

# THE ANZAAS MERCURY

ANZAAS: Empowering the Community with Science

Issue No. 27, December 2005 ☞

## Editor's Edict



On his retirement from the Chair, we thank Paul Adam for his concrete leadership over the past turbulent era, and his stalwart essays in the Mercury. Now we welcome Mike Murray to the chair, see Perrin's Points. Paul continues to cogently report for us, along with Victor Bien (Media) and Peter Toomer (ANTENNA editor).

-Duncan Rouch

## Murray's Matters

Comment From The Chair  
By Mike MURRAY



Can ANZAAS learn from NYAS' success?

Recently in a letter of thanks from the President of the New York Academy of Sciences (NYAS) to NYAS members (referred to as 'Darwins') the President outlined the dramatic growth of the NYAS over the last three years. Individual memberships had passed 24,000 and had risen for twelve consecutive months. New alliances with Academic Institutions had continued to be made, not only with the 18 great academic institutions of the New York metropolitan area, but also with major academic institutions in other US states and other countries, **including in Sydney**. The number of partnerships the NYAS has with corporations and foundations is continuing to rise, and the first conference to be co-sponsored with an overseas academy had taken place and been very successful. Significantly, **the number of unique visitors to the NYAS website had passed 100,000 per month!**

He proceeded to analyse the underlying causes of this success in terms of the acute need for an Academy (for which we might substitute Association) which has the ability and desire to

bring the diverse and rich set of institutions, the leading scientists, the young investigators and members of the corporate, financial, government and philanthropic community together. He emphasises '---Thanks to the support of you and all your fellow Darwins, we have created initiative after initiative each of which has provided unique service to the scientific community and our lay communities with interest in science.'

In recent months NYAS has continued putting together cutting edge discussion groups in a *Frontiers of Science Program*. It has organised in addition exciting meetings on topics such as, human immunology, skeletal development and remodeling, the physiology of post-traumatic stress disorders, oligonucleide therapeutics and visual art and the brain. Over the coming months scientists will be enjoying conferences on follow-on biologics, resilience in children, the abdominal aortic aneurism, teaching evolution, and imaging and the ageing brain.

The recently appointed *NYAS Manager for Diversity* has taken

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Printed By TS Press, 140 Johnston Street, Fitzroy Vic 3065

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on the challenge of empowering women and underrepresented minorities through new programs entitled *Women Investigators Network*, and *Network for Minority Investigators*. Through network events outstanding women and men have given presentations of their work and been duly honoured.

Another initiative is '*Laureates of Tomorrow; Nobel Essay Competition*' in which small groups of outstanding students from New York City schools are being selected to attend the Nobel Prizewinners' ceremonies in Stockholm. In yet another initiative the Academy has set up a unique online gateway entitled *Science & the City* which provides worldwide audiences with an immense calendar of scientific events, science literary programs, learning opportunities, and technology resources. Our ANZAAS website will shortly provide a link to this online facility.

A number of major world cities, through their Mayors and University Leaders, are negotiating with the NYAS to establish similar bodies or Associations to more rapidly diffuse the exciting and sometimes controversial messages emanating from the world's laboratories and advanced industries to a wide audience of scientists and lay communities. In Australia we already have such a body; it just needs remodeling.

The NYAS has visions and objectives remarkably similar to those of ANZAAS. The two organisations serve a similar population base (although Australia's is more scattered). Like ANZAAS, the NYAS has a long history (founded in 1817). Like ANZAAS it fell upon hard times, but is now undergoing a dramatic resurgence. Unlike ANZAAS the NYAS annual subscription is \$US 1000! The question I might pose is; why is it that so many New Yorkers have recently flocked to the 'expensive' NYAS and so few Australians join the ranks of ANZAAS (at a mere \$A45)? If we in ANZAAS can gain a clear understanding of the answer to this question, we too can gird up our loins appropriately and follow the NYAS along the path to (in our case) enhancing our value to the Australian and NZ communities and be deserving of the renewed growth and prosperity that will inevitably follow.

I'd like to thank Curtis Clark, Deputy Chairman of the ANZAAS Council, and a Member of the NYAS, for drawing my attention to this dramatic recent rise in the fortunes of the NYAS.

*Mike Murray, Chair ANZAAS*

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## ANZAAS News

### Tasmanian Division

#### Science Teachers' Talent Search

By Pete SMITH

Each year the Tasmanian Division makes Teacher Awards in connection with the Tasmanian Science Talent Search schools competition staged by the Tasmanian Science Teachers Association. These awards recognise excellence in teaching at secondary school levels.

The awards for 2005 were presented by member Chris Forbes-Ewan, the Division's Northern Representative, at a ceremony in Launceston on the 19th. March, to the following:

Senior Level: Mrs. Anne Bourke, Marist Regional College, Burnie.

Intermediate: Ms. Louise Rose, Kings Meadows High School, Launceston.

Junior Level: Ms. Jane Dadson, Exeter High School, Exeter.

Each award includes: a framed certificate, a one-year membership of ANZAAS and a one-year subscription to "Australasian Science".

# The ANZAAS Debate - Herbal Remedies: Dangerous Medicine?



*The use of herbal medicines in Australia is widespread. While herbal remedies may offer certain health benefits, problems have resulted from toxicity of components, contamination with heavy metals, and adulteration with prescription drugs in overseas herbal products. Duncan Rouch reports on the safety issues around public use of herbal products for health purposes.*

Bestselling books perpetuate the myth that natural products such as herbs and other "dietary supplements" tend to be safer than conventional medicines.[0] Once relegated to

health food stores, these products now fill pharmacy and supermarket shelves. So-called natural substances are more popular than ever. In the USA, fueled by congressional passage of the Dietary Supplement Health and Education Act of 1994,[1] which deregulated the industry by limiting the role of the Food and Drug Administration (FDA), the popularity of dietary supplements has created a \$15-billion-a-year industry.

The quality of herbal medicines available to the public in Australia has been seriously questioned.[2] Research pharmacist Dr Andrew McLachlan, Sydney University, was studying the dangers of herbal medicines interacting with regular drugs, and to do that he needed to know exactly what was in the herbal products. He was surprised by what he found. Some of them did appear to be missing what he thought would be standard ingredients. The content variation was quite considerable, despite the fact that the label stated a particular amount of a particular dried herb was contained.

For the last ten years Professor Ron Wills, University of Newcastle has been analysing herbal medicines. He found enormous variations for 32 Echinacea products he tested. Wills said, "I think it was pretty disturbing at the time that we found that often there was about twenty percent of the products that we analyzed had very low levels of active constituents." In other words, for one in five Echinacea products there were no active ingredients.

In the firing line for improved control of herbal medicines is the Therapeutic Goods Administration (TGA). Dr John McEwen, Principal Medical Adviser for the TGA, answered, "I think it needs to be emphasised that Australia is probably further ahead than any other country in the world – and has been for some time. We more than a decade ago set up the requirements for listing more of herbal products. We took the view that these were generally low risk products provided they didn't have designated poisons in them." Nevertheless, products like Echinacea may not have contained designated poisons, but by listing them, the TGA legitimises them, and a multi-million dollar industry has developed around herbal products.

Philip Daffy, representing the Herbal industry, responded, "For Echinacea we still do not know what the active ingredient is and with most herbs there is not one active ingredient, you know it is normally a broad spectrum of components."

We may not know the active ingredients for sure, said Wills, but we have a good idea what they are. Wills tells us that it wasn't just Echinacea that had problems. For Valerian products they found 50% had low levels of the active

ingredients and 16 percent had none. In addition, Ginseng medicines had active ingredients but the amounts were highly variable.

One of the difficult things for modern herbal medicine is that it's come from a traditional medicine background...where there were no pills; just the herbs themselves were consumed... with very little processing. I guess one of the interesting things we found, states Wills, was that if you harvested it and handled it carefully and just left it sitting around so it dried naturally by itself and then stored the dried material you actually got very little loss of active constituents.

But these days the herbs are turned into tablets, teas and capsules...and that requires processing, which can destroy many - or all - of the active ingredients says Wills.

The problems could be even worse. Pesticides were found in some herbal products and in others one herb was substituted for another. Over all up to half the manufacturers may have serious problems.

Currently the products that are selling in the shop right we now have a large variability in the active ingredients. What do we do about that right now?

McEwan answers, "You have to improve the standard."

## Case study: A Chinese Herb That Causes Toxicity and Cancer

Seriously, evidence of an association between the use of a Chinese herb, *Aristolochia fangchi*, and urothelial cancer in a group of Belgian patients has been reported by European investigators.[3,10] This story began in the early 1990s, when a weight-reducing treatment that usually consisted of two Chinese herbs and appetite suppressants (fenfluramine and diethylpropion), as well as cascara, belladonna extract, and acetazolamide in some cases, was administered to women in a Belgian clinic over a period of one to two years.[4] By 1993, dozens of cases of rapidly progressive renal failure had been documented in this group of patients.[5]

The herbal preparations were supposed to contain *Stephania tetrandra* and *Magnolia officinalis*, but they actually contained aristolochic acid, which is derived from *A. fangchi*, a herb that is known to be nephrotoxic in laboratory animals. The presence of *A. fangchi* was not surprising, It is often substituted for *S. tetrandra*. The Chinese names sound similar and can be confused, resulting in misidentification. Moreover, a number of purportedly interchangeable herbs are sometimes referred to collectively as *mu tong*. [6] Since there is virtually no control over the quality of these products, it is not unusual not to know what is actually in herbal preparations and dietary supplements.

Not only is aristolochic acid nephrotoxic; it is also a potent carcinogen in laboratory animals.[7] In 1994, the first case of bladder cancer among the Belgian patients was reported. By 1999, 40 percent of 19 kidney-biopsy specimens from a group of these patients showed multifocal, high-grade, flat, transitional-cell carcinoma in situ.[8]

The European investigators followed a series of 105 patients with nephropathy who had received weight-- reducing pills containing *A. fangchi*. [3] End-stage renal failure had developed in 43 of these patients. Because of a growing suspicion that the risk of urothelial carcinoma was also increased in these patients, the investigators recommended prophylactic nephrectomy to the patients with nonfunctioning kidneys. Of

the 39 patients who agreed to undergo surgery, 18 (46 percent) had evidence of urothelial cancer, and all but 2 of the remaining 21 patients had evidence of mild to-moderate dysplasia.

Evidence that the use of *A. fangchi* caused cancer is not as strong as the proof that it causes kidney failure. However, the combined evidence cannot be ignored in the push for better regulation of herbal pharmaceutical remedies.

The United Kingdom banned the use of herbs that contain aristolochic acid in mid-1999 on the basis of two cases of renal failure associated with aristolochia from a source different from that in the Belgian cases.[6] Other countries, including Canada, Australia, and Germany, have also banned the use of these herbs. The finding of an association of *A. fangchi* with human urothelial tumors, even though not perfect, adds urgency to the need to reach a decision that should already have been obvious.



**Foxglove; a herbal source of the drug digitalis, used in orthodox medicine, but otherwise the plant is highly toxic.**

## Other Herbal Problems

The association of *A. fangchi* with urothelial carcinoma is not the first instance in which dietary supplements have caused potentially serious harm, although this is the strongest association of an herb with a cancer in humans. Among the other well-documented examples of adverse reactions are the association of germander with acute hepatitis, of comfrey with hepatic veno-occlusive disease, of yohimbe with seizures and renal failure, and of ephedra with death from cardiovascular causes. The use of amino acids, herbs, and a host of other supplements is more likely to arouse concern about public health than is the use of traditional vitamin and mineral supplements at reasonable potencies. Even with the use of conventional medicines, the cause of adverse effects that are not immediate and dramatic is hard to pinpoint. This is especially true for substances that are given outside the conventional health care setting, since there is no adequate system of reporting adverse events that may be associated with these products.[9]

The current scientific data on herbal health problems should persuade Governments to change the law to ensure the safety and efficacy of dietary supplements before more people are harmed.

In Australia the importation and dispensing of raw herbs are not effectively regulated or closely monitored by the Therapeutic Goods Administration (TGA). At present, raw herbs can be imported and dispensed legally over the counter without registration with the TGA. These herbs may not meet the health standards for herbal products.

## Recommendations

Best practice for herbal medicines in Australia requires understanding both the traditional use, such as in the Chinese medicine system, and modern orthodox medicine. There is a need for the Government to establish a quality testing system for raw herbs and their preparations and herbal products. This would detect any mislabelling or misidentification and the presence of undeclared components. Herbs with toxicities equivalent to prescription pharmaceutical drugs require a regulatory control system, such as a special schedule to enable registered practitioners to prescribe them under appropriate

monitoring. Herbal dispensers should have an adequate qualification for dispensing, which includes knowledge of both herbal medicine and modern pharmaceuticals.[11]

Medical practitioners and pharmacists should have sufficient knowledge of traditional Chinese medicine and herbal medicines to allow them to discuss issues and give advice to patients, and to identify and manage drug-herb interactions. Education programs such as short courses on modern herbal medicine or exposure to the subject in the undergraduate curriculum may be of benefit to healthcare practitioners.[11]

The government should also take its responsibility to safeguard public health by running educational campaigns to inform the public about the potential dangers of uncertified herbal remedies, and for people to seek professional advice at all times before taking herbal products. The public should take a prudent informed approach to the use of herbal products, instead of blindly relying on the warm fuzzy feeling engendered by the herbal industry.[12]

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# Climate Change Demands Better Water Management

By Don Alcock

Fresh water from rivers will be in even shorter supply as climate change gathers pace. Increasing temperatures will dramatically impact on the world's great rivers. Combined with population growth and more competition for water resources, rivers are becoming the new political battleground, according to recent international reports published by Princeton University and the United Nations Environment Programme (UNEP).

Climate change is now recognised as a real and significant worldwide trend which will present profound challenges to the world's water managers. Predicted changes are likely to fuel calls for a new generation of super-dams and canals to move water round the planet and once-great rivers like the Yellow in China, the Ganges and Indus in India, and the Rio Grande on the border of Mexico and the United States now regularly dry up or clog up, with obvious consequences for aquatic species, and human health and sanitation.

Worldwide, freshwater shortages are likely to trigger increased environmental damage over the next 15 years, according to the United Nations Environment Programme report of the world's waters. Falls in river flows, rising salinity of estuaries, loss of fish and aquatic plant species and reductions in sediments to the coast are expected to rise in many areas of the globe by 2020. These in turn will intensify farmland losses, food insecurity and damage to fisheries along with rises in malnutrition and disease.

So what can we do? The complex issue of climate change and fresh water from rivers will be tackled at this year's International River *symposium*, which Australia hosts each year in Brisbane. The theme, '*Managing rivers with climate change and expanding populations*' looks at the challenge of meeting human needs for water under changing climatic conditions.

Highlights include a discussion forum on the pros and cons of desalination versus water reuse.

River *symposium* attracts leading water experts from around the world and Brisbane's Convention Centre will be buzzing from 4 - 7 September 2006 with new ideas, policies, agreements, debates and technology to address some of the world's most pressing water related issues.

The 2006 International River *symposium* will run 4 - 7 September 2006, is open to everyone and early bird registrations are now available. For information, program outline and booking visit: [www.riversymposium.com](http://www.riversymposium.com) advances.

## Tackling the Waste Mountain

By Sarah BARTLETT

It is estimated that each Australian leaves 360 kg of waste per year for collection by councils. For a family of four that's enough to fill three of more large four wheel drive vehicles.

"In our current consumer economy, more than 90% of gross domestic product goes to form waste and about 80% of all saleable products end up as waste, on average within just six months", according to Dr. John White, Chairman of waste processing company, Global Renewables (subsidiary company of GRB Limited).

In a world of declining natural resources and over consumption the management of waste is a rapidly expanding industry and an increasing challenge for governments and legislators around the world.

"The forecast demand for capital expenditure in NSW on waste infrastructure alone is about AUS\$600m over the next 5 years", according to Paul Howlett, Chair of Enviro 06 Conference & Exhibition (run May 2006, Melbourne).

With NSW accounting for some 35% of the Australian market, this estimate could be extrapolated to roughly 2 billion over the next 10 years for waste management infrastructure nationally.

This figure, based on in-house estimates by Wright Corporate Strategy, represents the amount that needs to be spent if all state governments are to meet published targets for waste minimisation.

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# Perrin's Points

NOTICES TO MEMBERS FROM THE HON. SECRETARY

Contact details for the ANZAAS Council and office-bearers for 2006 are shown on the next page.

Report from the AGM  
2005



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# Media Report

By Victor BIEN

## UK Royal Society's webcast facility



As I briefly mentioned at the end of the last report the UK Royal Society has been conducting an onslaught in public science education over the internet. See <http://www.royalsoc.ac.uk/> Their endeavours first came to my attention when I was pursuing a Google search about climate search and I

found that the RS had been vigorously and persistently asserting fossil fuel induced climate change is real.

Their complete list of public lecture programs available by webcast is as follows:

**Biology & Climate Science-** Julie Ahringer: Genes, worms and the new genetics; Fran Balkwill: A silent killer?; Alan Cowey: Magnetic brain stimulation; Tony Crowther: Microscopy goes cold; Richard Darton: Measuring our Future: the role of Sustainability Metrics; Eric Lander: Beyond the human genome project; Lord Oxburgh: The right climate for business; Martin Nowak: Why we cooperate; Daniel Pauly - Trends in global fisheries; Salvador Mondada: Adventures in vascular biology; Daniel Wolpert: How the brain controls the body

**Chemistry-** Carol Robinson: Finding the right balance; Nick Ross: Exploring nanotechnologies discussion

**Geology-** Chris Stringer: New views on human origins

**Mathematics-**John D Barrow: Not just about numbers

**Physics-**Tim Berners-Lee: The future of the world wide web; Christine Davies: The quandary of the quark; Athene Donald: The mesoscopic world; George Ellis: Science, complexity and the nature of existence; Thebe Mudepe - Cosmic Africa; Sandy Popescu: What is quantum non-locality?; Colin Pillinger: Beagle 2 the next generation; Nick Ross:

Exploring nanotechnologies discussion; David Scott: The human exploration of Mars; Wilson Sibbett: Optical science in the fast lane

**President's Address-**Lord May: Presidential address 2004; Lord May: Presidential address 2005

**History of Science / Science Literature-** David Attenborough: Perception, deception and reality; Bill Bryson: A short history of nearly everything; Jarad Diamond:How societies choose to fail or survive; Chaired by Sián Ede: Wild Reckonings; Einstein vs Newton debate; John Gribbin: The roots of the 'Royal' and the Scottish connection; Ben Okri FRSL & Nancy Rothwell FRS: Beauty in science and literature; Martin Rees: Einstein's legacy as scientist and icon

Tim Smit: A new Eden; John Sulston and Sydney Brenner: Nobel Lives

This aggregated list mixes their "Public lecture series" and their "Prize lecture series".

The most interesting one for a media report point of view is David Attenborough's. Here he shows how certain "deceptions" are justifiable. An example was a clip showing a polar bear

rearing its young on a snowy slope. The images were taken with an incredible 2000 mm telephoto lens. However, while visual technology was so incredible there is no matching audio technology. The clip showed the mother teaching its young how to get about on the snow slope. To show that in one of his TV shows without any sound would have severely degraded the impact of the message. So the clip was shown with the "sound" generated by grinding custard powder in a silk stocking! With many such examples he showed how such deception was justified if the presenter maintains moral integrity with the audience. Clearly less scrupulous presenters could easily intentionally mislead.



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