hans Buchdahl
Biographers: Professor Don Melrose and Professor Greg Forbes

Professor Ross Crozier
Biographers: Professor Ben Oldroyd and Dr Oliver Mayo

Professor Ben Gascoigne
Biographer: Professor Ken Freeman

Professor Mollie Holman
Biographers: Professor David Hirst and Professor Elspeth McLachlan

Dr Phil Law
Biographers: Professor Patrick Quilty and Dr Des Lugg

Professor Lawrie Lyons
Biographer: Professor John White

Professor Ren Potts
Biographer: Professor Peter Taylor (replacement author)

Mel Thompson
Biographer: Dr Barry Inglis

Professor Ernie Tuck
Biographer: Professor Roger Grimshaw

Dr Don Weiss
Biographer: Professor Tom Spurling

Dr Wes Whitten
Biographers: Dr Jim Shelton and Dr Peter McCullagh

Biographers would be grateful to readers who could provide assistance on the basis of their personal knowledge of the individual or their work.

Memoirs of deceased Fellows are published in *Historical Records of Australian Science* and are available from **science.org.au/fellows/deceased.html**

Obituaries

Gavin Brown

Gavin Brown was born in Lundin Links, Scotland, on 27 February 1942 and died in Adelaide on 25 December 2010. He was educated at the University of St Andrews, obtaining his MA (Hons) in 1963 and Newcastle University, receiving his PhD in 1966. He then joined the University of Liverpool as an assistant lecturer in mathematics and progressed to senior lecturer before moving to the University of NSW as professor of pure mathematics in 1976. From 1992 to 1993 he was deputy vice-chancellor (research) at the University of Adelaide, followed by two years as vice-chancellor. In 1996 he moved to the University of Sydney as vice-chancellor, retiring in 2008 as emeritus professor and taking up the position of inaugural director of the Royal Institution of Australia. His research was in the area of measure theory, particularly the structure of convolution measure algebras. He was one of the first people to recognise the importance of measure algebras for harmonic analysis and probability theory. He also developed a set of theorems which enabled the structure of Riesz product measures to be completely described.

Gavin was elected to the Academy in 1981 and served on the Council from 1992 to 1995, being a vice-president from 1993 to 1994. Other honours and awards included the Sir Edmund Whittaker Memorial Prize from the Edinburgh Mathematical Society in 1977, the Australian Mathematical Society Medal in 1982, an honorary Doctor of Laws from the University of St Andrews in 1997 and from the University of Dundee in 2004, Officer of the Order of Australia in 2006, honorary fellowship of the Royal Society of NSW in 2006, election as a corresponding fellow of the University of Edinburgh in 2007 and Royal Society of NSW Medal in 2008. A cricket pavilion at the University of Sydney was named in his honour because of his strong support for sport while vice-chancellor. He was the first chair of the Group of Eight board from 1991 to 2001. He was also appointed chair of the Association of Pacific Rim Universities, a consortium of 36 leading research universities, in June 2006.

Excelling at such intellectual pursuits as chess and bridge, he was so good at Scrabble that at the age of eight he was banned from playing the game in the local adult competition. He also began compiling crosswords at this age, an activity he continued to enjoy throughout his life.

Gavin married Barbara Routh in 1966 and they had two children. Barbara died in 2001 and Gavin married Diane Ranck in 2004. Diane survives him, together with his children Janet and Colin and stepchildren Benjamin and Oliver.

Keith Cole

Keith David Cole was born in Cairns, Queensland, on 2 March 1929 and died in Melbourne on 13 December 2010. He was educated at the University of Queensland, obtaining his BSc (Hons) in 1952, DipEd in 1953, MSc in 1954 and DSc in 1967. He began his career in 1953 as a secondary school teacher. In 1956 he was an auroral physicist on the Australian National Antarctic Research Expedition to Macquarie Island, continuing his career with the Antarctic Division from 1957 to 1963, with a secondment to CSIRO Upper Atmosphere Section in 1962. In 1963 he moved to the US to work as a research associate, first at the University of Chicago and then at the University of Colorado from 1965 to 1966. He returned to Australia in September 1966 as foundation professor of physics at La Trobe University, a position he held until his retirement in 1994 as emeritus professor. During this period he also spent time as a senior research associate at the NASA Goddard Space Flight Center in Maryland, USA, where he returned after his retirement.

Professor Cole's personal research was on the theory of the upper atmosphere, ionosphere and magnetosphere, especially magnetosphere-ionosphere coupling, as well as more general areas of theoretical physics. His prediction that energy pumped into the Earth's atmosphere by the solar 'wind' could be of almost as great significance as the electromagnetic input, stimulated much experimental work, and his theories are now widely accepted. He also organised the research of the Theoretical and Space Physics Group at La Trobe University. Keith was heavily involved in international science, being president of the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) from 1977 to 1986 and of the International Association of Geomagnetism and Aeronomy (IAGA) from 1979 to 1983. He was a member of the Executive Committee of the International Union of Geodesy and Geophysics (IUGG) from 1979 to 1983. He was made an honorary member of IAGA in 1989 and an honorary life member of SCOSTEP in 2002. In 1984 he was awarded the Appleton Prize of the Royal Society of London and the International Union of Radio Science.

Service to the Academy included a four year term on the Council as foreign secretary from 1985 to 1989 and chairing the Academy's committee on the International Geosphere-Biosphere Programme from 1986 to 1990. He was awarded an Australian Government Centenary Medal in 2003.

Keith married Ailsa Moore in 1956 (divorced early 1980s) and they had three children, Maxine, James and David. He is survived by David and six grandchildren.

Graeme (Bill) Ellis

Graeme Reade Anthony (Bill) Ellis was born in Launceston, Tasmania, on 20 December 1921 and died in Hobart on 4 February 2011. Bill was educated at the University of Tasmania completing a BSc (Hons), PhD and DSc. He served with the RAAF and was a navigator with the RAF between 1942 and 1945. In 1950 he became a scientific officer with the Ionospheric Prediction Service (IPS). While with the IPS he published his work showing that it was possible for electromagnetic waves of frequency as low as 1 MHz to penetrate the ionosphere in some circumstances. In 1957 he spent a year at the University of Queensland as a senior lecturer. Between 1958 and 1960 he was a senior and then principal research officer at CSIRO's Upper Atmosphere Section, where he worked on very low frequency radio waves, predicting the existence of a new type of very low frequency emission, the 'nose whistler'.

In 1960 he became professor of physics at the University of Tasmania. His appointment was very timely, injecting new vitality into the Physics Department both in teaching, where he was very popular, and in establishing new research directions. He remained in this position until his retirement and received the title of emeritus professor.

His 30 year study of radio emissions from the atmosphere of Jupiter resulted in the development of a very advanced technique to determine the dynamic spectra of bursts of these emissions.

Bill was a foundation member of the Australian Research Grants Committee which broke new ground in national funding for research in universities and eventually evolved into the Australian Research Council. He was also patron of the Astronomical Society of Tasmania for 20 years.

In 1963 he was awarded the Australian Academy of Science Lyle Medal, and in 1965 he was elected to the Fellowship of the Academy. In 1984 he was made an Officer of the Order of Australia.

His wife Helen predeceased him. He is survived by his children Elizabeth, Susan and David, and his grandchildren Chris, Anna and Hannah.

Bryan Womersley

Hugh Bryan Spencer Womersley was born in Bristol, UK, on 19 November 1922 and died in Adelaide on 16 January 2011. He was educated at the University of Adelaide obtaining BSc (Hons) in 1945, MSc in 1947, PhD in 1952 and DSc in 1960. While doing his masters in the botany department he first worked as a laboratory demonstrator and was soon appointed as a lecturer. He remained in the department for his entire career, as a lecturer from 1946 to 1949, senior lecturer from 1950 to 1960, reader from 1961 to 1973 and professor (personal chair) from 1974 to 1987, when he retired as emeritus professor. He remained active in the department as an honorary visiting research fellow, publishing into his mid 80s. The university has named the new HBS Womersley Chair of Systematic Botany in his honour.

Professor Womersley devoted his career to the taxonomy and systematics of marine algae and their ecology. Although he worked on several continents and in the tropical pacific, his major contribution was the description, documentation and ecological study of the marine algal flora of southern Australia, where he was an acknowledged international leader. His publication, *The marine benthic flora of Southern Australia*, was published in six volumes from 1984 to 2003. Two of these volumes received the GW Prescott Award of the Phycological Society of America.

Professor Womersley's many honours and awards include the Edgeworth David Medal, Royal Society of New South Wales in 1955; Verco Medal, Royal Society of South Australia in 1969; election to the fellowship of the Australian Academy of Science in 1977; Clarke Medal, Royal Society of New South Wales in 1985; Mueller Medal, ANZAAS in 1986; Silver Jubilee Award, Australian Marine Sciences Association in 1994; corresponding member, American Society for Plant Taxonomy in 2003; Australian Government Centenary Medal in 2003 and South Australian Great Environment Award in 2004. His 75th birthday was honoured by *Botanica Marina* with a special issue.

Bryan served as president of the Royal Society of South Australia from 1966 to 1967 and editor from 1971 to 1976, president of the International Phycological Society in 1970 and inaugural president of the Australasian Society for Phycology and Aquatic Botany from 1980 to 1981. He also served on the Board of Governors, Botanic Gardens, South Australia from 1961 to 1992 and the South Australian Marine Environment Advisory Committee from 1977 to 1987. After his retirement he took on the role of honorary associate and curator of algae at the State Herbarium.

He is survived by his wife Alleyne, whom he married in 1950, and his two sons, Robert and Peter.

… continues from page 1

language which paints public subsidy of irrigation infrastructure as a universal remedy for dealing with the challenges associated with managing water in Australia.

Bradley Moggridge, CSIRO Land and Water Indigenous Water Research Project Officer, discussed **Aboriginal knowledge and cultural values of water** in the September lecture. He emphasised Aboriginal people's connection with country does not separate individual features of the landscape, in stark contrast to non-Aboriginal traditions. Bradley said 'cultural flow' is needed to protect the water flow necessary for Aboriginal cultural and spiritual values. While Bradley acknowledged that work is needed to clearly define 'cultural flow' and its relationship to environmental flow, he also called for quantitative data on Aboriginal uses of water, to allow allocation for Aboriginal water requirements.

In October, Ross Young from the Water Services Association of Australia looked at cities of the future and the **changing face of the urban water industry** in a time of climate uncertainty, population growth and sustainability issues. Ross discussed the roles of the Australian urban water industry and water resource planning as essential components of planning for our cities in the future. Ross described the tools being developed by Water Services Association of Australia to assist in the transition to a carbon-constrained world and discussed the Australian urban water industry's great reputation around the world for adapting to climate change.

Graham Farquhar with Barry Hart, taking questions at the final lecture in the series

In November, Professor Craig Simmons of Flinders University described the **groundwater challenges and opportunities** for Australia in the 21st century. Professor Simmons discussed Australia's increasing reliance on groundwater as a water supply, and the need for effective management of this resource, including determining sustainable levels of groundwater extraction, licensing and metering, environmental water requirements and groundwater trading. Craig also highlighted a range of new groundwater research discoveries.

Professor Barry Hart, Director of Water Science Pty Ltd, concluded the series in December 2010 by examining **water reform in the Murray-Darling Basin**. Barry described the major reform currently underway in the Basin and explained the need to rebalance the area by providing more water for the environment while minimising the social and economic impacts of redirecting consumptive water. Barry covered the essential elements of the Basin Plan and highlighted the major challenges facing the Murray-Darling Basin Authority in developing and implementing the Plan.

Transcripts from the water series public lectures can be found at **science.org.au/events/publiclectures/wm/index.html**

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