ANU reporter

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SPRING 2009

Dogs, drugs and detection

Supersized solar | Bridge on the River Memory

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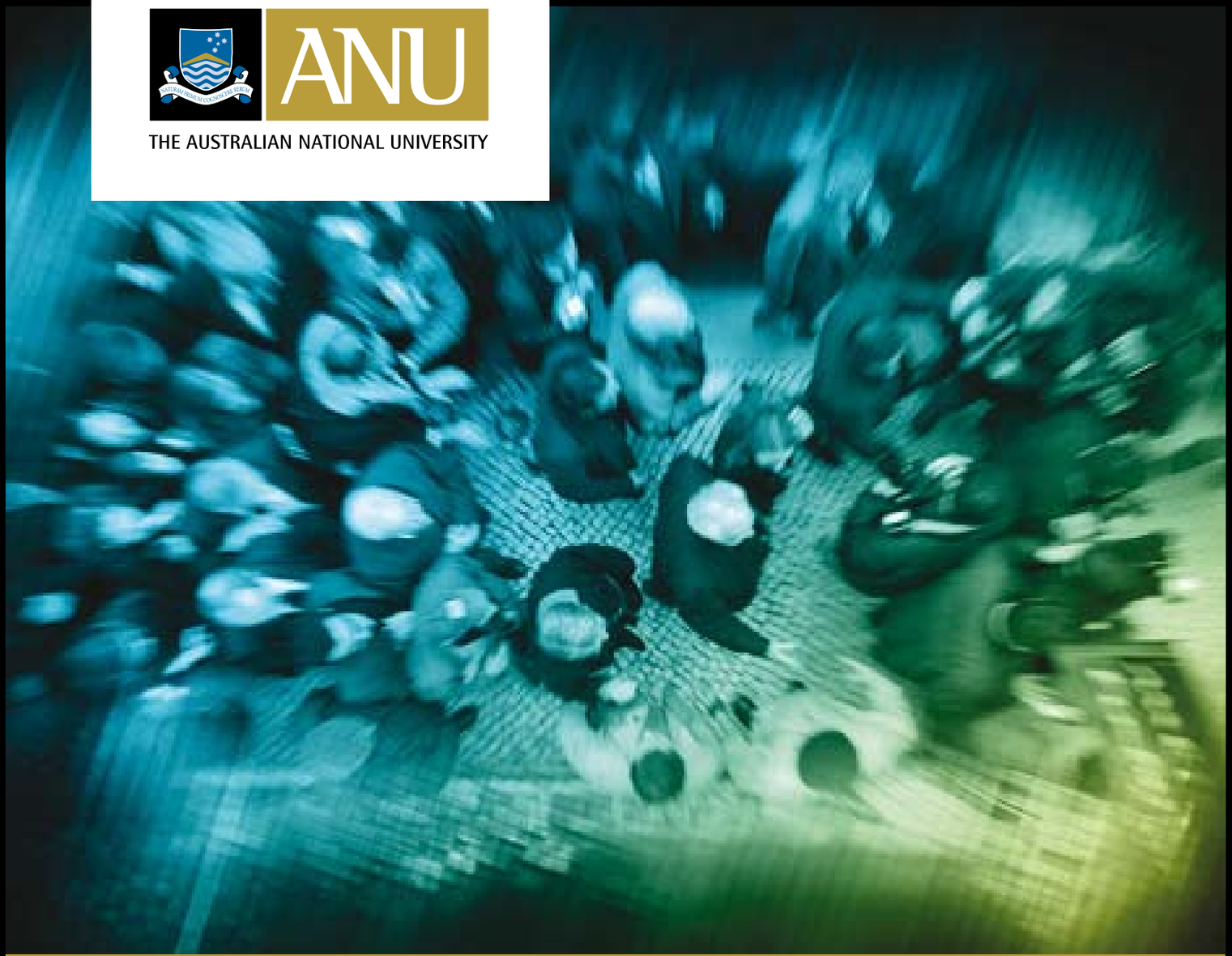

MENTAL HEALTH GRADUATE COURSE

Research, Treatment, Policy: Current Issues in Mental Health

The Centre for Mental Health Research (CMHR) provides a13-week course as practical introduction to the nature, epidemiology and treatment of mental health disorders.

Lecturers from the CMHR and specialists from other organisations present a fascinating discussion of recent developments in mental health. Topics include best-practice treatments for common disorders such as anxiety and depression, neurobiology and mental health, substance use disorders, and important emerging themes in mental health such as online interventions, ageing and consumer perspectives.

The course is tailored to public servants who need to keep abreast of the latest findings in mental health research, professionals working in sectors such as hospitals and nursing homes as well as members of the public with an interest in mental health.

Information: http://www.cmhr.anu.edu.au/popm8001.php

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Correction: In ANU Reporter for Winter 2009 the article Dawn of the SkyMapper on p21 should have been labelled 'Astronomy' in the top left-hand corner.

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Compact with the nation, compact with our readers

We're always proud when one of our alumni returns to visit us on campus, particularly when that person is making a contribution to the betterment of the nation and its future.

So it was with pride we welcomed back the Prime Minister Kevin Rudd in May to open the new building for the John Curtin School of Medical Research.

In his speech for that occasion, the self-described "country boy from Queensland" recalled how ANU had equipped him to speak Mandarin and to think about the nation's place in the Asia-Pacific century.

This dual focus — looking back and looking forward — became an impromptu theme for the launch of the new facilities at JCSMR, which will provide state-of-the-art laboratories and equipment in a research centre that has been home to many success stories in decades past, including three Nobel prize winners.

The Prime Minister said in his speech that *"When you walk around looking at the 200-odd buildings on the campus, you notice that the ANU doesn't have a lot of sandstone. There's not a whole lot of ivy crawling up the outside walls. But in just sixty years the ANU has created its own history. Its researchers have made discoveries of international significance. Its scholarship is world-class."*

He went on to say that "*...ANU holds a special place as a strategic endowment for our nation. The Government's vision for the ANU is to build on this great national endowment."*

I welcome the recognition of this status, but at the same time realise that it is much a challenge for us as a pat on the back.

It's a challenge because we can't afford to be comfortable with past successes, can't stand on the shoulders of our former giants of scholarship without making a vantage point for those who are to come.

Instead we need to foster new avenues of research and new modes of education within our national context. These are the kinds of goals that we want to see set out in our forthcoming compact with the Federal Government.

I've argued that these agreements between government and universities should encourage excellence via specialisation and diversity in our sector – not by continuing the kind of levelling out to a lowest common denominator that we saw under recent policies.

We celebrate our successes, whether from the past half-century, the past decade, or the past year – but we also look forward to a compact that will allow ANU to continue to grow as the national university, making contributions for Australia and all Australians.

I realise, too, that we already have a compact of sorts with you reading *ANU Reporter.*

For almost 40 years this publication has sought to inform the campus community, and, more recently, the wider community, about developments in education and research across campus.

But a compact works both ways, and now we would like to be informed by you: about how *ANU Reporter* can better deliver stories of discovery and achievement from your national university.

Please help us by taking part in the feedback survey online, by following the links at http://www.anu.edu.au/reporter, or by completing the hard copy of the survey form in this edition of *ANU Reporter.*

Professor Ian Chubb AC
Vice-Chancellor and President

Musicians play a counterpoint to the buzz of conversation at the annual ANU donor function held on Thursday 28 May at University House. *Photo: Stuart Hay*

PM opens new JCSMR building

Prime Minister Kevin Rudd opened the new building for The John Curtin School of Medical Research (JCSMR) on Wednesday 27 May.

The $84-million research facility includes three super laboratories, 180 new research stations, as well as state-of-the-art facilities for scientists studying in the fields of genomics, immunity, neuroscience, drug design and virology.

The Prime Minister congratulated JCSMR researchers for their "truly exceptional" track record in medical research.

"Yours is the work of saving lives, restoring, curing and protecting the young, the old, rich and poor alike – through world-changing discoveries and breakthroughs," Mr Rudd said.

"Australia needs schools such as the John Curtin School to achieve the breakthroughs in medical science that prevent disease, cure illnesses and deliver a better quality of life.

"The new John Curtin School of Medical Research will be a flagship for the ANU, as it continues to generate the research and breakthroughs that in past decades have brought such prestige and acclaim."

The new facility will focus research efforts on established and emerging threats to human health, such as influenza viruses and HIV. Researchers are developing new treatments for the prevention of cancer spread and new ways to treat autoimmune disease including diabetes, rheumatoid arthritis and lupus.

Read a transcript of the PM's speech: http://quicklink.anu.edu.au/qp97

Prime Minister Kevin Rudd speaks at the opening of JCSMR. *Photo: Craig Livingstone*

Aunty Janet Phillips at the Sorry Day ceremony. *Photo: Stuart Hay*

Reconciliation flies high at ANU

Two new flags will fly outside the Jabal Indigenous Higher Education Centre as a permanent reminder of the University's ongoing commitment to reconciliation.

The Aboriginal and Torres Strait Islander flags were hoisted at this year's Sorry Day ceremony, which was hosted by Registrar Tim Beckett and launched by Vice-Chancellor Professor Ian Chubb on Tuesday 26 May.

"We wanted to do something for Sorry Day which would create a visual symbol of our continued commitment to reconciliation," Mr Beckett said.

The flags are also a celebration of the 20th year of the Jabal Centre, which provides a meeting place for Australian Indigenous students studying at ANU.

More: http://www.anu.edu.au/jabal

Top international judges visit

The ANU College of Law hosted a lunch in the Hall at University House on Thursday 4 June 2009 that saw an extraordinary gathering of senior national and international judicial figures.

The occasion that led to the lunch was a visit to Australia, for the Indo-Australian Legal Forum 2009, of judges from the Supreme Court of India, including Chief Justice KG Balakrishnan and Justices SB Sinha and SH Kapadia, as well as the Additional Solicitor-General of India, Mr G Subramanium.

The Indian judges were accompanied by an array of Australia's leading judges – six of the seven Justices of the High Court of Australia, including Chief Justice Robert French and Justices William Gummow, Ken Hayne, Dyson Heydon, Susan Crennan, and Virginia Bell, as well as Chief Justice Michael Black of the Federal Court of Australia, Chief Justice James Spigelman of the Supreme Court of New South Wales, and Chief Justice Marilyn Warren of the Supreme Court of Victoria.

Privileges for ANU graduates

Are you an ANU graduate? Update your contact details at www.anu.edu.au/alumni to receive invitations to special events, regular news and alumni privileges, including:

- ongoing email accounts
- library access
- privileged membership of University House with its reciprocal club memberships worldwide
- discounts with the Centre for Continuing Education
- alumni exchanges with universities such as Yale and Cambridge
- membership of a growing number of special interest groups and social networks

word watch

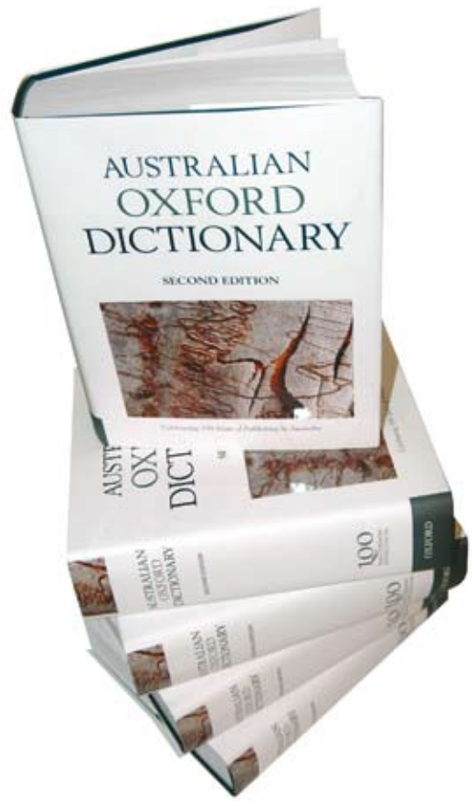
The Australian National Dictionary Centre is a joint venture between Oxford University Press and ANU. Director **Bruce Moore** takes a lexicographical look at our lingua franca.

In some quarters there was dismay when Prime Minister Rudd used the expression *fair shake of the sauce bottle* in June this year. Some accused the prime minister of not being 'the full bottle' on Australian idioms, and of mixing up the Australian *fair suck of the sauce bottle* with the international *fair roll of the dice* and the like. If the idiom is mistaken, it is a fairly well-entrenched mistake, first noted by the Australian National Dictionary Centre in a speech by Senator Kemp at a Senate Estimates Committee in 1995: 'Mr Chairman, just so that all of us feel that we have had a fair shake of the sauce bottle, my colleague also has quite a number of environmental questions.'

The underlying idiom is the old and well-established *fair go*, which was first recorded in Australian English in 1904. As an interjection, this means 'steady on!; be reasonable!; give us a go!' By 1924, an expanded variant of fair go had appeared: *fair crack of the whip*. From the late 1960s and early 1970s more variants appeared: *fair suck of the sauce bottle* (sometimes abbreviated to fair suck), *fair suck of the saveloy* (sometimes abbreviated to fair suck of the sav), *fair suck of the sausage*, and finally *fair shake of the sauce bottle*.

The tricky element in this process of expansion is the precise meaning of sauce bottle. Mark Juddery, in his column in *The Canberra Times* on 22 June 2009, expressed his puzzlement at the original phrase ('Sucking the sauce bottle is not only pointless, but also unhygienic') and pointed to the aptness of the 'fair shake' that is so necessary in dealing with sauce bottles in cold weather: 'The sauce is usually so congealed by the cold weather that shaking the bottle conjured the sense of frustration that usually inspires the phrase.' It is very likely, however, that the original 'sauce bottle' contained not reddish stuff made from tomatoes but cheap plonk or beer. Sauce in the sense 'alcoholic liquor' is an Americanism, but it had spread to other Englishes by the 1950s. The notion that all members of a group should be treated to their fair swig or 'suck' of the grog bottle (especially a bottle wrapped in a paper bag) extends the milieu of the Australian fair go to the realm of the down-and-outs—sharing their paper-bagged bottles of grog on the city's park benches.

To those not familiar with the sauce bottle of plonk, the idiom fair suck of the sauce bottle must have sounded puzzling. Once an idiom becomes befuddled by puzzlement, it is often refashioned or remodelled by the 'folk' (the technical term is 'folk etymology') to make sense: thus, *one fell swoop* is now very often *one foul swoop*. The literalised barbecue associations of the bottle of congealed sauce perhaps generated the saveloy and sausage variations. The latest version, fair shake of the sauce bottle, shows that for many people all contact with the original sauce bottle has been lost.



Win a copy of the Australian Oxford Dictionary (Second Edition), edited by Dr Bruce Moore. Turn to page 18 for more information.

definition: Fair suck of the sauce bottle (Australian idiom)
An exclamation that someone be reasonable and fair.

Adrian Manning

Protecting Mulligans Flat woodlands

The final gate that will secure the predator proof fence at Mulligans Flat Nature Reserve in the ACT has been locked into place.

The 11-kilometre fence will keep feral animals like foxes, cats, rabbits and hares out of the native box-gum grassy woodland. It has been constructed to create the Mulligan's Flat Woodland Sanctuary, a project which emerged out of a joint research initiative between ANU and the ACT Government.

"With the exclusion of feral pests that threatened native fauna we will be able to reintroduce locally extinct species," said Dr Adrian Manning, a Research Fellow at the Fenner School of Environment and Society. "Many of these, such as bettongs and bandicoots, had a key role in the healthy functioning of box-gum woodlands.

Dr Su Wild River from ANUgreen accepts the prize in Switzerland.

Campus sustainability award

ANUgreen has taken out the Impact Award from the International Sustainable Campus Network (ISCN) at a recent ceremony in Lausanne, Switzerland.

The University's sustainability program was recognised for its achievements in water reduction, vehicle fleet CO2 emission reductions and community awareness-raising, and substantial progress towards targets for energy use, CO2 emissions from electricity and gas, waste reduction, environmental risk and biodiversity management.

ANUgreen manager John Sullivan said that the program's success wouldn't have been possible without the participation of staff and students.

The ISCN Impact Award rewards excellence in engaging the various stakeholders at a university in campus sustainability. The ANU initiative was chosen by the judges for demonstrating how campus development and management can be used to create impact for research, teaching and campus community involvement.

Sod turning for ANU Climate Change Institute

Vice-Chancellor Professor Ian Chubb and ACT Chief Minister Jon Stanhope have turned the first sod at the site of the new building that will house the ANU Climate Change Institute.

The new building will bring together over 90 researchers from across the University to work on tackling the complex and interdisciplinary problems presented by climate change.

The ACT Government has pledged to contribute $2.5 million towards the $8.1 million building that will also house parts of the Fenner School of Environment and Society.

Professor Chubb welcomed the support from the ACT Government and said that climate change researchers would benefit by being able to work together in the same building.

"We are grateful for the support from the ACT Government and the serious demonstration of their commitment to climate change research and education," Professor Chubb said.

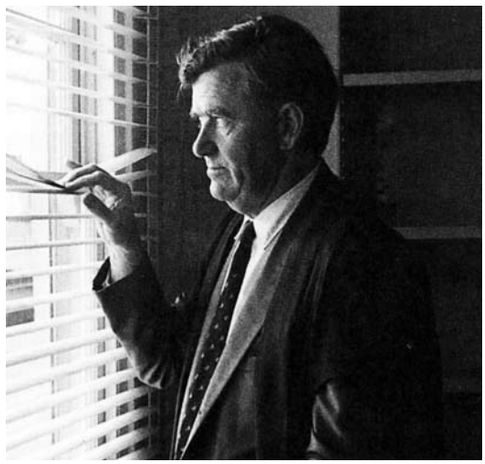
life sentences

The *Australian Dictionary of Biography* (ADB) presents the lives of many notable Australian artists among its 11,500 biographies. Research Editor **Pam Crichton** looks at some people who have combined these careers.

George Bernard Shaw suggested that a gentleman is someone who endeavours to put in more than he takes out. By that criterion three individuals who have contributed to the public service and then ANU – or vice versa – would likely have gained Shaw's approval.

Fin Crisp was the first professor of political science at Canberra University College, which later became part of ANU. He arrived in 1950, having had the experience of working in and then leading the Department of Post-War Reconstruction in the 1940s. Maintaining town-and-gown links, he was chairman of the Commonwealth Banking Corporation from 1975 until his death in 1984. Although he opposed what he called the "shotgun wedding" of the College and the research-only ANU in 1960, he worked hard for the reshaped university. Disillusioned by the student unrest in the 1970s, in the John Curtin lecture in 1974 he portrayed the "disaffected darlings" as the "the gravediggers of academic freedom". He retired in 1977.

John Crawford's time at ANU also coincided with an increase in student disquiet. Crawford had a major career in the Commonwealth Public Service (including a stint in the Department of Post-War Reconstruction at the same time as Crisp) before moving to ANU. Founding director of the Bureau of Agricultural Economics from 1945 to 1950, he was subsequently secretary of the departments of Commerce and Agriculture from 1950 and then Trade from 1956, where he supervised the negotiation of trade agreements with Britain and Japan. In 1960 he joined ANU as professor of economics and director of the Research School of Pacific Studies. He served as Vice-Chancellor from 1968 to 1973 and then Chancellor from 1976 to 1984. ANU historians Stephen Foster and Margaret Varghese write that, instead of being fazed by the years of student unrest that marked his stint as Vice-Chancellor, Crawford "exuded reason and understanding".



Fin Crisp founded the study of political science at ANU. *Photo: Gabe Carpay*

Some people moved from ANU to a substantial role in government – a transition that could cause friction with their former academic colleagues. Hugh Ennor came to ANU as a foundation professor of biochemistry. Dean of the John Curtin School of Medical Research from 1953 to 1967, then Deputy Vice-Chancellor from 1964 to 1967, he was a member of the government-appointed Martin Committee on the future of tertiary education in Australia. From 1967 he was Secretary of the Commonwealth Department of Education and Science, and later the Department of Science. In 1975 Ennor's department was blamed for the government's decision to reduce the funds of the Australian Research Grants Committee.

To honour their contribution on campus and in the capital, buildings at ANU are named to commemorate these three gentlemen.

ADB is part of the National Centre of Biography and is located in the History Program of the Research School of Social Sciences at ANU. The entry on Fin Crisp is by Scott Bennett in ADB vol 17; while J. D. B. Miller wrote the entry for John Crawford in that same edition. John P. Lonergan wrote about Hugh Ennor in ADB vol 14.

More: www.adb.online.anu.edu.au

Clockwork Universe
by Dr Tim Wetherell.

Winding the clock back on science

The great mathematical and observational achievements of orbital and planetary science are celebrated in an astronomical clock by ANU scientist and artist Dr Tim Wetherell recently launched at Questacon.

The piece *Clockwork Universe* explores early scientific theories of astronomy which held the universe as a massive, predictable mechanism. Its construction in riveted iron and polished brass deliberately echoes Victorian style. It is a collaborative project between Questacon and ANU and has been installed in the Questacon foyer.

"The name *Clockwork Universe* is a reference to the very Newtonian view that was held in Victorian times," Dr Wetherell said. "They saw the universe as driven by precise forces in which any point in the future could, in theory, be calculated from knowing the past. Of course, in the modern quantum universe, this rather convenient situation melts away.

Less fuss, more muscle in data transfer

Faster computers, more secure information transfer, smarter sensors — all technologies that could benefit from a new, simpler way of manipulating light to convey much more information using fewer light beams and resources.

An ANU research team has developed a breakthrough approach to generate quantum entanglement, where information is coded in the physical relationship between two objects.

Dr Jiri Janousek from the ARC Centre of Excellence for Quantum-Atom Optics at ANU said that the discovery is based on existing optical technology, but uses it in such a way that much fewer components and light beams are required.

Dr Janousek said that the group's discovery about mode manipulation in light meant that only one light source and one receiver is required to generate optical entanglement, meaning that this approach could be much more simply scaled up.

Minorities find it harder to get jobs

Job applicants find it easier to get an interview if they have an Anglo-Saxon name, a new study suggests.

The study, conducted by ANU economists Professor Alison Booth and Professor Andrew Leigh from the Research School of Social Sciences, in conjunction with researcher Elena Varganova, estimated discrimination by sending over 4000 fake CVs to employers in response to job advertisements in Brisbane, Melbourne and Sydney.

"By varying the names on the CVs, we were able to estimate precisely the extent of hiring discrimination," said Professor Booth. "Because all other characteristics are held constant, we can be sure that we are really measuring discrimination.

"To get the same number of interviews as an applicant with an Anglo-Saxon name, a Chinese applicant must submit 68% more applications, a Middle Eastern applicant must submit 64% more applications, an Indigenous applicant must submit 35% more applications, and an Italian applicant must submit 12% more applications."

Mal McLeod says his work developing a new method of detecting greyhound drug treats could be adapted for use for human track and field too. *Photo: Belinda Pratten*

Dogs, drugs and detection

A new method for catching sports drug cheating is shaking up the greyhound industry and could have major applications for the human world too. **Michael Cavanagh** reports on an organic chemist who's not averse to spending a day at the dog track.

The yapping of greyhounds and the noise of the people betting on the outcome of the races seems like a strange setting for a chemist – so what is Dr Mal McLeod doing here?

McLeod, from the Research School of Chemistry at ANU, is leading a team that's developing a reliable method to identify drugs that have been illegally administered to racing greyhounds by their trainers or owners.

The research program is helping the body that governs greyhound racing in Australia to crack down on the use of steroids within the sport.

McLeod's work so far has helped the guardians of greyhound racing to successfully prosecute a number of people for the illegal use of steroids in their dogs.

This is in a sport which last year had prize money totalling over $68 million spread across more than 43,000 races.

"There was a big unmet need. Up until now there has been a little bit of testing in the United Kingdom. We are now leading the charge," McLeod says. "The goal posts have shifted for the trainers; many of them can't operate the way they used to."

While testing on athletes and in horse racing has been going on for many years, it was only in July 2008 that Greyhounds Australasia started testing the dogs for possible illegal use of substances such as steroids.

This led to the Sydney-based Australian Racing Forensic Laboratory (ARFL) joining forces with ANU to find a foolproof manner in which greyhounds can be tested for steroid abuse.

The ARFL drew up a list of 12 steroid agents which it decided were most likely to be used by trainers and owners and were readily available in Australia.

Many of these drugs are similar to those used by humans and racehorse owners to try and beat the system.

The drugs are presently registered in Australia for human or veterinary use.

Probably the most famous is stanozolol, which became well known after Canadian Ben Johnson tested positive for the drug, following his record-breaking 100 metres run in the 1988 Seoul Olympics. He was subsequently stripped of his gold medal and the record.

Other high profile Olympians caught using performance-enhancing drugs include Linford Christie and Carl Lewis.

Yet despite the increasing success of catching sports drug cheats of the human and equine varieties, the same testing methods do not apply to greyhounds. All this rests on the analysis of metabolites – the products of chemical reactions within an organism when it attempts to break down complex molecules and eliminate them from the body.

The human metabolites of stanozolol do not match the major metabolite obtained when the same drug is administered to greyhounds.

Drugs metabolise differently in humans to greyhounds. Until now nobody performed the research on dogs to work out why.

As part of their experiments, McLeod's team made a number of new compounds. One of these was called 6 alpha-hydroxystanozolol, which was found to match the greyhound metabolite. This discovery has led to numerous positive swabs for stanozolol doping in greyhounds around the country.

"You have to know what you are looking for, and you need to be able to back that up in the hearing... The sport is definitely cleaner now, that is a fact."

The team's work has been part of the task to develop a foolproof method of to test for the listed drugs in the urine samples that are mandatorily taken from dogs that finish first, second and third in a race.

To make sure it is foolproof, the nominated list of drugs of abuse was sent by the ARFL to Queensland Racing Science Centre where there are greyhounds used in scientific research.

These dogs were given one of the nominated drugs under veterinary supervision and according to ethical guidelines.

It was then that McLeod's team stepped in.

The researchers have developed compounds – like 6 alpha-hydroxystanozolol – which are tested against the metabolites extracted from the urine from the Queensland greyhounds.

Matching 6 alpha-hydroxystanozolol to a greyhound metabolite sets off a 'red flag' and indicates the presence of an illegal drug when testing is carried out.

"It can be a bit of a needle in a haystack finding the correct structure as there is very little of the metabolite that comes from the dog and therefore we have to make an educated guess," McLeod says. "With the data that we obtain, there are a number of possible structures that we narrow down to find a match."

McLeod's findings mean that the compounds are matched to the different drugs which have been listed by the ARFL.

This enables the greyhound racing authorities to confirm that an illegal drug has been found in the specimen taken from a dog that has finished in a place while competing somewhere in Australia.

"You have to know what you are looking for, and you need to be able to back that up in the hearing when the case against the dog's connections is being held," McLeod says. "The sport is definitely cleaner now, that is a fact."

One only has to go to the website Australian Racing Greyhound.com to see how many cases are being prosecuted for illegal use of steroids on dogs by their owners and trainers.

Yet McLeod points out that the increase in successful prosecutions has led people wishing to gain an unfair advantage over their competitors on the greyhound racing circuit to try other substances.

The Australian greyhound racing industry is worth millions of dollars in prizes each year – but until recently there has been little testing for dog drug cheats. *Photo: Jupiter Images*

"We are seeing a shift to other drugs because of the successful prosecutions. People are looking to other drugs," he says. "Once we have finished working through and developing tests for the 12 drugs on the original list, we will look at more exotic agents which could be used for abuse in greyhound racing."

While this is a relatively new area when it comes to greyhounds and doping, much of the research into human drugs abuse in sport has been done.

"There may be some overlap in our work between dogs and humans. There may be some metabolites which have not been identified. But we are really filling in the gaps there as we are not testing for new agents in humans," McLeod says.

"The general methods we are using are of relevance to all drug testing. It could also be that some of the metabolites we identify are common to humans or horses and have not been previously identified - this would be a small benefit. We have some ideas for improvements in the identification of metabolites but no concrete results at this stage"

The future is also not all in trying to identify better ways in which to detect illegal drug use in greyhound racing.

As part of the research, the ANU team is learning more about metabolite structure while working on developing genetically engineered enzymes for the improved synthesis of drug metabolites. The synthesis of drug metabolites is needed by all drug testing – animal and human – and even in areas like pharmaceutical development.

"These techniques will not only be useful in the fight against doping," McLeod says. "They will have much broader application to areas like drug development in the pharmaceutical industry. We will be able to make the drug metabolites and test them to ensure they do not give rise to toxicity or other side effects."

Metabolites from pharmaceutical compounds are formed as part of the natural process of eliminating the compounds. Profiling these metabolites plays an important part in helping to show if there are any side effects that could occur from the using of the drug.

His work is expected to result in lowering the costs of producing metabolites that help identify any possible side effects of drugs.

This would enable pharmaceutical companies to carry out more thorough testing on new drugs which are yet to be approved for use in the community.

"Drug companies are already required to understand the metabolism of new drugs before approval. Better and cheaper ways to make the metabolites will enable drug companies to do more thorough testing. This should reduce the risk of adverse outcomes with new drugs," McLeod says.

Meanwhile, punters can be more confident that the greyhound they are betting their money on is competing in a much fairer environment.

More: Hear an interview with Mal McLeod by following the link to this story at www.anu.edu.au/reporter

The secret history

All good historians rely on primary documents – but what do you do if those documents are classified top secret? David Horner is about to find out, as he begins the process of writing the first official history of Australia's intelligence agency ASIO. BY PENNY COX

David Horner will turn spy history catcher as he writes the official record of ASIO.
Photo: Belinda Pratten

How extensive were Soviet espionage operations in Australia? Were the bombers of the Yugoslav General Trade and Tourist Agency really carrying out guerrilla training activities on our soil? What was the cause of the spectacular intelligence and security gaffe outside the Sydney Hilton in 1978?

Professor David Horner is about to uncover the hidden secrets of Australia's intelligence past.

Over the next few years he will be running his own reconnaissance missions, collecting top secret files and recovering classified government documents to create the first official history of the Australian Security Intelligence Organisation, or ASIO.

Horner, the Professor of Australian Defence History in the Strategic and Defence Studies Centre at ANU, was picked earlier this year by the intelligence agency to record the history of its first 30 years. He has been granted absolute and unconditional access to the organisation's archives so he can produce a two-volume history over the next five years.

"To my knowledge, there has never been an official history written about any of our intelligence agencies," Horner says. "Of course, there are numerous books out there about ASIO and its operations. Some of these histories are quite reputable — some less so.

"Many agencies have in-house histories written by people who have worked inside the agencies and then left. And then quite a few of the agencies have histories written about them, where people have been given some degree of access.

"Then there are the records that have made it through to the National Archives, although often they will have missing pages or blacked-out sections."

Horner is one of Australia's most eminent historians — a standing that was recognised in the 2009 Queen's Birthday Honours when he was made a member of the Order of Australia for service to higher education in the area of Australian military history and heritage as a researcher, author and academic.

He is currently wrapping up work on volume two of the five-volume *History of Australian Peacekeeping*, of which he is official historian and general editor. This is a project between ANU and the Australian War Memorial. So he has form as an official historian in this country, a role that few others have held.

"There have only ever been five official historians of the Australian Government – I am the fifth," Horner says.

"What I mean by official historian is that when I accept to write a history, I have full and unconditional access to all government records.

"My team and I go into government departments and collect top secret material and take it back to the War Memorial and put it in a vault. From this information we write the histories."

It was Horner's work on the History of Australian Peacekeeping that led to the ASIO project.

"I needed to get access to ASIO records. In order to do this I had to speak with ASIO's Director-General of Security.

"It was within that conversation that he mentioned that perhaps I look into writing the official history of ASIO. So, I gave him some indicative figures of what it might cost."

Instead of taking Horner up on that offer, the Director-General decided to put the history project out to tender.

Undeterred, Horner put in a bid for the job, stipulating a number of conditions that had to be agreed to by ASIO.

"They had to accept that, to write an official history, the historian had to have full access to all records, absolutely, so naturally there were some conditions.

"Firstly, there was to be no censorship — except that they would have the right to clear it for national security reasons. Second, there had to be sufficient funding to employ a second historian to work with me on the project. And third, we would need to remain employees of ANU so we could continue to be seen as reputable, credible and independent.

"These were the conditions and ASIO accepted them completely."

Horner says that his plan is to write two volumes to cover the first 30 years of ASIO. He hopes to have the first volume finished in three years.

The story of ASIO begins in the period after WWII when, under growing unease about the intentions of the Soviet Bloc, the Australian Government noticed a diminished supply of intelligence coming from the Americans and British.

A joint US/UK code breaking operation, called Venona, targeting encrypted Soviet diplomatic communications, showed sensitive Australian Government information was being passed to the Soviet Union from a source in Australia. Venona identified a 'spy ring' operating in Australia being run from the Soviet Embassy.

"Most sensible people understand that ASIO still has an important and relevant role to play in Australian society."

"So the Australian Government was none the wiser except that we knew our intelligence had been cut off," Horner says. "Eventually, a British agent came to see the Australian Government and said that unless Australia set up a security service to catch the spies in Australia, they were not going to get any future intelligence from America or Britain.

"As a result of that, on March 16 1949, Prime Minister Ben Chifley issued a directive to Mr Justice Geoffrey Reed appointing him Director-General of Security and directing him to establish a national security service.

"ASIO was set up specifically to catch the spies that had been identified and then to put in place a number of security procedures to ensure that the Australian Government would be secure in the future."

When the Cold War ended, some aspects of ASIO's brief became less important. Yet new concerns for Australia's security — such as terrorism — mean that there has been a shift in focus from 'reds under the beds' to a broader based intelligence gathering.

"But we shouldn't discount the fact that there are still other countries out there looking to steal our secrets and undermine the Australian way of life. Perhaps - no longer just the communist party," Horner says.

"Most sensible people understand that ASIO still has an important and relevant role to play in Australian society."

It's difficult not to share Horner's excitement about the project. His enthusiasm shifts up a gear as he starts to anticipate the contents of the intelligence agency's boxes and files.

"What we don't know is what's in the ASIO records.

"It's not about chasing spy stories, it's about writing the history of the whole organisation — although it is an organisation that has gone down in Australian folklore.

"Of course, looking at events like the Petrov incident from the official ASIO records — well, it's immensely exciting.

"We'll be doing reconnaissance missions to recover top secret, classified files and then have the chance to pore over them at length.

"We want to get the true and proper story of ASIO out there on the street, based on their records, in a balanced way by an independent historian. That's what we're going to do."

How to succeed in business without really having a business

Photo: Jupiter Images

A trio of MBA students has proven they can run a world-beating company at the national and international level. Now all they need to do is translate their virtual success into the real world.

BY SIMON COUPER

John Gordon works for a start-up engineering company in Canberra that makes Global Positioning Systems (GPS) for telecommunications companies.

He says it's a small player that's just starting to break in on the big world of communication technologies — a fact that might make someone at the start of a career nervous for their future.

But Gordon has the confidence that comes from helping to run one of the most successful digital camera companies in the world. Virtually speaking, that is.

Last year the Master of Business Administration student from the ANU College of Business and Economics, along with his two classmates Sam Underdown and Oner Aktas, took part in the Best-Strategy Invitational (BSI).

Ninety-six student teams from around the world competed in this computer-based corporate strategy simulation, vying for supremacy in the digital camera marketplace.

The trio were named grand champions in their category — the first time that an ANU team had achieved the honour.

They gained further glory this year by winning the national round of the Global Management Challenge (GMC), a competition similar to BSI, and in the process beating some of the best business schools in the country.

"In both cases there is a simulator," Gordon says. "You make a set of decisions and those hold for the next quarter. Based on all the decisions that all the teams made, the simulation decides how the things play out. It reports how much you sold, what your market share was and so on."

In the GloBus simulation used in BSI, Gordon says that all competitors are given the same starting position.

"Each team has the same share of the market: you're all selling the same product at the same prices [in this case, digital cameras]. Then it's up to you to develop a strategy and try to dominate the market. You do things like setting your pricing, setting the features and costs of the product, allocating money to the marketing you'd like to do, how much you want to pay for the wages of your staff, how much manufacturing equipment you want to have, then you have to do forward predictions of how much you're going to sell and warehouse stock and that sort of thing."

Aktas, Gordon and Underdown cut their teeth on the GloBus simulator during a corporate strategy course run by Dr Ananda Jayawardana as part of their MBA.

Jayawardana praised his students for their success and ability to translate theories from class into practice during the simulations.

"The combination of case learning, knowledge gained in the classroom and applications through strategy games, helped the students to get actively involved throughout the course and develop competencies where they improved their business acumen, their ability to make good bottom-line decisions in the face of uncertain market and competitive conditions, and their proficiency in weaving functional area decisions into a cohesive strategy," he said.

"You have an opportunity to see how you can implement strategy"

"The task of a teacher is to get students commitment and active engagement in the learning process, by providing an opportunity to apply what they learn in class," Jayawardana said. "If not, teaching will only lead to an award of a grade, limited to a piece of paper but not to the development of competencies of students."

But Gordon said a lot of the team's success has to do with good group dynamics. The trio were sitting near one another in Jayawardana's class and decided to join forces when the group assessment was announced.

"We said hello and got into a groove and worked effectively from the start I'd say," Gordon says.

"Oner was really good with some of the financial aspects of the simulation early on. But we brought different viewpoints. We'd suggest different approaches we might take, discuss it in the group and then reach a consensus that way."

Gordon says that one of the key lessons from competing in the global corporate strategy simulations was making the connection between developing and implementing plans — something he can apply in his engineering career, and Aktas and Underdown can pursue in their public service roles.

"When you take a course on strategy at university, you talk about how you might go down the path, for example, of cost cutting," Gordon says. "What that means for a company like a digital camera manufacturer, you don't actually think about. So the simulations ground it in the reality of a real example. By participating in these games you have an opportunity to see how you can implement strategy as well as coming up with it."

After winning the national level of the GMC, the trio went to Portugal in May to compete on the world stage for that event. They were playing against teams from universities and the corporate world in what Gordon describes as one of the most respected corporate strategy competitions in the world — but also one of the most highly pressured.

"It was encouraging to have success last year and that certainly spurred us on to try it again," Gordon says. "Plus the GMC is an extremely well-established competition internationally, the biggest of its kind in the world. It's been running 30 years. It was attractive to see how we would go at the global scale, because there are a lot more participants."

The team didn't place in the top three for that event, but said that being there was rewarding enough.

Now with wins at the national and international levels under their belts, Aktas, Gordon and Underdown are more likely than the average MBA graduate to turn simulated success into the real thing.

Linda Botterill shows NIRRA online to ACT Senator Kate Lundy and the Minister for Agriculture, Fisheries and Forestry Tony Burke. *Photo: Stuart Hay*

Big Ideas

A new institute at ANU brings together – for the first time – researchers working on rural and regional issues from throughout Australia. BY MARTYN PEARCE

Some of the best ideas in life also seem the most simple. They are the kinds of ideas that seem obvious, or necessary. The kind of ideas that, as Minister for Agriculture, Fisheries and Forestry Tony Burke said at the launch of the National Institute for Rural and Regional Australia (NIRRA): "I don't know why someone hasn't thought of it before."

NIRRA brings together rural and regional researchers from throughout Australia on a web-based network. It spans disciplines and institutions and, in doing so, is building up a multi-dimensional picture of what researchers are looking at.

Importantly, it also encourages connections between the researchers for the first time.

And the Minister isn't the only person who thinks it's a good idea. Since launching in April, NIRRA has quickly created a network of more than 230 researchers, from nearly every institution in Australia and across a huge range of disciplines.

Its success is more than the NIRRA Director, Dr Linda Botterill, ever imagined.

"I knew there was a lot of work being done out there on rural and regional issues, but I had no idea how much," she says.

"The response has been absolutely overwhelming."

The idea began when Botterill and the NIRRA Deputy Director, Dr Nicholas Brown, put together a proposal for a small centre of postgraduate students to help research biographical gaps on National Party members for a book Botterill was co-editing.

By the time that NIRRA launched, that "small idea" had become something altogether bigger.

"NIRRA is a network of researchers," Botterill says.

"It's a web based network with two purposes – to provide an entry point into the rural and regional research being done throughout Australia, but also to provide an online networking site for those researchers.

"On top of that, we're going to do a public lecture series and a seminar series. We're also running face-to-face networking exercises – we recently did one in Melbourne – so that the network becomes more concrete. Hopefully it'll make connections that will lead to collaborative efforts down the track."

At the launch the Minister announced funding for two honours scholarships at ANU. The next step, under consideration at the moment, is to put together a Masters program of rural and regional studies.

By bringing together the researchers from around the country, the institute puts rural and regional issues back into the spotlight – something that Botterill says was lacking for years.

"If you look elsewhere in the world, rural and regional issues are considered to be important public policy points. But in Australia, they've tended to be confined to quite a small policy community. Urban Australians haven't tended to take a great deal of interest in what's happening in rural Australia, and I think that's extended into academia as well," she says.

She hopes that the rising profile of rural issues – through issues such as the drought and climate policy – will make more students consider these research fields.

"I'd like to see more students thinking about rural and regional issues. Now that we've got NIRRA, we've got a network that they can tap into.

"What I'd really like to see them do with NIRRA is if, for example, a student from ANU is going to Sydney for a conference, before they go they'll look on the website and find some other postgrads and start building their networks.

"Networking is so important in collaborative research. If we can start our postgrads thinking of themselves as part of something bigger, a cohort going forward, that would be perfect."

It's a simple idea but, as the Minister said, it's not been done before – and the simple ideas are often the best ones.

"I'd like to see more students thinking about rural and regional issues. Now that we've got NIRRA, we've got a network that they can tap into."

Supersized solar

Researchers are about to beat their own record by creating the world's biggest solar concentrator dish. But this time it will be industry ready – meaning solar farms could be coming to a sunny spot near you.

BY SIMON COUPER

Picture a cloudless Australian sky, so blue you could drop a stone in it and expect a ripple. The white-hot sun traces a lazy backstroke from horizon to horizon. Below, a field of massive mirrored dishes track the sun's paddle, moving in unison befitting an Esther Williams routine. Their shining faces wink up at the sun above, turning its light waves into genuine star power.

This vision will be one step closer to reality this year as the world's biggest paraboloidal dish solar concentrator comes online at ANU.

If you think you've heard that claim before, then you'd be right. Since 1994 the University has been home to a prototype solar concentrator dish that generates steam temperatures up to 500 degrees Celsius. The scorching potential created by 400 square metres of mirrors is focussed onto a small receiver, where water is superheated into steam that in turn drives a nearby generator. This dish – until recently the largest of its kind on the planet – has been operated experimentally for 15 years, but its moment in the sun is about to end.

This year construction on a bigger dish will be completed. At 494 square metres it's not that much larger than its predecessor, which it neighbours on the banks of Sullivans Creek on the campus. But the new structure is the fruit of a commercialisation partnership between ANU researchers and the company Wizard Power, which wants to create fields of solar concentrator dishes able to create enough power that they become a viable alternative to fossil fuel-based electricity generation.

The company has received a number of grants from the Federal Government, most recently towards developing a solar thermal power plant near Whyalla in South Australia.

As a first stage, Wizard needed to know that it was possible to build a dish in such a way that production could be easily scaled up. They turned to the Solar Thermal Group in the ANU College of Engineering and Computer Science, proponents and creators of the original big dish.

"The goal was to completely redesign a new big dish from scratch with the specific purpose of coming up with a design suitable for mass production in an industrial context," explains Associate Professor Keith Lovegrove, leader of the Solar Thermal Group in the ANU College of Engineering and Computer Science. "I think we've absolutely succeeded there. Every aspect of the design was considered, solutions were found to meet that goal and every single one of them has worked.

"The biggest single thing about the new dish that goes to the mass production problem is the mirror panels," Lovegrove says. "The Solar Thermal Group has been working on that for many years. The panels on

The mirrored dish concentrates the rays of the sun into a superheated point. *Photos: Greg Burgess*

"Every aspect of the design was considered, solutions were found to meet that goal and every single one of them has worked."

the original dish were not a particularly good design and never intended for mass production: they're large, handmade and every single one is different. We settled many years ago that all mirror panels should be identical and mass producible. A lot of work has gone into working out a solution for an integrated mirror panel that meets those needs. It's worked very well."

Another design innovation was getting the lengths of metal in the lattice underpinning the mirrors into the right kind of parabolic shape, and then getting them to hold it. Lovegrove says that Wizard brought in a portable rolling machine from China which could form pieces of sheet metal into large circular arcs and then cut them to length. These curved pieces were then pulled down and riveted into place on top of a large, horizontal jig, which helped to ensure the shape was accurate.

"We had this jig constructed with support points on it. And we had these very large pieces of floppy metal. We had to work out methods for efficiently pulling this down and making it conform. There was quite a deal of on-the-job problem solving that goes into working out the techniques. You find that the first few you put down are very slow and then you develop the tools and methods for the job and by the end it's going very efficiently."

When it came time to lift the completed dish off its jig and up onto the vertical supports, Lovegrove admits that his heart was sometimes in his mouth. The team's computer modelling had shown that the weight of the metal and the reach needed could push the hired 100-tonne crane to its lifting limit. If it didn't work, a 200-tonne crane would need to be brought in from Sydney, causing major delays and incurring thousands of dollars in extra costs.

"In the end it went quite smoothly," says an audibly relieved Lovegrove. "The dish was so close to the boom of the crane at one point that five people had to push it sideways just to get those extra few millimetres, but then it was fine."

Lovegrove is full of praise for the team of people who've helped bring the new big dish to completion, saying that the diverse pool of talents was integral to the design and construction process.

"Here we are in a university environment doing an activity that mixes engineering design, materials development and actual construction work with cranes and heavy machinery and all the challenges of that. We're doing all of that on campus in a fairly unconventional way with a small group of people. It means that our team, which includes qualified tradespeople, technical assistants, engineers, and academics and PhD students, all get in and have a go at all aspects."

While solar concentrator dishes like this one are likely to be coupled with steam-driven generators for the near future, Lovegrove says that an alternative idea is to mount a gas turbine on the dish itself.

"You take air at atmospheric pressure," he says. "You compress it with one side of the turbine. You heat it. You expand it through an expanding turbine. The expansion work is more than enough to drive the compressor and the surplus drives a generator."

The researcher says a test for this idea is in the pipeline as part of a collaborative project with the CSIRO funded by the new Australian Solar Institute. But for now, he's relieved to be nearing the end of a lengthy design and construction period, but also excited about the potential for renewable energy technologies to grow.

"It is an enormously satisfying thing," Lovegrove says. "I've worked for 20 years on this stuff. It's satisfying to have built one that you think is pretty good and have it work.

"What's particularly gratifying is that the world's interest in this kind of power generation has completely taken off in the last couple of years. All the policy signals from around the world mean that it's suddenly launched itself as a global industry. That's incredibly exciting.

"I joined the group in 1987, and the work was begun by Peter Carden and Stephen Kaneff in 1971. The ANU solar thermal people have been pushing this solution to power generation for nearly 40 years. This might indeed be a very viable solution for our energy future."

We want to hear from you

Please complete the survey at www.anu.edu.au/reporter

ANU Reporter is about to turn 40, so we'd like you to tell us what you think about our magazine on the eve of this major anniversary.

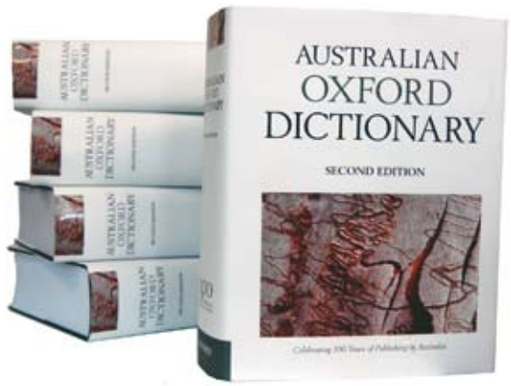
By taking part in this feedback survey and answering question 3.11, you could win one of five copies of the lavish Australian Oxford Dictionary (Second Edition), edited by Dr Bruce Moore at ANU and valued at $115 each. You will also help us ensure we're making the kind of publication you want to read.

• The simplest way to take part is to complete the feedback survey online by following the link at http://www.anu.edu.au/reporter

• Or you can fill in the form below (we suggest using a ballpoint pen), pull it out from the magazine and mail it to:

ANU Reporter Feedback
Office of the Vice-Chancellor
Chancelry
The Australian National University
Canberra ACT 0200 Australia

Entries must be in by Friday 4 September 2009.



Some parts of this feedback form are optional, others mandatory. In order to be eligible for the competition, you must: provide your name and contact details and answer all the questions appropriate to you. For the purposes of the competition, the responses to question 3.11 will be judged by ANU Reporter staff, who will determine which five responses are the most creative and constructive and award those entrants the above described prize.

1 About you

The first part of section 1 is optional – but you must complete it if you wish to be in for a chance to win one of the prizes.

1.1 Full name (optional): _____

1.2 Address (optional): _____

1.3 Preferred daytime phone number (optional): _____

1.4 Preferred email (optional): _____

Answers are required for the next part of section 1.

1.5 Age (please specify): _____

1.6 Gender

☐ Female ☐ Male ☐ Other

1.7 Where do you mainly live? Please tick one.

☐ Australian Capital Territory ☐ New South Wales
☐ Victoria ☐ Queensland
☐ South Australia ☐ Tasmania
☐ Western Australia ☐ Northern Territory
☐ Other (please specify):

1.8 Job. Please tick one that's closest to your profession.

☐ Federal government ☐ Local government
☐ Diplomat ☐ Media
☐ Corporate ☐ Small business
☐ Industrial ☐ Retired
☐ Student ☐ Education (tertiary)
☐ Education (secondary) ☐ Education (other)
☐ Unemployed
☐ Other (please specify):

1.9 Are you a current ANU student?

☐ Yes ☐ No

1.10 Are you an ANU graduate? If no, then please go to question 2.1

☐ Yes ☐ No

1.11 If you are an ANU graduate, in what year(s) did you get your degree(s)?
Please list specific years:

_____

1.12 If you are an ANU graduate, what degree(s) did you attain? Please list:

_____

2. How do you get ANU Reporter?

2.1 How do you mainly receive *ANU Reporter*? Please tick one.

☐ In *The Canberra Times*
☐ By mail
☐ Alumni email directs me to online version
☐ Passed on by family member, friend or acquaintance
☐ Pick it up in library, café or other public space
☐ Other (please specify):

2.2 How would you prefer to receive *ANU Reporter*? Please tick one.

☐ In *The Canberra Times*
☐ By mail
☐ Alumni email directs me to online version
☐ Passed on by family member, friend or acquaintance
☐ Pick it up in library, café or other public space
☐ Other (please specify):

If you don't mainly receive *ANU Reporter* in *The Canberra Times*, please go to question 3.1

2.3 If you receive *ANU Reporter* mainly in *The Canberra Times* or would prefer to, which day would you prefer it appeared in the paper? Please tick one.

☐ Monday ☐ Tuesday (current distribution day)
☐ Wednesday ☐ Thursday ☐ Friday
☐ Saturday ☐ Sunday

2.4 How do you mainly know that *ANU Reporter* is due to appear in *The Canberra Times*?

☐ Via ads in *The Canberra Times*
☐ Via an email from ANU
☐ Via the ANU website
☐ Other (please specify)
☐ I don't know ahead of time

3. About the articles and appearance

3.1 How much of each *ANU Reporter* edition do you read? Please tick one.

☐ All ☐ Most ☐ Some ☐ Not much ☐ None

3.2 What kinds of articles do you prefer reading in *ANU Reporter*? Please tick as many as you like and make a comment if you wish.

☐ Research features ☐ Education features
☐ Opinion essays ☐ Questions & Answers
☐ Graduate profiles ☐ Research & Development stories
☐ ANU events stories ☐ ANU campus stories
☐ ANU history stories ☐ None

What kinds of stories would you like to see more of that we're not currently running? Please specify. This answer is optional.

3.3 Please rate your level of satisfaction with the quality of the articles that appear in *ANU Reporter*. Please tick one and make a comment if you wish.

☐ Highly satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Highly dissatisfied

What comments would you like to make about the quality of articles? This answer is optional.

3.4 Please rate your level of satisfaction with the mix of articles that appear in *ANU Reporter* (that is, the range of topics covered). Please tick one and make a comment if you wish.

☐ Highly satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Highly dissatisfied

What comments would you like to make about the mix of articles? This answer is optional.

3.4 Please rate your level of satisfaction with the design and layout of *ANU Reporter*? Please tick one and make a comment if you wish.

☐ Highly satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Highly dissatisfied

What comments would you like to make about the design and layout? This answer is optional.

3.5 Have you ever visited the *ANU Reporter* website at http://www.anu.edu.au/reporter?

☐ Yes ☐ No, but I knew it existed ☐ No, I didn't know it existed

If you answer "no", please go to question 3.8

3.6 If you have visited the *ANU Reporter* website, which of the following is closest to the frequency of your visits? Please tick one.

☐ Once a year
☐ Once a month
☐ Once a week
☐ More than once a week
☐ Once ever

3.7 Please rate your level of satisfaction with the *ANU Reporter* website? Please tick one and make a comment if you wish.

☐ Highly satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Highly dissatisfied

What comments would you like to make about the website? This answer is optional.

3.8 As a result of reading *ANU Reporter*, how would you rate your knowledge about education at ANU? Please tick one.

☐ More informed ☐ Same as before

3.9 As a result of reading *ANU Reporter*, how would you rate your knowledge about research at ANU? Please tick one.

☐ More informed ☐ Same as before

3.10 As a result of reading *ANU Reporter*, how do you feel about ANU in general? Please tick one.

☐ More positive ☐ Same as before ☐ Less positive

3.11 Tell us in 50 words or less how we could make the magazine a more enjoyable and informative read for you.

Engaging visions

They say a picture is worth a thousand words, but tell that to a struggling landholder when his water supply disappears. But what if, instead of telling people things, image makers set out to listen to rural and regional communities about their relationship with land and water?

The Engaging Visions Research Project is an initiative of ANU and the Murray-Darling Basin Authority, with financial support from the Australian Research Council.

The team of researchers and visual artists is exploring how artists can interact with communities in the Murray-Darling Basin to capture attitudes towards the natural environment and encourage sustainable practices.

More: http://engagingvisions.com.au

1

1. Visualisation of a Historical Experience, Calperum Station, Riverland Biosphere Reserve, South Australia. *Image: John Reid*

2. Spirits of Bushfires Past, Goobarragandra Valley, Tumut, New South Wales. *Image: Charles Tambiah*

3. Fruits of the Mallee No. 3, Calperum Station, Renmark, South Australia. *Image: Carolyn Young*

4. The (over) lie of the land – Avochie Cottage, Myall Park Botanic Garden, Glenmorgan, Queensland. *Image: Victoria Cooper and Doug Spowart*

5. Tumut Dam Wall, Tumut, New South Wales. *Image: Dean Sewell*

The view from here

It's a long way from space to the Murray-Darling Basin, but not too far for a pair of satellites that have revealed an alarming decline in the hydrology of one of Australia's largest fresh water systems. The same technology could also help us get a clearer picture of how climate change is affecting the planet.

BY MICHAEL CAVANAGH

Picture two cars connected by a length of rope traversing the globe.

While on the flat they travel at the same speed, the rope remains taut between the two.

As the lead car approaches an incline, it slows, enabling the following vehicle to catch up, causing the rope to go limp.

In effect, bumps and hollows in the Earth's gravity field cause the same thing to happen for two satellites known as the Gravity Recovery and Climate Experiment (GRACE). This mission has been circling the planet since March 2002, when it was launched by NASA in partnership with the German Aerospace Centre (DLR).

Data from GRACE have revealed that over the past six years the Murray-Darling Basin has lost water which could fill the equivalent of 400 Sydney Harbours or eight Port Philip Bays.

The finding is the result of work by Dr Paul Tregoning from the Research School of Earth Sciences at ANU and his colleague Dr Marc Leblanc from James Cook University's School of Earth and Environmental Sciences. Their project has been supported by the Australian Research Council through a Discovery Grant.

Working with French researchers from the Centre Nationale de la Recherche Scientifique, Tregoning and Leblanc produced a more accurate assessment of how the Murray-Darling Basin has been hit by drought.

Up until now it has been quite difficult to quantify total water loss across vast areas.

"Droughts affect more people globally than any other natural hazard," Tregoning says. "There is a real need for better tools to monitor droughts and new satellites have an important contribution to play here. Changes in total water storage can be quantified through the use of observations of the Earth from space."

All you need do to realise that the Earth's surface is not uniform is run your hand over any school room globe. The planet's surface is a patchwork of mountains, valleys, and plains, which lead to density changes in Earth's gravitational field. It's these variations that are picked up by GRACE.

Like the two cars linked by rope, the two satellites which make up GRACE work as one. Changes in distance between the two satellites, one following the other approximately 220 kilometres apart, are used to estimate gravitational changes.

The trailing satellite, like the car at the end of the rope, is drawn toward the lead satellite as they pass over something that causes a change in the gravitational pull.

"The satellites take 10 days to cover the entire earth. They map the gravity and give us a snapshot every 10 days. This allows us to identify any changes that may occur in the Earth's surface," Tregoning says. "They have produced a mapping of the gravity field with an accuracy that has never been achieved before, so we can actually see changes in the Earth's gravity field from one month to the next."

When GRACE took readings from the Murray-Darling Basin, some big changes became apparent.

The Murray-Darling Basin accounts for between 20 and 30 per cent of Australia's gross agricultural production and includes 60 per cent of the country's irrigated land.

So what was behind the changes in the gravitational field over the Basin picked up by GRACE?

Changes in the field could be due to a shift in the Earth's tectonic plates because of such things as volcanic activity and earthquakes. Or they might result from the melting of ice sheets, which changes the water level and ocean tides and influences the height of the water. These variations change the gravity field which, in turn, changes the distance between the satellites from one time to the next as they pass over the same point on the Earth.

"Now we know that there is no ocean in the Murray-Darling, so the changes detected could not be due to oceanic effects," Tregoning says. "There are obviously no melting ice sheets in the Basin that would lead to a change in the water level. So it can only mean that there have been changes in hydrology."

Surface water – such as rivers, lakes, dams and ponds – accounts for just six per cent of the total water loss in the Murray-Darling Basin. About half of it is ground water and the remainder is the moisture in the soil. Ground water is anything that is below the soil's surface and includes aquifers.

The use of Global Positioning System (GPS) receivers on each satellite identifies the exact position of the satellite to within a centimetre or less.

"The GPS on the satellite tells us where the measurements are taken. It's similar to having a yachtsman know where he or she is on the ocean," Tregoning says.

All of this information is available online, which Tregoning and his colleagues downloaded and then applied a number of mathematical formulae. This enabled them to derive a clear picture of what is happening in the Murray-Darling Basin.

They found that groundwater storage has been declining over six years and that, even when average rainfall was experienced in the region in 2007, the "hydrological drought" continues.

Across the Murray-Darling Basin, most of the surface water and soil moisture rapidly disappeared in the first two years after the onset of the drought in 2001. The basin continues to lose vast quantities of water, long after most water at the land surface (in the reservoirs and the moisture of the soil) has dried up.

"We looked at interpreting the changes in gravity as being caused by changes in hydrology in the Basin. We have an accuracy of about 20 – 30 millimetres across the Basin's scale which is about a million square kilometres. What we can measure from GRACE is the change in the total amount of the water. That includes groundwater, water in the soil moisture, surface water and also water in the vegetation." Tregoning says.

It's not just the Murray-Darling Basin which is becoming better understood as a result of the GRACE project. GRACE is also sensitive to changes in ocean mass, such as the tidal variation, and also the effect from phenomena such as El Nino and climate-related changes due to the melting of the Greenland and the Antarctic ice sheets.

"It is that change in mass that can be detected by GRACE and therefore this is a tool to actually measure and quantify the effect of climate change on the polar ice sheets at the moment," Tregoning says.

"GRACE is an observing tool which provides observations and measurements which can then be used to develop and prove or disprove theories. In the case of climate change, GRACE is one of the few available tools for quantifying what is actually happening."

More: Hear an interview with Paul Tregoning by following the link to this story at www.anu.edu.au/reporter

Standing water like this is an increasingly rare sight in parts of the Murray-Darling Basin. *Photo: Jupiter Images*

Fossil future

ANU is home to one of the world's most important fossil collections, including one-of-a-kind examples of creatures past. Now researchers passionate about this treasure trove want to ensure it's preserved for the future.

BY SIMON COUPER

Holotype of Elvaspis tuberculata, a new genus and species described by Gavin Young this year. This was a small placoderm with similar body form and size to modern boxfishes. The example compared on the left is a turret fish that washed up on a South Coast beach. "Presumably Elvaspis had a similar life style, manoevering amongst the coral reefs in the shallow tropical sea that existed in the Burrinjuck area 400 million years ago," Young says. *Photo: Ben Young.*

As books go, *The International Code of Zoological Nomenclature* is a modest looking thing. But among arks of information it's one of the most important we've got, for it sets out how newly discovered species and higher levels of biological groupings need to be defined to fit into the world's system of known organisms.

Palaeontologist Ken Campbell pulls his copy down from the shelf in his office with a flourish, explaining that adherence to the code is a formal requirement for the international recognition of every new species, whether extant or extinct.

Campbell has been working with fossils for over 40 years, sharing his enthusiasm with a range of colleagues and students. In all that time his zeal has not diminished.

Visit him in the Research School of Earth Sciences at ANU and he might even offer to show you one of his proudest — and largest — discoveries.

"This beast is the largest lungfish found at Wee Jasper," Campbell explains. "It is a massive lower jaw, taking up two drawers in storage where most items take one. Its length is ten times the jaw of the living lungfish, Neoceratodus, from Queensland. The massive cavity for the jaw muscles demonstrate that its food was shelly organisms — these are abundant in the same rock layer as the fossil jaw. This individual is the end product of an evolutionary sequence for lungfish laid out in the 15 million years of limestone deposition at Burrinjuck."

This giant jawbone is just one of some 70,000 registered items in the geological collection at ANU, which includes fossil specimens from all over Australia and overseas, including molluscs, brachiopods, trilobites, corals, bryozoans, and many other animal groups.

The collection is best known in palaeontological circles as housing the world's largest collection of fossil vertebrates (back-boned animals) from the 400 million year old Devonian limestone deposits around Lake Burrinjuck, to the northwest of Canberra.

Some of its contents come from further afield, too. Consider these riches. There is the world's oldest known fossil fish, Arandaspis, from the Northern Territory. There is the only known amphibian bone of Devonian age from Australia's mother continent Gondwana, a mandible named Metaxygnathus — found near Forbes in New South Wales by an ANU student many years ago. There is the oldest completely preserved vertebrate eye capsule, from near Taemas bridge at Burrinjuck, showing the evolutionary development of nerves and blood vessels underpinning sight some 400 million years ago. There are also many specimens of the now-extinct placoderm fish, which included giant jawed predators of the Devonian seas, as well as some of the oldest known lungfish. There are also many of the world's best preserved examples from a second famous Australian fossil location – Gogo in the Kimberley of Western Australia.

Superlatives like priceless and unique sound positively inadequate when trying to describe these irreplaceable treasures. But it's on this point of description that the collection shows one of its greatest values.

Remember the International Code of Zoological Nomenclature, that who's who of the zoo? It mandates that all animal descriptions should refer back to one example of that species, known as the 'type' specimen. For example, somewhere in the world there is one preserved aardvark, one preserved zebra, on which the biological descriptions for all aardvarks, all zebras, are based.

The ANU fossil collection contains numerous examples of these 'type' specimens, such as Campbell's lungfish, or the placoderms described by his colleague and palaeontologist Dr Gavin Young.

Before each new species can be officially recognised, researchers must first check that it is different from existing species. This is why all type specimens must be lodged in recognised scientific institutions, to be available for anyone to check on the original description of an organism by examining the type specimen for themselves.

Young explains that this is particularly important to further our understanding of anatomy and evolution, in part thanks to new technologies like X-ray tomography.

This particular technique uses computer-guided X-ray to take thousands of sliver-thin images of an object

"Some of this material is certainly the best in the world. It's terrifically important that the specimens are looked after."

A 3D computer scan of a fossilised placoderm eye casing, part of the collection at ANU. *Image: Tim Senden*

in minute detail. These slivers are then stitched back together to build up a comprehensive 3D image. ANU is a pioneer in this field.

But Young says that when it comes to fossils, you can't build a clever computer image without the original object, and even the cleverest form of imaging may not be adequate for a future research question.

"I was talking to our X-ray tomography expert Tim Senden about a particular point concerning one of our fossils," Young says. "The initial scan wasn't of high enough resolution to resolve that problem – so we had to go back to the original fossil to answer our question.

"If we didn't have the original specimen properly stored, catalogued, and curated – say we'd put it aside after making our first image and then couldn't find it – we'd be in trouble. It would be a bit like taking a photo of the crown jewels and then chucking the original items in the trash. If you were then to say, 'Where's that nice little diamond in the crown, it didn't come up in the photo', then we'd have chucked the crown away and have no way of knowing."

Like Campbell, Young is very enthusiastic about the fossil collection. The researchers and their students are continually adding to the fossil specimens in the fireproof store, as new specimens are prepared revealing unknown anatomical features, or new species are discovered. The store, in the D.A. Brown building of the Research School of Earth Sciences, is an unassuming room lined with uniform filing drawers. Young slides one open and pulls out a treasure.

"This is a 400-million-year-old fossil fish skull still encased in limestone. The skull has been weathered away and you can see inside the entire brain cavity. There are only one or two other places in the world producing specimens that show the internal anatomy of the vertebrate brain from that long ago. This is just one of dozens of specimens we have collected over the years from Burrinjuck."

The foundation Professor of Geology at ANU, David Brown, started a fossil collection for teaching and research back in 1958, by purchasing overseas material and establishing collections for research projects in the local region. Over the years the ANU researchers have developed a close working relationship with land holders in the Burrinjuck region. This area is the fossil equivalent of a gold field, one where the nuggets may be sitting exposed in the sides of gullies and open fields. Sometimes they're laid bare by the vicissitudes of climate.

"Burrinjuck Dam goes up and down," Young explains. "The drought has created vast exposures that weren't accessible 50 years ago. If we hear from the local landholders that they have seen something interesting down in the paddock when the water goes down, we can duck out to Burrinjuck and collect it. Since Ken [Campbell] found the first lungfish skull out there in 1965, we've had over four decades of being on site, and we've accumulated a much better collection of specimens than anywhere else. Even so, the British Museum came out here in 1955 and 1963, and over 500 fossil fish specimens from Burrinjuck are held in the museum in London."

The Burrinjuck specimens, and those from the second famous locality at Gogo, are remarkable for the quality of the preservation, the researchers explain. Being preserved in limestone, it is possible to extract them in three dimensions, unlike more typical fossil occurrences that are preserved in shale. Compaction of shale over millions of years can crush the fossil specimens, destroying such features as the fine structure of the bones.

The technique of etching fossil bones from limestone with acetic acid, now used in laboratories throughout the world, was developed in the British Museum of Natural History in the 1940s, using some specimens from Burrinjuck sent to London for examination in 1938. The spectacular results led to the two British collecting expeditions to Burrinjuck, the 1963 trip also including the first visit to the now-famous Gogo site in the Kimberley. The original Australian specimens played a major part in the story of discovering and understanding fossils, and the actual Gogo specimens used by David Attenborough in the TV series *Life on Earth* are held in the ANU collection.

Young argues that this historical connection, coupled with the vast array and importance of specimens prepared and researched at ANU, many collected from an internationally significant fossil site close to Canberra, mean that the capital is the appropriate place to house the collection. This could be used for a fossil display that would rival anything elsewhere in the world.

To this end an endowment is being established to maintain the collection in its entirety, to support the work of a curator, and to provide funds for PhD scholarships in paleontological research. It's hoped this fund will grow to a substantial level to ensure that the fossil collection is not only preserved for future researchers, but also made more publicly available, so that you and I can marvel at these creatures from the planet's past.

The ANU Palaeontological Collection Endowment is seeking support from a range of individuals, companies and the community. Contributions from individuals have begun building the endowment, so it's off to a good start. There are also negotiations on a more permanent location where the collection could be made more accessible to the public.

"Some of this material is certainly the best in the world. It's terrifically important that the specimens are looked after. They [the public] would be staggered at the quality of the material we have," Campbell says.

After speaking with Campbell and Young, it's hard to disagree with this point. Although many advances in evolutionary studies are being forged through fields like genetics, our understanding of the evolution of vertebrate and invertebrate life depends on defending our fossils.

For more information on supporting the ANU Paleontological Collection: www.anu.edu.au/endowment

Equal before the law

2009 is the 15th anniversary of the United Nations Human Rights Committee's ruling on the Toonen v Australia complaint, which led to Tasmania overturning its prohibitions against gay sex and ultimately becoming one of the most progressive states for same sex couples with its pioneering civil union scheme. Wayne Morgan from the ANU College of Law was a legal advisor on the Toonen case, and advised the Tasmanian Attorney-General on the design of the relationship laws. He talks to *ANU Reporter* editor Simon Couper about how far we've come in ending legal discrimination against gays and lesbians in Australia, and what remains to be done.

ANU Reporter: What's the first step in ending legal discrimination against same-sex relationships?

Wayne Morgan: Decriminalisation is the first step. That makes sense on the basis of logic but also on the basis of experience in history. If we look overseas, it usually starts off with decriminalisation, then it moves to some form of anti-discrimination protection, and then, most problematically, it moves on to things like recognition of relationships and family rights.

Where did decriminalisation begin in Australia?

The ACT was the first jurisdiction to do it under the Federal Government, as it was before self-government. It's interesting that it happened here first given the homophobia of more recent federal governments. The first state to do it was South Australia in the 1970s. Then it followed slowly around the country. Victoria was next, followed by New South Wales. The three laggards were Queensland, Western Australia and Tasmania.

How did you become involved in the legal process that became Toonen v Australia?

That was one of the most interesting experiences of my life. I was overseas doing my Masters degree when the whole case got started, so I wasn't involved from the very beginning. Nick Toonen and Rodney Croome, who I didn't know at that stage, were young activists in Tasmania who had been trying to get the Tasmanian anti-sodomy laws changed by a series of legal and political actions, including one that led to their arrest at the Salamanca Markets in Hobart. They decided that because they couldn't achieve decriminalisation through the Tasmanian Parliament, maybe the UN was an option.

A friend alerted me to the case. I immediately got in touch with them and said: I'm a gay man, I'm one of the few in Australia who knows something about the UN Human Rights Committee process (at that time), so if I can be of any assistance let me know. From that point on I took over the legal side of the case, and was heavily involved in drafting submissions to the United Nations, which is quite a lengthy process. Eventually it resulted in a ruling from the Human Rights Committee of the United Nations [in 1994] that the Tasmanian laws were a breach of Australia's obligations under international human rights law, and the governments in Australia should do something about it.

The Tasmanian Government still refused to decriminalise, so we had to turn to the Federal Government to try to pass a federal law overriding the Tasmanian law, based on the UN decision. That in itself was an involved process. The Federal Government, in my opinion, never properly did the job, and that is why after it was passed the Tasmanian Government still claimed that their laws were valid because the Federal legislation was so ambiguous. The final stage in the process meant we had to take a case to the High Court.

Finally, as a result of all that process, we got a ruling from the High Court that they would hear the case. When that happened, Tasmania finally caved in and itself repealed the law. It was a very important outcome in Tasmania, not just for decriminalising same-sex sexual activity, but also because it actually led to substantial reform of the Upper House in Tasmania. It was the Upper House that had prevented decriminalisation for a number of years. The case had ramifications far beyond just repealing the law.

What were some of the other ramifications?

The decriminalisation process itself substantially influenced the attitudes of Tasmanians generally speaking. Because of the wonderful myth-busting that the Tasmanian gay and lesbian rights groups were able to do, attitudes towards sexuality in Tasmania really changed and that was reflected in surveys. Because

Wayne Morgan says, that while Australia has come a long way in ending legal discrimination against same sex couples, there is still much to be achieved. *Photos: Belinda Pratten*

of that it meant that the time was then right to put in place a whole lot of reforms. For example, the Tasmanian Anti-discrimination Act that was passed had fewer exemptions in relation to sexuality than any of the other state acts. It was actually a stronger form of anti-discrimination protection. Also, Tasmania was one of the first jurisdictions to begin actual homophobia programs within secondary schools. Tassie also took the lead in terms of recognition of gay and lesbian relationships. In 2003 it put in place the first civil union scheme in Australia.

You advised the Tasmanian government on its civil union scheme for same sex relationships. How do you start designing that kind of system?

Based upon community consultation with the gay and lesbian community, we had very clear ideas about what the law should do if we could get it through. Then it was a matter of looking at whether any other models that already existed fulfilled those goals. Two of the important models were first, a proposal from NSW originally made in the 1980s that was never debated in parliament and, secondly, the New Zealand proposals for their civil union scheme.

We felt it was important not just to include gay and lesbian relationships, and not just put in place a system that mimicked marriage. What we wanted to do was to put in place a different system of relationship recognition that would be open to anybody who either did not want or could not marry. Also, we didn't want it to be restricted just to "conjugal" couples. If you think about it, there are a number of people in intimate relationships that might not be sexual, but who also need their relationships recognised for a number of legal purposes.

So the Tasmanian law went far beyond anything that actually existed globally at the time by achieving both of those goals. By having a diverse and open scheme, that basically means any two adults in an intimate relationship can register their relationship in Tasmania and in that way get all of the rights and obligations of married couples to the extent that Tasmania can achieve this. It's not completely possible because of our federal system which means that many areas of relationship regulation are the responsibility of the Federal Government.

That's why I sometimes get very annoyed that one of the criticisms of the Tasmanian law is that it doesn't mimic marriage enough. One of the goals from the very beginning was that it shouldn't mimic marriage, that instead it should be as inclusive as possible and not just open up marriage to what is a very small group, that is, conjugal gay and lesbian couples.

Is a civil union scheme the end of the line for abolishing legal discrimination against gay men and lesbians?

There's a lot still to be done. Even though I'm not a fan of marriage, that remains one of the largest concerns for gay and lesbian communities nation-wide. Of course, even though I'm not a supporter of marriage, it is true to say that we will never be equal in Australian society whilst this great marker of legitimacy is denied to us. I do see the marriage fight as important on that level.

In 2008 one thing the Rudd Government did do – and it's something gay and lesbian communities had been lobbying about for over a decade – was pass federal law reforms to equate gay and lesbian couples with heterosexual de facto couples. In almost all circumstances now under federal law, gay and lesbian couples are treated the same as heterosexual de facto couples. But de facto status isn't sufficient because it means gay and lesbian couples will still be regarded as inferior so long as marriage is denied to us..

Those federal reforms last year were also extremely important in giving gay and lesbian couples access to the Federal Family Court, which is a much more experienced institution and a faster and cheaper institution in dealing with relationship and custody issues.

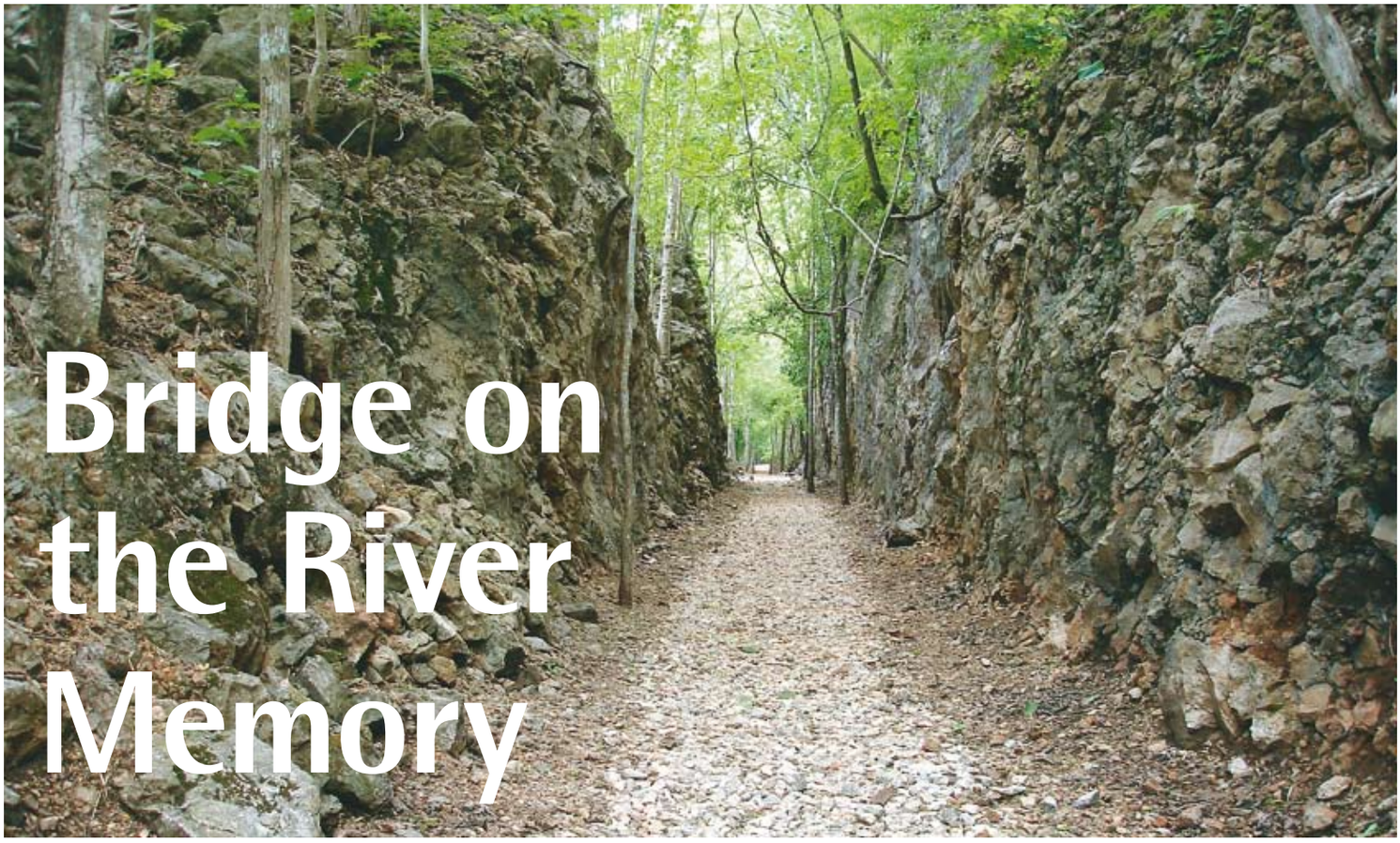
What else remains to be done?

Under a number of state and territory laws we still don't have full reform on relationship issues, and particularly family issues. Recognising the rights of co-parents, for example, varies from state to state.

Gay men and lesbians are covered under all of the state and territory anti-discrimination laws, but there is still no cover under federal law. All Commonwealth agencies are immune from being defendants under state and territory anti-discrimination laws. This is particularly an issue as, under last year's reforms, all gay and lesbian couples receiving benefits will have to "come out" to Centrelink to have their relationships recognised. If they're discriminated against by Centrelink or one of its staff, there is no protection under anti-discrimination laws.

Also, violence against lesbians and gay men is still a huge issue Australia-wide. Dealing with violence requires a change in cultural attitudes. But there are ways in which laws can have an impact (such as hate-crime legislation), so we need to see what we can do in this area.

Finally, the next big step is to do with transgender rights. Even just looking at all of the different areas where people are required to report their gender, it's not really necessary at all. The role of gender in our legal system, like sexuality, still needs a lot of work.



Bridge on the River Memory

This cutting at Hintok, near Hellfire Pass,shows the record in rock left behind by labourers in WWII. *Photo: Michael Knopp*

After Anzac Cove and the Kokoda Track, the Thai-Burma Railway is one of the most important sites for the commemoration of Australian war history overseas. Thousands of tourists visit it each year and the Australian Government funds a memorial museum at Hellfire Pass cutting. But what do the people of Thailand make of this reverence for a part of their territory and fragment of their history? Thai and Australian students have gone some way to bridging that divide in a new project on cultural memory and war heritage.

BY SIMON COUPER

Jungles are supposed to be steamy, vine-tangled affairs, but can they also be deciduous and ghostly?

These were the qualities that struck Joan Beaumont the first time she visited the jungle around Konyu Cutting in Thailand, site of the infamous Hellfire Pass.

During World War II Japanese soldiers forced thousands of Allied prisoners of war (POWs) to chisel a rail passage through the obdurate rock as part of the Thai-Burma Railway.

The prisoners worked in pairs, one holding a long metal drill steady while the other pounded it with a mallet. Once they'd bashed out a deep enough cavity, the hole would be packed with dynamite and exploded. Little by little, the rock yielded down to the level of the desired track.

It was backbreaking work. The Japanese drove their labourers for up to 18 hours a shift, lighting massive bamboo fires after sunset so the work could continue into the night. It was the light of these flames and the shock of dynamite explosions that gave the site its name, but it was the toil and toll on the POWs that gave Hellfire Pass its legacy for Australians.

Beaumont, an ANU professor of war history whose work includes an interest in the memory of war, recalls her introduction to the cutting.

"The first time I went I was on my own," she says. "The jungle in that part of Thailand is actually deciduous. The leaves float down from above the cutting. You can have a distinct sense of the presence of the dead there. If you're there at night, it must be profoundly evocative."

It must be quite a spectacle at Hellfire Pass during the Anzac Day dawn service too, when fires are lit in the pre-dawn dark while visitors hold a ceremony for those who lost their lives.

Tourists can still take the "Death Railway Tour" along part of the Thai-Burma Railway and contemplate the 13,000 POWs and perhaps 90 000 Asian labourers who perished during its construction.

They can also visit the Bridge on the River Kwai at Kanchanaburi– a steel construction quite different to the wooden one immortalised in David Lean's 1957 movie.

Beaumont says this collision of fact and fiction, tribute and tourism points to a fundamental problem around the preservation of offshore commemorative sites – places like Anzac Cove and the Kokoda Track, which are iconic sites in Australian memory of war.

"You have sites of heritage value located in a sovereign nation that does not have as much investment in their preservation as do outsiders," she says. "So we've been looking at the questions: What is the heritage value of the [Thai-Burma] railway? Can it, and how should it be preserved? And that leads us naturally to its different meaning for different national groups."

Prior to taking up the role of Dean of the Faculty of Arts at ANU, Beaumont worked at Deakin University. There she helped lead a project that allowed Australian

and Thai postgraduate students of cultural heritage to explore what their respective populations knew of the history of the Thai-Burma Railway, and what these different perspectives meant for the preservation of significant war sites. The project was supported by the Australia-Thailand Institute (ATI), a federally funded body that encourages links and cultural exchange between Australia and Thailand.

In 2007, Beaumont led a group of Australian students on a trip to Hellfire Pass and other railway sites so that they could evaluate the different ways in which their Thai peers thought about the building of the railway and its legacy.

Earlier this year a second cohort of Australian students visited the Pass with Beaumont, as part of a second ATI-funded project to write a book on contested memory. But this time around the Chulalongkorn University staff and students taking part also visited Australia to gain a better understanding of what the memory of war means to us.

The students were divided into pairs consisting of one Thai and one Australian each, and then assigned a site connected with the Thai-Burma Railway. They were encouraged to explore its history and contemporary relevance to visitors and locals alike. In addition to Hellfire Pass and the Kwai River bridge, the students considered the Wang Pho viaduct and the two major Commonwealth War Graves Commission (CWGC) cemeteries in Kanchanaburi, plus a local Chinese cemetery where many Asian labourers who worked on the railway are interred.

Beaumont says that Thai attitudes towards WWII and the commemoration of the dead differ markedly from Australian approaches, so the Western drive to create war museums and maintain immaculate wartime cemeteries leaves many Thais baffled.

"When we first turned up in Thailand, I think the Thai students struggled to understand why the railway mattered to us. Why do Australians think this episode over sixty years ago continues to have such importance and relevance?"

The historian recalls one of the Thai students asking why anyone would exhume bodies from burial sites in the jungle and then reinter them in another cemetery in Kanchanaburi. In Thailand it is common for the dead to be cremated . The emphasis is placed on the deceased's sprit rather than the location of the body.

"They questioned what we assumed was a natural and valuable commemorative practice [interring the dead in the CWGC cemeteries]. The British tradition is to honour the individual who dies in war by giving each man his own identifiable grave. It's part of the citizenship contract in a democracy between the state and the individual who is willing to die in the nation's defence. These cemeteries are also places where families return to commemorate their dead relative. All that the Thais saw was a strange, macabre practice. So that was an intriguing moment of cross-cultural understanding."

This sentiment is reinforced by Yuttachai Boongthong, or Chalie, a Thai tour operator who is studying a degree in cultural management at Chulalongkorn University.

Chalie worked on the bridge over the River Kwai component of the project.

"I have learnt the history of the Second World War from Thai view and the damage and loss of Thai people during war, especially when the Japanese attacked Thailand in 1941," Chalie says.

"I learned the difficulties of Thais during war when the Allies attacked Bangkok in different districts and caused loss of lives in the city. However, I did not know much about the lives of POWs and Asian labourers during the war, including Australians. What we learn [about WWII] is that we live our life as usual, but I feel as if two people are fighting in my house and don't listen to what the owner of the house is saying to them.

"After the war ended, I felt a little bit bitter when the British asked the Thai government to pay money and export rice as a war pension, while they ask the Australian government for a place to commemorate the deaths."

Chalie says that his own view is that relations between Australia and Thailand since the end of the Second World War have been good, but he thinks that many of his compatriots would be confused by sites like the war cemeteries in Kanchanaburi or the museum at Hellfire Pass.

He valued the opportunity to visit Australian places of war commemoration, including the Australian War Memorial, Cowra POW camp site and the Anzac Day dawn service and march in Melbourne.

He was impressed by the number of memorials to war that exist in Australia and formed the view that these play an important role in defining a sense of Australian nationhood.

He also remarked on the number of younger people who took part in the Anzac Day rituals, saying that the memory of war could be used as one component in an evolving Australian national identity.

"There are many reasons why people look at war differently — different culture is one," Chalie says. "In the case of River Kwai, blaming certain groups of people for the way they think about wars and [how they are] looking at the past wars would probably be unfair for them. On the other hand, it should be a mission of each nation to learn, and to seek to benefit from war as a lesson for the society."

Chalie was paired with Australian student Talitha Robinson, who has recently completed a Masters of Cultural Heritage and is now working on a chapter for the book arising from the project.

Professor Joan Beaumont.
Photo: Stuart Hay

"Places that become what we might call 'sites of memory' often have a very strong sense of place where the landscape tells the story."

Before taking part in the cultural exchange, Robinson says her knowledge of the history behind the Thai-Burma Railway was limited.

"I think this was largely due to the fact my secondary education history lessons focussed more on Australia's role in the European theatres of war and less on the Asia Pacific. I had some knowledge of the fall of Singapore and the Kokoda Trail because my grandfather was stationed in Papua New Guinea during the Second World War.

"[After the project] I wouldn't say my views changed but rather were expanded. During the initial phase of our research I was a little incredulous of how benign the Thai perspective or acknowledgment of the sites along the railway appeared to be. As our research developed and friendships formed, it was fantastic to understand the broad perspective of both eastern and western cultures.

"It is a wonderful opportunity to have the chance to work with a peer from another country on a common project. Undoubtedly it is most positive to work in both Australia and Thailand together. The language gap is sometimes challenging when trying to convey a lot of cultural intricacies we take for granted. I think my partner and all our Thai colleagues have done a wonderful job conveying their knowledge in a language that is not their own."

For her own part, Beaumont says that the interactions between the Thai and Australian students were gratifying, as were the way in which the research helped to address some wider questions about Australian heritage sites in other countries.

She says that, although she takes issue with how the memory of war can be appropriated by governments to legitimise contemporary agendas, there is definitely a place in Australian culture for remembering past conflicts and atrocities.

"I think we are unduly fixated [on war]," Beaumont says. "Yet the exercise of confronting difficult issues from the past in order to move forward in the present is a worthwhile exercise."

The act of visiting sites of former death and suffering can also help people confront the extremes of human behaviour, and their consequences.

"Places that become what we might call 'sites of memory' often have a very strong sense of place where the landscape tells the story," Beaumont says.

"The cutting at Hellfire Pass does this because it is so deep. You stand there and imagine the huge physical effort it took to develop it. You can still see in the rock face evidence of the construction of the cutting."

A record in rock, in a railway, in a river bridge. What they mean for Australians, Thais and others in future could depend on the kinds of conversations between different peoples that take place today.

Living with uncertainty

Tropical species like these plumed whistling ducks on Cape York move inland in large numbers when the 'boom' arrives, as happened this year. *Photo: David Roshier*

Australia's birds have much to lose in a dry country affected by human development, but they could also teach us something about how to survive in Australia, argues environmental historian **Libby Robin.**

Why do pelicans fly inland after rain, even though they never saw the drops falling? They somehow 'know' that this is the moment to go and breed. Inland they find huge ephemeral lakes in country that is normally desert. Such knowledge is becoming increasingly essential to their survival. Pelicans must now co-exist with people who drain or pollute wetlands and lakes closer to their coastal roosts. They need to know where other wetlands are, where they can find resources to breed and feed hungry chicks.

Pelicans have evolved to work with the 'boom-and-bust' cycle of the Australian desert. They are adapted to the world's most variable climate, the climate of inland Australia. They can find and exploit its resources. It is just as well, as the people who now dominate the coastal ecosystems of the country have changed these dramatically.

Pelicans are not the only birds that have adapted to both the people and climate of Australia. In a land where floods and droughts are natural parts of a bigger ecological cycle, birds (and other animals and plants) depend for their survival not on regular rains but on how long they can stretch out their resources between big flooding events. They need to seize the opportunities offered by booms and stay within the constraints of bust-times. They must live with respect to the whole boom-and-bust system.

Drought is normal in Australia. In the arid lands of Australia, 'normal' ecosystems do not follow annual seasons as they do in other parts of the world, but rather boom (or 'pulse') after rare rain events. Flowers, seeds, seedlings, baby birds and other animals all follow at different times after the events, but the 'pulse' produces activity, and then inactivity. During the long dry times between booms, the natural systems wait (or 'reserve' their energy). The length of the wait is variable. There are no regular seasons in this country. The survival of creatures depends on how well they can adapt: how long they can wait and cope with the uncertainty of the wait, and then how quickly they can respond to opportunity when it arises.

Pelicans know instinctively to head to inland lakes for breeding after major rainfalls. *Photo: David Roshier*

"As global climate change affects ecosystems, certainty is increasingly eroded everywhere ..."

In our book, *Boom and Bust: Bird Stories for a Dry Country*, we explore the workings of the exceptional Australian ecosystems and how people have changed them. Some birds, like the pelicans, adapt to them and cope well with the uncertainties of never knowing when the bust (or resource-poor) time will end. They must learn to adapt to new factors as well. There have been great changes wrought in the Australian landscape by humans.

The first wave of human settlement was Aboriginal people who arrived about 55,000 years ago and burned vegetation to improve their hunt, thereby changing profoundly the vegetation patterns of the landscape. Human fires changed the food sources available to birds as well as the structure of the vegetation cover. In changing times it is better not to be a fussy eater. The huge duck-like bird, Genyornis, taller than a man and weighing about 275 kilograms, was, it seems, too particular about what it would eat. It died out about 45,000 years ago, probably because its preferred food, chenopod shrubland (saltbush, bluebush), became increasingly replaced by grasslands and open eucalypt woodlands. Without its preferred tucker in large quantities, Genyornis did not survive. But emu, another big bird that lived in some of the same places in the Australian desert, adapted. It seized on available food sources, and learned to eat them. Changing its feeding pattern ensured its survival.

Then the second wave of humans arrived just over 200 years ago and introduced European farming practices to the wide expanses of inland Australia. The adaptable emu discovered a taste for wheat and ate it with enthusiasm, much to the chagrin of Western Australian farmers, who declared an emu war in 1932. In Queensland emus ate prickly pear and spread the seed of that noxious plant, making farmers unhappy there too. The opportunist emu added to the woes of the new human arrivals who were trying to make a European-style living from a country so unlike Europe.

In the northern hemisphere, where most of our economic and many of our ecological models are based, resources return with the movement of the sun each year: spring brings new growth, autumn, harvests. Global and national financial systems are built on this certainty; mostly these are based on annual cycles built up from the deeply seasonal agricultural past of dominant western nations.

As global climate change affects ecosystems, certainty is increasingly eroded everywhere: seasons fail, food supplies are no longer reliable, and extraordinary weather patterns bring disasters on unprecedented scales – not just in marginal places like the Australian desert, but even in places where certainty has been the norm. In some places boom times appeared every year at the same time on the calendar: the 'harvest festival' celebrated the bounty of nature every autumn. The whole world now is seeking models for how to live with uncertainty and increasingly unpredictable seasons. We all need to think more about how to adapt to disasters and wait out the uncertain stretches of time between good seasons. We need a different sort of calendar.

Australian Aboriginal people have a different calendar: they watch the birds and flowers and use their behaviour to understand the structure of each year on its merits. 'Tellers' provide crucial information, very specific to country. 'When the brolga sings out, the catfish start to move', Daly Pulkara told Deborah Rose at Yarralin. Tellers create a calendar, but the calendar is not cyclical or certain, rather interconnected and ecological. The coming of rain, of fish, of edible seeds is each an important season, but it is not necessarily annual, and the order of events is knowledge that is embedded in country. This is a calendar that can wait, that can adapt people's behaviour to suit unpredictable rain and the ecological response following fire events.

In uncertain times, we need bird stories for a dry country. These magnificent creatures regard uncertainty as normal. They have built up resilience to cycles of boom and bust: they know how to wait for resources, living on the edge on very little, and then to seize the opportunity to breed when it arrives. For some, like the endangered Night Parrot, perhaps the wait between resources has been too long.

Ecological systems have booms (opportunities) and times of reserve. Humans, like birds, need to know when to take opportunities to grow and when it is better to wait and conserve resources. The global economic crisis has everyone talking about booms and busts. But busts attract all the attention: they are 'abnormal'. Yet good and bad economic times have always been interconnected. Perhaps human society has much to learn from life in the Australian desert.

All creatures need to be able to recognise the moment in the cycle when it is safe to expand, to place demands on our ecosystems. Understanding the natural system as a whole, its patterns and its irregularities, its booms and its busts together is essential to survival in an uncertain world. The only certainty is that if we don't realise that expansion puts pressure on the ecological systems, then the economic systems that depend on expansion are sure to collapse.

Libby Robin is an environmental historian at the National Museum of Australia and ANU. She co-authored the book Boom and Bust: Bird Stories for a Dry Country with Robert Heinsohn from ANU and Leo Joseph from CSIRO. The book is published by CSIRO.

Gaining the edge

A Masters student takes her new know-how on mental health from the classroom to the workplace.

BY WILL WRIGHT

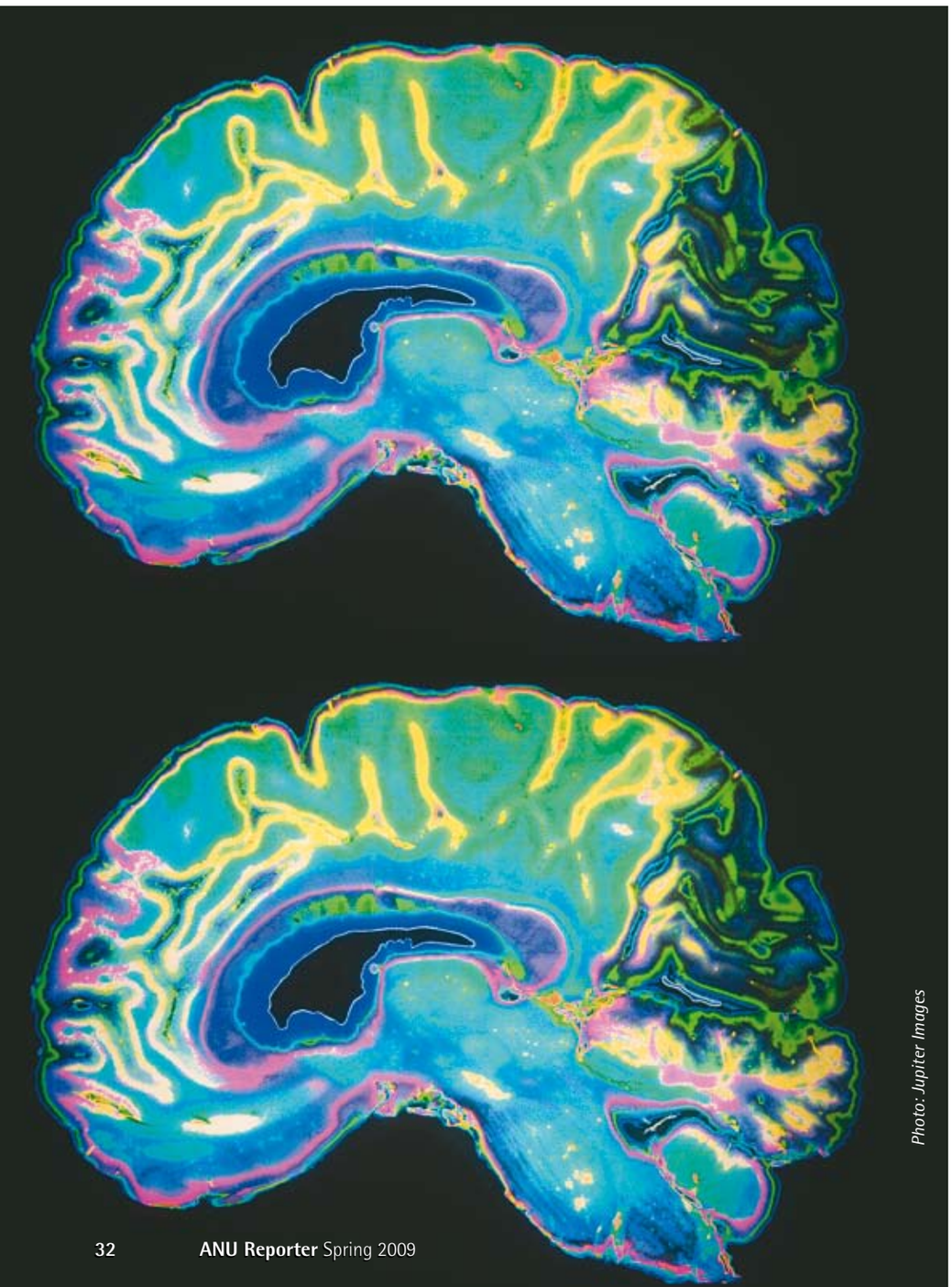


Photo: Jupiter Images

Parliamentary Library researcher Rebecca de Boer helps politicians find information about the latest developments in health, so it's essential that she knows how to spot good research papers and media reports in the area.

She receives a lot of requests about mental health issues related to ageing. These types of requests are on the rise due to the ageing population and the increasing prevalence of chronic illnesses.

"I don't research mental health specifically, but it's certainly an emerging area of interest among federal politicians," De Boer says.

When she saw a graduate course being offered at ANU through the Centre for Mental Health Research (CMHR), she jumped at the chance to take it up. Research, Treatment, Policy: Current Issues in Mental Health provides a practical introduction to the nature, epidemiology and treatment of mental health disorders. It was designed primarily to inform people working in fields related to mental health about the latest findings in the area, and also to teach students how to critically assess information in research publications and the media.

"I decided to enrol in the course because it looked really interesting and useful for my work," says de Boer, who is undertaking a Master of Studies at ANU.

The 13-week course covers a range of topics related to mental health such as stigma, e-health, substance abuse, adolescence and later life, and treatments for depression and anxiety. Each week involves a four-hour evening session tailored to suit full-time workers.

De Boer says the course is "very well designed", with small class sizes and an opportunity to engage with lecturers who are experts in their fields.

"You have a lecture followed by questions and discussions. Not only do you get to learn about the latest mental health issues, but you gain critical analysis skills and work on your own research project."

De Boer's research project focussed on the development of mental health guidelines, particularly in relation to GPs prescribing anti-depressants.

So what difference has the course made to de Boer's work?

The course strengthened her knowledge in analysing multiple aspects of research, including the methodological rigour, the reliability of the results and the wider implications of applying it to a policy context.

"Now I can evaluate a research paper and determine the validity of the research. It means I can provide better research support to members of Federal Parliament, particularly in relation to ageing and mental health policy."

Course coordinator Dr Lisa Barney encouraged public servants and administrators who need to keep abreast of the latest findings in mental health research, as well as professionals working in sectors such as hospitals and nursing homes, to enrol in the course. She said it was created based on feedback from government departments that they wanted graduate courses to target skills and knowledge required by their staff.

"Lecturers from the CMHR and leading researchers from other organisations present a fascinating discussion of recent developments in mental health," Dr Barney says.

"The course is very up-to-date and covers the current and engaging mental health issues of the day.

"We've had great feedback from students about the small-group lectures, with interactive tutorial and discussion periods."

The CMHR aims to improve the mental health of Australians through research and development, training, policy and the dissemination of health information.

The core of the matter

A new company involving ANU and UNSW researchers is using clever X-ray technology to make oil exploration more efficient.

BY MICHAEL CAVANAGH

A sliver of oil-bearing rock is analysed under polarised light to show crystal placement. *Image: Digital Core Lab*

It may not be as hard as getting blood from a stone, but for a group of ANU researchers extracting oil from rock could be a major boost for our society's appetite for energy.

Tucked away in a building at the southern end of the campus, a team headed by Professor Mark Knackstedt from the Research School of Physics and Engineering is working on a project that has some of the world's largest energy companies beating a path to their door.

Rocks from the world's oil fields are being sent to the group, which includes colleagues at the University of New South Wales, for 3D X-ray imaging to help determine what may happen when a firm starts to extract oil from underground.

Where there is oil, so too are water and gas. Oil companies are driven by three things when it comes to pushing the black gold to the surface when the drilling team begins: 1. How much oil is there; 2. How much oil, gas and water can they get out; and 3. How quickly it can they be recovered from the underground reservoir.

"The oil industry is an industry associated with significant risk," Knackstedt says. "Developing a reservoir, the costs sunk into getting it out can run into several billion dollars. If there is a way to predict better results the oil companies want to know, and this is one way of assisting."

"The big question is how much will they get out. [Our analysis] reduces the risk in decision-making."

That ability to reduce that risk so impressed the oil companies that a research consortium involving some of the world's largest energy companies was set up three years ago with the University.

The firms in the consortium are Saudi Aramco, ExxonMobil, Shell, Chevron, BP, Total, Schlumberger, Baker Hughes, Abu Dhabi Onshore, Maersk, Petronas, Japan Oil & Gas, ONGC (India) and BHP-Billiton.

The results have been so good that the researchers have established a company, called Digital Core Lab (DCL), with strong support from the Office of Commercialisation and the Legal Office at ANU. DCL now has an office and staff in Canberra servicing the energy industry. Employing University-owned software, the company will provide firms with valuable digital analysis of their rocks.

During the late 1980s and early 1990s oil companies had been examining the concept of 3D visual analysis of rocks samples, but with oil at < US $30 a barrel it was deemed to be commercially unviable. So they mothballed it as the industry dramatically scaled back research and development.

"However when oil started to fetch US $140 a barrel, research was happening all around the world exploding with all sorts of ideas," Knackstedt explains. "Ideas that had been sitting in the closet were revived." Since the 1990s greatly improved computer hardware has also fuelled this area.

Knackstedt had been looking at the idea of 3D computer-aided visualization of complex materials, although at the time he thought it would more likely be taken up by the medical sector.

It was thought this technology could possibly be applied in examining bones and other parts of the body to detect if there had been any change over time that could indicate conditions such as the onset of osteoporosis.

There was little enthusiasm displayed by the medical profession, and so it was the oil industry which benefitted more immediately from the research.

"The only way we could grow was to bring in external money," Knackstedt says. "This is a model which is used by universities all around the world."

A potential oil field is often found first by seismic mapping, but to really tell the potential of recovery of the oil a well must be drilled.

While drilling, it's possible to extract small lengths of the oil bearing rock. Tiny pieces of this, only a few centimetres in diameter, can then sent to the team for analysing.

Using an X-ray scanner built at the ANU, the rock fragment is digitally reduced to literally billions of data points. These provide an internal view of how pores within the rock hold either the water or the oil.

"Conventional analysis is difficult to calibrate; documented cases include the sending of three different samples to three different commercial laboratories. It could take up to 18 months for an answer and then the results were not consistent across labs; there are a lot of things that can go wrong," Knackstedt says. "Digital analysis, such as what we are doing, can provide some answers in two to three weeks and also provides visual information not before available."

With the demand for energy increasing, oil companies are heading back to "mature and unconventional fields" which have identified for up to 40 years, but have not been considered commercially viable until recently.

Now the research by the ANU team is helping to identify if those fields may be commercially attractive.

More: Hear an interview with Mark Knackstedt by following the link to this story at www.anu.edu.au/reporter

last word

Sex, drugs and the usual suspects

Michael Kirby was until February 2009, a Justice of the High Court of Australia and Australia's longest serving judge. He is now President of the Institute of Arbitrators & Mediators Australia. ANU in 2006 conferred on him the honorary degree of Doctor of Laws, and in 2009 he became a Distinguished Visiting Fellow at the ANU College of Law. He writes here of his work in the Global Reference Panel on Human Rights of UNAIDS, the joint UN body to combat the spread of the human immuno deficiency virus (HIV).

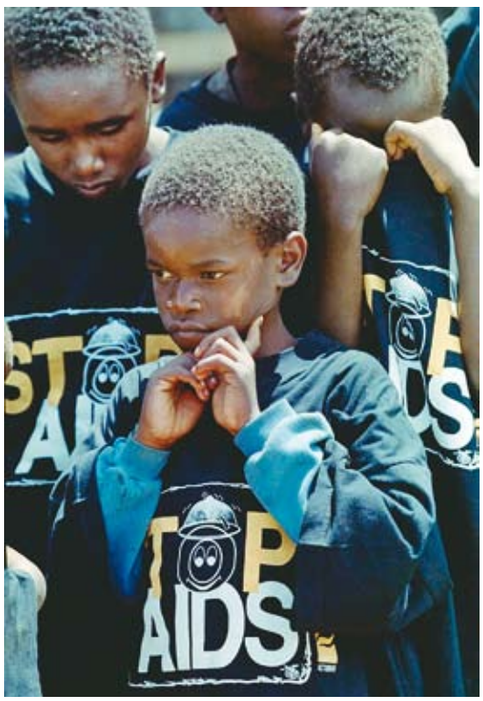


Photo: Corinne Dufka REUTERS

Let's start with the usual parental warnings. This article is about sex. It mentions injecting drugs and prostitution. If you wrap the rubbish with it, please turn it inside out and keep it from the reach of children.

Yet children inherit a world where HIV, the virus that causes AIDS, is still a major problem. AIDS is not over. Every year about 2.7 million people get infected. We do not seem to know how to stop the spread. Untreated, HIV leads to serious diseases as the body's immune system breaks down. Without expensive anti retro-viral drugs (ARVs), HIV will kill nearly all of those infected.

Despite all the energy, more than 40 million people have been infected since HIV was first identified and more than half of them have died. HIV spreads fastest in developing countries, wreaking havoc mostly on young adults.

A few weeks back, I attended a closed door meeting in New York organised by the American think tank, the Council on Foreign Relations. It gathered a group of scientists, doctors, public health experts, and statisticians to puzzle over the next phase of the struggle against HIV.

One of the best initiatives of the unlamented George W. Bush as US President was the provision of huge US resources to combat three diseases: AIDS, tuberculosis and malaria. These initiatives were taken in good economic times. They resulted in the establishment of The Global Fund, to which developed countries, like the US and Australia, contribute billions of dollars.

With the global economic downturn, there is a growing realisation that the world cannot afford to pump vast resources into supplying ARVs to meet the needs of the growing numbers of infected. A ghastly international triage may have to be devised to write off huge numbers of newly infected people and perhaps some presently receiving ARVs. Otherwise, something radical must be done to cut down on the rates of infection. What will work to achieve this?

In the early days of AIDS, epidemiologists insisted that the only effective way to achieve reduction of the spread of HIV was by basing strategies on sound scientific data and an approach that addressed the fears of those on the front line. I became involved in HIV strategies, in part because, in the early days I sat at the bedside of friends who died of AIDS. In Australia, AIDS then mainly hit the gay community. It still does. However, worldwide, men who have sex with men constitute just a fraction of the infected. Most infections come about through heterosexual sex, sometimes via commercial sex workers. Sometimes through injecting drug use involving unclean needles.

Faced by the ongoing explosion of HIV, many societies in the last few years have rushed to criminalise the transmission of HIV, to close down brothels and arrest sex workers found with condoms in their possession.

Many speakers at the New York meeting argued that this was quite the wrong way to tackle the spread of HIV. Our own experience in Australia, in the 1980s, following initiatives of Health Minister Neal Blewett and Shadow Minister Peter Baume (later ANU Chancellor), showed the way. Paradoxically, the best way to achieve behaviour modification lies not through criminal prosecutions and it is now far too late to resort to quarantine. The strategy that seems to succeed in developed countries involves accepting a paradox. Getting into the minds of people at risk requires protecting them against the burden of stigma, shame and discrimination. Only then will they obtain and observe the messages that are essential to reducing HIV spread.

Participating in the New York meeting was Michel Sidibe, newly appointed Executive Director of UNAIDS. He is the third person to lead the world effort against the AIDS pandemic with its double whammy of medical and stigma burdens. He follows the charismatic Jonathan Mann and the distinguished Belgian scientist, Peter Piot. When it was my turn to speak, I suggested that Sidibe would face the challenge to lead the struggle against AIDS into its third phase. Jonathan Mann alerted the world to the enormous challenge of AIDS. Peter Piot led UNAIDS into initiatives to make ARVs available to all in need. But this cannot go on at the present rate of spread. So Sidibe must somehow mobilise the world community to tackle the tricky issue of prevention. If that means explaining the AIDS paradox, this is now his challenge and responsibility. To persuade leaders that criminalisation is ineffective and counter-productive. To get fundamentalists to remove the laws against gay sex. To coerce the ignorant to empower and not arrest sex workers. To promote knowledge and protection in the place of ignorance, fear and stigma.

All this is a big ask. Pie in the sky, I hear you say? Yet already Michel Sidibe has embraced his challenge. Repeatedly in recent weeks, he has addressed the urgent need to change the laws on commercial sex work. The clock is ticking. Every day, hundreds of people are infected. Sidibe, with his self-confidence and energy, directs strategies to help reduce stigma, reform criminal laws, and promote awareness of the tactics that fail and those that work. As an African himself, perhaps Sidibe's voice will be heard where new policies matter most. On his shoulders rest the hopes of unknown millions. Just think of his burdens next time a day in the office gets you down.

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Image: Salvatore Zofrea, *Illawarra flame tree and bower bird*, 2008, hand coloured woodcut print on Kozo paper, 69 x 89 cm.

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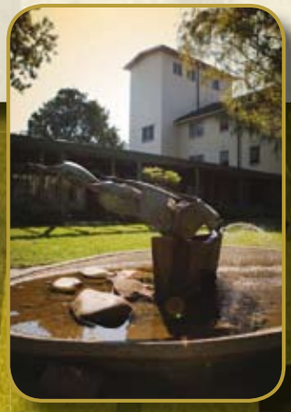


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