

THE ANZAAS MERCURY

ANZAAS: Empowering the Community with Science

∞ Issue No. 21, June 2004 ☞

Editor's Edict

Please enjoy this issue, packed with news about S&T issues. In **ANZAAS Debate** we reveal the hidden truth behind the Spanish 'Olive Oil' Diaster of 1981, and the key lessons for keeping scientists' integrity. We also present news from ANZAAS and other interesting events. Also do not miss the bright breezy ANTENNA.

-Duncan Rouch

Adam's Airing



Comment From The Chair
By Paul ADAM

Push To Reinvent CRCs

The development of Co-operative Research Centres has had a major influence on the conduct and funding of scientific research in Australia. The CRC model was an Australian initiative and from many perspectives has been a success. Linkages

between universities and partners have been developed and nurtured – hopefully leading to lasting relationships extending beyond the initial CRCs. The artificial barrier between (so-called) pure and applied research has started to breakdown, successful outcomes have generated new industrial processes and products and the talent for innovation amongst Australian scientists has been tapped.

Nevertheless, all is not rosy. "The Australian" of 31 March 2004 reported concerns about the requirement for universities to contribute towards the costs of CRCs (and other types of project) either directly or in kind. Unfortunately resources are scarce in many universities, and there is a distinct possibility that university administrations may be reluctant to enter into new partnership proposals because of the implications for core budgets. The Federal Government is always anxious to deny that there is a crisis in university funding, but there is little doubt that many universities have very limited scope for discretionary funding.

If an institution decides to support a particular CRC, then this is increasingly likely to limit opportunities for funding other programs. In the run-up to the Federal election, with large sums mysteriously appearing to support new electorally attractive (at least that is the intention) programs then may be the bidding war between the government and opposition might yield an increase in core funding for the university sector.

Concerns have also been expressed within government about public benefit science in CRCs, with the suggestion that CRCs be limited to fields where there are industrial partners. In terms of the original CRC model there is logic in this. However, there are important areas of research, with clear public good outcomes, that require cross-institutional collaboration (bush fire research is an obvious example). If the CRC model is not be expanded to encompass non-commercial science, then another structure will need to be developed.

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Environmental Monitoring

One of the other areas of public interest science which does not fit well in current funding models is long-term monitoring of the environment. We do not have a good track record of an organized program in this area. There are important examples of very long-term monitoring of particular sites but these have largely been the result of serendipity and the enthusiasm of particular individuals. With very short funding cycles, and a need to justify funding in terms of immediate outcomes it is unlikely that individuals could conduct monitoring. The old

haphazard model is also very inefficient and left many important questions unaddressed. If governments are serious about, for example, addressing long-term management of biodiversity, then monitoring must be properly funded and maintained, rather than being the object of well meaning, but unproductive, arm waving.

*I would welcome any comments and suggestions for issues that could be addressed -e-mail: chair@anzaas.org.au,
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ANZAAS News

Youth ANZAAS

Youth ANZAAS 2004 is on the way to be a great success. All student places have been filled from all states and territories.

Science Talks in Melbourne

The Victorian division has run two interesting presentations recently:

- Parental care in Leeches: By Dr Fred Govedich, Monash University & ANZAAS, on 28th April.
- Visualising microscopic biology with Haollywood 3D animation techniques: Drew Berry, Walter and Eliza Institute of Medical Research, on 26th May.

For more information about these talks or future activities in Victoria, please contact Fred Govedich, tel: (03) 9905 5603, or email: Fredric.Govedich@sci.monash.edu.au.

Dear Divisions

This is your newsletter, please send us reports on your activities. Write in any style you like, but preferably in newsworthy form, like a newspaper.

Email your reports to newsletter_editor@anzaas.org.au, or post to the general secretary, see page 7.

The ANZAAS Debate - Saving Scientific Independence: Lessons from The Spanish “Cooking Oil” Disaster

The independence of scientists is under growing attack, as Universities and government research organizations, like the NIH in the USA and CSIRO in Australia, have been increasingly forced to become more reliant on commercial funding to perform scientific research. In particular the effect of close links between drug companies and medical research on the integrity of medical research is of continuing concern (1,2,3,4).

While no serious disaster has yet resulted from these attacks on scientific independence we can look back to an event twenty three years ago in Spain where scientific integrity was disastrously compromised to see why it is critical to safeguard scientific independence(5). Here Duncan ROUGH reports.

Twenty three years ago, 1,000 people died in an epidemic that spread across Spain. Poisoned cooking oil was (and is still) blamed – a bogus explanation that suited both government and industrial vested interests. The official story was, and to a continuing extent is, blindly supported by the scientific establishment (e.g., 6).

Start of an Epidemic

The epidemic is officially deemed to have started on May 1st 1981, when an eight-year-old boy, Jaime Vaquero Garcia, suddenly fell ill and died in his mother's arms on the way to La Paz children's hospital in Madrid. Learning that his five siblings were also ill, doctors had them all brought in and put one of the girls into intensive care. The four other children were transferred to the Hospital del Rey, Madrid's prestigious clinic for infectious diseases, where doctors began treating them for "atypical pneumonia".

The Vaquero family proved merely the first of many. It seemed to be mainly women and children who were affected. The initial symptoms were flu-like: fever and breathing difficulties, vomiting and nausea, although patients soon developed a pulmonary oedema (the build-up of fluid in the lungs), skin rashes and muscle pain. The epidemic was national news.

Food Poisoning

The hospitals director, Dr Antonio Muro y Fernandez-Cavada told the media that he believed it was due to food poisoning, adding that the foodstuff was marketed "via an alternative route". He was certain of this because the casualties were all coming from the apartment blocks of the communities and towns surrounding the capital; almost no one from Madrid itself appeared to be affected. Muro brought together relatives of those afflicted with the mystery illness and told them to work out exactly what the victims may have eaten that they, the unaffected family members, may not have eaten. In half an hour, they had an answer: salads.

Start Of The Cover Up

On May 12, Dr Angel Peralta, the head of the endocrinology department at La Paz hospital, pointed out in a newspaper article that the symptoms of the illness were best explained by "poisoning by organo-phosphates". The following day, he received a telephone call from the health ministry, ordering

him to say nothing about the epidemic, and certainly nothing about organo-phosphorous poisoning.

Investigator Fired

Muro believed that the contaminated foodstuff was being sold at the local weekly street markets, the mercadillos, which set up in different towns on different days. On this basis, he predicted where the illness would strike next. He was proved right, but this was scant consolation for the fact that he was suddenly informed that he was relieved of his duties as hospital director, with immediate effect.

Oil Samples

Muro's dismissal at least enabled him to carry out his own first-hand investigations. He patrolled the mercadillos and noticed the popularity and cheapness of large, unlabelled plastic containers of cooking oil.

Immediately, he and his colleagues, one of whom was Dr Vicente Granero More, went to the houses of affected families and removed the containers of oil that they had been using when they fell ill. They carefully labelled them, sent samples of each to the government's main laboratory at Majadahonda, just outside Madrid, and

awaited the results.

“It's The Oil”

Dr Juan Tabuenca Oliver, director of the Hospital Infantil de Niño Jesus, told the government that he'd found the cause of the epidemic. He claimed he had asked 210 of the sick children in his care, and they all replied that they had consumed cooking oil (7).

After, it seems, some initial hesitation, the government accepted his theory. On June 10, an official announcement was made on late-night television, informing the public that the epidemic was caused by contaminated cooking oil. Almost immediately, the panic subsided. The hospitals remained full of victims, but new admissions dropped sharply. The situation seemed, at least, under control.

“It's not the Oil”

Yet the government's announcement had been watched with stunned disbelief by Muro and his colleagues. Only the previous day, on June 9, they had obtained the results of the tests on their own, precise oil samples. These showed that, although none was the pure olive oil that the vendor had no doubt claimed it to be, almost all the oils had different constituents. Such a variety of oils probably could not account for one specific illness.

Cheap Oil

The cooking oil theory was superficially persuasive. To protect its native olive oil industry, the Spanish government tried to prevent imports of the much cheaper rapeseed oil, then being put to widespread use throughout the European Community (which Spain did not join until 1986).

“...scientists should be held accountable for their actions, or non-actions, by law, as well as by ethical and moral paradigms.”

Imports of rapeseed oil were allowed only for industrial use; the oil first had to be made inedible through the addition of aniline. Streetwise entrepreneurs simply imported the cheaper oil anyway. The more scrupulous among them then removed the aniline; the others didn't bother. The illness was therefore attributed to aniline poisoning. It became colloquially known as la colza (which is Spanish for "rapeseed"), and officially as Toxic Oil Syndrome (TOS). A number of the more high-profile oil merchants were arrested.

Conviction of Scapegoats

The trial of the oil merchants began in March 1987. At the end of the two-year trial in 1989, the judges themselves stressed that the toxin in the oil was "still unknown". This somewhat fundamental difficulty did not prevent them from handing down long prison terms to the oil merchants, who were convicted, in effect, of causing the epidemic.

Fresh Enquiry Damned Oil Explanation

The Spanish government recruited some of the country's leading epidemiologists to head a fresh commission of inquiry. Among those chosen were Dr Javier Martinez Ruiz and Dr Maria Clavera Ortiz, a husband-and-wife team from Barcelona. They set about a rigorous examination of the official information. The results shocked them. Martinez looked at the pattern of admissions to hospitals and realised that the epidemic had peaked at the end of May. The incidence curve went down at least 10 days before the government's June 10 broadcast, and about a month before the withdrawal of the oil. In fact, the announcement that oil was to blame had had no effect on the course of the epidemic.

Dr Maria Clavera Ortiz had examined the patterns of distribution of the suspect oil, which had come across the border from France. She realised that vast quantities of the oil were sold in regions (notably Catalonia) where there had not been a single case of illness. And they subsequently learned that the government was already fully aware of this.

At the time of the epidemic, the government had created a new post of secretary of state for consumer affairs at cabinet level. Chosen for this appointment was a rising lawyer and economist, Enrique Martinez de Genique.

Genique himself had drawn up maps of the distribution of the oil and the pattern of illness. He realised that there was no correlation between the two and, accordingly, that the oil was not the cause of the epidemic. After presenting his findings to the health ministry, he was sacked from his government post, and soon decided to retire from politics altogether. He emphasised that he had never regretted what he did: "I had very grave doubts [about the government's stance on the epidemic] and I was morally and ethically obliged to voice them." Martinez and Clavera, too, were fired.

Maria Concepcion Navarro

Many victims were adamant that they had never purchased the oil. One woman used only supplies from the olive groves of her relatives in Andalusia, yet she was seriously disabled by the illness. Perhaps the best authenticated example was the case of Maria Concepcion Navarro, a young lawyer in Madrid who fell ill, became progressively worse and died in August 1982. Her symptoms were exactly the same as those of other fatalities of

la colza and she was put on the official roll of TOS victims - despite the fact that her husband, also a lawyer, stressed that they had only ever used the most reputable cooking oils.

Destroying The Truth

How were the statistics of the epidemic compiled? If victims - afectados - or their families agreed that they had used the oil, their names were added to the official list; if they asserted that they had never had the oil, their names were excluded. However, the health ministry had made it known that only those whose names appeared on the official list would qualify for government compensation, so there was a clear incentive for afectados to say that they had used the oil.

Developments like this artificially buttressed the government's position and made it almost impossible to produce an accurate assessment of the epidemic.

Tomatoes: Insecticide Contamination

Having eliminated the cooking oil, Muro and his colleagues turned their attention to other salad products. Speaking to market stallholders, lorry drivers and around 4,000-5,000 affected families, they concluded that, without any doubt, the contaminated foodstuff was tomatoes, and it was the pesticides on them that were responsible for the epidemic. The organo-phosphorous chemicals would indeed cause the range of symptoms observed by clinicians.

The tomatoes, they established, had come from Almeria, in the south-east corner of Spain. Once a desert area, this was not fit for crop-growing until the discovery of underground water in the 1970s helped to transform it into an agricultural success story. Fruit and vegetables were forced into rapid growth under long tunnels of plastic sheeting. Some farmers got three, or even four, crops a year.

This agricultural boom was made possible only through the application of copious quantities of chemicals: nutrients, fertilisers and pesticides.

Although exactly what happened may never be known, it is likely that one farmer had used the chemicals too liberally, or had harvested the crop too quickly after applying them. Neither would have been surprising. Some of the farmers were illiterate and would have had difficulty with

the instructions for use on the containers of chemicals.

Rewriting History

What of the Government's epidemiology report that WHO described in 1992 as a "comprehensive and exacting epidemiological studies, subjected to critical independent assessment"? From first-hand inquiries, Guardian journalist Bob Woffinden established that there was not a single case in which the family's history corresponded with what was written in the epidemiological reports. Sometimes the differences were slight; sometimes the reports bore no relation to what had actually happened. In one sense, this was not surprising; while some families did recall having been interviewed by officials at the time, others insisted that they were never questioned at all.

Scientific Tests?

Nor was the oil theory underpinned by any laboratory science. In the years since the 1981 outbreak, the suspect oils have been analysed in leading laboratories throughout the world. No chemical, or contaminant, that would account for the



Tomatoes in the frame. Photo courtesy of T.A. Zitter, Cornell University, Ithaca, NY

symptoms observed in the afectados has ever been found. Aniline - which was blamed for the epidemic - is poisonous only in much greater quantities than were present in the oil and, in any case, the symptoms of aniline poisoning are quite different from those of the afectados.

In order to demonstrate that the oil had caused the illness, government scientists needed to be able to show, that,

- Families who had bought the oil were affected, whereas those who hadn't were not;
- The aniline in the oil was indeed poisonous and that the victims were suffering from aniline poisoning;
- What had changed in the manufacturing process to cause the oil suddenly to become so poisonous (bearing in mind that such commercial cooking oil fraud had been widespread for years).

To this day, none of these basic conditions has been met.

Narrow Political Imperatives

With the attempted coup in the Spanish parliament of February 1981 was still fresh in the public mind, it was vital that ministers were seen to be in control. Spanish democracy itself depended on the government being seen to deal capably with this national tragedy.

Moreover, at that time, Almeria represented an economic miracle for Spain, providing produce that went to all parts of Europe. Had it been frankly acknowledged that all those deaths had been caused by pesticides on tomatoes, the effect on the entire Spanish export trade would have been incalculable.

Spain was also working towards becoming a member of the European Union, achieved in 1986. So it was useful to blame imported oil and not its own agricultural kingdom, which it was hoped would attract large subsidies from the Union.

Costs and Lessons

Given the likelihood of organophosphate contamination, it can be inferred that Spanish government authorities were aware of it and took steps in secret to prevent it reoccurring. Nevertheless, the consequences of the cover-up were appalling. Many died unnecessarily. Thousands more, children among them, were left to endure a lifetime of pain and physical impairment that perhaps could have been avoided if they had received the care and treatment they needed as early as possible. The great investigator Muro died in 1985.

The Spanish colza is not just one of the great tragedies of the last century, it is also one of the great scandals. The principal

scientific premise - that evidence should be gathered and, on that basis, a conclusion reached - appeared to have been disastrously reversed: a conclusion had been reached, and then the evidence manipulated in order to support that invalid conclusion.

Lack of integrity in both the Spanish government and scientific establishment of the time along with vested interests in both government and industry were key factors in both causing the disaster and failing to correctly respond to it, resulting in the terrific human cost. Isolated whistle blowers like Muro could only tell the truth, but not save people's lives.

Similarly the genesis of BSE disease in England during the 1980's, which led to a severe crisis in the 1990's, also involved failure of the scientific establishment to act. Such action might have prevented the crisis, or at least reduced its severity (8).

The official response to the Spanish colza can be seen as an extreme case of multiple failures of responsibilities. Nevertheless this case provides a telling example of the disastrous outcomes that can follow the compromising of scientific integrity.

The main lesson from this saga is that it is critical that scientists in general maintain their independence. Moreover scientists should be held accountable for their actions, or non-actions, by law, as well as by ethical and moral paradigms.

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News And Analysis

Lets Be Smart With Sustainable Agriculture Know-How

By Snow BARLOW

The steady GDP growth in Australia, through a number of global business cycles and perturbations, is the envy of the world and has largely resulted from micro-economic reforms carried out by successive governments. However there is good evidence that we, as a nation, have almost exhausted the economic growth we can achieve through efficiencies in traditional industries.

To maintain this competitive edge we must explore ways of working smarter rather than just harder if we want our economy to maintain its competitive edge. This would enable society to pursue social and environmental benefits as well as economic ones.

Currently Australia's gross expenditure in R & D (GERD) lags significantly behind the OECD average, largely because of lower business investment. More importantly the gap appears to be widening rather than narrowing.

Exceptions to poor R&D investment in Australia are primary industries, namely within the agriculture and mining sectors. Investment in R & D in these sectors has increased in the past 20 years. In agriculture robust investment followed the passing of the PIERD Act (1985) which formalised the industry levy system and ultimately established the Rural Industries R & D Corporations (RIRCs). This investment has greatly assisted agricultural industries to remain globally competitive on a playing field that is rarely level.

It is now time for Australia's primary industries to lead a second wave of R & D investment to drive the innovation necessary to ensure that our economy maintains this competitive edge in the face of the challenge to generate sustainable practices and associated technology and business opportunities. Currently, government matching funds to rural industry R & D investment are capped at 0.5 per cent of Gross

Value Product. Isn't it time this cap was reviewed in order to encourage further industry investment?

Extra R & D investment in primary industries may additionally stimulate and assist innovation in the service industries that serve these primary industries. The high tech and smart products of these service industries have the potential to be as valuable in export earnings as the commodities produced by the industries they serve. In many cases these industries operate in regional Australia and encompass environmental management and services that assist in our quest for sustainable landscape use.

In the next phase of *Backing Australia's Ability*, currently in preparation, it will be important to recognise the innovative capacity of Australia's primary industries and build on it to ensure that the nation achieves the R & D investment necessary to drive our economy. -Professor Snow Barlow is President of the Federation of Australian Scientific and Technological Societies (FASTS) and Head of the School of Agricultural and Food Systems, University of Melbourne.

Improving Irrigation Practice

By Duncan ROUCH

A project funded by the Sugar Research and Development Corporation (SRDC) found that sugarcane can access water late in the growing season from deeper in the soil than previously thought, particularly when that soil is deep and friable. The project was conducted for SRDC by Dr Geoff Inman-Bamber of CSIRO Sustainable Ecosystems.

According to Dr Inman-Bamber, the project showed that when soil is moist following the wet season, there is no increase in sugar yield from irrigation.

"In fact, in experiments conducted in Burdekin, sugar yield increased by up to 3.6 tonne per hectare late in the season when the soil was relatively dry," says Dr Inman-Bamber. "This increase in sugar probably occurred because the plants

produced sucrose rather than new stalk growth." Dr Inman-Bamber's studies have shown that the Relative Stalk Elongation Rate (RSER) can decline by up to 70 per cent without a loss in sugar yield, despite a loss of cane yield.

"The project results suggest that sugar yield can be maximised by withholding irrigation until the number of green leaves on the cane starts to decline," he says. "In the dry-down stage, the crop should be harvested for maximum sugar yield when 3 or 4 leaves per stalk have died." Dr Inman-Bamber says his project should lead to a reduced use of irrigation water without a reduction in sugar yield.

His four key recommendations for sugarcane farmers are:

- 1) Following wet season rains reduce irrigation for the remainder of the crop cycle;
- 2) Reduce irrigation following crop lodging (when the crop falls over);
- 3) Reduce irrigation later in the season on deep soils;
- 4) Irrigate when the stalk elongation rate declines to one third, rather than half, of the elongation rate when the plants are in moist soil.

The project, conducted between 1998 and 2002, was completed in conjunction with related studies in the Ord River district. It's produced tables of best-bet irrigation schedules for specific soil types based on crop responses to water stress and soil water holding capacity. In addition, it's enabled a water balance spreadsheet to be developed for specific cane blocks. A similar irrigation scheduling system is being used by plantation managers in Swaziland with significant savings in water.

Dr Inman-Bamber says growers will need to see convincing demonstrations of these findings before revising their irrigation schedules and that's the goal of a new SRDC project.

"We're now moving from case studies to a whole of industry approach," he says. "We hope the entire industry will adopt the new standards for irrigation that we've developed in this project."

Science Poem: by Duncan Rouch

Heisenberg

Werner Heisenberg (1901-1976)

On this death bed I do not disquietly request redemption
I the matrix mechanic that sailed secrets of the atom
Add the principle that sets us voyaging in a bright sea of doubt
My guiding beacon I have followed even to treacherous rocks

World War II but all I want to be is the nuclear scientist
This heart hums with hunger to delve deep shadows of the nucleus
You Bohr more German than I in your view of 1941
How could this one meeting destroy friendship deep as the Baltic Sea?

Hazily I query the morality of nuclear weapons
Was it self-doubt that told you I must be a Nazi acolyte?
That incendiary guilt of the atomic bomb is not mine
Yet I am enchained as the amoral pariah of this dark time

How could I claim Unified Field Theory when Einstein not?
This obstreperous ego soars like the moon over savage sea
Yet I push with full success to oppose German nuclear weapons
Now gliding as a twilight neutron through a wistful solar wind

*Duncan Rouch
11-2-03*

Perrin's Points

NOTICES TO MEMBERS FROM THE HON. SECRETARY



SUBSCRIPTIONS

Members are reminded that their subscriptions are **now due**. Following a decision at the AGM, the GST on renewal subscriptions or new subscriptions will be again be absorbed for this coming year and the position reviewed in June

2005. Therefore subscription rates remain as follows:

Ordinary Members:	\$45
Retired/Concession Members:	\$35
Student Members:	\$20

Renewals of all categories of subscription are due on **1st July** for the **2004/2005** financial year.

PLEASE USE THE **GREY** SUBSCRIPTION RENEWAL FORM ALREADY SENT TO YOU

Members are reminded that ANZAAS provides for subscription renewal by credit card, [**not AMEX or Diners!**] although this facility does NOT provide for telephone renewals as we would be required to place \$5000 on deposit at the bank to underwrite non-signature transactions.

It is hoped that in the near future we shall have put into place a facility on our upgraded web-site which will allow members to renew via totally electronic means, with new members enrolling via the web-site.

DIVISIONAL MEETINGS – Members are urged to support Divisional meetings of all kinds, and to particularly encourage the younger members to organise and participate in Divisional activities. It is crucial to the long-term survival of ANZAAS as a credible entity that the younger members begin to be brought into the management of the Association.

Divisional meetings can be good recruiting grounds for new members AS THE VICTORIAN DIVISION HAS DEMONSTRATED DURING THE PAST YEAR!

OFFICERS OF THE ASSOCIATION – The Constitution of the Association requires that the prescribed Offices shall fall vacant after a term of three years. The incumbent officeholders can only offer themselves for re-election provided that they have not held the office for two consecutive terms.

This clause means that the Offices of:

Chairman

Deputy Chairman

Secretary

Member-at-large

will fall vacant at the Annual General Meeting scheduled for **November 2004**.

The clause also means that the present incumbents **CANNOT OFFER THEMSELVES FOR RE-ELECTION for the positions that they currently hold**

Members are urged to give very serious thought to offering themselves or nominating others to fill the vacancies. The very future of ANZAAS requires early thought on this important matter.

The present incumbents are:

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IMPORTANT INFORMATION!
AS FROM FRIDAY 25th JUNE
2004, THE HEAD OFFICE
WILL BE OPEN ON MONDAY
AND WEDNESDAY
MORNINGS AND ALTERNATE
THURSDAY AND FRIDAY

Media Report

By Victor BIEN

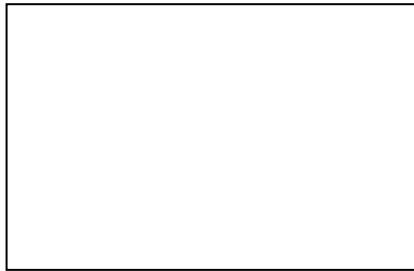
Snazzy Science Program for Kids



Channel Ten runs a program named Totally Wild, 4 - 4:30 pm Mondays to Thursdays. The format is lots of short breezy grabs but nevertheless informative with good scientific content. It has lots of interspersed advertisements but includes some which are educationally relevant to the target audience.

The topics covered in the few episodes

I watched were: Crocodiles, birds of prey, fashion designer, traffic lights, scuba diving and sharks, black neck stork the "Jabaru", student picture drawing artwork, grey nurse sharks, atmospheric methane rise slowing, thunder and lightning, visit to a CSIRO Centre about RAM jets, mazes, museums focusing on giant sea lice, ventriloquism, lizards, unicycle sports



mountain riding, baby sea water crocodiles, the dreadful annual seal hunt in Canada, Stevens and Thorpe, why forests are special, smells, wind farms, Reptile Park - casuari babies, survey of Lane Cove National Park, bell frogs, Dingo carer, pontoon for tourists at the Barrier Reef, model submarine, "Assistant" dogs, African Kudus, and Tandem Boarding. Each program also has a science related quiz.

The program is full of action graphics, jazzy sounds and fast moving themes which I found rather jarring but that probably shows how old I'm getting :-). It has a huge production team, feature good looking presenters and lots of cooperating organisations. One edition featured the cooperation of the CSIRO's Double Helix Club. Commercial enterprises are promoted as part and parcel of relevant segments. The two I noted were Australian Reptile Park and Featherdale Wildlife Park. A prominent advertisement is to an educational "Reading Writing Hotline" a project managed by TAFE NSW.

Their web site is www.literacyline.edu.au. Channel Ten's web site is www.ten.com.au.

If undeliverable, please return to:
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