In their early years children are knowledge junkies, questioning everything in their view, though exhibiting little skepticism. Most never learn to distinguish between inquisitiveness and credulity. Those who do either come to a bad end or become professional skeptics.
Michael Shermer

Pharmaceuticals from nature

Dream triggers in the rocks

Complementary medicine policy

Counselling: worse than the disease

Intelligent Design

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editorial

The Wedge's thin edge gets blunted

THE decision by Judge John Jones ruling that the promotion of Intelligent Design (ID) in schools is a violation of the constitutional ban on teaching religion, is at least a temporary victory for scientific integrity (Newsfront, p10). Previous attempts to get creationism into the American classroom have been more ambitious, notably a Louisiana act which would have mandated for biblical literalism to be granted equal time alongside evolutionary theory, finally struck down in a majority Supreme Court decision in 1987. The proposal in Dover, Pennsylvania, was modest by comparison. It required that teachers read a 159-word statement declaring evolution "a theory ... [t]he theory is not a fact", and stating that ID is "an explanation of the origin of life that differs from Darwin's view." The book, Of Pandas and People, was recommended for students who wished to understand what ID involves.

But this was, very literally, the thin edge of the Wedge. The Wedge is the name given to the strategy promoted by the Discovery Institute's Center for the Renewal of Science and Culture (CRSC), the group at the forefront of the ID movement. Just as a solid log can be split by a small wedge, they argue, so can the apparently solid edifice of materialist, naturalist science (and the secular worldview they say it underpins) be brought down by a small group applying pressure at its weakest points.

To date the CRSC has been very effective at publishing books, running conferences, and placing their affiliates in positions at reputable universities, but in the only field that can give them scientific credibility, namely research and publication in refereed journals, they have failed utterly. Despite their insistence that ID is a scientific theory it has yet to generate any testable hypotheses or research programme. As Judge Jones correctly concluded, the movement is fundamentally religious in nature.

This will only be a temporary setback for the ID movement, which continues to advance on other fronts (eg in Kansas, see Newsfront). Nor is this country immune; 500 resource kits from the CRSC were distributed to schools in August. As Royal Society education manager Peter Spratt has said, these could be used by an informed and knowledgeable teacher to engage students in a stimulating lesson about the nature of science. My secondary school biology teacher held a very successful session following a visit to our school by American creationist Duane Gish, so that the net outcome of Gish's visit was to make it clear to most that creationism was nonsense. But it is doubtful whether many of our teachers have the background to do this effectively. In many cases the best that can be hoped is that these resource kits gather dust.

David Riddell

Natural products chemistry – the road from nature to pharmaceutical

Joanna Wojnar

Many pharmaceuticals originate from nature, but their development is very different from that of so-called natural health products. This article was originally presented at the 2005 Skeptics Conference.

THE field of natural products chemistry deals with the scientific study of chemicals isolated from living organisms. This can be anything from isolating indigo dye from woad, distilling lavender oil from the lavender plant, working with plant oils and animal fats to make soap, to trying to find the active ingredient in a plant extract that reduces fever.

Interest in compounds from living organisms dates back to the beginnings of civilisation. More recently it also gave birth to what we now call 'organic chemistry'. Initially, organic chemistry *was* natural products chemistry, when people thought that carbon containing molecules were imbued with a 'vital force' and could *only* be made by living organisms – hence the name 'organic'. Friedrich Wöhler shattered that idea in 1828 when he became the first to make urea (an organic molecule) from inorganic precursors. Now we define organic chemistry simply as the chemistry of carbon containing compounds.

Unfortunately this mystical feeling that "natural" things are somehow better, or special, has survived till today, and many people are still convinced that "it's natural, so it's got to be good!" When dealing with natural substances that have biological activity, one must ask *why* they have any physiological effect. The answer is chemical defense: plants that do not have thorns, for example, have evolved chemical substances to poison animals that would otherwise eat them. The 'natural' effect of any herbal product then, is to make the user sick! We should not be talking about 'natural is good', but about chemical warfare.

Friedrich Wöhler, the founder of organic chemistry

Chemical warfare

The mould *Penicillium notatum* produces and secretes an antibiotic, a compound that inhibits bacteria that could compete with it for food or resources. This is chemical warfare on the microscale, a life and death battle for survival between the mould and its enemy. The mould certainly does not make the antibiotic for the benefit of mankind – any beneficial effect to us is an accidental advantage. But we can certainly make good use of that! The antibiotic in question is of course penicillin, the first discovered antibiotic. It has revolutionised medical treatment of bacterial infections and earned its discoverers Sir Alexander Fleming, Ernst Chain and Sir Howard Florey the 1945 Nobel Prize in Medicine.

We certainly exploit this type of biological activity to our great advantage. Natural products, or compounds derived from natural products, comprise the majority of pharmaceuticals in use today. So what is the difference between them and

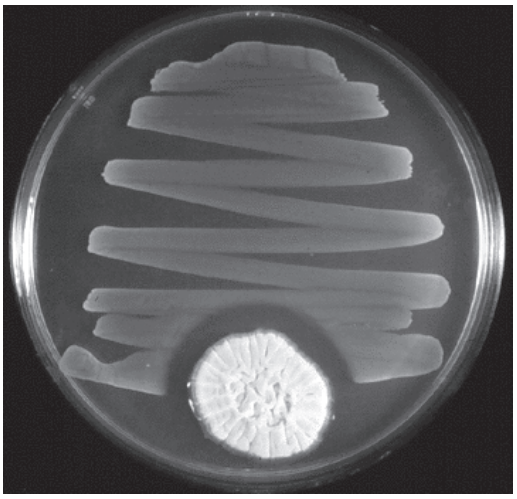
'herbal remedies' that are sold in health shops and supermarkets?

The big difference is that herbal remedies are not tested. Not tested for efficacy (we don't know whether or how they work), they are not tested for safety (we don't know whether they are toxic or have side effects). They are not regulated in any way, so you don't know what you are buying at all!

Drug development process

Before a natural product can be approved for use as a human pharmaceutical, it must go through a rigorous process of testing during clinical trials. And before it even enters those, it must be fully identified and characterised. This precise analysis is what makes the known and well understood pharmaceuticals stand apart from herbal remedies. For the most part, we know very little, if anything, about their chemical composition and effects.

Once the initial discovery process is complete, the natural product is subjected to a barrage of tests in vitro (in the test tube) and in vivo (in lab animals). Once biological activity and initial safety is demonstrated, the potential pharmaceutical can be admitted to the Phase I clinical trial. This involves a small group of healthy volunteers who are given the compound to determine its safety (that is, evaluate any toxicity and side effects) and tolerated dosage. Phase II trial follows, where the effectiveness of the compound at curing a disease is finally tested on a small number of human patients.

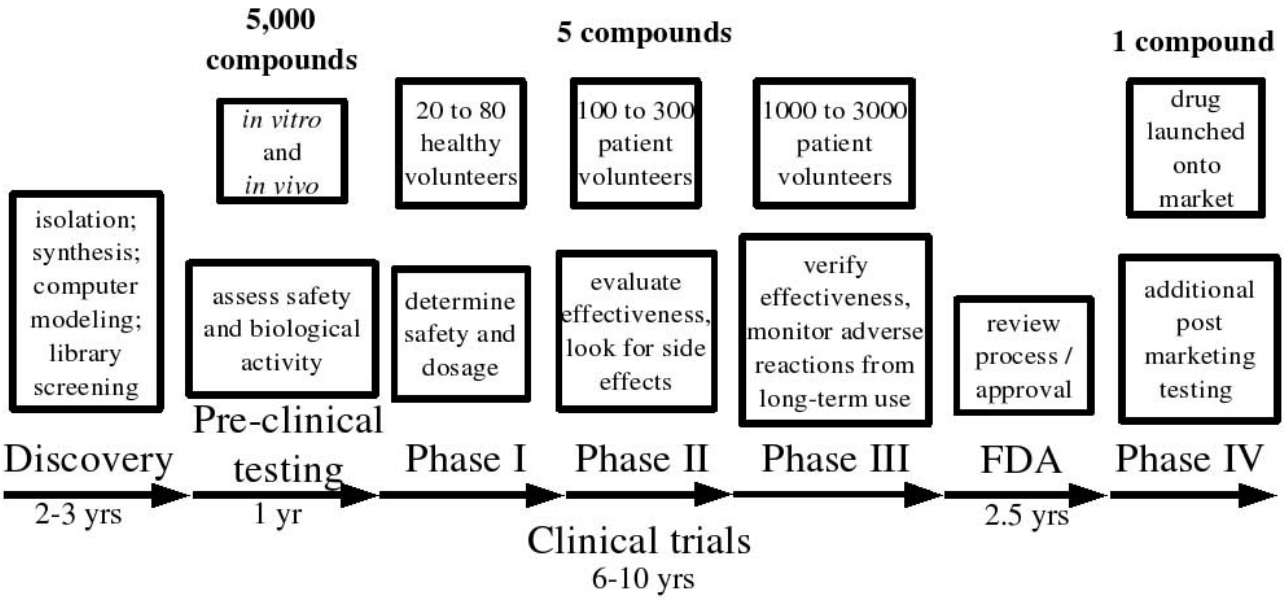


Penicillin: chemical warfare on the microscale

Finally, Phase III is a large scale trial on 1000 to 3000 patients, verifying effectiveness and monitoring any adverse effects from long term use. At the end, all the data are submitted to the monitoring agency (in the US this is the Food and Drug Administration) for evaluation. Once approval is given, the drug can be launched onto the market, where it still undergoes long-term safety monitoring and additional tests during the so-called Phase IV trial.

On average, out of 5000 compounds that undergo pre-clinical testing, only five are deemed promising enough to enter clinical trials. Out of those five, only one is approved – others fail because they do not show effectiveness once trialled in humans, or exhibit unacceptable levels of toxicity or side effects. From discovery to prescription, the whole process takes on average 12 years, with costs estimated to be in the hundreds of millions of US dollars.

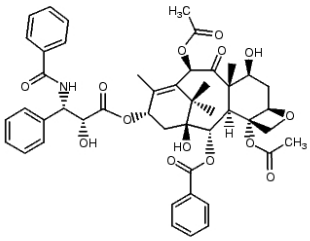
While the process may not be perfect, it does attempt to ensure that the medication we are prescribed is first of all safe, and that it works. Herbal remedies cannot claim the same.



Timeline: Pharmaceutical development is a lengthy process

The Story of Taxol

In the 1960s the National Cancer Institute (NCI) launched a screening programme to test various plants for potential anticancer activity. Over the next two decades they screened more than 114,000 plant extracts. This included, in 1962, a collection of bark from the Pacific Yew, *Taxus brevifolia*. Immediately, this shrub generated great excitement as it showed interesting activity in biological assays. A research



Paclitaxel (Taxol)

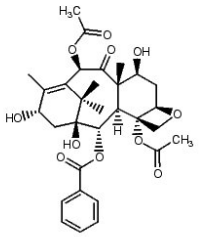
project was launched to investigate these properties, and in 1967 the active ingredient was isolated and named paclitaxel. The structure was not solved until four years later in 1971, a reflection of its high degree of complexity. Paclitaxel exhibited a broad spectrum of activity against cancer cells in vitro, and in 1979 scientists discovered its mode of action in the cell – a completely novel way of stopping and killing cancerous cells. In vivo testing showed phenomenal successes – paclitaxel stopped the growth and even shriveled breast cancer tumours in mice. All of these results made paclitaxel the hottest natural product around. Everyone wanted to get their hands on some, but paclitaxel had many hurdles yet to overcome.

Researchers rushed the compound into clinical trials, but immediately faced a problem. Paclitaxel was not soluble in anything. As one researcher put it, "it had the solubility of a brick." How were they going to administer it to patients? Finally a concoction consisting mainly of castor oil was found to be effective, but was almost the drug's undoing. Paclitaxel proceeded to clinical trials, and was almost rejected right then and there, as it showed unacceptable levels of side-effects. Fortunately, someone figured out that most of these were due to the castor oil, and after the formulation was changed somewhat, the drug continued to Phase II clinical trials.

The results were astonishing: against the most virulent forms of ovarian cancer, paclitaxel showed unheard-of levels of response. Doctors and researchers were suddenly clamouring for more and more of the drug. But Taxol faced its greatest challenge yet: that of supply.

The compound paclitaxel is present in only minute amounts in the bark of *Taxus brevifolia*. Fifteen kilograms of the bark yield barely half a gram of the active compound, which means it would take six 100-year-old trees to treat one patient. Quite aside from the ecological impact of the large scale logging operation required, there simply are not enough Pacific Yew trees in the world to treat all the cancer patients.

Making the compound in the lab was not an option. Though a successful synthesis of paclitaxel was reported in the literature, the molecule was too complex for this to be a viable route to obtaining large quantities. Fortunately however, researchers discovered that the much more common English Yew (*Taxus baccata*) contained relatively large quantities of a compound that is



Baccatin

related to paclitaxel. Eventually in 1989 they succeeded in transforming this 10-deacetylbaccatin into paclitaxel. This semi-synthetic pathway is how Taxol is made even today.

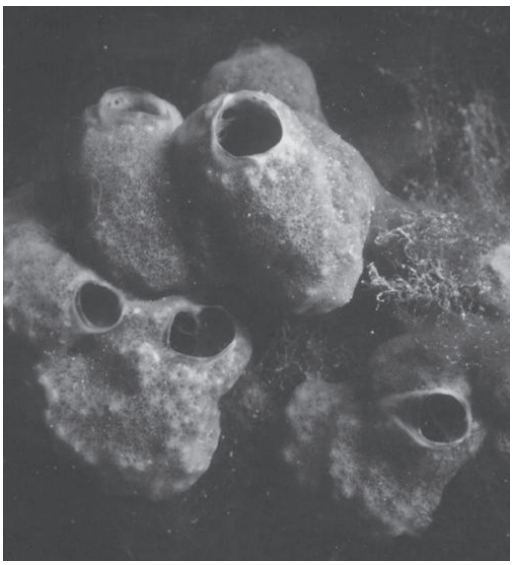
The billion dollar wonder molecule

Having successfully completed clinical trials, paclitaxel was launched onto the market in 1993 under the trade name Taxol as a drug to treat ovarian cancer. Sales of Taxol grew exponentially, rapidly reaching and passing the US$1 billion mark. Today, Taxol remains the leading treatment against ovarian, breast and lung cancers, and Karposi's sarcoma. Yet it had not been an easy journey: from bark to drug it took 31 years, and with an estimated cost in excess of US $300 million.

Victoria University Marine Chemistry Lab

Most of the natural products that have "made it" as pharmaceuticals come from the terrestrial environment, not surprisingly, as terrestrial plants, animals and fungi are most easily accessible to researchers. In the last few decades however, with the advent of scuba diving, a whole new world has opened up: the marine environment. The Marine Chemistry

Lab at Victoria University studies chemical compounds found in marine plants and animals. We examine a wide variety of organisms, including sponges, seaweeds, sea-slugs and others. Our ultimate goal is to discover new, biologically active chemicals from marine organisms and develop them into pharmaceuticals.



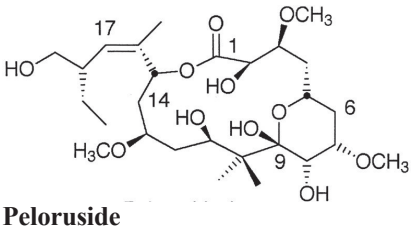
Mycale hetsheli

Discovery of peloruside

In 1998, Lyndon West (who was at that time doing his PhD in our lab), discovered a new compound from the sponge *Mycale hetsheli*. He named it peloruside, after Pelorus Sound where the sponge came from. The compound looked very interesting right from the start, so patents were filed right away, and biological testing initiated. Indeed, exhaustive in vitro tests revealed that peloruside had the same mode of action as Taxol! This news generated a lot of interest, and in 2004 a deal was signed with Reata, a US Pharmaceutical company. Their tests in mice showed very promising results: injections of peloruside into grafted tumours radically reduced their growth. With exciting results like that, everyone is now keen to start clinical trials. Unfortunately, we face a supply problem even worse than the Taxol people did: the compound is once again present in only small amounts in the sponge. In addition, sponge populations are scarce in the wild, and difficult to reach. They also show a large variability in the amounts of peloruside they produce, depending on depth, season, geographical location and even individual animal.

Aquaculture

But, we have a solution: aquaculture! Fortunately for the project, the sponge can be propagated from small cuttings. We have taken bits of wild sponges and tied them to ropes that have been suspended off the anchor lines of a mussel farm in the Marlborough Sounds. The sponge has grown well – our sponge farm yielded almost 100 kilograms of the sponge in 2005. Some of this mass was returned to the ropes to grow again for this year, the rest has been harvested and is now being processed in our lab. We hope to get gram amounts of peloruside and hopefully start clinical trials with Reata Pharmaceuticals in the US this year.



Peloruside

Could peloruside be the next wonder drug against cancer? Well, it has a long way to go yet. But it certainly shows promise, so watch this space.

Joanna Wojnar is a PhD student at the Marine Chemistry Lab, Victoria University of Wellington.

The future of the pharmaceutical industry?

Dream triggers: of shapely rocks and shapes in rocks

*Research scientist **Hamish Campbell** spoke of his experiences as Te Papa's museum geologist at the 2005 NZ Skeptics conference.*

IT behoves all scientists to be both skeptical and open-minded, research scientist Hamish Campbell told delegates attending last year's Skeptic Conference in Rotorua.

In his capacity as a professional palaeontologist since 1978 Dr Campbell has seen many geological and palaeontological theories revisited and revised. He has also dealt with members of the public convinced they have made major discoveries. 'Dinosaur eggs' and 'meteorites' were routinely found by members of the public, who were often convinced their finds would transform them from rags to riches.

"There is nothing worse than being deflated by an ordinary authority in the guise of a museum geologist!" he said. The title of the talk alluded to such people and the diplomatic skepticism required to address their queries and concerns.

Much of Dr Campbell's own research has been on the antiquity of New Zealand's land surface.

Joan Wiffen's discovery of 75 million year old dinosaurs was highly significant, he said. It followed that if there were dinosaurs in New Zealand, there must have been mammals, since the two co-evolved and co-existed. "What happened to them? We think we know what happened to the dinosaurs, but why did the mammals disappear?"

He suggested one possible solution. "Some researchers, including myself, have dared suggest that there may not have been any land at all during Late Oligocene to early Miocene time about 25-23 million years ago:

Hamish Campbell

the entire landmass may have been submerged or certainly greatly reduced with only ephemeral small islands and no continuous land areas."

New Zealand's natural science had followed the pioneering work of Sir Charles Fleming in presenting palaeogeographic maps of New Zealand through geological time.

"These maps were first attempted in 1959 and were published initially in 1962, again in 1975 and many times after. They have been greatly used and have become a kind of mantra. Nowadays, however, hard questions are being asked about the geological evidence for Sir Charles' linework. What is the basis for his paleo-coast line? How certain is it?"

To illustrate his point Dr Campbell showed images of marine-cut surfaces near Oamaru and the Kakanui Mountains and also the Hawkdun Range in Otago.

"This scenario of total submergence has huge implications for the history of terrestrial life in New Zealand, but at one stroke may explain the absence of mammals: they were all drowned! Easy to say, but hard to prove."

He also described his three-year Marsden Fund project which explores the antiquity of the land surface in the Chatham Islands. "There is compelling geological evidence to suggest that it is all less than four million years old."

On rare occasions, reexamination of earlier work had revealed cases of out and out fraud. One professional geologist who had 'gone off the rails' was

Professor Vishwa Jit Gupta, from the University of Punjab, Chandigarh. He falsified the geological record and scientific literature for more than 30 years before being found out in 1987.

Among his anecdotes, Dr Campbell delved into the history of palaeontology and geology, commenting on Nicolaus Steno who in the late 1660s became involved in a great debate about the origin of fossils.

"This story is the subject of a fascinating, recently published book called The Seashell on the Mountain Top, in which it is claimed that among many amazing achievements, Steno was the first person to establish (in 1667) that humans have eggs!"

At any rate, Steno's career was more successful than that of one Professor Solas, who was imprisoned in the 19th century for daring to suggest that chalk was made up of tiny fossils.

Skeptics were told that the first professor of geology, William Buckland, was established at Oxford University in 1818 expressly to research evidence of the great flood. And that 150 years ago, Sir Charles Lyell used his amazing powers of logic to determine a direct causal link between the 1855 Wairarapa Earthquake and movement on the Wairarapa Fault.

"This was the first scientific realisation that earthquakes relate to geological faults."

He also talked about the great fascination in markings on rocks (petroglyphs) such as in the Chathams (Nunuku's Cave) and the Kaimanawa Wall near Taupo.

A letter to the Minister of Health

*This is the text of a letter sent to new Minister of Health Pete Hodgson in November 2005 by **Keith Garratt**, as a follow-up to his submission to the MACCAH committee in 2003.*

Dear Minister

In mid-2003, I made a submission to the Ministerial Advisory Committee on Complementary and Alternative Health (MACCAH). I also sent a letter to your predecessor, the Hon. Annette King.

MACCAH provided its advisory report to the Minister in June 2004. I understand that no policy decisions have been made as a result, but that the question of possible integration and public funding of complementary and alternative health practices (CAM) is still open.

A key recommendation of the MACCAH committee was:

> "Where there is evidence of safety, efficacy and cost effectiveness, specified CAM modalities should be considered for public funding."

The requirement for evidence sounds reasonable. However, elsewhere in the report MACCAH recommends that:

> "Recognition should be given ... to the relevance and importance of research at different levels of evidence for the efficacy and safety of CAM."

In context, it is clear that the intention is that something less than the 'gold standard' systematic reviews, meta-analyses and randomised control trials usually required of mainstream medicine should be accepted as sufficient evidence.

Recent Green Party statements have referred to integration of "recognised" or "selected" CAM modalities, but I have seen no indication of how such a selection would be made. I also note the appointment of the Green Party health spokesperson as Chair of the Health Committee.

All this gives me concern that serious consideration may yet be given to the integration and funding of unproven pseudo-medical procedures and treatments within the national health system. As I noted in my letter to your predecessor, this would be a very major and probably retrograde step, and would bring grave danger of a serious downgrading of the quality and credibility of the system.

In a recent statement about a successful prosecution of the seller of phoney weight-loss pills, David Russell of the Consumers' Institute commented: "It sends a

clear signal to the peddlers of hope with no substance that if they get caught the penalties are going to be very severe." The term "peddlers of hope with no substance" exactly describes the great majority of alternative health practitioners and the marketers of alternative health products. It would be a paradox indeed if the Government was to enter into the support and funding of such unproven practices and products, thereby becoming by proxy a 'peddler of hope with no substance'.

It may be that, among the scores of alternative pseudo-medical practices and the hundreds or thousands of alternative remedies, a few may have some actual or potential benefit. Unfortunately, none of the 75 or so CAM modalities identified by MACCAH have met the stern requirements of objective research, investigation and substantiation that would enable them to be accepted as part of 'mainstream' medicine. Unless and until the practitioners and marketers of CAM are prepared to submit to and accept the same standard of research and evidence required of 'mainstream' medicine, there should be no suggestion that they deserve integration or public funding. It is only this level of research and proof that could be considered to provide the 'evidence' mentioned in the MACCAH recommendation quoted above. The paradox is that, if the safety and real efficacy of any of these practices had been proven in this way in the past, they would no longer be classed as CAM, and would in fact have already become part of mainstream medicine.

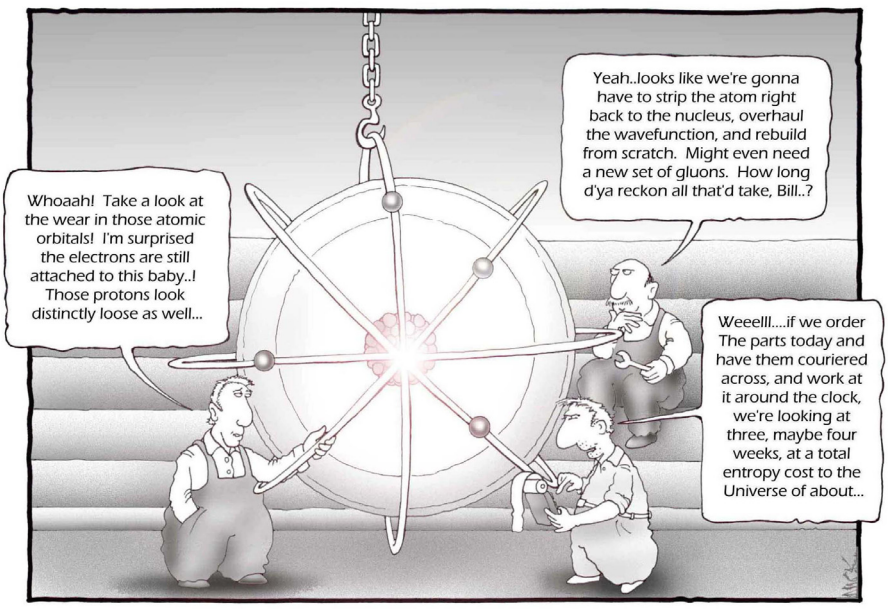
Another paradox is that CAM practices are often claimed to be valid because they are ancient and/or derive from cultures other than our own. The irony here is that they derive from times and places where life expectancy was dramatically lower than that which we experience in our time and culture because of the benefit of modern medicine.

There is reference in the MACCAH report to the often-repeated claim that CAM is more 'holistic' than mainstream medicine. Again, this is paradoxical. A feature of mainstream medicine is the team approach, with patients being referred to and attended by a range of specialists and technical experts as required to give the total diagnosis and care required. In contrast, CAM is very fragmented, with practitioners often acting in isolation, each offering so-called 'holistic' care. There is little evidence that the various CAM practitioners act together in an integrated manner, or that they necessarily believe in the validity of modalities other than their own. In my submission to MACCAH, I suggested that each committee member should be asked to nominate CAM practices, other than his or her own, that they believed deserved integration and public funding. I suspect that this did not occur.

The proliferation of CAM is already a major concern to many people, because of its exploitation of people's gullibility, the waste of money by people who can ill-afford it, the diversion of people from conventional care, and the potential for tragic disappointment (such as in the Liam Holloway case.) At present, it is a matter for private choice. Those of us that recognise CAM for what it is can choose not to use it. However, any move to give it public recognition and to divert scarce public health funding would certainly bring a storm of protest and ridicule from rational-thinking members of the tax-paying public.

Yours sincerely

Keith Garratt



Quantum mechanics.

Compiled by David Riddell

Intelligent Design ruled a pretext for religion in the classroom

IN A decision which sets an important precedent for US science education, a court has ruled against the teaching of the theory of 'Intelligent Design' alongside Darwinian evolution (BBC, 20 December). The ruling comes after a group of parents in the Pennsylvania town of Dover had taken the school board to court for demanding biology classes not teach evolution as fact.

The 11 parents argued that teaching intelligent design (ID) was effectively teaching creationism, which is banned. They complained the theory – which argues life must have been helped to develop by an unseen power – is tantamount to religious education. The separation of Church and State is enshrined in the US constitution. The school board argued they had sought to improve science education by exposing pupils to alternatives to Charles Darwin's theory of evolution.

But Judge John Jones said he had determined that ID was not science and "cannot uncouple itself from its creationist, and thus religious, antecedents". In a 139-page written ruling, the judge said: "Our conclusion today is that it is unconstitutional to teach ID as an alternative to evolution in a public school science classroom." He accused school board members of disguising their true motives for introducing the ID policy. "We find that the secular purposes claimed by the board amount to a pretext for the board's real purpose, which was to promote religion in the public school classroom," he said. He banned any future implementation of the policy in Dover schools.

Ironically, the ruling is somewhat academic since parents there voted in November to replace the school board members who brought in the policy. That move provoked US TV evangelist Pat Robertson to warn the town was invoking the wrath of God.

Meanwhile in Kansas...

Opponents of evolution have won a big victory with the approval of new science standards for Kansas' public schools (Arkansas City Traveller, 9 November).

The new standards say the theory that all life had a common origin has been challenged by fossil evidence and molecular biology. They also describe as controversial the theory that changes over time in one species can lead to another species. None of those statements were in Kansas' previous standards, which treated the theories as well-established and universally accepted by scientists.

"This action is likely to be the playbook for creationism for the next several years," said National Center for Science Education director Eugenie Scott. "We can predict this fight happening elsewhere."

"We're becoming a laughing stock of not only the nation, but of the world, and I hate that," said Kansas City Democrat Janet Waugh, who opposed the new standards.

Abductees 'vulnerable to false memories'

Research in London suggests that people who claim to have been abducted by aliens have a higher tendency to hallucinate and fantasise than those who do not report such experiences (Dominion Post, 27 October). Prof Chris French, head of the Anomalistic Psychology Research Unit at Goldsmiths College compared 19 'abductees' and 19 random volunteers. He found that in psychological tests, so-called 'experiencers' scored more highly in a number of areas, including 'dissociative' tendencies which can lead to altered states of consciousness, and displayed 'absorption', the habit of becoming engrossed in experiences.

Like other paranormal experiences, such as encounters with ghosts, alien abduction was often associated with sleep paralysis, French said. In this state, sleepers woke to find themselves unable to move but aware of their surroundings. Dream-like auditory and visual hallucinations could also occur.

Scientists asked to explain 'Buddha'

A Nepalese boy who some believe is an incarnation of Buddha has reportedly survived without food or drink for six months, but local authorities want to get to the bottom of the mystery (Dominion Post, 28 November). The district administrator in Bara, 150km southeast of Kathmandu, has asked

a Buddhist panel and the Royal Nepal Academy of Science to investigate claims that 15-year-old Ram Bahadur Bamjon has survived so long without sustenance while meditating under a sacred pipal tree. He does not speak and people are not allowed to approach within 50 metres. At night he is hidden from public view behind a curtain. Doctors observing from a distance say he is breathing normally but is weak.

The Bermuda Triangle – 60 years on

December 5 2005 was the 60th anniversary of the disappearance of Flight 19, the event that began the myth of the Bermuda Triangle (Weekend Herald, 19 November). The 27 airmen who disappeared were honoured by the American government on November 19, in a gesture Representative Clay Shaw said he hoped would help to bring closure for surviving families.

The incident began when five US Navy Avenger airplanes left the Fort Lauderdale Naval Air Station on a routine training mission over the Bahamas. The five pilots and nine crewmen, led by Lieutenant Charles Taylor, were to practise strafing and low level bombing on small coral shoals 96.5km east of the station, then head north to practise mapping, before returning home. But the compasses on the lead plane apparently malfunctioned. With no instruments to guide him over the open ocean, Taylor thought the flight had drifted off course and was south over the Florida Keys. As a result, he directed the planes to fly north.

"He was not in the Keys, he was out in the end of the Bahama chain," said David White who, at the time, was a flight instructor at Fort Lauderdale. "When he went north, he was going out to the wide ocean."

A few hours later a navy rescue airplane, a Martin Mariner with 13 crewmen, also vanished. Though a passing ship reported seeing what could have been a mid-air explosion, no evidence of the Mariner was found either.

Miracle hoax claim angers church

September 20 marked another anniversary, the 1700th, of the martyrdom of San Gennaro, the patron saint of Naples (Dominion Post, 21 September). Three times each year, the faithful gather to witness the "miracle of the blood" in Naples Cathedral, in which a phial alleged to contain the dried blood of the saint is held aloft by the archbishop, who declares it has liquefied. The years when it fails to do so are said to presage disasters such as the eruption of Mt Vesuvius or the defeat of Napoli football club.

This year, however, astrophysicist Margherita Hack and fellow scientists from the Italian Association for the Study of the Paranormal have enraged many by claiming the miracle is a fake.

"There is nothing mystical about this. You can make the so-called blood in your kitchen at home."

Hack said the dark brown gel, which was solid but liquefied when shaken, was hydrated iron oxide, which had the characteristics of blood.

Pierluigi Sanfelice, one of the phial's official guardians, said the church had conducted tests on it in the 1980s which showed that its contents included haemoglobin. "The trouble with scientists is that when they cannot find an explanation they invent one. They simply cannot accept that some things are beyond human understanding," he said.

Fat-loss pills 'dead loss'

An Auckland man and his company have been ordered to refund $175,000 after falsely claiming a tablet could "melt away" fat and cellulite (NZ Herald, 10 November). However, the refunds, which could benefit thousands of customers who bought Celluslim tablets, are on hold pending an appeal.

From 2002, Dennis Johnson O'Neill marketed Celluslim tablets through Martini Ltd, as a product that would get rid of fat and cellulite in just three weeks without dieting or exercise. Customers paid $168.80 for an eight-week supply of the tablets, but an Auckland District Court judge David Wilson QC said anyone who bought them was wasting money.

"The only evidence is that Celluslim could not reduce cellulite fat and weight and moreover made some customers feel unwell."

An advertising brochure said Celluslim was scientifically developed and tested by Doctor Malissi at Switzerland's Saint Alto Research Centre, but neither existed. At one stage, O'Neill and his company ran out of the tablets and relabelled a honey, garlic and apple cider vinegar tablet as Celluslim so they could continue to fill orders, the Commerce Commission said.

More bad news for homeopaths

THE leading medical journal The Lancet recently published yet another analysis of trials of homeopathy. After examining 110 such trials, the Swiss researchers concluded that there was no convincing evidence that homeopathy was any more effective than placebo. In the accompanying editorial, the editor, Dr Richard Horton, made a comment which has an uncanny, and no doubt intentional parallel with the views of the founder of homeopathy over two hundred years ago:-

Hahnemann's Law of Dilution; "The more dilute the medicine, the stronger its effect".

Horton's Law of Dilution; "The more dilute the evidence for homeopathy becomes, the greater seems its popularity."

Bernard Howard
Christchurch

Book should be blank

As a superskeptic I'm saddened by our chair-entity's proposal for a book called Paranormal New Zealand. As we all know, there is no such thing as the paranormal. Everything that happens, no matter how strange, obscure or apparently inexplicable is 'normal'. Vicky's book should therefore be blank...

If it happens, it can be explained.

Now, CSICOP includes the initials for 'Scientific Investigation'. In my brief association with New Zealand's skeptics I've seen no evidence of investigation of any COPs. In both America and England, where I've been a member, they have far more involvement in investigating CsOP.

Isn't it time we started hammering away at the lunatic fringe? To give us a start, I offer a 'paranormal' experience of my own for Scientific Investigation by the Committee.

Some years ago, while I was working at my desk, it suddenly leapt vertically about four inches and crashed back to the floor. My colleagues told me later that I'd gone green with fear and shock. I shall never forget it.

Can the members of the committee investigate this occurrence SCIENTIFICALLY, please. I will answer all legitimate questions honestly and fully, but refuse to respond to guesses or theories.

With a bit of practice, we can soon take on the Wilsons of this world...

Clive Shaw

Scientologists told: 'See you in court'

The Church of Scientology has issued a cease and desist order to the New Zealand owner of a Tom Cruise parody website, **www.scientomogy.info** demanding they shut down the site or face a law suit of up to $100,000.

Website owner Glen Stollery says this is simply a way of "scaring any critics into instantly backing down at the prospect of costly lawsuits regardless of their innocence ... "I'm calling your bluff. File your lawsuit we're keeping our domain ... see you in court".

Indians show the way

I assume you are subscribed to the Indian Rationalist Society. If not the web address is **www.rationalistinternational.net**

They send regular email bulletins. The latest concerned the Indian astrologer claiming he would die at a specific time. This article is trivial and amusing. However the society does a lot more serious work by exposing religious irrationality and intolerance – mainly Islamic but Western countries and religions, especially the Catholic Church, come in for criticism.

A couple of bulletins ago the Indian Rationalist included a shocking picture of two Iranian young men about to be hanged. They were 16 and 18, both healthy good looking young men. Their crime – they were homosexuals caught in homosexual acts. The picture showed them on a platform with the nooses around their necks and their masked executioners standing behind them.

It seems our local Skeptics tend to promote logic and debate on an almost academic level. Personally I am more concerned with the effect of frauds and poor thinking on the part of a sizeable section of the public, such as financial losses and woolly thinking about the supposed dangers of immunisation.

Along with the normal debates of logic in our magazine could we not go further and include some of the shocking evidence of the effects of irrationality and dogmatic ideas. It wouldn't hurt if they were picked up by the news media. It gives people a better idea of why we are fighting international terrorism.

Bob Howard.

‘Treatment’ for suffering just creates the disease

Lynley Hood

FOR those of us who learnt of the tragedy through the media, the anguish and grief of the family who lost their two youngest children in the icy depths of Lake Wakatipu is painful even to imagine. We know their lives will never be the same again. So it was comforting to read that the people of Glenorchy are doing what close-knit communities always do in times of adversity.

“The 111 call on Friday night, made by the children’s father, Stefan Poplawski, brought not just the emergency services to Greenstone Elfin Bay Station, but scores of local residents – by boat, car and helicopter. Some came to assist the commercial divers attempting to retrieve the lost children ... others came to give whatever comfort they could.”

A police officer reported that the community had rallied protectively around the family, so we can be confident that the sensible, good-hearted people of Glenorchy are giving the bereaved family the comfort and practical assistance they need. The school mates of the Poplawski children are not so lucky. They’re being offered counselling.

Why? Sure, the accident was a terrible tragedy, but tragedies are nothing new and neither is the suffering they cause.

Throughout human history, people – both adults and children – have shown themselves to be remarkably resilient. Whenever and wherever tragedy strikes there is always strength and solace to be found in adversity. What is new in our modern world is the propensity of mental health practitioners to pathologise ordinary human suffering. These so-called experts want us to believe that suffering is no longer part of the human condition; these days suffering is a disease in need of treatment. A whole industry has grown up around this belief. Now, when adversity strikes, ACC-funded trauma counsellors descend on the unfortunate community in droves. And here’s the rub: trauma counselling doesn’t work. In fact, trauma counselling does more harm than good.

There have now been over a dozen controlled trials in which people involved in accidents and other traumas were randomly allocated to receive or not receive counselling. The results showed conclusively that counselling immediately after a traumatic event does not work. Those who received it were no better emotionally than those who did not. Worse, the better studies with longer follow-ups showed that receiving such counselling increased the rate of later psychological problems. The group that seemed to be harmed most by this were those who were particularly upset at the time – exactly those who you might think ought to be treated. So immediate post-trauma counselling may help us feel that something is being done, but it doesn’t help those who receive it. The fundamental problem with trauma counselling seems to be that asking anyone to talk to a complete stranger about their feelings while they are still raw with pain just makes things worse.

For most mentally healthy people – including the children of Glenorchy – not talking about it is often the most appropriate immediate response to a disaster. No doubt, in their own good time, the kids will talk about the tragedy as little or as much as they want with their family and friends and teachers, for these are the people who know them best, and who know best what support they need and when they need it. Of course they will be anxious for a while, and in need of comfort. But, as always, there will be chores to be done, lessons to be learned, sports to be played. Day by day, life does indeed go on. These children don’t need counselling. As they learn to cope with adversity they’ve already got the best role models any child could have – the courageous and compassionate adults in their own community.

Originally published in the Otago Daily Times, 15 September 2005.

The first in a series of collectable images of the NZ Skeptics inimitable medical columnist John Welch

Silent scientologists and hot cold treatments

Pill Popping

PHARMAC is the Government drug-purchasing agency. Pharmac's 2005 Annual Review showed that about eight prescription items were issued per adult in that year. In the course of my work I write a lot of prescriptions but I certainly don't consume eight scripts per year.

I did a few locums recently and I was frequently dismayed to read patient records, particularly children's records, to find repeated prescriptions for all sorts of antibiotics. The majority of childhood infections are viral but many doctors seem to have a compulsion to write prescriptions for antibiotics, which are nothing more than expensive placebos.

The Pharmac list showed almost 1.5 million prescriptions for the antibiotics amoxycillin and the compound antibiotic augmentin. This is completely ludicrous and it beggars belief that there can be so many bacterial infections in one year.

Omeprazole, an indigestion remedy, was prescribed on 800,000 occasions, probably to alleviate the indigestion caused by all the other medicines that people are swallowing.

Here is a one-day cold cure from 1925:

> "A chest or head cold can be cured in one night if treated in time. Put on a flannel night dress, and also wrap a blanket well over that, then sit for 15 minutes with the feet and ankles in a mustard and water foot-bath as hot as it can be borne, adding more hot water if necessary. Meanwhile sip a pint of hot, strong home-made Lemonade (or a glass of hot Whisky). Next dry the feet quickly, and get into bed instantly. Keep the blanket still wrapped around you, as the touch of cold sheets would undo all the work. The cold will be gone in the morning."

Readers may laugh at this quaint and harmless placebo treatment from 1925. Now we are more sophisticated and require expensive placebos such as antibiotics!

I hope a reader will try this 'cure' and report back. I particularly approve of the whisky option.

Christchurch Press 7 December
Practical Medical Prescriptions 1925

Homeopathy

The Blenheim Sun (16 November) recently published an advertorial for homeopathy. The Bay of Plenty College of Homeopathy is offering extramural courses in Auckland, Tauranga, and Christchurch. The National Diploma and the Diploma of Homeopathy (Animal Health) are NZQA approved. By endorsing these 'dilutions of grandeur' the NZQA is in serious danger of discrediting itself. What next, Diploma of Iridology, Diploma of Alien Abduction?

The Ministry of Education has approved student loans for this nonsense!

The article goes on to claim with respect to the 1831 Cholera epidemic "mortality rates using homeopathy were an astonishingly low 21% compared with 59% for those treated conventionally." This is a deliberate distortion of history. Standard medical treatments in 1831 involved bleeding and purging and it is not surprising that 'conventional' treatment was worse than doing nothing, which is what homeopathy is all about. If the 1831 Doctors had offered their patients water (ie placebo), there

would have been no difference between the respective mortality rates.

I recommend having a look at **www.homeopathycollege.com** and as many people as possible should write to the NZQA and the Ministry protesting Government support for this nonsense.

Lifestyles of the Rich and Stupid

Katie Holmes, recently pregnant to Tom Cruise, will be expected to have a silent birth in accordance with the Scientology beliefs of her partner. I often describe scientology as the 'Sect of the mystical galvanometer' as they use some such device described as an 'e-meter'. Pretty much what you would expect from the founder, L Ron Hubbard, a hack science fiction writer.

Scientologists believe that a painful or traumatic birth can trigger 'irrational fears' and 'unwanted emotions'. The article goes on to say, "Groans are a form of expression Scientologists view as less harmful than actual speech" and even "throw me in the car! I want an epidural!" can be regarded as acceptable.

I am looking forward to hearing that Tom Cruise will soon be having a 'silent vasectomy'. It will be a great relief for the gene pool. As the great joke goes, Tom Cruise got into the gene pool when the lifeguard wasn't looking.

Black Cohosh flunks

In issue 76 I reported a trial, which showed that the effects of acupuncture or sham acupuncture are about the same as placebo in the treatment of menopausal hot flushes.

Another popular remedy is the herb, black cohosh, and a recent study found no difference in either the intensity or frequency of hot flushes between placebo and the herbal treatment. The next time any readers see this product for sale in a pharmacy please feel free to draw this report to the pharmacist's attention.

Maturitas 2005;16:134-46

Ritalin and bad behaviour

Attention Deficit Hyperactivity Disorder (ADHD) is widely diagnosed in New Zealand and frequently treated with stimulant medication such as methylphenidate (Ritalin).

Dr LeFever is a clinical psychologist concerned about the high rates of use of stimulant medication in some US schools. She found that 8-10% of children in two districts were taking some form of stimulant for ADHD. Dr LeFever is reported as being "outspoken about what she has called the over-diagnosis and overmedication of children said to have ADHD."

Following anonymous charges of scientific misconduct, the establishment reacted by trying to sack her, an attempt that triggered a strong campaign to have her reinstated. A petition in her favour criticised her employer's actions as "an egregious violation of academic freedom."

I suspect that this sort of thing will become more common. Groups of people who have a shared delusion (homeopathy, acupuncture, ADHD – take your pick) react angrily when their sacred beliefs are questioned.

BMJ 2005;330:691

At last, something decent on telly

It was refreshing to see Jeremy Wells discussing conspiracy theorists, Paul Holmes, Jonathan Eisen, the Skeptics – and wolverines, on TV2's Eating Media Lunch in November. Best line: "When it comes to pointing out f*ckwittery, the Skeptics are usually on the money." For those who missed it, the Skeptics Video Library has a copy on DVD.

Opening Pandora's Box

Raymond Bradley

Demands for equal time cut both ways.

ARMIES of the night, science-writer and novelist Isaac Asimov once called them. He was referring to the countless millions of evangelicals who believe the book of Genesis to be literally true and therefore reject any evidence to the contrary.

President Bush is one of them. So is Michael Drake, principal of Auckland's Carey College.

As reported in the Weekend Herald (27 August), Drake believes that one can provide dates for the main events in the history of the universe by adding up all the 'begats' in the Bible.

The date of creation turns out to be just over 4000 BC, and that of Noah's Flood about 2400 BC.

What can these young-earth creationists say when confronted by scientific evidence that the universe began more than 12 billion years ago, that life began over 4 billion years ago, that dinosaurs became extinct some 63 million years ago, or that fossils of our hominid ancestors are shown by potassium-argon dating to be more than three million years old?

Their best ploy is to say that God created the universe with all this contrary evidence built into it. This, says Drake, is "perfectly possible". It seems not to bother him that this hypothesis makes God, not just a Great Designer, but a Great Deceiver as well.

And what about the ancient civilisations whose historical and archaeological records spitefully ignore the Flood and the death of all living creatures, other than the inhabitants of the ark?

Clearly, God must have even more tricks up his sleeve. After all, as Drake points out, tautologically, "God is God."

Most mainstream Christians outside the US would reject this version of intelligent design. Like fifth century St Augustine, they would say that biblical literalists deserve to be "laughed to scorn" for their "utterly foolish and obviously untrue statements."

Adopting Augustine's figurative interpretation of Genesis, liberal Christians believe they can accommodate the findings of science and history. Thus those who call themselves theistic evolutionists can, without contradiction, accept Darwin's laws of natural selection as one of the laws of nature – along with those of physics and chemistry – with which God endowed his creation at the outset. No need for him to intervene on this account.

Enter a third version, one that reintroduces elements of evangelical creationism into the evolutionary story. Michael Behe, in his 1996 book Darwin's Black Box, claimed that although evolutionary mechanisms can explain a lot, they can't explain the emergence of certain highly complex biological systems. His examples include the flagellum of *E. coli*, and the human immune system.

These systems, Behe argues, are "irreducibly complex" in the sense that none of their simpler parts would have survival value until they were assembled in the right way by the intervention of a supernatural deity. Unlike theistic evolutionists, Behe believes God has to tinker with his initial design.

How scientific is all this? Well, Behe himself is a scientist. And scientists certainly do find complexity in the biological world, especially at the molecular level.

But is there scientific evidence that this complexity is irreducible? Scientists can literally see complexity. But they can't see irreducibility. Behe has to argue for it. And his arguments have been found wanting by both philosophers and scientists.

Philosophers disparage his argument's form: "We don't yet understand how these complex forms could have emerged, so God must have created them". It is a rehash of the 'God of the Gaps' fallacy. Flawed faith-based reasoning. Not sound evidence-based science.

Meanwhile scientists continue to plug those gaps with accounts of the evolutionary pathways that generated these supposedly irreducible systems. What becomes of

Behe's argument for an intelligent designer if all the gaps get filled?

Now to the important question: Should intelligent design be taught in schools? If so, which version?

Mary Chamberlain, curriculum manager for the Ministry of Education, says science classes should allow for some version or other. She seems to echo Bush's recent call for 'equal time' for those who oppose evolution.

Equal time counts both ways. If equal time is to be given to those who think there are arguments against evolution, then it should also be given to those who think there are arguments against intelligent design.

But then we get into what philosophers call "the problem of natural evil."

If you think an intelligent designer designed the universe, then think about the unsavoury aspects of his design. Think of diseases like Alzheimers, cancer, smallpox, and those caused by Behe's favourite, *E. coli*. Think of disasters like tsunamis, hurricanes, and earthquakes. If complex design demonstrates intelligence, then by the same token the "god-awful" nature of much of God's design demonstrates defective or malevolent intelligence.

On reflection, do its promoters really want intelligent design analysed and evaluated in schools? And if so, by whom?

Do they really want to open Pandora's box?

Raymond Bradley was professor of philosophy at Simon Fraser University in British Columbia.

Skeptics join celebration of Earth's birthday

The last of Hamilton's highly successful Café Scientifique series for 2005 examined the issue of dating the Earth and the universe. The date was chosen to be as close as possible to Bishop Ussher's preferred date of October 22 when, he calculated, the creation of the universe began in the year 4004 BC.

This was an event the NZ Skeptics definitely thought we should support, so we donated a birthday cake, magnificently iced and in the shape of a dinosaur, which was much enjoyed by the 50 or so people attending the central city café.

Happy Birthday: Among those celebrating the Earth's 6008th birthday and helping to consume the dinosaur cake were, from left, history lecturer and NZ Skeptic columnist Raymond Richards, biological sciences lecturer Alison Campbell, earth sciences postdoc Penny Cooke (all Waikato University), and NZ Skeptic editor Annette Taylor.

Ussher was, of course, only the starting point for a wide ranging examination, led by Waikato University's Penny Cooke, of different ideas and techniques for answering a question which has only been resolved with any real precision within the last few decades. An irony is that the systematic, numerical approach of Ussher and men like him (his date was at least better than Isaac Newton's first attempt) would, when more information came to light, undermine the authority of the texts the bishop was trying to uphold.

Among those present on the night was journalist Philippa Stevenson, who provided a very entertaining summary in the NZ Herald. The Café Scientifique concept has proved to be a very successful medium for engaging the general public with scientific issues, and we look forward to another lively programme in 2006.

David Lange vs the scholars

Raymond Richards

Checking facts should be part and parcel of academic life, but too often it isn't done.

THE late David Lange opened his 1990 book Nuclear Free: the New Zealand Way with a remarkable story. He wrote that on a winter evening in 1962, he was 20 years old and walking home near Auckland when he saw a blood-red moon and shafts of light in the sky:

> They were red and white. They extended across the night like the ribs of a fan. They were spinning, they were intermingling. The sky was diffused with a ghastly brush of red. It was an unnerving spectacle.

Lange's book says he soon learned from the radio that the United States had tested a nuclear bomb by launching it on a rocket and exploding it above Johnston Atoll, which lies in the North Pacific, about 1300km southwest of Hawaii. The sight of a nuclear explosion disturbed him, Lange wrote, and he was haunted thereafter by the fear of nuclear war.

Scholars have dismissed Lange's story. In a 1994 article in the Journal of Imperial and Commonwealth History, historian GP Taylor from Sheffield University denied that Lange or anyone else in New Zealand could have seen any such display. In the perverse article – the point of which was to justify France's bombing of the Rainbow Warrior – Taylor wrote:

> His religious upbringing coupled with a lively imagination seem to have affected Lange here. Johnston Island is over 4000 miles from New Zealand and the impression he gives of what he saw was impossible from that distance.

It would have been easy for Taylor to check the facts. He simply had to look in the New Zealand Herald for the winter days of 1962 to see if there were reports of a spectacle in the evening sky. The Journal of Imperial and Commonwealth History is a refereed periodical, and it would have been easy for the anonymous referees of Taylor's article also to check his claim that Lange's story was false. None of these scholars did the job. In fact, a big photograph of the sight covered the top of the front page of the Herald on 10 July 1962. The photo was captioned: "The spectacle in the Auckland sky shortly after 9 o'clock last night." Under the headline 'Aurora' Lights N.Z. Sky, the newspaper described the sight:

> A deep red "aurora" striped with jets of white light swept in a broad band over the New Zealand sky after 9 p.m. last night – seconds after a United States task force exploded a high altitude nuclear device of "megaton-plus" power over Johnston Island – 4000 miles to the north.

Watchers from Whangarei to Central Otago reported the eerie glow. An astronomer theorised in his Herald column that the results of the blast were visible in the South Pacific because:

> "the electrons released by the bomb dropped quickly to the level where auroras normally occur, between 80 and 120 miles, and then dashed rapidly along the line of magnetic force which links Johnston Atoll with the north and south magnetic poles and which travels over New Zealand."

After finding the story on the front page of the Herald, I wrote an article about the effect of the sight on David Lange and on the development of anti-nuclear attitudes in New Zealanders. My article mentioned how GP Taylor – and, by implication, the Journal of Imperial and Commonwealth History – got it wrong. I submitted the article to the journal. The referees rejected the article and did not even suggest how I might revise it to make it acceptable. Neither did the Journal of Imperial and Commonwealth History print a correction to their earlier article.

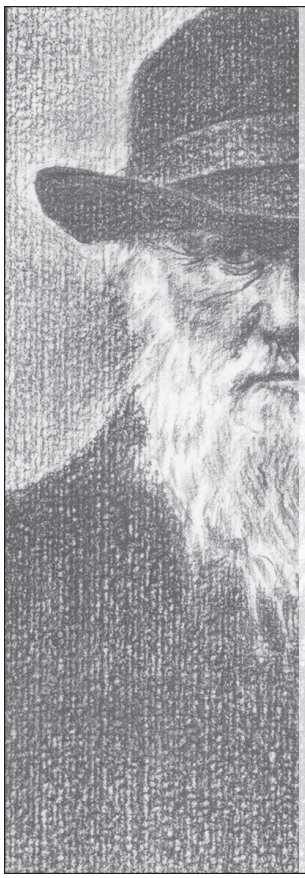
This year, Victoria University political scientist Jon Johansson published a book, Two Titans, about Rob Muldoon and David Lange's respective prime ministerships. Johansson repeats Taylor's blunder, writing on page 142:

> Lange's connection of an unusually red sky to a nuclear test is also, one must add, highly implausible. The earth's rotation alone renders Lange's anecdote an illusory one, but illusion is also part of the anti-nuclear story, notwithstanding its central position in New Zealand's contemporary political culture.

Neither Taylor nor Johansson nor the referees in Britain or New Zealand bothered to check whether or not the former prime minister of New Zealand was telling the truth before they alleged he was deluded. As for my article? It was published in Auckland University's e-journal Asia Pacific Cultural Studies and is online at **www.apcsjournal.org/pdf.php?type=article&id=5**

The article will earn me a small tick on my PBRF report. Had Taylor published his article recently in New Zealand, then he also would get a tick. His tick would probably be bigger than mine because of the status of the Journal of Imperial and Commonwealth History. Johansson's book will earn him a big tick. Hopefully, the substantial issue of David Lange's reputation will not be lost.

Dr Raymond Richards is a senior lecturer in History and American Studies at Waikato University. He can be reached at ray@waikato.ac.nz



Celebrate Darwin's Birthday!

Saturday February 11, 2006, 8pm
(bar open for purchases from 7.30pm)
Cotswold Hotel, 88-96 Papanui Rd, Christchurch

All Skeptics and like-minded folk in Christchurch are invited to celebrate Darwin's Birthday on Saturday 11 February with a special Darwinian Dinner.

Reservations close **January 27**, and places are limited, so send in your booking now!

$40 per head includes a three-course meal and wine.

For your entertainment and edification, there will be some table amusements and an after-dinner address by Dr Denis Dutton.

Send money for your reserved ticket/s to:
Darwin Day Dinner, NZCSICOP Inc, Box 29-492, Christchurch
Please make cheques payable to NZCSICOP Inc. Don't forget to include your postal address so we can send the tickets out to you.

For further information contact NZCSICOP Secretary Claire le Couteur
Email: Claire.LeCouteur@xtra.co.nz

If undelivered, return to:

NZ Skeptics
PO Box 29-492
Christchurch

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