

the Skeptic

Volume 15, No 1

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a journal of fact and opinion



Thinking critically
Challenging the claims
Seeking the evidence

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Editorial

Recently I read an item "Soothsayers, suckers and sceptics" in *New Scientist* (Feb 4, 1994 p46), written by Alison Brooks, a palaeontologist. In it, while generally supporting the activities of sceptics groups, she questioned why so many of the public sceptics needed to be so earnest about their work.

It may only be a reflection of my own attitude to life, but I think she is right. As sceptics, we assert the right to question the claims made by others, especially when they make dogmatic but unsubstantiated statements about how the world works. However we, in our turn, run the risk of becoming equally dogmatic in our opposition to them. At the risk of stating the obvious, dogmatism and scepticism really do not belong in the same bed.

It is important for sceptics to keep a sense of perspective about the issues we deal with and, I suggest, equally importantly, a sense of humour. That has always been my aim in editing *the Skeptic* and I am grateful for your many notes that express your approval of that policy.

Sitting in this chair, I get to see publications from diverse sceptics groups from around the world and I do not believe that *the Skeptic* suffers from comparison with any of them. This is at least partly due to the fact that *the Skeptic* makes no pretense of preaching at people, or telling them what to think, preferring to suggest that they do think, rather than believe uncritically.

Barry Williams

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Australian Skeptics 1995 Annual Convention Melbourne University Queens Birthday Weekend June 10-12, 1995

The Victorian Skeptics have organised a full three-day programme for the largest Annual Convention ever, with an exciting list of prominent local and overseas guest speakers.

Speakers will include:

Dr Susan Blackmore from the University of the West of England, UK, a prominent psychologist, author and sceptic, whose investigations of near-death and out-of-body experiences are leading to a better understanding of the physiological and psychological reasons for these often misunderstood phenomena.

Professor Paul Davies, Professor of Natural Philosophy at Adelaide University, physicist and renowned author of such popular science books as *God and the New Physics*, *The Mind of God* and *The Last Three Minutes*.

And many other expert speakers, who will cover topics of interest to all Skeptics.

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News and Views

By an amazing stroke of (some might say spooky) fortune, some of our most esteemed media outlets (*ABC TV News*, *Sydney Morning Herald*, *The Age*) have just discovered that astrology is bunk.

Quoting a British astronomer from the Royal Astronomical Society, each of these worthy organs, during late January, presented amusing stories about a 'newly discovered sign' Ophiuchus (or Ochiuphus as the *SMH* dubbed it) and pointed out that the sun now no longer passes through the constellations that astrologers ascribe it to on the dates they claim.

This 'revelation' caused our Noble Baronet to splutter uncontrollably into his vintage port, for had he not penned one of his usually incisive contributions on this very point in this very journal ("What Star Sign are You Really", Vol 7, No 3) in 1987. And, as Sir Jim is the first to admit, the information was hardly original with him.

Just so we can appreciate the magnitude and timeliness of this 'scoop', the "precession of the equinoxes", caused by a 'wobble' in the earth's axis, the phenomenon that causes the sun to change its apparent position against the background stars, was first discovered by Hipparchus around 150 BCE, 250 years before Ptolemy, who established the rules of astrology used by modern astrologers around 100 CE. Ptolemy used a lot of Hipparchus' work, so he certainly knew about precession.

Not only that, but Ophiuchus didn't suddenly become one of the Zodiacal constellations in the past few months, but has been there for a very long time, probably ever since some ancient humans first decided to ascribe certain patterns to the stars they saw. (We would appreciate enlightenment from any of our astronomers or historians of science on this point.)

What, we wonder, could have caused these things to suddenly become 'news'

(which would seem to demand a new definition in light of these events)?

Could it be that British astronomers, because of the notoriously dodgy British weather, only get to see the sky every millennium or so, or could it be that our news media have only just discovered that astrology is crap?

* * *

Although we often give the astrologers a bit of stick, you can't help feeling sorry for them at times.

One such time is now, as indicated by a story in *New Scientist* (Jan 14, 1995). This story "Crowding in outer space", reports that astronomers David Jewitt of the University of Hawaii and Jane Luu of Harvard, whose discovery of a large trans-Neptunian asteroid was mentioned in this journal a couple of years ago, have now calculated that there are in the order of 35,000 of these objects, larger than 100 km across, circling the sun beyond Neptune's orbit. This compares with around 200 bodies of similar size in the Asteroid Belt between Mars and Jupiter.

For reasons known only to themselves, and which defy logic, astrologers ignore the Belt bodies, but do calculate the influence of Chiron, a similarly sized body that orbits between Saturn and Uranus, which happens to be much farther from Earth..

We suspect we are whistling in the dark, but we hereby warn anyone who feels inclined to pay good money to an astrologer to design a horoscope for them, that they should bear in mind that it will contain 35,000 unconsidered variables and is therefore likely to be extremely inaccurate.

Take our advice and insist that your astrologer include every influential body in the calculation; for \$80 or so, it will then represent good value for money, regardless of its accuracy.

* * *

Harry Edwards weighs in with these thoughts

Back in the winter of '93, I wrote a short article entitled "Pop Psychic Pabulum" (Vol 13 No 2 pp 8-9), in which I expressed the opinion that some women are their own worst enemies, referring to the female editors of womens' magazines who, by including astrology, numerology, past lives, aura readings, talks with the departed, and various other columns of psychic pabulum, feed their readers a load of drivel, underestimate their intelligence, and do absolutely nothing to encourage critical thinking.

The exception was *Ita*, a magazine published by Ita Buttrose, who aimed at the more mature reader by not including the above nor any gossip concerning the British royal family. The result - advertisers would not support her and the magazine folded.

To my mind, this reflects more on the advertisers than the readership, for they are cognizant of the fact that people who are not encouraged to be critical thinkers will also be more susceptible to the ploys used to sell their products.

The July 1994 issue of *Women's Weekly* included half-a-dozen pages of what I can only call an insult to any person's intelligence - "The Moon and your Moods" by Karen Mooregold, a chart supposedly representing the ebb and flow of one's moods; and the *Psychic Secrets of your Initials* by the *Women's Weekly's* "amazing" new clairvoyant Bridget Pluis, who also uses her psychic powers to advise readers on their present lives, reveal what the future holds, and pass on special messages from the "other side."

Bridget incidentally broadcasts from 9 pm to midnight each Sunday on Sydney's 2UE and Brisbane's 4BC. She also makes regular club appearances throughout NSW.

To solicit a message from the other

side, one is required to send Bridget a photo signed on the back and say if the person is still alive.

Apart from the fact that Bridget claims to have some remarkable talents, she still needs a photo to give her some clues and is evidently aware that she can be caught out by someone sending her a photograph of a deceased person.

The questions asked of the clairvoyant are pathetic to read, "My son is an Aries, did we know each other in a past life?" Answer, "Yes, he saved your life when you were set upon by bandits."

"My mum died late last year and I miss her very much. Is she alright?"

Answer, "Your mum is happy and with your grandmother."

Responding to a young man who sent in his photo, "The message I pick up for you is from a great-aunt...take care in September she advises."

Another reader, who sent a photo of her dog was concerned that her pet Rosie looked so sad and asked, "Can you tell me what she's thinking?"

Answer, "This beautiful old soul is a born worrier. If there isn't a ready-made worry, she'll invent one. She likes her owners to be reliable,

punctual and demonstrative so she can reply in kind. Very protective of the family, she will bark when strangers arrive, but apart from that she's the perfect lady. She assumes that it goes without saying that she's one of the family and would be horrified if a trip was planned without her."

Apart from being mainly a cold-reading for a typical dog, to my mind the expression on the dog's face said it all - "What a load of crap!"

* * *

We were delighted to hear of the results of the Michael Daley Awards for 1994, announced by the Minister for Industry, Science and Technology, Senator Cook, in December.

The Awards are named in memory of Michael Daley, the ABC's first

"The Environmental impact of Creation".

Ian's presentation was a reworked script from a talk he gave at the Australian Skeptics 1993 Annual Convention and all who heard it will long remember it as a classical example of Plimer at his caustic best.

* * *

In December, a crop circle appeared in land owned by the SA Agriculture Dept in Adelaide.

Not surprisingly, a number of people claimed that it was conclusive evidence of something mystical happening, with guesses ranging from UFO activity to mysterious earth energies.

We don't want to appear cynical, but the proximity to the Xmas holidays and the presence of a number of agricultural scientists, suggests a far more mundane explanation.

However, Peter Johnson, our Adelaide based cartoonist, has a novel idea, as shown at left.

* * *

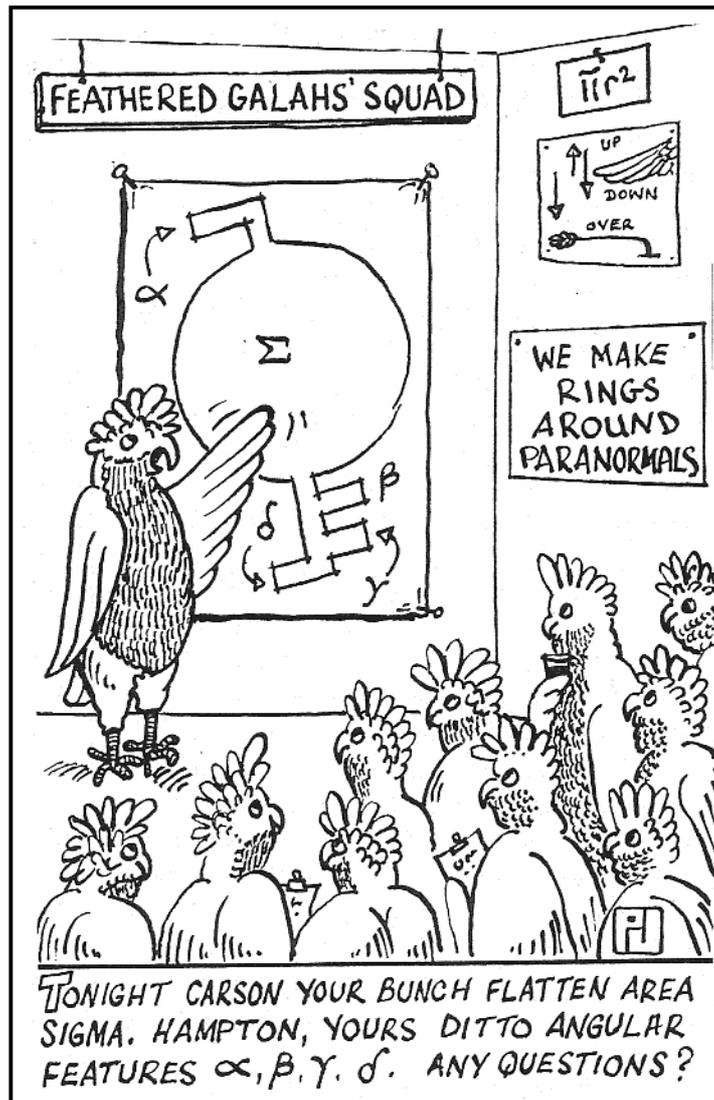
Newspaper reports in January told of a Huon Pine found in Tasmania that is estimated to be 10,500 years old. As this is about 4000 years older than the Earth, according to the

creationists, we will be very interested to read what rationalisation they attach to this find.

* * *

Long-time *Skeptic* subscriber, Prof John Storey from the University of NSW, was heard on Australia Day, broadcasting from the South Pole, where he was investigating sites for the establishment of the Australian Antarctic Telescope.

So let's hear it from everyone "Freeze a jolly good fellow".



producer of TV science and are sponsored by the Science and Technology Awareness Programme of the DIST, the Institution of Engineers, Australia and are judged by an independent panel.

An award for "Best radio entry" was made to Skeptic subscriber Karl Kruszelnicki for several entries under the heading *Great Moments in Science*

The "best entry by a communicator who is not a professional journalist", went to our very own Prof Ian Plimer, for an *Ockham's Razor* programme broadcast in January, 1994, entitled

REPORT

Never Mind the Body, the Spirit is Willing

Barry Williams

The Festival of Mind, Body & Spirit
Darling Harbour Exhibition Centre, Sydney
Nov 30-Dec 4, 1994

With a free (courtesy ABC Radio) ticket in my pocket and a couple of hours to kill, it came to me that it was time once more to gird my loins and investigate the Festival of Mind, Body and Spirit, that annual celebration of the vacuity of the New Age movement.

On my previous visit three years ago, in company with a 7.30 Report (ABCTV) crew, I bearded the New Age fraternity in their den and was thoroughly underwhelmed by the quality of the wisdom on display. This time I expected that nothing much would have changed, with the usual tinkling crystals, pyramids and 'elevator' music forming a familiar ambience, all heavily overlaid with the sickly odour of assorted and all pervasive incenses and perfumes.

I was somewhat surprised, then, to find that pyramids appeared to have almost disappeared as a universal panacea, and that crystals were far less ubiquitous than on the previous visit. The number of personal 'consultants' giving 'readings' seemed to have increased out of all proportion to the quality of the advice they were likely to be giving, although none seemed to be sporting the credentials of the Australian Psychics' Association (not surprisingly, given Harry Edwards' expose of that organisation in Vol 14, No 4). Astrologers, numerologists, Tarot readers and purveyors of who knows what mystical effluvia, rubbed elbows in the narrow confines of a crowded pen. It occurred to me that a keen-eared customer could easily get the benefit of several 'fortunes' for the price of one. Little matter that they were intended for someone else, as they were likely to be exactly as applicable to anyone.

Noting at one table ABC newsreader, astrologer and friend of Skeptics everywhere, Barry Eaton, I paused a while in my perambulations to exchange some good natured banter with prominent astrologer, Gary Wiseman, who attested to the success of the affair.

Scattered throughout the hall was the usual plethora of vaguely 'greenish' claimants, predicting the imminent demise of the planet, and all on it; familiar dolphin pictures competed for attention with various nostrums guaranteed to cure every known ailment. One stand even offered the good oil on Angels, the latest fad to exercise our American cousins.

The atmosphere was, as is usual in events of this nature, redolent with mystical perfumes, reminding my untutored, and decidedly Old Age, nose of nothing so much as those

sickly 'crystals' that used to nestle in the pub urinals of my youth. Perhaps the crystal connection was significant.

One stand that nonplussed me more than a little, hawked the wares of the Creation Science Foundation, although it was not that worthy organisation's name appearing on the fascia board. What, I thought to myself, is the last bastion of Christian fundamentalism doing, rubbing shoulders (not to mention cheeks and jowls) with the front line practitioners of the occult? Then it occurred to me, in the finest traditions of hucksterdom, where else should one expect to find such a body? After all, they are all after the same audience (and the same dollars).

An obvious departure from the previous event consisted of the number of different forms of massage on show. Practitioners of shiatsu, reiki, rolfing and one named kreuzfeld? kransky? feldspar? (something like that) jostled with each other in order to lay their hands on the bodies (and wallets?) of the willing rubes. Massage is definitely IN in the New Age (1994 vintage), it would seem. Pretty harmless, you might think. After all, a nice massage of tense muscles, especially if performed by a loved one, is a very pleasant experience, leading perhaps to all sorts of unintended consequences. Even, if recent TV advertisements can be believed, to worthy national cricket captains becoming fluent in Chinese dialects. But if you do think that, you are probably thinking of a massage as a dynamic operation, in which the operator pulls, knuckles and pummels the muscles of the recipient, leading to a feeling of well-being and all round *bonhomie*.

This does not appear to be the case with the New Age massages which are more in the nature of static exercises. On several stands I was confronted with rows of people sitting on plain kitchen chairs, each with another individual leaning on their shoulders. They reminded me of nothing so much as those posed Edwardian wedding photographs we sometimes come across in our grandparents' photo albums. In other stands, the operators appeared to be suffering from a lack of visual and tactical acuity, as they were massaging the air several inches above the flesh of their recumbent charges. It all seemed to be a little bit nebulous to me. But then, isn't that the signature of the New Age movement?

On the way out, I noticed in the hall next to the Festival of Mind, Body and Spirit, a Golf Show. In each case, the entry fee was \$10.00. Curiously, while the MB&S show was packed with people, the Golf Show appeared to be relatively sparsely attended, the main distinction between the audiences being that the golfers were somewhat better dressed. ■

PSEUDOSCIENCE

Eclipse of Krystal Starshine

Harry Edwards

Clairvoyance: The ability to see things not visible to the normal human eye; second sight. Intuitive sagacity or perception; mind-reading.

Appearing in a small but nevertheless interesting bi-monthly South Australian mag *Investigator* (No 39), whose editor Bernhard Stett sympathises with empiricism and science, was a list of predictions submitted by one Krystal Starshine. She was evidently motivated to submit the predictions after reading about the competition in *the Skeptic* (Vol 3, No 4).

In *Investigator* No 40, she refers to them as “pathetic”, and after telling Jeane Dixon to move over, Nostradamus to turn in his grave, and Athena Starwoman to hide her face, Krystal believes her talent outshines them all, claiming that her predictions have already started their remarkable fulfilments.

Confidence is one thing, cocksureness another, and on perusing her list of predictions and the claimed hits, I find it difficult to concede that her talent extends beyond that of Mr and Mrs Average whose prognostications for the future are mundanely based on what they read, see or hear via the media.

Before Krystal Starshine floats off the planet in a cloud of flatulent self-aggrandisement, she should learn to differentiate between a prediction using clairvoyance or paranormal ability, and a prediction arrived at by using the laws of probability or a pragmatic consideration of political and socioeconomic trends. Further, predictions unconstrained by a definitive time frame will almost inevitably come to pass, although most of us won't be around to see them, eg the end of the world! Krystal gives herself two years latitude, hardly indicative of crystal-clear clairvoyance.

First let's set the record straight. Krystal says the predictions in *the Skeptic* Vol 13, No 4, were pathetic. I agree - they were meant to be! The idea was to show just how ambiguous, general and self-evident are predictions by professional prognosticators, using exactly the same criteria employed by Miss/Mrs/Ms Starshine. Now let's take a close look at some of our prognosticator's “remarkable fulfilments” listed in Vol. 40, p 9 of the *Investigator*.

Tourism increases in SA. The ABS figures show that it also increased in NSW, QLD, WA, VIC, TAS, and the NT.

Confining ourselves specifically to SA, I would presume the TV ad or other pertinent information in the press was mooted well before it appeared, allowing Krystal prior privy through a very mundane source. An excellent example of the

way this works entitled “Old Moore's Mice” can be read in *the Skeptic*, Vol 14, No 10 p46.

Inflation & interest rates increase in Australia. Anyone who reads a newspaper, listens to the radio, or watches the TV news would have to be deaf, dumb and blind not to be aware of the trend in interest rates and inflation.

Price rises in Russia cause discontent. Is Krystal living in a time warp? This has been ongoing for the past three years!

Surprise winner in Melbourne Cup. Exactly what does Krystal mean by ‘surprise’? A long shot? In the past 130 years some forty-five horses starting at 15/1 or longer odds (including three at 100/1) have won the Cup. A ‘surprise’ on average every third Cup race meeting. A real ‘surprise’ would be if the race was won by a donkey or a cow. I note she didn't pick the winner!

Hollywood celebrity with the initial B dies. There are tens of thousands of Hollywood celebrities - film stars, singers and artists of one sort or another, producers, directors etc. Several die every year. Our prognosticator just fluked one with the letter B in his name. Picking almost any other letter would have stood the same chance.

Chess playing computer beats world champion. You can't win them all. Even champs have their off days.

New Revelations about the Prince & Princess of Wales. Like *The Days of Our Lives*, *The Young and the Restless* and all the other soopies they go on for ever *ad nauseam*. So what's new pussy cat?

Floods in India and USA. Floods are endemic to the Indian sub-continent and south-east Asia, as are hurricanes to the southern states of the USA, earthquakes in California, Japan, Indonesia, South America, Turkey and New Zealand. Had Krystal forecast no floods or hurricanes, or snow avalanches in the Nullarbor, I would have been impressed had it come to pass.

Bushfires in Australia. Try and recall one year when there weren't any!

Kuwait Borders recognised by Iraq. Well I guess some people eventually have to admit when they're licked.

New Medical advances against cancer. There is hardly a month goes by without the mention of an advance in medicine. Cancer being one of the most thoroughly researched, it is

Continued p 10...

SCIENCE

Of Asteroids and Aliens

Duncan Steel

This article is a pre-emptive strike. In a scientific journal called *The Observatory* will appear shortly a paper in which I make the suggestion that an object observed in the Earth's vicinity (astronomically-speaking) in late 1991 was perhaps an alien probe.

However, I do not *believe* that it was such an (hypothetical) object. To me, as a practising scientist, that makes good sense: if you come to a certain conclusion then you should make that conclusion clear, regardless of your personal beliefs (for which read 'biases'). When I looked into the data pertaining to this object, I found that a case could be made for it being of unknown provenance (ie alien), so it is good practice to say so. But I anticipate that various UFOlogists, journalists and other yahoos will say that 'astronomer believes object was an alien spacecraft,' when I don't; but it is a plausible explanation. I just want to put on record somewhere that I *don't* believe it to have been an alien object, and where better to do that than in *the Skeptic*?

The facts are these. In early November 1991 a peculiar object was spotted by Jim Scotti, using the so-called Spacewatch telescope at Kitt Peak in Arizona. That telescope is the first fitted with a CCD video camera to be used for routine searching for asteroids and comets near the Earth, and the team there have made many pioneering discoveries.

The object in question is called 1991 VG, which is an asteroidal designation: 1991 tells you the year, 'V' means that it was found in the first half-month of November (that being the 21st half month of the year, V being the 22nd letter in the alphabet, and we don't use 'I' since it could be confused with a '1'), and 'G' means that it was the seventh object classified in that half-month. So that's the terminology.

Most asteroids found are in the main belt between Mars and Jupiter, but the name of the game for the Spacewatch folk, and my own group at the Anglo-Australian Observatory, is looking for asteroids on eccentric Earth-crossing orbits (which could, at some time, hit our planet). 1991 VG was on an Earth-crossing orbit, and was found very nearby, astronomically-speaking: about seven times as far away as the Moon.

The observations obtained by Scotti soon showed that its orbit was very similar to that of the Earth, having an orbital plane less than half a degree inclined to our own, and a near-circular path. Its brightness suggested that it was only 8 to 20 metres in size, depending upon how much sunlight one assumes that it reflects. The suggestion was therefore made that this was not an asteroid at all, but actually a rocket booster

which by chance had returned whence it came. That idea was boosted by observations from the European Southern Observatory in Chile, which showed that it appeared to flash. Such flashing is often seen in the case of artificial satellites going overhead, with occasional glints occurring as they spin and some flat metallic face catches the Sun.

So, it appeared that 1991 VG was not an asteroid after all, but some artificial object. Another thing counting against it being a natural asteroid was its orbit: such a very Earth-like orbit would lead to close approaches to the Earth every 50 years or so, with the terrestrial gravity then causing the orbit to be changed (as was actually observed). If it were a natural body, it would need to have arrived in such an orbit within the past millennium or so, which is unlikely. For example, one possible origin would be as ejecta from a massive impact on the Moon, but those occur infrequently, and in any case the flashing observed could not be explained in that way.

Another way of phrasing what I'm doing is this. Three possible origins for 1991 VG come to mind, and for each we can estimate a probability. One is that it is/was an asteroid; call that probability A. The second is that it was a man-made body returning to our vicinity, call that probability B. The third is that it was of alien origin, call that probability C. Those three probabilities sum to unity: $A+B+C=1$. In the presence of perfect information, one derives a value of one for one of them, and zero for the other two. But we don't have perfect information (as is the case in most scientific investigations), so we have to assess A, B and C as best we can. So far I have found that A is small (it seems unlikely that it was an asteroid).

Next I attack B. 1991 VG had an orbit slightly bigger than that of the Earth, meaning that it *could* (not *would*) come close to the Earth once every 16.75 years. That means that an approach early in 1975 was possible, and also in early-to mid-1958 (although an approach in 1975 could have altered the orbit by enough to make an approach perhaps in 1959 feasible). An inspection of the records of mankind's launches into space showed that there were no candidates from 1975. In October 1974 the Russian Luna 23 was sent to the Moon, and hit it, so count that one out. I thought that the upper stage from the American launch of the German satellite Helios 1 in December 1974 was a possibility, but then I learnt that it was put back into geocentric (rather than heliocentric) orbit. From the earlier period there were no candidates until late in 1958 (and of course the space age began only the year before), but none of these could be made to fit the observations unless

some force acted upon them which was not known to have occurred (like fuel left on board venting due to a leak, or perhaps solar radiation pressure giving a push).

The consensus, though, was that 1991 VG could not be linked with surety with any launches in the late 1950s or the mid-1970s. Another possibility was one of the Apollo upper stages used in the Moon landings, which could be suggested to have hung around in orbit near the Earth and Moon for a few years, and then escaped (unobserved) in 1975. Again, this would be hypothesising an event which is not known to have occurred.

Even if one were to accept the possibility that 1991 VG was a man-made rocket body returning to our vicinity, one then might estimate the probability that it would be spotted. Only the Spacewatch telescope is capable of discovering such small, faint, moving objects (which is why our knowledge of small asteroids has been revolutionised since Spacewatch began operations in 1989). Using the amount of sky which is covered in its scans, and the number of nights each year in which observations are made, and so on, I estimated that there was about a one-in-2,000 chance that any arbitrary object with the brightness of 1991 VG would be spotted, given that it came somewhere within the geocentric distance occupied by 1991 VG when it was found (about 3.3 million kilometres). Passage within that distance, assuming that 1991 VG was not under control, occurs about once every 50 years. Thus if 1991 VG were a solitary, uncontrolled rocket body, one would expect Spacewatch to spot it about once every 100,000 years. On that basis one has to conclude that B (the probability of it being a man-made object) is very small.

Since we know that $A+B+C=1$, and we have derived small values for A and B, that implies that C must be substantial. It is on that basis that I suggested, very tentatively, that it is a candidate as an alien spacecraft. In fact my bias says that it was a man-made body, but a scientific analysis indicates that this would require a fluke to have occurred. That is, *a priori* its discovery was unlikely; but *a posteriori* things are as they are, not as we might believe them to be.

There is also another piece of evidence that supports the 'alien probe' interpretation. Although 1991 VG was first spotted when it was 3.3 million kilometres from the Earth, it actually passed just 485,000 kilometres from our planet. If it were an uncontrolled object (either an asteroid or a fluke returning man-made rocket body) then passage within that 3.3 million kilometres would occur at a random distance. Only about one in 40 would come within 485,000 kilometres. That argues for it indeed having been under control: an alien probe coming to take a look at us, but keeping a distance away at which they thought they were safe from detection (well beyond the grasp of military radars). One might object that the same sort of statistics would apply for an alien craft as outlined above for man-made craft (one discovery per 100,000 years), but that would be in error: if this were an alien craft under control then it could buzz repeatedly past the Earth, but under free flight (as observed) whilst within

the grasp of our telescopes.

OK, one last time, I don't believe that 1991 VG was an alien object, but the simple analysis above does lead to the conclusion that it is a decent candidate for consideration. Most of us have heard about the Search for Extra-Terrestrial Intelligence (SETI), which seems to be the only science with nothing to study (just pulling their tails). A sub-division of that is SETA, or Search for Extra-Terrestrial Artifacts. All I'm suggesting is that the SETA people might at least have something to argue about. And some Skeptics might like to put in their two cents worth too. ■

...Krystal Starshine from p 8

inevitable that progress and an announcement to that effect will be made periodically.

Contact with Space aliens not made. Credit where credit is due Krystal, but then you couldn't really miss with that one could you! What's more you can use it next year, the year after, the year after that and so on *ad infinitum* and you'll be spot on every time!

Going through the list of predictions in Volume 39 I would aver that several more of them will come to pass simply because they are based on the laws of probability and statistics.

Gold price passes \$US400. Over the past five years gold has fluctuated between \$US370 and \$US390, but hasn't passed \$US400. With time it probably will. So with no time frame constraints Krystal will eventually score a hit. But of what use is the information? When do I buy and sell?

A famous psychic makes a correct prediction. Given the number of so called "psychics" around the world, and the hundreds of thousands of predictions made every year, sooner or later the odds are that one of them will have to get it right.

As for the disasters and political forecasts, again you have this vague time frame "the immediate future", and the laws of probability in their favour. How "immediate" is immediate?

I'm afraid so far Krystal does not even qualify for the amateur league, it would be a waste of time, presumptuous and pretentious to submit a list like this to the Skeptics and call them predictions. I'm not psychic, but by applying the laws of probability I have made far more specific forecasts, in some cases accurate to within a day or so as my article published in *the Skeptic* Vol 9 No 3 p 50 will show.

For Krystal's information a prediction worthy of its name should consist of the name of the person, place or event, and the exact date and time.

I would also recommend that Krystal and readers of *Investigator* read my articles, "Predicting the Future, Parts I & II," in *the Skeptic* Vol 13, Nos 2-3, which explains in detail how to predict the future with reasonable accuracy. ■

HISTORY

Building Pharaoh's Mountains

Barry Williams

In 1988, I wrote "Pyramids, Pyramyths and Pyramidiots" (Vol 8, No 3) in which I looked at the many strange ideas which had grown up about the pyramid, both as a solid construction and as a geometrical shape. Since then, although the pyramid appears to have declined in importance as a cutting-edge New Age cure-all, its shape still exerts a peculiar influence over the minds of those who have a desperate desire to believe.

In particular, the Egyptian Pyramids and more specifically the Great Pyramid of Khufu, located on the plateau of Giza on the outskirts of Cairo, seem to fascinate those who wish to believe that the world is a more mysterious and magical place than it actually is. In this article I will look in more detail at just how these remarkable structures came to be built and show that, far from representing evidence for lost civilisations or star travelling extraterrestrials, they are entirely consistent with, and stand as a tribute to, the abilities of the very human people of their time - people who were no different, in any material respect, from us.

History

To begin with, we need to know just a little of the history, geography and religion of Egypt, a nation which lasted as a continuous culture, and was a powerful player in its world, for almost 3000 years, beginning with unification in c 3150 BCE and ending with the death of the last native born Pharaoh in 332 BCE.

To put this into context, many of the other major political entities of the ancient world lasted for less than a couple of centuries, the Roman Empire for around 800 years, and in modern times, the European empires, usually less than 200. Even the British Empire, by far the largest of all, was only a major power in the world for around 300 years. Or, to make the point about the time scale of Ancient Egypt even more starkly, the Egyptians from the reign of Ahmose II (26th Dynasty) onwards are closer in time to us than they are to their ancestors of the First Dynasty.

Historically, Egypt was ruled by god/kings, known to us as Pharaohs, the name in Egyptian originally meaning the king's palace ie the Great House (note the interesting parallels with modern usage eg "the White House said", "a spokesman for No 10 claimed", "the Kremlin reports" [but fortunately not as yet "the Lodge demands"]). These kings are conventionally grouped into 30 Dynasties, following from the Egyptian History of Manetho, a Greek-Egyptian priest who lived in the 3rd century BCE. During the following

Persian and Greek (Ptolomaic) periods, the rulers of Egypt assumed the titles and forms of the Pharaohs and these are sometimes added to the original 30 dynasties.

For convenience, Egyptian dynastic history is broken down into various periods:

Early Dynastic	Dyn I-II	3150-2686 BCE
Old Kingdom	Dyn III-VI	2686-2181
First Intermediate	Dyn VII-X	2181-2040
Middle Kingdom	Dyn XI-XII	2040-1782
Second Intermed	Dyn XIII-XVII	1782-1570
New Kingdom	Dyn XVIII-XX	1567-1070
Third Intermed	Dyn XXI-XXV	1070-525
Late Period	Dyn XXVII-XXXI	525-332

Geography

The kingdom of Egypt consisted of the very fertile Nile Delta (Lower Egypt) and a narrow strip of arable land on either side of the Nile Valley (Upper Egypt), which was kept fertile by the deposition of silt during the regular annual flood. Throughout most of Egyptian history, it stretched from the Mediterranean in the North to the First Cataract (at Aswan) in the South, a country 1000 km long and on average 30 km wide, giving an estimated usable land area of around 34,000 sq km (about half the area of Tasmania). Although at various times of imperial expansion, Egyptian conquests extended its territory as far North as Syria and far to the South into what is now Sudan, the core of Egypt remained the land between the First Cataract and the Delta.

The Nile was the most important fact of Ancient Egypt, guaranteeing its agricultural wealth (an estimated 10 metres of silt has been deposited in the Nile Valley during historical times) and acting as the main transport corridor for this long, narrow land.

Religion

The Egyptian religion was very complex, with many gods originally associated with local settlements. Re, the sun god was the primary deity and the personal god of the Pharaoh, who was also considered to be the son of Re. Royal succession followed the female line with, ideally, the king being the son of the preceding king and his Great Wife (the heiress to the line). In some cases, when another individual assumed the kingly role, he assured his legitimacy by marrying the heiress (often his sister and occasionally his mother).

Burial customs

There is evidence of nomad hunters moving into the Nile region as long as 15,000 years ago and, over time, some of these appeared to have settled down and taken up agriculture, which was invented in the Middle East and probably brought to Egypt from that area. Some traces of late palaeolithic sites and early farming settlements have been found, but it must be remembered that more civilised societies have been building over these sites for 5,000 years, so it is unsurprising that not a great deal is known about the pre-Dynastic Egyptians.

One of the facts that has emerged from this time concerns the burial customs of the earlier settlers; bodies in an excellent state of preservation have been found in simple graves in the sand. They are almost always found lying on one side, with the knees drawn up to the chest, wrapped in a mat and with some personal items beside the body. There is no evidence of any special methods having been used to ensure preservation; it appears to stem fortuitously from the rapid desiccation of the corpse by the extremely dry and hot sand.

Later burials are in brick-lined graves which probably had sand heaped over them and there is some decoration evident. It is reasonable to suppose that the mummification and funeral rituals of later Egyptians derived from this accidental preservation of their predecessors. Unfortunately, some of these rituals appear to have done more harm than good, as dynastic mummies are often in a far worse state of preservation than the earlier bodies. There is, however, no doubt that a major part of the Egyptian religion concerned survival into the afterlife and that this very much depended on the survival of the mortal remains of the individual.

Before the Dynasties

Not a great deal is known about the civilisations which grew up along the Nile prior to the establishment of Egypt as a single entity, but there is plenty of circumstantial evidence that two kingdoms must have existed in the latter part of the third millennium BCE, one based in the Delta and one in the Valley.

Then, sometime between 3150 and 3050 BCE, a king whose name appears to have been Narmer (later Greek historians referred to him as Menes) [just think, with a couple more letters he could have been Menzies], is seen on two carved pieces wearing both the White Crown of Upper Egypt and the Red Crown of Lower Egypt. He is generally credited as the king who unified the two kingdoms and all future kings had among their titles "King of the two lands". The next king of whom there is good evidence is one Hor-Aha [one is tempted to think that this is what he exclaimed on being promoted, but that is foolish conjecture, so I will resist the temptation]. He was probably the son of Narmer and is credited with being the founder of the First Dynasty in about 3050, setting up his capital at Memphis (near the present day Cairo). This was to remain a major city, though not always the capital, throughout Egyptian history.

During the First Dynasty the kings began to build large tombs as a prelude to the afterlife and to preserve their remains from the depredations of the elements and from grave robbers, although none of them has been positively identified with a particular king. This is not germane to our story, but the method of tomb construction is. The oldest of these tombs consisted of a burial pit, roofed over with planks, walled into separate compartments, one of which presumably contained the body and the remainder containing the possessions of the deceased to give him comfort in the afterlife. Above the burial pit was built a large, rectangular, decorated brick superstructure which contained compartments for the storage of food, wine and other useful items. This type of brick tomb we call a mastaba, after the Arabic word for the step found outside modern Egyptian houses, which they resemble in shape.

As time went on through the first two dynasties, the burial chambers of the kings were made deeper and more complex, while the superstructure became larger and more highly decorated. Presumably this was partly because even this early in Egyptian history there was the fear of the desecration of the king's tomb and remains.

Pyramids

Then, in the Third Dynasty, (2686 BCE and considered to be the beginning of the Old Kingdom) someone had the bright idea that stone would be a better and more permanent building material than sun-dried mud bricks.

Evidence suggests, and it is generally accepted, that this individual was one Imhotep, described in a contemporary inscription as "The Treasurer of the King of Lower Egypt, the First after the King of Upper Egypt, Administrator of the Great Palace, Hereditary Lord, the High Priest of Heliopolis, Imhotep the builder, the sculptor, the maker of stone vases...". Certainly a man of many accomplishments and arguably the best known Egyptian who was not a king. He was revered by later Egyptians as a scribe, doctor, astronomer and all round good bloke and he was subsequently deified during the Late Period, more than 2000 years later. [It is tempting to think that he may have introduced himself to others as "I'm Hotep, who are you?", but I have resisted such temptations in the past and I will continue to do so here.] The king to whom Imhotep was such an invaluable servant is known to us as Djoser or Zoser, (also known to the later Greeks as Tosorthos and described on his monuments as Netjerikhet) the second king of the Third Dynasty, who reigned c2668-2649.

Imhotep selected a site for his king's tomb at Saqqara to the northwest of Memphis. On this site he constructed the first really large stone structure ever built. He began by constructing a stone mastaba in an uniquely square shape, approximately 207 feet on each side and 26ft high (I will use imperial measurements in the descriptions of the pyramids as these are the measurements given in my reference, *The Pyramids of Egypt* by IES Edwards.) It was built of local stone and faced with fine limestone, with the four faces

roughly oriented to the four cardinal points. When it was completed, it was extended by 14ft on each side and again faced with dressed limestone, although the height of these extensions was two feet lower than the central box. Then another enlargement of 28ft was added to the east side, making it a stepped, and now rectangular, mastaba. A further three steps were added on top of this, but, before this was completed, further extensions were added to the north and west sides and the whole structure was completed as a six step pyramid. The final dimensions were 411ft east to west, 358ft north to south and 204ft high. This extraordinary structure formed only the centrepiece of a huge complex, 1800ft long and 900ft wide, totally enclosed with decorated stone walls and including buildings and courtyards used in the funeral ceremonies. These buildings, though full sized were only replicas and their interiors were filled with stone. The burial chambers under the pyramid are considerably more complex than in any of the later pyramids, consisting of shafts, tunnels and chambers which also show that many changes in design were undertaken during construction. It really was a most remarkable feat of design and engineering. Nevertheless, there are many signs that the builders were not entirely comfortable with the new techniques and materials; just what we would expect in any entirely new enterprise.

In the construction of the Step Pyramid there is no indication of any external influences by advanced civilisations from either Atlantis or the stars. There is plenty of evidence of a highly intelligent people learning a brand new skill (working with stone); of a highly organised society able to undertake major works; and of a driving force aiming for something special. It has been conjectured that the Step Pyramid was seen as a staircase to enable the dead king to join his father Re in heaven, but this is only conjecture - we just don't have enough evidence to determine what motivated Imhotep and his royal master.

I have no intention of describing in detail the pyramids built by Djoser's immediate successors; enough to say that they did build pyramids, of a much lower standard and smaller than the Step Pyramid. Perhaps the cost of construction of Djoser's masterpiece had impoverished the kingdom.

Then, at the beginning of the Fourth Dynasty, (c 2613) someone decided to convert the step form into a true pyramid. At Meidum, about 50 km south of Memphis, a building was commenced as a step pyramid and again several changes of design during construction are evident. The interesting thing about this pyramid is that, at some time during its history (perhaps even during construction), it collapsed, for reasons we cannot tell for certain. Its remains resemble a rectangular tower standing in a huge hill of rubble.

About 40 km north of this, at Dashur, we find the next pyramid, belonging to Snefru, the first king of the Fourth Dynasty. This again is different from what we think of as a true pyramid. It begins with a slope on the sides of 54 and, at 160 ft above the ground the slope decreases to 43 . This is known (for obvious reasons) as the Bent Pyramid. Some have

suggested that this change was made when the Meidum pyramid collapsed and the slope was reduced to prevent another collapse. Though plausible, this idea is not supported by concrete evidence. To the north of this pyramid, we find the first true pyramid, also belonging to Snefru. Called the Northern Stone, or the Red Pyramid, this was built at the conservative angle of 43. All of this shows that the Egyptians were still learning as they went along.

The Great Pyramid

Now we move north again to Giza, on the outskirts of modern Cairo. Khufu (Cheops in Greek), the son of Snefru, ruled c2589-2566, and began work on the greatest piece of construction ever attempted in the ancient world. It represents the culmination of everything the Egyptians had learned about pyramid construction and, although many subsequent pyramids were constructed, none of them could match the sheer scale of the Great Pyramid of Khufu. Probably no building in the history of the world has excited so much interest, nor so many peculiar hypotheses, as Khufu's great monument. And there is little wonder that this should be so, because it is indeed a very remarkable piece of work.

Khufu's pyramid differs in some other respects from its predecessors. Until this stage, the kings' burial chambers had been hewn out of the rock beneath the pyramid or built at ground level, with the pyramid superimposed above them. A subterranean chamber was apparently the original intention of Khufu, as a corridor descends into the rock of the Giza plateau, terminating in an unfinished chamber. Then, at some stage during the construction it was decided that the burial chamber should lie within the superstructure of the pyramid. A narrow ascending corridor (known, surprisingly, as the Ascending Corridor) was cut through the already completed levels, meeting a short horizontal corridor which ends in another chamber which is generally (and incorrectly) known as the Queen's Chamber. This room is a short distance above ground level and directly beneath the apex of the pyramid. Two small passages, about 8in square lead upwards at an angle of about 38 from the north and south walls of this chamber. Until recently, these were believed to end within the masonry and were regarded as evidence that the chamber had been abandoned unfinished. In 1994, however, a small robot camera was sent up one of these passages and discovered a metal door at its end. To this date, we have no idea what lies behind the door, but I will go out on a limb here and bet that it will not be evidence of extraterrestrial visitors [it may, on the other hand, contain a message which says "Kilroy was here", in perfect hieroglyphics, of course].

But the changes in the pyramid did not end here. Above, and continuing on from, the Ascending Corridor, we come to a remarkable piece of architecture. The Grand Gallery is 153ft long, 6ft 9in wide and 28ft high to the peak of its corbelled roof. At the end of the Grand Gallery, a horizontal passage leads to the King's Chamber, built of granite and measuring 34ft 4in east to west, 17ft 2in north to south and

19ft 1in high, which is offset to the south from the vertical centreline. From the north wall, a small shaft penetrates to the outer surface of the pyramid at an angle of 31 and from the south wall, a similar shaft ascends to the outside at 45. The purpose of these is unknown but hypotheses have been advanced that they pointed to important stars in the Egyptian cosmology.

These hypotheses may be correct, but, as with so much about the Egyptians, we just don't know. The King's Chamber has a flat ceiling, consisting of nine granite slabs averaging 50 tons each in weight. Above this are four other flat roofed spaces and one pointed roof, presumably designed to relieve the stress of the remaining masonry on the ceiling of the King's Chamber. On one of the walls of one of these relieving chambers is found the only known mention of the name Khufu in the entire pyramid. Curiously, the only known representation of this very important king is a 7.6 cm high ivory statue, found somewhere else. [To me, he bears a resemblance to King Sihanouk of Cambodia, but I don't want to start another crank theory.]

All of the construction methods used in the Grand Gallery and the King's Chamber shows that the Egyptians had no concept of the arch but they do represent the best methods of construction using contemporary techniques and materials. They are not the sort of thing one would expect from advanced external civilisations. That most of them have subsequently cracked, but none has collapsed is evidence that it was not a bad technique at that. The King's Chamber contains a granite lidless sarcophagus, which is about 1 inch too wide to have been brought in through the Ascending Corridor, so it must have been installed during construction. Various devices were included in the pyramid to block these passages with blocks of stone and none of them succeeded in keeping out tomb robbers. No item belonging to the king's burial has been found and the pyramid was almost certainly breached in antiquity. Another, roughly built, tunnel leads from behind where these blocks were placed to enable the masons to escape after their work was done.

The completed pyramid was faced with dressed white limestone (almost all of which has now been removed) and must have been a truly remarkable sight to contemporary and later Egyptians. The pyramid had the name "Khufu is one belonging to the horizon" (each of the pyramids had a name extolling the virtues of its owner) which no doubt derived from some religious purpose. It is useful always to remember that the Pharaohs were in fact gods to their people and in death were believed to have joined their father, Re, the sun god, so a certain hyperbole in description is to be expected.

And the pyramid was not the only construction associated with this monument. Each of the pyramid complexes included a Valley Temple, on the Nile bank, a covered causeway leading up to a number of large constructions beside the pyramid, all of which have disappeared. In 1925, a vertical pit was discovered, at the bottom of which was found the funeral accoutrements of Queen Hetepheres, Khufu's mother.

Her body was not found in this tomb and may have been buried elsewhere. This find gives us some idea of the artifacts in use at that time and is one of the greatest ancient treasures ever found. Then, in 1954, another pit was discovered to contain a dismantled cedar boat. About 141ft long, this boat has subsequently been reconstructed, and is in a specially designed museum at Giza.

Khufu was succeeded by his son Djedefre, who only reigned for eight years and left a, now ruined, pyramid at different location, then by another son Khafre who was responsible for the second pyramid at Giza (the one that actually looks taller than the Great Pyramid because it is built on higher ground). This pyramid is roughly 50ft shorter in each of its base dimensions, 8ft lower in height, and not as well built as its predecessor, though more of its associated buildings remain. Khafre is also credited with the construction of the Great Sphinx, which is located near his valley temple. The third, and much smaller pyramid (356ft square) at Giza belongs to Menkaure, son of Khafre. The Giza complex also contains a number of very small pyramids, assumed to belong to wives of the kings.

Later kings of the Old Kingdom continued to build pyramids, though much smaller (typically 250ft square) than those of Giza, and largely of rubble or mud bricks, cased with limestone. At the end of the Sixth Dynasty, centralised government seems to have broken down only to be restored after about 150 years. Twelfth Dynasty kings c1900 reinstated the construction of pyramids, but these consisted largely of mud brick and were far inferior to those of the Old Kingdom.

To recapitulate, the construction of stone pyramids began in the reign of Djoser (2668-2649) and reached its peak in the reign of Khufu (2589-2566), little more than 100 years. Compare this with our achievement of powered flight in 1903 and putting a man on the moon in 1969 and I don't think the Egyptians suffer at all from the comparison.

Let us now consider a few facts about the Great Pyramid:

Length of the four faces at ground level:

North	755.43 ft
South	756.08 ft
East	755.88 ft
West	755.77 ft

Thus the difference between the longest and shortest sides is only 7.9 inches.

Angles at the corners:

North-east	90 3' 2"
North-west	89 59' 58"
South-east	89 56' 27"
South-west	90 0' 33"

Height (originally)481.4 ft (of which the top 31 ft are now missing)

Slope angle	51 52'
Base area	13.1 acres

Alignment errors to the cardinal points:

North side	2' 28" south of west
South side	1' 57" south of west
East side	5' 30" west of north
West side	2' 30" west of north

All of which appears to be near enough for government work. (Although Khufu's pyramid is the most exactly aligned to the cardinal points, most of the others of this time are true to within less than 15')

It is estimated that the structure contained approximately 2.3 million separate blocks of average weight 2.5 tons. It is impossible to be more accurate as in the centre of the base there is a core of the natural rock of the Giza plateau, the size of which cannot be determined. At 5.75 million tons, it is the heaviest building ever constructed and, until the 19th century CE, it was the tallest.

Construction methods

We now know what was built, but we need to ask, how was it built. The simple answer is that we do not know for certain. Little in the way of written records have been found from this early period of Egyptian history, but we can make some fairly confident deductions from what evidence remains.

How was the base levelled (13.1 acres, remember)? In the case of the Great Pyramid, and presumably for others, the whole base area was not levelled. In this case, a large outcrop of the native rock was left in place in the centre. But the perimeter of the Pyramid stands on a level base, which is important to ensure that the construction goes up straight. We can be quite confident that a mud wall was built around the perimeter of the base, the space inside being filled with water. Then a network of trenches was cut in the bedrock, so that the bottom of each trench was the same distance below the surface (which would have to be constantly topped up to account for evaporation). The water was then drained off and the remaining rock chipped down to the level of the bottom of the trenches. An example of this trench grid remains near the Second Pyramid. It has been estimated that the base of the Great Pyramid is level to within half an inch between the north-west corner and the south-east corner. There is even a suggestion that the prevailing winds may have accounted for this minor imperfection by 'piling up' the water in this corner.

Where did the stone come from? Most of the internal stones were quarried on site on the Giza Plateau. The limestone casing stones came from Tura, on the opposite (eastern) bank of the Nile. Rocks were quarried by cutting grooves along three sides with copper chisels and using wooden wedges to split the rock away from its base. Partially cut blocks from later periods are still in place in quarries and show how this

was done and samples of copper chisels and saws are still in existence.

How were the rocks moved? On flat ground on sledges, pulled by men. A 2.5 ton block could be moved by as few as four to six men and later illustrations show teams of 150 or more pulling giant statues weighing 60 tons using this method. Getting the stones up an increasing pyramid would have posed more problems. It is known that the Egyptians used levers in their work and we assume that they built ramps up the sides of the growing structures. Remains of ramps have been found near some pyramids, but a modern attempt to build a small scale pyramid shows that by using levers and billets of wood, a stone can be lifted to a higher course efficiently and that may have been the method used, but we do not know for certain. It remains a fact that the technology known to be available to the pyramid builders was sufficient to do the job. Remember that in a pyramid, 70% of the mass lies in the lower third and 80% lies in the lower half of the structure, so the job, though difficult is not quite as difficult as might be at first imagined.

Who did the work? The technical work would have been carried out by skilled artisans, who no doubt were employed year round. The heavy lifting work was probably done by ordinary workers (mainly farmers in a primarily agricultural society) who would otherwise have been unemployed during the height of the annual flood. They were not slaves, except insofar as the god/king could be considered to own everything, and records exist to show they were paid for their labour (chiefly in bread and onions, which must have made for some interesting odours in internal construction sites). The picture we have of cruel overseers whipping the reluctant workers is an invention of Hollywood or cartoonists and no contemporary illustrations show whips being wielded in this way. In general, and except for captives taken during imperial expansion phases, the Egyptians were not slave owners. And another myth for which there is no evidence is that members of the king's family and household were killed and buried with him. This may have occurred during pre-dynastic times and during very early dynasties, but did not occur at this time.

How did they get the sides to so accurately align with the cardinal points? Sometimes this question is posed with the addendum "as they did not have the compass". If they had used a compass, the alignment would not have been nearly so accurate, as this would have lined up with the magnetic poles, not true north or south. But a better method exists and this is one that was certainly used later in Egyptian history. All that is needed is an observation of the rising and setting points of a particular star, bisect the angle and Presto, you have North. You then use a set square to make the corners 90 and away you go. Because the horizon is not level you can build an enclosure around your surveyor, so he cannot see the horizon and he marks the points where the star rises and sets with great accuracy. They probably did the calculations several times to be sure they were right but that is again a plausible method using extant technology.

And while we are on measurements, it is a fact that the circumference bears a relationship to its height that is a pretty fair approximation of 2π . The Egyptians did not have that level of sophistication in mathematics, so how could this have come about? Again, we do not know, but we do not have to propose any extraterrestrial forces. It could be just by chance that this came about or it could be that a rolling drum or wheel was used to measure long distances, in which case δ would have been included in measurements fortuitously. We just don't know.

Some crank theories

Apart from the external influences, some of the other weird suggestions made for how and why the Egyptians made their pyramids are:

- energy transmitters/concentrators - there is absolutely no evidence that the pyramids represent any form of energy that would not be contained in the rocks that comprise them (apart from the potential energy they contain by virtue of their height above the ground). Nor is there any evidence to suggest that the pyramid was used to preserve the bodies of the pharaohs, although, as no pharonic bodies have ever been found in any of the pyramids, we cannot be absolutely certain (only bloody sure);

- granaries - an old idea was that they were built by Noah as granaries against times of famine. As the empty spaces within or beneath the pyramids are such a minor percentage of their entire bulk, this seems to be a case of 'conspicuous construction'. Clearly wrong;

- a calendar of all the earth's history, past and future - a hoary old chestnut perpetrated last century by some rabid fundamentalists, chief among whom was the Astronomer Royal for Scotland, Charles Piazzi Smyth. Details of his mania are contained in my previous article "Pyramids, Pyramyths and Pyramidiots" (Vol 8, No 3). Suffice it to say that there are any number of measurements one could make on any structure the size of the Great Pyramid that, suitably massaged, would give any result from Planck's Constant to the GDP of New Zealand for 1957. This idea continues to bob up from time to time and makes even less sense now than it did 150 years ago. Wishful thinking;

And then there is one idea that stays within the bounds of plausibility: pyramid construction was devised as a method of welding together a community, a nation, from the disparate elements so recently independent entities. A reasonable hypothesis, possibly correct, but it suffers, like so much about Ancient Egypt, from lack of evidence.

Conclusion

We do not know for certain just how the pyramids of Egypt were constructed; after all, they were constructed over 4500 years ago and very few written records remain from that early time. Many mysteries remain as to actual techniques and certainly as to motivation, and many of those mysteries may

never be solved with any certainty. Nevertheless we can be confident that the job was not beyond the *people* who did it. The technology of the time, which we might consider primitive, was appropriate for the job to be done. To suggest that the Egyptians needed the assistance of Atlanteans or Pleiadeans is an insult to our species.

Let me put that in a different context. During the 12th and 13th centuries CE, a wave of cathedral building swept through Europe. The work that was done was truly monumental and represented the cutting edge of contemporary techniques and inventiveness, but that was all it represented. Just as no-one seriously suggests that Catholic missionaries from Orion came to earth to instruct these mediaeval artisans and architects in how to do their jobs, so we do not need to postulate external agencies to account for the pyramids. In each case, it was just some *homo sapiens* showing how good they can be if they have the incentive. If nothing else, remarkable works as the pyramids and Mediaeval cathedrals may be (and are), had they been built with lasers and anti-gravity devices, they should have been a lot better.

Why did they do it? Well, in both cases the simple answer might be "To the Greater Glory of God", but that does not tell the whole story. In our own century, we might look at the desire to enter space in the same context. Our species seems to have this internal drive to push out the boundaries and it sometimes manifests itself in remarkable works. However, we should not overuse analogy to try to understand the motivation of earlier members of our species and it remains a matter for speculation, not for certainty.

Finally, we can make logical assumptions about how the Egyptians went about constructing these magnificent works, because we know something about the technologies they had, but we make assumptions about their motivation and thoughts at our peril. The Ancient Egyptians were *homo sapiens sapiens*, just as we are; they were every bit as intelligent and as capable as we are, but they stand at the very threshold of our species' long journey into civilisation and we stand at the end of a 5000 year long corridor. On the way, we have learned a lot and have taken on a lot of cultural baggage. In many ways, the Ancient Egyptians are just as alien to us as any hypothesised civilisation from the stars could conceivably be.

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PSEUDOSCIENCE

Creationist's Chicanery Exposed

Ken Smith

In 1991 Australia was favoured with a whirlwind tour by a Russian, one Dmitri Kuznetsov. This tour was sponsored by the Creation Science Foundation, well-known to most readers of *the Skeptic*. Kuznetsov was touted, in the publicity, as someone who had become a creationist before he became a Christian. Thus his objections to evolution were, it was claimed, scientific and not religious. So, we were told, we should all pay attention to what he had to say. We were urged to think deeply about our philosophical presuppositions, and consider whether creationism offered a better explanation than evolution for the fascinating variety of life which we see around us.

Incidentally, before going any further, it may be worth pointing out that his surname comes in a variety of spellings. Since *the Skeptic* is not, as far as I know, set up to print in Cyrillic, any Russian names have to be transliterated. As well as Kuznetsov, you will find Kousnetsov, Kusnetsov, Kouznetsof, and possibly other spellings for his surname. This article uses the spelling in one of his scientific papers. As part of his credentials, the publicity stated that he was on the editorial board of three journals: *Ecology Research*, *Journal of Applied Biochemistry and Biophysics* and *International Journal of Neuroscience*.

As Ian Plimer has pointed out on pages 202-204 of his book *Telling Lies for God*, these claims have not been substantiated. Kuznetsov was, indeed, on the editorial board of the *International Journal of Neuroscience*. However nobody has been able to verify that the other two journals even exist. Checking on the existence of periodicals is easy if you are in the neighbourhood of any reasonable reference library. The regularly updated work *Ulrich's International Periodicals Directory*² lists almost all periodicals published in the world, apart from daily newspapers. For example, for our male readers, it lists *Playboy*, and our female readers are catered for by its listing of *Cleo*. In the section headed "Parapsychology and Occultism" it lists *the Skeptic*, and our American counterpart *The Skeptical Inquirer*, and the entries clearly indicate that these two periodicals are devoted to attacking parapsychology and occultism. It includes (under the heading of religion) the weekly Australian fundamentalist newspaper *New Life*, and our old friends *Creation Ex Nihilo* and *Ex Nihilo Technical Journal*.

So if there was any substance in the claim about Kuznetsov being on the editorial boards of *Ecology Research* and *Journal of Applied Biochemistry and Biophysics* we would expect to find these journals listed. Unfortunately for our creationist

friends, they are not included. Thus they must either fall into the category of paranormal objects, or else are so obscure that nobody outside the creationist community has read them. It is, of course, possible that the titles have been misquoted. We all know how difficult it can be to track down creationist quotations, given their free and easy way with citations. Despite these problems, one correct out of three is a considerably better track record than we have come to expect from creationists. They must be evolving into more accurate reporters of information.

Recently my attention was drawn to a paper by Kuznetsov³ in *International Journal of Neuroscience*. How this came about, and the consequences, are covered later in this article. The title of the paper is - take a deep breath here: "*In vitro* studies of interactions between frequent and unique mRNAs and cytoplasmic factors from brain tissue of several species of wild timber voles of Northern Eurasia, *Clethrionomys glareolus*, *Clethrionomys frater*, and *Clethrionomys gapperi*: a new criticism to a modern molecular-genetic concept of biological evolution."

Phew! I don't remember coming across a title as long as that in any of the reading I have done. Usually authors try to find a fairly short, pithy, title to attract attention; it is not usual to be long-winded and run the risk of turning prospective readers off right at the start. And there is something a bit amiss with the grammar of the title.

Despite that I waded on. Following the title, and the name and institutional affiliation of the author, came the Abstract. Now neurochemistry and molecular biology are not fields in which I claim any expertise, so I found reading the abstract somewhat heavy going. Perhaps the author should have found someone a bit more competent in the use of English to polish up his style and remove some of the obscurities.

Nevertheless, some quite good scientific papers have been poorly written, so let us pass on. We will even overlook the queries raised by his use of quotation marks in the first sentence where he wrote about "... the brain cells of three conventionally 'phylogenetically related' species of wild timber vole...", and the concluding sentence "All findings and ideas of the paper are under discussion."

It is common to find, on the first page of any scientific paper, some acknowledgements of assistance, financial or otherwise, provided to the author. Kuznetsov's paper follows this hallowed tradition. In a footnote at the bottom of the first page he thanks Professors Leonid Korochkin and Kirill Gladilin "for their helpful remarks and participation in

discussion of the data". He then goes on to thank various other people for assistance in different ways. The second paragraph of the footnote is somewhat out of the ordinary for learned journals. It reads, in full: "I am especially, deeply and sincerely grateful to the Moscow Baptist Church and the Slavic Gospel Association, IL, for supporting most of our research program. In part, I am greatly indebted to Dr Henry Morris and Mr Eugene Grossman for concrete participation in supporting our program."

Moscow Baptist Church? The Slavic Gospel Association? Henry Morris? Here, just what is going on? I thought I was reading a scientific paper, not a bit of religious propaganda! And what about the plural "our research program"? If more than one person was involved their names should have been included in the list of authors. And just what form did the support take, anyway? Was it anything more than moral support from one creationist to another? There seems to be something a bit unusual about this paper. Do we have a genuine case of a recognised scientific journal publishing a creationist work? It seems so.

This impression is strengthened by the last paragraph of the footnote. This indicates that requests for reprints should be sent to the author's private address, rather than the institution at which he works. This is most uncommon in the scientific community. The paper itself is not well written. The author's familiarity with English seems to be somewhat limited, and there are a number of obscurities throughout the paper. But it clearly comes across as anti-evolution in tone. Thus the last sentence of the second paragraph reads "To be exact, it seems a mistake to consider that the fact of origin of a new, 'useful' and replicable gene is a quite sufficient condition for the renovation of the phenotype, for the formation of a new form of life."

And at the end of the fourth paragraph, after talking about looking for evidence, he wrote "If such evidence is obtained, the general creationist concept on the problems of the origin of boundless multitudes of different and harmonically functioning forms of life, will be supported by a new argument." This sentence raises some interesting questions. Do these "harmonically functioning forms" have anything to do with the "harmonic convergence" we have been hearing about from New Age circles? Do we perhaps have an example of convergent evolution, with these two fields of pseudoscience using similar terminology?

But I digress. So is there any validity in Kuznetsov's arguments? This paper was published over five years ago, and nothing seems to have emerged from the creationist community hailing it, and any further evidence turned up, as the final death-blow for evolution. Could it be that the paper was faulty in some way? Were Kuznetsov's arguments not quite as good as he thought?

Which brings me to how I heard about the paper. On 18th October 1994 Peter Drake, a postgraduate student in Artificial Intelligence at Oregon State University, posted a four line message to the Internet newsgroup *talk.origins*. This is a

newsgroup devoted mainly to creationism and creationist claims, though other nuttury such as Velikovskyism also crops up with monotonous regularity. Experts in all fields of science, and many areas of theology, are quick to respond to creationist claims. There have been a few cases where creationists have withdrawn their claims, but most creationists who post messages retire quickly when they realise that they are up against experts.

Peter's posting read (with the spelling as in the original): "I finally went and looked this up: *International Journal of Neuroscience*, v. 77, p. 199-201. It's a letter nailing Kouznetsov for fabricating several references. Great fun!" Fabricating references? A creationist caught in the act? This I'll have to check! Unfortunately that issue had not arrived at the University of Queensland library, so over the next couple of weeks I had to be content with reading postings from other people to talk.origins. But it certainly seemed to be the case that Kuznetsov was guilty as charged.

Eventually the relevant issue arrived, and I was able to read the article for myself. It is by Dan Larhammar⁴ of the Department of Medical Genetics, Uppsala University, Sweden. The article is headed "Letter to the Editor", and entitled "Lack of experimental support for Kuznetsov's criticism of biological evolution." And does Larhammar get stuck into Kuznetsov! He was doubtless restricted by the canons of letters to a scientific journal. No matter how bad some other article is, in general the editor will not allow accusations of deliberate falsification to be printed.

So Larhammar had to be content with some observations that he was unable to verify Kuznetsov's claims. Why couldn't he do this? Surely the point of writing an article in a scientific journal is to present your evidence to other scientists, and let them try to find any weak points. If they succeed - well, back to the drawing board. But if the work stands up under criticism, it can serve as a starting point for the next advance in that area of science.

The problem that Larhammar encountered was that he couldn't check some of the crucial papers Kuznetsov had referred to. Worse than that, he couldn't find the journals listed in a couple of on-line databases of work in the biological area. To give the first example, one vital piece of evidence was in a paper cited as being from *Acta Allergologica*. Larhammar wrote

"This journal is neither included in Medline nor in CASSI (Chemical Abstracts Service Source Index). A journal called *Allergologica Acta* exists but its volume-year assignments do not match those ascribed to *Acta Allergologica* by Kuznetsov."

Now if it was just one journal there might be some excuse. Maybe Kuznetsov had mixed something up, and it hadn't been detected during the refereeing process. Or maybe a typographical error had gone undetected. But it isn't a case of a single error. Five more times Larhammar writes, about other citations given by Kuznetsov, "this journal, too, could not be found", or "this is another unidentified journal or

book.”

But the most scathing item comes in the second last paragraph of the letter. Larhammar had been trying to track down an article attributed to HV Hyden, and allegedly published in *Scandinavian Archives of Molecular Pathology* in 1988. Now there are not a great number of people working in molecular biology in Scandinavia, so it is not too difficult to do a bit of checking on names. In Larhammar’s own words “After unsuccessfully having sought this reference I contacted Prof. Holger V Hyden (Gothenberg, Sweden) who is a member of the Editorial Board of *The International Journal of Neuroscience*. Prof. Hyden states that he has written no such article and that he, too, is unaware of the journal *Scandinavian Archives of Molecular Pathology*.”

This would seem to be conclusive. Of course, there is the remote possibility that there are two people with the name HV Hyden, living in Scandinavia, who write learned articles on molecular biology; one in respectable journals, and the other in extremely obscure journals. After all, do we not have the case of two Dr Andrew Snellings in Australia? Now it is just possible that the on-line databases may be defective, and that the seven journals which Larhammar failed to track down do exist somewhere. And this is where the Internet and the speed of modern communications comes to the rescue. Not to the rescue of Kuznetsov, I hasten to add - all the evidence posted to talk.origins backed up Larhammar. I checked in *Ulrich’s International Periodicals Directory*² mentioned above. No trace of the journals could be found. Chris Nedin, research student in the Department of Geology and Geophysics at the University of Adelaide, who has been criticised by our good friend Dr Carl Wieland of the Creation Science Foundation, could find no listing of these in another reference work *Periodical Title Abbreviations*, 1994 edition⁵. Various people in overseas countries checked the largest library in the world, the Library of Congress in USA, without avail. Nor could any trace of them be found in the British Library, or in the Bodleian Library at Oxford University, or in any other place people looked.

So it looks very much as though Chris Owen, in a message from the Oxford University Computer Service, was correct when he said “I think Kuznetsov is telling porkies here.” Larhammar was rather more restrained in his choice of words, but the final paragraph of his letter expresses the same sentiment.

To summarise, Kuznetsov’s experimental concept is obscure, his approach goes against established scientific experience and his claimed results are not qualitatively demonstrated. The key methodological references cited by Kuznetsov have not been published in journals listed in Medline or CASSI. These, as well as many other, references are afflicted with complications: some authors could not be found, one author has not written the article ascribed to him, many articles have obvious grammatical errors in their titles, etc I conclude that Kuznetsov’s critique of “a modern molecular-genetic concept of biological evolution” has no

scientific basis whatsoever.

One wonders how this paper managed to make it through the refereeing process with citations from at least seven unknown journals. Part of my job as Assistant Editor of the *Bulletin of the Australian Mathematical Society* has been to check that authors use the correct abbreviations for journals. Normally this is a simple task, since most citations refer to the most widely known and circulated journals. Occasionally I have had to revert to the library to check on a less well-known journal. In a few instances I have not been able to find the reference, and have asked the author for clarification. This has always been forthcoming, as either a correction to the citation, or a photocopy of the article cited. No author who cited unknown journals would pass the refereeing barriers, at least for publications of the Australian Mathematical Society.

So how did Kuznetsov’s paper get through? The most likely solution would appear to lie with Kuznetsov’s position at the time. He was on the editorial board of the journal. It seems possible, or even probable, that the article received only a cursory review, if any. After all, if a scientist is sufficiently eminent to be placed on the board of editors one naturally assumes that he is cognizant of the canons of scientific writing. One does not normally expect that such a person will fabricate references in support of his case.

Well, where does this leave Kuznetsov? On page 253 of his book¹ Ian Plimer has something to say about scientists who fabricate results:

“Disclosure of scientific fraud keeps science honest. Financial fraud sometimes results in a short prison sentence. With scientific fraud, it is a life sentence. Those guilty of scientific fraud are banished for perpetuity from the corridors of science in a blaze of publicity.”

Whether Kuznetsov will continue to travel the creationist lecture circuit remains to be seen. But his career in science has come to an inglorious end, with the documentation of his fabrications. I wonder what the reactions of people associated with the Moscow Baptist Church and the Slavic Gospel Association, not to mention the Creation Science Foundation, will be when this news reaches them. The Bible has nothing to say specifically about fabricating references in a scientific paper. But it does say some things about ethical behaviour in general. Perhaps a sermon based on *Numbers* 32:23, “Behold, you have sinned against the Lord, and be sure your sin will find you out”, would be appropriate.

I have no expectations that anything I write will affect them, but perhaps members of the Creation Science Foundation might like to do rather more checking on the credentials of any other creationists they invite to Australia. I am sure they wish to insist that any speakers at meetings they sponsor adhere to high ethical standards.

BELIEF AND SCEPTICISM I

A Glut of Gulls

or

Beware the Renegade Mutant Mental Resurgents

Andi Stevenson

Editors' Note:

This article, and the one that immediately succeeds it, address the same questions; what is the nature of belief and how do sceptics differ from the population at large?

Of interest about the authors is that Andi Stevenson is a farmer and Nik Bogduk is a professor of anatomy. Both are long term Sceptics. Although they reach similar conclusions, each approaches the task from her/his own perspective and addresses the issues in different ways.

We are hopeful that our readers will find the two articles to be both thought provoking and instructive and will not regard this as an exercise in redundancy. And of course, we welcome comments from our readers.

In *the Skeptic* Vol 14 No 3, William Ewers asks 'Why are Sceptics rare?' We sceptics are certainly outnumbered. It may be that we are unnatural. As noticed by some, the bulk of the human population leans toward Wonders and Magic, in preference to bewildering Science. Rather in the way inherited wealth is venerated above hard earned 'new money'.

What the bloke who mows the lawn suggests for arthritis can carry more weight than a doctor's prescription. Is this a paranoid view that the doctor has a doctor's axe to grind, while the mower-er offers help gratis? Or is it the attractive mysticism of homebaked remedies? Pleasing to those people, to whom explaining how the trick is worked is about as popular as telling how the movie ends.

The Myths

Mythology is basic science. Our forebears sought answers for their questions: What is lightning? Why are we here? Where has all the rain gone and what can be done to bring it back? What happens when I die? A mythology combines perceived answers with prescription for law, religion and status: social order. It offers a comforting, magical, authority figure. Now we have science instead...

Authority

Human nature has a strong need to submit, unquestioning, to a dominant greater power. Children to their parents, adults to a parent figure. Few grow out of wanting a parent figure. We all begin with a dream of the ideal parent. Disappointment

ensues on recognition that our own are merely fallible fellow humans who happened to procreate.

We have state leaders, business leaders, religious icons, all of whom attract us by playing the wise, stern but kind authority figure. (Unless you happen to know them personally.) An abusive politician will command a better following than a hesitant one, regardless of ability to govern. The desire to worship is encouraged.

Children are prompted to respect their parents; women to look to men for leadership; citizens to state leaders; everyone to god/s. Whatever they might reject, most still want a sacred icon, be it a god, religion or monarch, something that you don't poke fun at. Something to be taken seriously, to be absolutely respected.

And why not, submitting to an authority is comforting. Somebody else will protect you, take responsibility. Therefore that Somebody must be powerful. Desire for submission to authority figures induces irrational belief. An authority figure is not really superior until accredited with supernatural powers. To adulate an equal is demeaning. Having someone to adulate is desirable. Attribute supernatural powers, and you can worship with dignity. (NB: the current popular way to submit to a powerful external authority is to be abducted by aliens.)

Them vs Us

Cities swell, forests fall down, the world population expands in a plague of bald apes. However large the total, the components still clot. Races, nations, regions, religions, sects, communities, families, and those you send Christmas cards to. The boundaries are flexible, but the labels remain 'Them' vs 'Us'. Unfortunately, the Established Authority in unwieldy Western societies is often Them.

When 'Them' can be proved wrong, 'Us' are all delighted sceptics. At the slightest hint that 'Us' may be proved wrong, rationalisation, re-interpretation, anger, hysteria and defence strategies are called for.

Tell me, dear Skeptic; if, while chortling at a demonstration of clairvoyance, you began to suspect that it was real, was actually working - might you feel threatened? The immediate instinct is to sacrifice logic and defend stated beliefs.

True sceptics know it can be painful. However, for an

allegedly logical animal, most humans will endorse any lie or act of violence, if it is done in the name of 'loyalty', to 'Us'. Emotions, such as patriotism, are far stronger than logic.

Rejecting Authority

In organic life, evolution is facilitated by out-breeding and mutation. In social life, the dangers of inertia are avoided by rebellion. This is facilitated by teenagers, sceptics and idiots. Whatever their motivation, rebels will gain some respect. To challenge authority is to become another authority.

A rebel acting on intelligent conviction may convince others with intelligence. These will be accompanied by the gullible; gulls who jump on the bandwagon for the pleasure of the ride (and who have no idea of where it's going), and because they fancy an alternative authority. An idiot rebel pursuing an irrational authority will fascinate even more gulls into following. If it can't be understood it must be powerful.

When the seeming 'rebel' is a cold-blooded cynic who knows how to represent an authority and manipulate gulls, the bandwagon sags at the springs.

Fairies at the Bottom of the Garden - the Enchanting Identity

Even intelligent, well educated people 'like' the idea of magic. What is magic and why is it desirable?

A great driving force, in your average human, is identity. Each needs to know their own identity; to express their identity to others; to have their identity perceived by others. They may even want to understand the identity of the other person. Identity is fundamental. It can be nicer to invent an attractive identity than perceive the real one. When it comes to understanding another's identity, this problem with perception gets worse.

Instead of open-minded acceptance of what another person may be, the observer's own likes, hates and expectations are projected onto the observed. Prospective friends are attributed with the same beliefs, standards and tastes. Everyone must have a category, and behave accordingly: men, women, mothers, fathers, boys, girls, grandparents, blacks, homosexuals, tall people, beautiful people, and so on *ad nauseam*.

Behaviour not concordant with the attributed standards is resented, or simply not perceived. Some people attempt to forcibly project their beliefs on those who won't accept them, a la missionaries and Fred Nile.

Projection of identity starts early. Children attribute other animals, and objects, with their own thoughts, characters and values. They become quite cross with domestic pets who refuse to co-operate. (This anthropomorphising is confirmed by those adults who write their story books and cartoons.) Children live in a world of wonder. Everything is magic. Fairies, electric lights, parents who know where you've been. The amazing powers of the adult go with the dominance of the adult. (Some of this is shed in maturing - but many adults still believe that dolphins are like us, but smarter.)

Perhaps this projection of human identity, combined with the desire for authority, is the basis of magic. We want everything to have an identity. A small rock can be quite boring, until named Penelope and attributed with the power to heal psoriasis and speak to the dead. Then it is a talisman to treasure, a friend to relate to, and an idol to worship. Once an object has an identity of its own, it can look after itself (and you). It doesn't need to be understood.

Dieters prefer special concoctions to less fat and more exercise. Is this laziness, or a desire pass the responsibility to an external authority? Primitive people, on first encountering a ship's compass, thought that it held a spirit, who when invoked would tell where North was. The difference between their perception, and reality, is that a magnet lacks a personal identity. (It also lacks discrimination, and will show North to anyone.)

Even things that go wrong need an identity. The source of most everyday grievances is an inanimate object behaving objectionably. Other animals yield to the bluff of raised hackles, or the huge fake eyes on the wings of a butterfly. We clever bald apes can see through the magic, comprehend life and death. It is not comforting.

Magic is a pleasant sensation. Some sceptics who detest un-logic fail to appreciate how what a nice habit magic is. Like ice cream, like smoking - delicious, even if unhealthy, and not to be given up easily. Magic is very handy, recommended for social control. Fear of jail is nothing on fear of supernatural retribution in this life or the next. For child control, Santa and the bogey man have been used successfully for years.

It is hard not to be superstitious when desperate. A tragedy calls for comfort, explanation, blame, protection and denial. (It's for the best; Venus was in the wrong cusp; your mother walked over a grave; go to Mecca; she isn't dead and will be reincarnated.)

Who hasn't said, in a moment of great despair, "What have I done to deserve this?" Well - you could have walked under a ladder, got your aura grubby, failed in a past life, or made god cross. You can find plenty of priests, spirit guide councillors, clairvoyants etc who will explain. The explanations may be different, but who cares?

Even in the 1990s, the Catholic Church applies the sainthood not according to genuine, natural achievements. A saint is sainted only for unprovable, supernatural acts; 'miracles'.

Mythology vs Science

The marvels of Science don't seem to attract. Why isn't the brilliance of evolution as popular as reincarnation? Why is creationism preferred to the magnificence of an ancient earth? Why don't we see stalls in markets for geophysics instead of aura readings? Why the fascination with astrology, now that science has moved on to astronomy? Because they don't apply to us.

Why bother with the stars, if they don't describe our

personalities and foretell our future? Who cares about the structure of Earth, if it isn't the centre of our universe, put here for us?

The favourite subject of the human ego is itself. It all comes back to identity. The best way to get someone talking is to ask them about themselves. The best way to get someone to listen to you, is to tell them about themselves. As those who prey on the gullible well know, take someone's hand, look deep into their eyes, and tell them that deep down they are insecure - you've got 'em.

It is dastardly Science which coldly points out that we evolved by chance in an impassive environment. The makers of mythologies would never have considered such an unbecoming answer.

Simplicity - the Village Idiots unite.

As any Skeptic will have noticed, comfortable people refuse to believe the most minor and obvious things. Those who don't like analysis of a situation, resent being given one. A remark such as 'it's hot in here', is rarely an invitation to discuss architecture and thermal dynamics. Debate demands that one open the mind, admit ignorance, give up old ideas and entertain new ones. It is a lot easier to put it all down to Magic and complain about the heat.

Magic is wonderful because it is never wrong. (The irrational can never be challenged by logic.) Science, on the other hand, is often wrong, and the scientists admit it.

The ego is safe when practising magic. In dealing with the knowable, revealing ignorance is practically unavoidable. A simple black and white answer gives less headache, and doesn't need to be understood. Many who unquestioningly accept Christianity as the only religion, have little idea what is in a bible, and they don't want to know.

It is daunting to try to comprehend too much power (space without end, time without end, even millions of years). The magical authority figure has these powers, but they needn't and shouldn't be comprehended. The Authority itself, however, must be within our scope of comprehension. Anthropomorphic, fact. Presenting simple answers is also handy for dominating the lower status.

For all our great technology, Westerners of the 90s prefer the medical practises of ancient, superstitious villagers - and refuse to immunise their children against the diseases that gave those ancient villagers a shorter life expectancy.

Do people really want technology?

In the 1970s rangers in the North warned that action should be taken concerning dingo attacks on children before something really bad happened.

Something really bad happened, and the population of Australia had two options to believe:

- (a) a dingo, wild carnivore, had carried off a human baby.
- (b) a woman (bad) of a strange sect (bad) gorily sacrificed her own child (exciting), bewitching the laws

of time to do it (irrelevant), and showed personal strength in court (bad). The rest is history.

One might conclude that, should iridology be proved rational tomorrow morning, and adopted next week as a respectable diagnostic tool, within a fortnight its popularity would plummet, and in a month it would be seen as another invasive ploy by Them, to suborn the Free People and support the Drug companies. Steven Spielberg makes more money than David Attenborough.

Downright Arrogance

So, logic is not required. Instead leaders are asked to provide simple, ego-feeding stories.

Creationists really loathe the idea of evolving from 'slime'. Instead of seeing it as a brilliant process of biology, as a mind boggling event in the effort of DNA to perpetuate itself, they find the idea quite insulting. Mythologies, on the other hand, are designed by people, for people. Certainties equal strength. Uncertainty, and unanswered questions, are as frightening to many people as death, space, and microwave ovens. Arrogance offers certainties, and in receiving them - you too can have an ego like this!

The Ultimate Social Law

The old theory on the evolution of the big human brain, was that an ape, smitten by intelligence, stood upon his (yes, his) hind legs, took up a spear, and became a Noble Hunter. Technology requires a large brain, and so we were selected for technological advantage.

Apart from the minor fact that bipedalism occurred some millions of years before brain expansion, many researchers have now dismissed technology as an encephalic engine. Little brain tissue is needed for making stone tools.

On the other hand, a lot of brain is needed to comprehend social structure and language. A food sharing society, it is argued, does offer a survival advantage. Offspring are protected, wasteful competition eliminated. Technology was a by-product. If that is true, this great big brain of ours was designed to comprehend social interaction and social alliances. Social cohesiveness is all important. Does this theory fit?

We might expect to find a need to submit to authority, a need for rules and ritual to bind, a mythology (any mythology) to prescribe Behaviour and weave it all together. For a social creature, humiliation would be unsatisfactory, and veneration pleasant. In school yards can be seen children, a few behaving as gods and most as worshippers, making rules and damning those who break them, and above all seeking to belong.

Even our social sympathies are illogical. Guilt replaces socially disruptive anger, but is frequently felt by the guiltless (powerless). Likewise the victim of abuse is often blamed rather than the perpetrator. The abuser has power, and society

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BELIEF AND SCEPTICISM II

A Grand Unifying Theory of Scepticism

Nikolai Bogduk

As I have listened to the debates and conflicts between sceptics and their opponents I have repeatedly been struck by a singular, recurrent theme that seems to underlie these conflicts. Cheekily, and to be consistent with the current flavour of developments in Physics, I shall refer to it as the Grand Unifying Theory of Scepticism (GUTS). I offer it to our readers for rebuttal, endorsement or elaboration.

The first principle of GUTS is *life is a bitch*. The second principle is *knowledge is too hard*. A corollary to the second principle is that it reinforces the first principle: because knowledge is too hard it makes life more of a bitch. All the trouble that sceptics encounter stems from these two principles.

Life is a Bitch

This principle is overtly cheerless but unashamedly so. Biologically, human existence is no different from that of other organisms as simple as an amoeba. (You may feel differently, but check that in appraising this assertion you have not complicated the issue by adding spiritual dimensions; that comes later, and is a compensatory mechanism but is not part of the fundamental appraisal.)

All living organisms have the obligation to feed, respire, excrete, assimilate and grow; they may get to reproduce. To obtain food they must explore the environment, but in doing so they must encounter and negotiate the hazards of the environment.

The environment is not friendly. An amoeba is at risk of being eaten by another organism; it is vulnerable to desiccation if its pond dries out; it is vulnerable to toxins in its pond or to a lack of nutrients. So too is the human.

Humans can get drowned in a flood, dried out in a drought, plagued by insects, starve in a famine, crushed in an earthquake, or struck by lightning. These, and others, constitute the threats of the environment.

To appreciate the first principle, simply conduct a mind experiment. How do you feel if spontaneously I drop you naked with no resources in Carpentaria, the middle of Tasmania, or on a rainy weekend in Canberra when no-one else is home?

Anthropologically, humans have turned to one another to address material needs. In families or tribes they can build shelters from the elements, gather food, develop agriculture, hunt, and domesticate cattle. In tribes they can resist if not

withstand the hazards imposed by competing tribes. In modern times we see the equivalent of the latter when individuals join protective organisations such as the Mafia, the Triad or secret societies, that give them the “edge” over other individuals.

However, although tribes cater for material needs - food and physical protection, they do not allay fears. An individual fundamentally remains in peril from elements and events over which they have no control or from which the tribe cannot protect them. Not even the Mafia can prevent an earthquake or prevent cancer. Specific fears may differ from individual to individual, but nonetheless fears obtain.

The material threats are brought into relief when society disintegrates. To be convinced, picture the grief, the horror and despair, of suddenly being caught in Bosnia or Ethiopia, with no escape.

However, material threats and fears are not the bane of sceptics. Creation Science and UFOs pale into insignificance during famine, pestilence and civil unrest. The fears that scepticism addresses are metaphysical, and emerge as an indulgence or disease or stable societies.

Having catered to their material needs, an individual is left with extraneous fears and curiosity. To cope with these the individual (or the tribe) seeks explanations. If material explanations are not forthcoming they develop models or theories that offer explanations, in order to allay the anxiety of not knowing and, therefore, fearing.

A classical example is fear of thunder and lightning. The innate fear of these phenomena is evident in the fear that children express, until their fears are assuaged. Early explanations were theistic. Humans invented gods of thunder and gods wielding lightning bolts. Later, boring meteorologists devised other models that eliminated this romanticism.

Romanticism is the key. It is only natural for humans to anthropomorphise: to conjure models in their own image or based on their immediate experience. Gods are simply super humans; or in other cultures they could have been super animals (as in Dreamtime). Romanticism is natural because the ingredients are immediately available. The ensuing model does not require tedious observation and experiment, or an intellectual capacity that enables one to understand quantum mechanics.

Romanticism also reflects the fundamental human fear of

personal insignificance or impotence. Human power is dwarfed by the power of the elements; and physically weak individuals are in fear of stronger bullies.

If you are leading a pathetic life, it is hard to rationalise. A pathetic life, plagued by poverty, hunger and disease, causes anxiety. Life is a bitch; but rather than simply accept that, individuals invent models for solace. Life can't be this bad; there must be something better.

Witches and sorcerers are one invention. Oh, for the power over life, death and the forces of Nature. As a fantasy, witchcraft deals with the sense of impotence - "at least *they* have the power; it was just my misfortune not to have been born a witch."

The advantage of crediting witchcraft and sorcery is that I can entertain myself with stories of witches and sorcerers, celebrating how they can overcome so wonderfully the hazards of life. In a story I can identify with the hero, and for a moment, I can escape from the perils of my wretched existence, into my imagination.

However, the fantasy becomes dangerous when literalised; when peasants turn to self-proclaimed witches for potions for sickness or frustration with their lot; or when angry, ignorant crowds burn witches out of jealousy for their perceived superiority.

Extraterrestrials are another escape.

"I may be impotent but those guys in space-ships have really got the goods. Life is better, but it's out there."

Less trivial but nonetheless romantic are the religions. "Life is a bitch but not for long; the rewards come later, but for now be tolerant."

In psychiatric terms the process is called displacement. The anxiety we suffer now can be displaced by putting the blame on the model; "it's the nature of things, it's god's will; it will all be better later".

Whether there's an after life or you come back as a cockroach, life is bitch only temporarily; so, stop complaining and wait your turn.

Now, in a psychiatric sense there is nothing wrong with romantic models; they serve a just and necessary purpose: to allay anxiety about the basic futility and oppression of life. If it helps to believe in an after-life, fine. If it helps to believe that you are only a small step in the cosmic progress to nirvana, fine.

The evil arises when romanticism is literalised; when individuals deny the fantasy status of models and insist that they are materially real. Here is where we encounter the conflict between belief and Science.

Religious zealots, romantics and scientists alike, each are able and are entitled to invent, by imagination, any sort of model to explain anything they choose. But the distinction of a scientist is that they look for connections between their model and observable, reproducible reality.

Knowledge is Too Hard

It is easy to formulate a model; it is harder to validate it. The hallmarks of Science are the studious acquisition of existing knowledge, the formulation of hypotheses to explain the remaining unknown, and the disciplined testing of these hypotheses by observation or experiment. All this takes time and intellect.

The greatest sin of Science, however, is that it kills romanticism. For this it can be berated and implicitly decried. Science is cold and inhuman; it reduces events to trivial, material explanations. It takes the magic out of life and replaces it with facts and formulae that take a lifetime to learn. Science also threatens the anxiety and investment of those who develop romantic models. "I struggled to develop this model and now you tell me it's untrue. I am left with my anxiety exposed; yet, to cover it I must learn Physics, Chemistry, Mathematics and Geology? No way; I shall insist rather than learn and reform."

The conflict lies between the easy route - simply to accept an attractive model to be literally true, or the hard route - to learn, and to explore this and other models, testing if each might not be true. Now which is more attractive to the average individual - an overnight fix or a lifetime of arduous work?

It is evident even amongst sceptics that no one individual nowadays can know everything to counter all the romanticism. The knowledge base is just too great. We need Geologists to identify synclines instead of arks; we need Palaeontologists to age a fossil before the flood; we need medical scientists to explain acupuncture and herbalism. No one individual can do all of this, but interested parties can be entertained by invited experts and take solace that at least someone has dedicated their life to being an expert in these respective fields.

Yet it takes a particular frame of mind to take heart from the existence of experts in the event that you need them.

Too Frightened, Dumb and Lazy

The third, and hitherto unannounced, principle of GUTS is that by and large the human population are too frightened, dumb and lazy to benefit from scientific expertise.

People have anxieties now; they want solutions now. They don't want to invest time to read, study and learn in order to get an answer; they want it now.

They also prefer a model with which they can identify: models with gods, witches and aliens (who are, sort of, just like us). They don't want equations, formulae and all that maths which they hated at school.

"Look, god created the universe; it's as simple as that. What's all this bullshit about 10^{-32} seconds anyway?"

"Look, you've got a disease; acupuncture can cure it. Western Medicine doesn't know and doesn't give a damn. Acupuncture is oriental and you know that Orientals harbour great secrets of life."

Simple assertions are fine, but the evil lies in obliging people to abide by the corollaries.

“Now that you believe god created the universe, you will believe everything in the bible, and you will believe that this is the lost ark.”

“Now that you believe in herbalism you will continue to pay for and take this potion” (even though there is no proven benefit).

Full Cycle

The greatest evil is retribution. Individuals take to a religion to allay their personal anxieties but to adopt a religion involves discipline, particular if the corollaries of that religion involve taboos and restrictions - no sex, no drinking. When others around do not abide by this religion or its restrictions, jealousy arises; jealousy that “I had to restrict myself but you didn’t”. “Therefore, I will impose my will upon you. If I can’t have sex, neither will you.”

Now, if Skeptics threaten the belief system, they also threaten the satisfaction of retribution. If you deny the belief system you take away the basis for retribution. Where does that leave the believer? Back with their original, fundamental anxieties, frustrated that they expended all that discipline conforming to the rules of a fantasy, and now without even the satisfaction of getting back at others for being heathens.

Significance

An obvious way of coping with insignificance is to become significant. There are three routes to significance - power, money and recognition. Power is pursued by generals and politicians. Enough money eventually brings significance in one form or another. But, these two routes are very demanding and capricious.

Alternatively, individuals can become recognised for a discovery or for an intellectual revelation; that’s the game Scientists play. It seems easier than becoming a politician, and more noble; it’s easier than becoming rich. Hence, we find emulators - people who seek to be recognised like scientists or doctors, for discoveries or ideas, irrespective of how patently false these discoveries may be.

Some want to be seen as great scientists, others as great healers. Have you ever noticed how the “alternative” people have take to putting strings of letters after their names so that they too can have emblems like the real professors, scientists and doctors?

Irrespective of the discipline, the desire is to become important. But why? It can’t be altruism, because true altruists don’t seek recognition. My perception is that importance is a device to cover personal insignificance. Hence, when Skeptics demolish a factitious claim they also strip the perpetrator of their hope for significance, leaving them ... insignificant.

Epilogue

To me the system appears simple. Life is a bitch and people

are scared. They need models with which to cope with these fears. That I do not deny them. But what I resist is the literalisation of these models. By all means test the models for connections to reality, but do not invent connections when they are not there. Moreover, I am not concerned for myself because I am prepared to learn. When I am concerned is when the romantics inflict their beliefs onto others and in the process demand some sort of payment either literally, or figuratively in the form of intellectual enslavement to the belief.

I ask fellow Skeptics if the situation is any simpler than that; our enemy is ignorance and the reluctance of people to do anything about it. Fearful and impatient they are prey to any fulfilling belief regardless of its reality. Those who defend their beliefs without evidence are no more than protecting their own anxieties and the strange way up in which they have covered them. No wonder they are violent. When you challenge their belief you threaten to expose their deepest anxieties and the artificial way that they have been suppressed.

At the heart of all sceptical conflicts are the fears, anxieties and insignificance of every human being. ■

...Gulls from p 22

must not be disrupted. In order to maintain our social structure, we re-define internal forces as external, then attribute them with identity and authority. All are bonded together in serving the mythology.

Intelligent (?) people persist in believing their social doctrine even when the society is composed of evidence to the contrary. Whatever the society, once its doctrines are absorbed by children, the mythology and its rituals set firm. The society is preserved. Dissenters aren’t encouraged, they’re burnt at the stake.

Renegade Mutant Mental Resurgents

Just as technology appears to be a sideline of social evolution, so too do logical thought and scepticism appear to be a by-product. The sceptic threatens the protected group. To observe the truth, to question ritual, to produce anger, is not good for social cohesiveness. Is this why we have mechanisms to block reality? To make fantasy more acceptable?

The search for the meaning of life reveals that life is meaningless. We are just another trend in DNA’s megalomaniac drive to replicate itself. Humanity is arrogant, and doesn’t want that answer. It is imaginative, and can create better answers, egocentric anthropomorphic certainties.

Our is not to reason why, ours is but to do and die. To this end, gulls have been killing sceptics for centuries, if not millennia. Perhaps we should just accept that we’re unwanted, unnatural, oddballs. Unless, of course, sceptics and scientists are a mutation, leading the next leg of evolution... ■

PERCEPTIONS

Taking a Risk

Steven D'Aprano

Risk analysis is more of an art than a science, relying on complex statistics to try to make sense of partial data. The uncertainties can at times be far greater than what is actually known. Laboratory experiments often rely on animals especially bred to be cancer-prone, and on dose rates thousands and sometimes millions of times greater than that found in even worst case scenarios. Low dose experiments are often at the extreme limit of detectability.

Nevertheless, risk assessment can usually give a fairly accurate analysis of risks, especially if the risk is very common, or the dose is very high. The general public's perception of risk is strongly influenced by the media and personal experience. The media tends to thoroughly document rare catastrophic events and gloss over common dangers.

How well does the general public rate the inherent risks in every day life when compared to experts in risk analysis?

Table 1 shows an ordering of risk perceptions given by four groups of Americans. All four groups are relatively well educated and sophisticated. As the table shows, there can be an enormous difference in perceptions between the experts and the other groups. For instance, nuclear power is clearly seen to be the most dangerous technology listed, with a rating of 1 for both the League of Women Voters and college students, and a rating of 8 for active club members. However experts rate nuclear power at 20, less dangerous than railroads or bicycles.

Table 2 shows the same data as differences between the expert's ranking and that of the various other sampled groups.

Generally speaking, the public tends to perceive a technology or activity as more dangerous if it is unfamiliar, or if the risk is more dreadful. Nuclear power is both. Very few people understand how nuclear reactors work, and the consequences of an accident may be terrible, especially the worst-case scenarios that are portrayed in the media as the most-likely scenario. Nuclear power also suffers by association with nuclear war.

Familiar dangers tend to be over looked. College students rated swimming as the least dangerous activity, while experts rated it as more risky than aviation, fire fighting and mountain climbing!

The paradox is that the general public is frightened by low-probability risks while complacent of high-probability but familiar dangers. As a result, governments are pressured into spending millions of dollars to protect against unlikely events while people are dying from common preventable situations.

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Activity or Technology	Group			
	A	B	C	D
Motor vehicles	1	2	5	3
Smoking	2	4	3	4
Alcoholic beverages	3	6	7	5
Handguns	4	3	2	1
Surgery	5	10	11	9
Motorcycles	6	5	6	2
X-rays	7	22	17	24
Pesticides	8	9	4	15
Non-nuclear elect pwr	9	18	19	19
Swimming	10	19	30	17
Contraceptives	11	20	9	22
Private aviation	12	7	15	11
Large construction	13	12	14	13
Food preservatives	14	25	12	28
Bicycles	15	16	24	14
Commercial aviation	16	17	16	18
Police work	17	8	8	7
Fire fighting	18	11	10	6
Railroads	19	24	23	29
Nuclear power	20	1	1	8
Food colouring	21	26	20	30
Home appliances	22	29	27	27
Hunting	23	13	18	10
Prescription antibiotics	24	28	21	26
Vaccinations	25	30	29	29
Spray cans	26	14	13	23
High schl & coll football	27	23	26	21
Power mowers	28	27	28	25
Mountain climbing	29	15	22	12
Skiing	30	21	25	16

Table 1

A = Experts

B = League of Women Voters

C = College Students

D = Active Club Members

Statistics

Jim Farmer

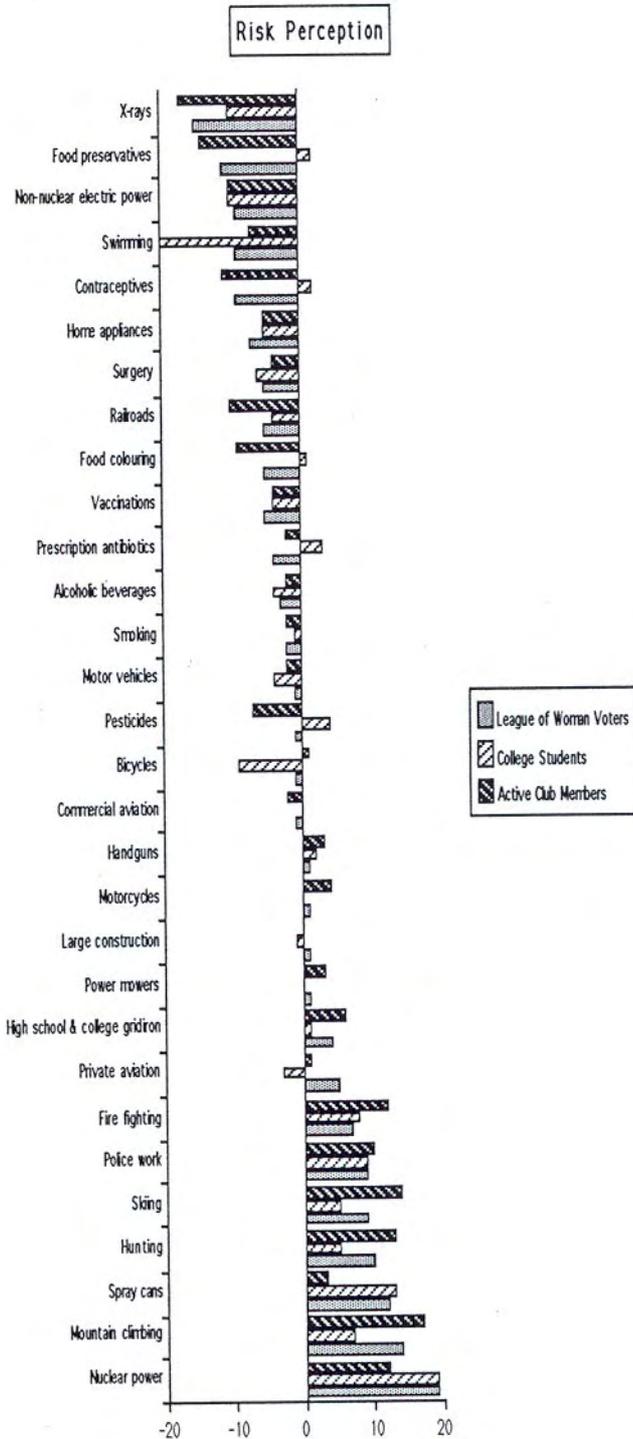


Table 2
Perceived risk for 30 activities and technologies, expressed as a difference between the risk rating given by experts and that of the specified group. Positive

In a Letter to the Editor in Vol 14, No 4, Michael Morris details a method for determining 95% confidence intervals for the results of surveys. In the example shown in that letter a survey reported that 37% of those surveyed had answered 'Yes' to a particular question. The 95% confidence interval was calculated as 29.45 to 44.6%. That is, if those sampled were a random sample from the whole population of Australia, then there is a 95% chance that the proportion of Australians who would answer Yes to the question is between 29.4% and 44.6%.

Usually confidence intervals are calculated in a symmetric manner and that has been done here. There is a 5% chance that the proportion of Australians who would answer Yes falls outside that range. We can subdivide this into a 2.5% chance that the proportion answering Yes would be less than 29.4% and a 2.5% chance that it would be greater than 44.6%. Let's look at another arbitrary example of the method. 100 randomly selected Australians were asked if they would like a three-toed sloth as Prime Minister. The responses were:

Yes: 1

No: 99 That's it, 1% of the sample answered 'Yes'.

Applying the method and using the notation in Michael's letter, we have:

$$a_1 = 1$$

$$A = 100$$

and so

$$\sigma = \sqrt{\frac{1 \times 99}{100^2 \times 101}}$$

$$= 0.0099$$

So the 95% confidence interval should be:

$$1\% - 1.96 \times 0.0099 \text{ to } 1\% + 1.96 \times 0.0099$$

$$= -0.94\% \text{ to } 2.94\%$$

The result is unreasonable. The lower limit should not be negative. If this confidence interval were correct, there would be a 2.5% chance that the proportion of the population answering Yes to the question would be less than -0.94%, but common sense says that the proportion answering Yes can never be less than zero.

What has gone wrong?

It isn't possible to provide a thorough answer to that in this journal. Readers who are statisticians already know what the problem is. Readers who have never studied statistics would have several weeks of study ahead of them if they wanted to understand the answer. For readers who know a small amount of statistics (such as a first year university introductory statistics course), here is a quick one paragraph description of the problem.

Continued p 30...

DUBIOUS SCIENCE

Cars Run on Gas (or Hot Air?)

Jim Goulter

I was recently contacted by a friend who has become interested in a system which generates hydrogen by splitting water. The hydrogen is supposedly used to run a car engine. The system uses a stainless steel tube with a stainless steel rod mounted down the centre, insulated from the tube. These are the electrodes. Water is introduced into this system presumably with the addition of an electrolyte. A hefty current is applied until the system starts to produce gas. He was told: once the system is gassing, the power is disconnected and it continues to produce gas. I queried this and suggested that maybe the running engine supplies current to keep the system gassing. My friend says that he thought it was a bit strange and supposes that that is what they meant. This is a project being undertaken by a group working on alternative energy systems. They do not wish to involve the government “for obvious reasons”. He alludes to the “suppression” of such systems by the powers that be.

The story gets more interesting now as it is further revealed that once the system is running, the petrol is shut off and the car runs entirely off the hydrogen/oxygen being generated. I suggested that this would mean that the laws of physics, as we understand them, would have to be wrong; if the motor were to keep running then it would be producing more energy than it was using.

He had been assured that a Rover V8 had made the trip from Casino to Melbourne and back (some 4000 km) using only one and three quarter cups of water as fuel, petrol not being required. He had been told that the unit did not work by the *normal* laws of physics.

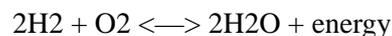
Another acquaintance of my friend, with whom I had debated Noah’s flood on a previous occasion, had become involved in the project and was paying to have one of these devices installed in his car. My friend was keen to have a meeting with these people “just in case there’s something in it”, and would like me to come along, because he wanted a sceptics perspective on the device.

Two days later we visited the home of the person regarded as the technical expert for the project (Mr X). Mr X was a friendly character with a booming voice; he exuded much confidence and spoke with a strong air of authority. This seemed to impress his friend (Mr N the Noah’s flood proponent) who was also present. I gained the impression that Mr X was absolutely confident that he was ‘on a winner’ and I don’t think that he was knowingly trying to deceive anyone. He launched into a long dialogue to impress us with his deep understanding of the subject. It was during this expose that he revealed a serious lack of understanding of

basic chemistry and physics. He produced a Time-Life book called Water and indicated the chapter, “A Maverick Compound.” He took this book to be a serious technical reference work, explaining that Time-Life, “had done quite a bit of research into water”. They had used the term “maverick” to indicate that water had properties unexplainable by science. It was these maverick properties which were being tapped by his system.

Mr X said that he had supplied another acquaintance (Mr Q) with a system which was now fitted to a Rover V8. It was in this vehicle that he had accompanied Mr Q on the round trip to Melbourne. Mr X had personally turned off a tap on the fuel line once the engine was running. I wondered how many times during the trip Mr Q had gone off on an errand by himself (to get petrol). I also wondered if there was another fuel line, or whether the tap was designed to allow fuel to pass when it was turned off.

Clearly someone was being deceived. I was informed that the current to the electrolyser could be cut off and the unit would, quote, “continue to generate gas because it was under a partial vacuum from the carburettor”. When I tried to explain why this system could not work as described, a knowing expression grew across his face. Obviously I was one of those naive people who has accepted what has been taught about “conventional science” and was therefore unable to understand the truth about the more mysterious forces at work (I had only been taught what they wanted me to know). I described in simple terms the chemical reactions involved as I understood them, using the simple formula.



I was informed, accompanied by a wise nod, that I had, “basically got it right”, (that was a great relief) but that I hadn’t taken *maverick* into account (I really am thick). I pointed out that the reverse water to gas conversion required the constant consumption of energy and that even in a 100% efficient system the available energy from the combustion of gas would be equal to the energy used to create it. There would be no excess energy available to lose as heat and friction let alone drive the vehicle. Additionally, their system would be far from 100% efficient. This of course, was irrelevant because they knew that the system did work. The trip to Melbourne proved this. Then, without warning, and a loud clap of his hands to demonstrated that hydrogen is very powerful, he explained, “there are bricks that have never been found” (how silly of me not to realise that). There was

mention of a Professor Davis (a physicist) being involved. I wondered who this person really was. If past experience by Skeptics is anything to go by, he will probably turn out to be a lab attendant in a veterinary clinic who had a friend who once met a physicist.

Some gems that emerged: (Not all related to this issue)

* It is safer to mix the hydrogen and oxygen than to keep them separated. This is known as "Brown's gas".

* Water has 10,000 feet of potential. Because rain forms at say 10,000 feet above sea level, the potential energy due to height is somehow stored in the water. This energy is tapped by the Unit. ("Potential energy" will have to be re-defined)

* The map of the world is more correct with the south pole at the top because Atlantis was in the southern hemisphere.

* The periodic table of elements is now known to be wrong and has to be re-written.

* Water should more correctly be at about 18 in the periodic table. (stop laughing, this is serious science)

* The Ford company has an electric car which uses on board fuel cells to generate electricity from

hydrogen and oxygen. This electricity is used to run the car. Simultaneously the fuel cell is used in reverse to re-generate the hydrogen and oxygen which is used to generate the electricity in the fuel cell.

This was determined by *reading between the lines*, an article about a design that could use mains power to generate hydrogen, then use the stored hydrogen to generate electricity in a fuel cell. He read out the article. There was no such inference as far as I could determine. I said so, and was told "Well I can tell you that I know that's what they're doing".

* "Net gain over unity is involved here. Scientists just don't know why it works."

* An engine develops 17 times as much power when run on this system than when run on petrol.

I spoke to my friend a couple of days later and reported my impressions as follows:

Scenario: (as I understand it)

1. They connected the output of the electrolyser to the intake manifold of the engine just after the carburettor. They started the engine and turned the electrolyser on. (The petrol tank is

of course still connected).

2. They observe gas production in the electrolyser.

3. After a number of minutes they disconnected the current to the electrolyser.

4. They observe that gassing continues to take place for some time after.

(I don't know just how this *observation* takes place; maybe they have a window in the electrolyser.)

Their conclusion:

They are observing the continued production of hydrogen and oxygen. It is therefore not necessary to apply a current after the system is running in order to keep making gas.

My conclusion:

(a) The current applied to the water causes it to heat up to a point where it begins to boil under the partial vacuum created by the intake to the engine. Once the water is hot enough it will continue to boil for a while after the current is disconnected, because of the vacuum.

or

(b) Air is leaking past the electrolyser seals

and is bubbling through the water.

In either case they are mis-interpreting what they are seeing. If they had a basic understanding of what they are dabbling in they would have realised something was amiss. Their electrolyser is extremely crude and would only be a few percent efficient at best. The engine could not possibly work in the way they describe.

Regarding the Melbourne trip: I suggest;

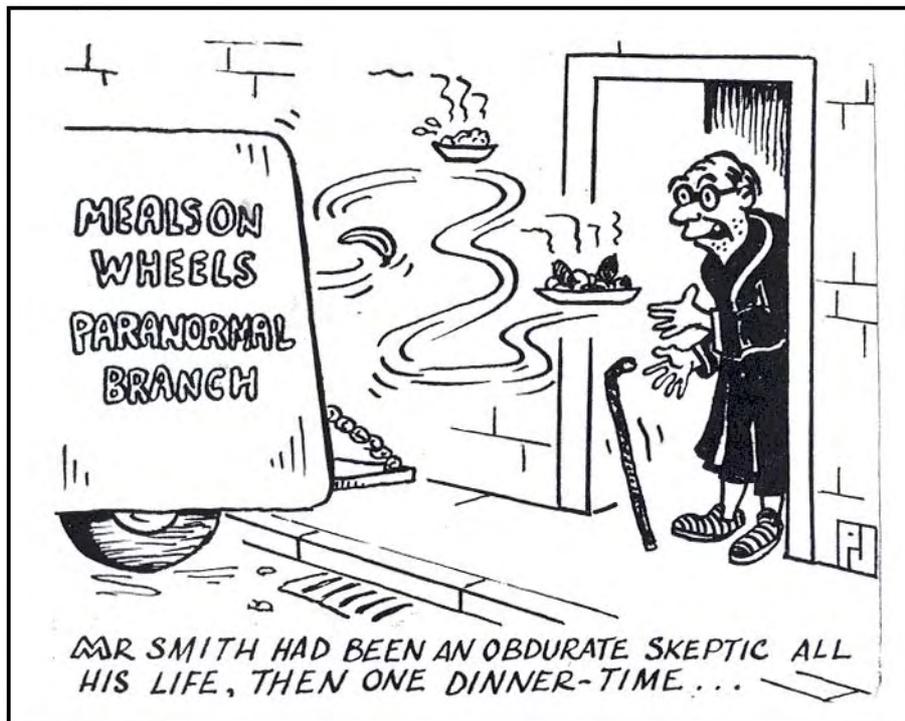
(a) Perhaps the technical expert forgot that the Rover V8 was only *supplementing* the fuel with the gases from the electrolyser.

(b) A concealed fuel line exists.

(c) The tap was designed to allow fuel through despite being turned off.

My predictions:

1. They will never be able to demonstrate a system (in my presence) that runs as they claim. The engine will only run with the petrol line intact with the gas "supplementing" the normal fuel.



2. If they show us an engine apparently running entirely off the electrolyser they will not let us disconnect the petrol line, examine the engine closely or collect exhaust gas samples.
3. Due to lack of success they will eventually lose interest in the project and give various excuses along such lines as ...
 - (a) "We just didn't have time to develop the system. Too many other things to do." (Even though they said that it is fully operational)
 - (b) "We can't get sufficient finance." (But keep in mind they told me they have everything they need in the shed)
 - (c) "We've received mysterious phone calls and have been harassed and threatened by unknown people, departments etc, and told that it would be in our best interests to drop it. Its just not worth putting our families at risk."
4. (The clincher) They will continue to buy petrol for their own vehicles even though they could secretly install the system.

My advice:

Don't invest any money on this system.

Updates...

Things develop quickly at the coal-face of pseudo-technology. The "technical expert" now says that he did not in fact make the trip to Melbourne. He accepted the word of the driver, and has such confidence in the system that he might as well have gone on the trip.

I have been told that the physicist is actually a mathematician.

Coincidentally, in a car park I overheard two people talking about the system. They were quite excited about it. One commented that it must be above board because the bloke who told him about it was very religious.

There is already a story that some hippie bloke in New Zealand had one of these systems working. An oil company has paid him off to keep quiet.

Another story is circulating that someone was murdered because he had a working system.

I encountered the "technical expert" in the street. He told me with great gusto how he had won first prize for his hydrolyser in the recent Trade Expo; (invention section.) "Oh, I had to cheat a bit though; I presented it as a water treatment system to make agricultural chemicals disperse better and stick better to plants." He personally noticed how treated water stuck better to leaves without beading as much as untreated water.

Another chance encounter in the street with the "technical expert". He informs me that they now have the Northern Territory government "on side". I looked puzzled. ... "Oh, not for the engine unit. Its for the use of the hydrolyser in a rain making machine. In effect we charge the atmosphere like a giant capacitor." ■

... Creationist from p 19

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...Statistics from p 27

The number of people answering Yes in the survey has a binomial distribution. The method described assumes we can use the Central Limit Theorem to approximate this by the normal distribution, (giving rise to the 1.96 factor, a famous number from the normal tables.) This approach will work provided the sample size is 'large enough', but when dealing with the binomial distribution 'large enough' depends on how skewed the binomial distribution is. If the proportion voting Yes had been 50% then the sample size of 100 would be quite large enough for the normal approximation to be valid. When the proportion is 1% as above, then the sample size of 100 is not large enough.

The example I presented above produced a confidence interval which is obviously unreasonable. there will be other examples where the result of the method is quite valid. The method will only be useful if we have some way of telling when it works!

Here is one rule of thumb (from *Probability and Statistics for Engineers and Scientists*; RE Walpole and RH Myers, p216) for the case where there are only 2 responses to the question. The method will work reasonably well provided each response occurs more than 5 times in the sample. The example I contrived above fails this test.

We can extend this rule of thumb to the case where there are more than two categories of response (such as 'Yes', 'No', 'Don't know', 'Please stop following me around asking me these stupid questions', etc). The method will work for category *i* if there are more than 5 responses falling in category *i* and also more than 5 responses in total in all other categories. ■

HISTORY

The Calendar

Roland Seidel

“The calendar is a system designed to reckon time in periods convenient to the conduct of civil life. It is generally based on the natural cycles of moon phases and seasons since the moon has always influenced the timing of religious festivals, and the seasons have set the time of sowing and harvesting and so controlled economic life.” [m126]

This is an excellent definition illuminating the dual role of the calendar: religious matters that are arbitrarily timed and agricultural matters that must be precisely timed in the year. It is my opinion that the confusion of these agendas has led to most of the silliness in the calendar. We experience three natural cycles: the day, the month and the year. It is natural to assume that these are related but the illusion of stability that attends them belies the comedy of errors and false hope that is their history.

Most of the energy spent in calendric pursuits has gone in the essentially fruitless task of reconciling the cycles of the sun (agriculture) and the moon (religion) using the doubly irreconcilable unit of the day. The following is an incomplete study of the evolution of the calendar that will give you a good idea of the nature of the beast. [p214]

Mesopotamia:

Early agriculturalists began to settle the flood plains of the Tigris-Euphrates valley (modern Iraq just above Kuwait) around 6000 BC. The Sumerians turned up sometime later (3600 BC), coming from an unknown area called Aratta probably near the Caspian Sea, incorporated all the indigenous agricultural terms into their own agglutinative language and came to dominate the area near the Persian Gulf. They invented cuneiform script and were exquisite mathematicians using a number system based on 60 (we use base 10) managing the solution of quadratic, cubic and simultaneous equations. [oe 15,37-39][k39-43][f330-340]

Why they chose 60 is not entirely clear; it has lots of factors and they may have been aware that 6 is ‘perfect’ (factors of 6 add up to 6) but it may also have had something to do with the length of the year which was initially thought to be 360 days comprised of 12 months of 30 days each. (Month = moon of course). They also divided the sky into 12 signs (the astrological ones) and also 360 degrees, each degree having 60 minutes, each minute 60 seconds and each second 60 thirds. They did sums with numbers like 29;55,13,40 (29 55' 13" 40") and left us, in that, an ugly legacy. [oe 50][i170-181][n21,39][p217]

Meanwhile Semitic peoples who had settled further north

were building cities and competing for dominance. Sargon (Akkadian, 2370 BC) took over and later Hammurabi (Babylonian, 1790 BC), subjugating and assimilating the Sumerians. They adopted Sumerian ‘science’ and retained their language for ritual occasions the way Latin was retained in Europe. Months now alternated 29 and 30 days making a year of 354 days requiring an extra intercalated month now and again to get the seasons to line up properly. There was a lot of astronomical data-gathering on stars and ‘bibbu’ (meaning sheep - the Greeks later called them ‘planetoi’ meaning wanderers) and eclipses. [oe16,17][k60,288-290][n21][p217][f343-346]

To see what they were up against we need to pause for some technical terms.

Months:

The month is not a simple thing at all. First there is the Synodic month (synod = meeting, in astronomy it means conjunction or lining-up) being the time between successive new moons (29.53059 days mean value, min 29.26, max 29.80). This is a handy size chunk of time that should be useful in measuring the course of the year but it isn't. The Babylonians tried 8 years = 99 months = 2922 days, then 27 years = 334 months but the best approximation was 19 years = 235 months = 6940 days.

This last is attributed to Meton (432 BC Athenian Greek) but may have been Babylonian and is preserved today in the Jewish ‘Metonic Cycle’. Each of these was used to create a sequence of years where roughly every third year has thirteen months. [oe5,31,55,56][n37,65][p218]

Eclipses present manifold problems that the Babylonians chipped away at with observation; we can approach them from theory. The Moon's orbit is inclined at 5° (to the Earth's, so eclipses can only occur when the moon crosses the ecliptic (apparent path of the Sun). Such points are called nodes, either ascending or descending. The *Draconic* month is the time between two ascending nodes (27.21222 days mean value) and since eclipses can only occur when the moon is also full or new we need some nice round numbers where the draconic and synodic month match up. A nice one is 6 synodic months for 61/2 draconic months but it tends to slip fairly quickly being useful for only seven or eight cycles. [oe31]

A further problem is that the moon's orbit is elliptical and it will be travelling faster when closer to earth (nearest = perigee) and slower when further away (furthest = apogee). The *Anomalistic* month is the time between perigees

(27.55455 days mean value). The Babylonians discovered that 223 synodic = 242 draconic = 239 anomalistic = 6585 days (accurate to a few hours) making eclipses fairly predictable. This is also only a couple of weeks more than 18 years. Halley mistakenly thought they referred to it as the Saros Cycle but the name has stuck. [oe29,32,33,69][n35]

Just for completeness there is one more month: the *Sidereal* month (sidereal = of the stars) when the moon returns to the same position relative to the background stars (27.32166 days mean value). [oe5]

Greece:

By the sixth century BC the Greeks had taken over everything and refined the convergencies. Kallipos (370 BC) took four Metonic cycles and dropped one day to make 76 years = 940 months = 27750 days. Hipparchos did the same to Kallipos and got 304 years = 3760 months = 111035 days but the numbers were getting a bit too silly to be useful by then. [oe56,69][n65]

Euktemon (5th century BC) noted that the times between solstices (longest, shortest days) and equinoxes (equal day and night) were different. The seasons vary from 89 to 94 days due to another orbital irregularity. Time for some more technical terms. [oe56]

Years:

The common year is called the *Tropical* year meaning the time between spring equinoxes (365.24219 days mean value decreasing by 0.000 006 14 days per century). Because the Earth's orbit is elliptical it will travel faster at perihelion (closest, now early January) and slower at aphelion (furthest, now early July). This means that the season around perihelion will be shorter than the one around aphelion. Currently the gaps between equinoxes and solstices are, starting at the Northern Hemisphere Spring Equinox, 92.72, 93.66, 89.84, and 88.98 days. The southern hemisphere gets a few extra days of winter and the northern hemisphere gets a few extra days of summer. [oe4,56]

The *Anomalistic* year is the time between perihelions (365.25964 days mean value). Because it is longer than the tropical the date of perihelion will creep a little later each year - about a month in 200 years - so the hemispheres get to exchange the advantageous seasons eventually. [oe56,57]

The *Sidereal* year is the time for the Earth to return to the same position relative to the fixed stars (365.25636 days mean value increasing by 0.000 000 12 days per century). Because it is slightly longer than the tropical the equinoxes will gradually creep westward around the ecliptic by 1 degree in 71.71 years or 360 degrees in 25800 years. This is the famous 'Precession of the Equinoxes' discovered by Hipparchos that so embarrasses astrology. [oe70,80,96,172][n37,39]

Rome:

Rome conquered Greece in 146 BC and had been developing their own calendar. All of our calendar names come from the

Romans including the word calendar itself. The Roman month began when an official went into the streets and shouted out that a new moon had just happened (Indo-European root *kele* = shout, *calends* = start of month) and announce the *ides* (13th or 15th day) and the *nones* (9 days before *ides*). [m126][e][p219]

Originally there were ten months making a year of 304 days: Martius (Mars, god of war), Aprilus (*aperire* = to open - buds of spring), Maius (Maia, goddess of fertility), Junius (Juno, goddess of the moon), Quintilis, Sextilis, September, October, November, December - the last being the Roman numbers five to ten. In the 8th century BC King Numa Pompilius added January (Janus, god of doorways) and February (*februa*, festival of purification) although the year still began on March 1 until 153 BC when it was set to 1 January making the numbered months look silly. [rd390][e]

They still had to have an extra month now and again to fix up the seasons. These 'full years' became somewhat controversial since the start of the year was also the start of public office and the priests who decided which years were to be full tended to favour their friends. By Julius Caesar's time the seasons were a couple of months off and he was not happy. He found the solution when he went to Egypt. [m126,129][e]

Egypt:

Caesar met not only Cleopatra in Egypt but also an astronomer called Sosigenes who explained the Egyptian calendar. The Egyptians had been developing their own system since about 3000 BC and started off with a lunar one just like everybody else but ran into problems very quickly. Egypt is unique in early civilisations in being so dependent on one event: the flooding of the Nile. The moon consistently failed to predict this but the stars were very serviceable. They soon noticed that the heliacal rising of Sirius (first day visible just before sunrise) always preceded the flood by a few days. [m126][oe10][n12][p219]

They eventually had a system of 36 stars to mark out the year and in the end had three different calendars working concurrently for over 2000 years: a stellar calendar for agriculture, a solar year of 365 days (12 months x 30 + 5 extra) and a quasi-lunar calendar for festivals. Sosigenes' message to Caesar was that the moon was a nice god but knew nothing about when things happen. [oe10][n13]

Solar Calendar plus Leap Years - the Julian Calendar:

Armed with this information Caesar returned to Rome and made big changes. The old lunar system with intercalary months was abandoned and a new solar system was introduced with fixed month lengths making 365 days and an intercalary day every fourth year in February which now had 29 or 30 days. To shift the equinox back to March 25 he added three extra months to 46 BC making it 445 days long ('the year of confusion') and the Julian calendar began on 1 January 45 BC. He also added to the Regnal numbering

system (year of king: eg 12th year of the reign of Pompilius) an absolute numbering system setting the beginning at the foundation of Rome (753 BC = 1 AUC, *ab urbe condita*). They renamed Quintilius Julius in honour of him. [m126][rd390][e][b1][p220,221]

His nephew Augustus (originally named Octavius) also did some cleaning up that is not clear. One source (Britannica) suggests that the priests got the leap years wrong having one every third year for forty years so he had to skip a few until 8 BC. He was the first Emperor anyway so they renamed Sextilis August in his honour but had to pinch a day from February to make it the same length as July. [m126][e]

Christian adjustments:

Things went swimmingly for a while; the seasons were finally staying put in the year and festivals were happening at sensible times - almost. At the Council of Nicea in 1079 AUC (325 AD) Easter was decreed to be the first Sunday after the full moon after the vernal equinox. The early Christians were keen to cleanse pagan ideas (like the spherical Earth) so in 1280 AUC (526 AD) the Abbot of Rome, Dionysius Exiguus proclaimed that the birth of Christ should be the event from which years are counted, calculated that this was December 25 (a handy pagan festival for mid-winter) 753 AUC (at least four years too late - Herod's rule was from 11 BC to 4 BC). He asserted that 754 AUC should now be called 1 AD (*anno Domini* = in the year of our Lord) and 753 AUC should be called 1 BC (now meaning Before Christ) with prior years counted backwards. The omission of a year zero was a dumb idea. [oe101,103][e][p210,221]

About this time the seven day week was introduced as well although it may have appeared earlier in the Jewish calendar that was tidied up in the fourth century. Cycles of from four to ten days had previously been used for organising work and play. Seven was chosen apparently in acknowledgment of the Genesis story where God rested on the seventh day although there is a strong suggestion that it reflected the seven pagan gods visible in the sky as the planets, sun and moon. The names of the days in Latin countries are sensibly the Roman gods but the English ones are mostly the equivalent Nordic gods. [rd390][p220]

Sunday	(sun) = Dimanche (dies Domini, Lord's day)
Monday	(moon) = Lundi (moon)
Tuesday	(Tiw) = Mardi (Mars, god of war)
Wednesday	(Woden, Odin) = Mercredi (Mercury, messenger god)
Thursday	(Thor) = Jeudi (Jove, Jupiter, top god)
Friday	(Frigg, Freya) = Vendredi (Venus, god of love)
Saturday	(Saturn, Roman god of agriculture) = Samedi (Sabbath day)

The Gregorian Calendar:

By the middle ages the seasons had slipped again. Pope Leo X tackled the problem in 1514 by engaging a number of

astronomers, among them one Copernicus who quickly recognised that there was a more fundamental problem than rearranging the calendar and rearranged the universe instead by putting the sun at the centre. Work stopped.

Half a century later Pope Gregory XIII was game enough to have another go and assembled a team of experts led by the German mathematician Christoph Clavius who spent ten years finding a solution. The church spent another six years working out how to implement it receiving final approval in 1582. [e][p223]

The change was this: skip ten days sometime to bring the seasons back in line and skip a few leap years now and again. The extra day every fourth year is too much so skip the leap year at the end of the century. This is now a touch short so put back a leap year every fourth century. Simple isn't it? The rule is: a year is leap if it is a multiple of 4, it is not leap if it is a multiple of 100, it is back to being leap if it is a multiple of 400. Since this still produces an error of a day in 3,323 years we will also skip the leap year in 4000 AD. So in 1583, October 4 was followed by October 15, 1600 was a leap year but 1700, 1800 and 1900 were not. 2000 will be a leap year. [m126][e][b1][p223,224]

Two Calendars:

The change over was not smooth. France, Spain, Italy, and Portugal changed in 1582; Prussia, Switzerland, Holland, Flanders and the German Catholic states in 1583; Poland in 1586 and Hungary in 1587. The Protestant countries weren't too keen to follow so for nearly two centuries there were two calendars running in Europe ten days apart. England had just shifted the start of the year from December 25 to March 25 a couple of centuries ago and they weren't about to jump on any new Catholic bandwagon. George Washington's birthday could be equally stated as February 22 1732 NS (new style) or February 11 1731 OS (old style) and letters usually carried both dates. [e][b1][p224]

Matters came to a head in 1700 when the Protestants had a leap year and the Catholics didn't, increasing the gap to 11 days. Denmark and the German Protestant states changed in 1700 and Sweden came up with the brilliant plan of simply skipping all leap years until they caught up in 1740. England and America switched over in 1752, skipping 11 days by making September 3 September 14 and shifting the start of the year to January 1. There was much unrest - 'give us back our eleven days' was a popular campaign slogan. [b1][n238][e][p224]

Many other countries were slow to adopt the standard and it was not until early this century that the entire world was finally synchronised. Japan changed in 1872, China in 1912, Bulgaria in 1915, Turkey in 1917, Yugoslavia and Rumania in 1919 and Greece in 1923. Russia made the switch after the October revolution which actually happened in November (25 October OS = 7 November NS). The Gregorian calendar is now recognised world wide although there are still many other calendars running alongside it for religious purposes.

[e][b1]

The Jewish Calendar:

The Metonic cycle of 19 years has twelve years of 12 months and seven years of 13 months, generally alternating 29 and 30 days. In the fourth century the Jews refined this to suit their festival requirements. The 3rd, 6th, 8th, 11th, 14th, 17th and 19th years of each cycle have 13 months (384 days) and the others 12 months (354 days). The day begins at sunset (6 pm) and the week has seven days only the last of which is named (Sabbath). The years are numbered from the Jewish creation of the world (3761 BC) and are occasionally lengthened or shortened to meet certain rules. [b3][m129][rd392][p222]

The extra months ensure that Passover is celebrated in the month of Abib (fresh ears of grain). The Day of Atonement (10 Tishri, Yom Kippur) must not fall on the 1st or 6th day and the seventh day of Tabernacles must not fall on the Sabbath. The New Year festival (1 Tishri, Rosh Hashanah) must be celebrated on the day the moon becomes visible. This means that the eighth month, Cheshvan, sometimes has 30 days instead of 29 (a 'redundant' year) and the ninth month, Kislev, sometimes has 29 instead of 30 (a 'defective' year). Jewish years are described by a three letter 'characteristic' indicating respectively the day of the week for New Year, the type (regular, redundant or defective), and the day of the week for Passover. This is followed by the word for 'leap' or 'ordinary'. There are 14 possible Jewish years. The year 5755 began on September 6 1994. [b3]

The Moslem Calendar:

This is the only truly lunar calendar left, very similar to the old Babylonian Calendar, having 12 months alternating 29 and 30 days making 354 days altogether. Occasionally an extra day is included in the last month to ensure the year begins with the new moon. It has no connection with the sun and seasons and while 32 Christian years go by, the Moslems enjoy nearly 33. Years are counted from Mohammed's flight from Mecca (the Hegira) on 16 July 622 AD. The year 1415 began in early June 1994. [m128][rd392][p222]

Others:

There are a couple of Ecclesiastical calendars for organising festivals, a Chinese calendar banned in China but used in some Asian countries, in remote areas like the Russian steppe there are still remnants of simple agricultural calendars which depend on equinoxes but not on counting days and dozens of provincial calendars. [b9-19][r1- 185]

The Calendar of Reason:

The French Revolution against the aristocracy and the church insisted on radical change with immediate impact. The church ran the calendar so it had to go. They adopted the old Egyptian one with 12 months of 30 days being 3 decades, the last day of each decade was a day of rest. Five spare days

(Sansculottides) were for pleasure and feasting. The Republican Era began on 22 September 1792 (Year I) and ended on 31 December 1805 after it became clear that the rest of the world was having difficulty with it. Leap days happened in September and the year VIII was leap where the corresponding Gregorian 1800 was not. [b20][r62]

The Positivist Calendar (13 month):

Auguste Comte, the founder of Positivism, offered a plan in April 1849 for a calendar. It has 13 months of 28 days each, always 4 weeks, always starting on Sunday. The spare day called 'Year End Day' followed December and was not in the weekly round. The sequence Saturday December 28, Year End Day, Sunday January 1 ensured identical months. The extra month, Sol, after June was followed by 'Leap Year Day' as appropriate. He used the names of eminent men for each month, week and day and event (559 in all) consecrating Leap Year Day to 'Eminent Women'. France tried it for a while in 1849 and it gained much support in the US. [w258-266][r62- 63]

The World Calendar:

The minimum impact suggestion is to divide the year evenly into four identical quarters each having months of 31, 30 and 30 days and exactly 13 weeks. Use the Year Day and Leap Day as before to ensure that every quarter begins on Sunday. This repairs the unevenness of the quarter and half year and much of the irregularity of the months while fiddling with only 8 days in a normal year and 4 in a leap. It really is the only prospect for modern reform. [w267-273]

The International Calendar:

In October 1931 The International Calendar Association put before the League of Nations a plan for modern calendar reform. They listed the problems of the Gregorian as: it was designed for an agricultural world 2000 years ago, it still tries to match lunar and solar agendas (Easter), it begins at a silly time, the seven day week is too long, random month length, complicated leap years, irregular national holidays, stupid base 60 sums. Their suggestion was for the 365 day year to be divided into 5 quintals of 73 days each. A quintal has 12 six-day weeks, the last day of the week and of the quintal being rest days making 300 work and 65 rest days in the year. The day has 12 hours, the hour 100 minutes and the minute 100 seconds. Leap years occur every fourth year unless it is a multiple of 128 (accurate to 90 minutes in 1,000,000 years). It is still before the UN. [r186-194]

The Millennium:

Finally, when does the 21st century begin? Because we have no zero year the first century comprised years 1 to 100, the second years 101 to 200, the third years 201 to 300 and so on. Clearly 2000 AD is the last year of the 20th century and

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THE UNIVERSE

Big Bang Cosmology - Fact or Fiction?

Colin Keay

During the 'fifties and early 'sixties, there were two strongly competing schools of cosmology. On the one hand there was a Steady State model championed by Hermann Bondi, Tommy Gold and the inimitable Fred Hoyle, in which creation occurred continuously at a rate just sufficient to make up for the loss due to the matter disappearing from view as a result of the Hubble expansion of the universe. Opposing it was a concept proposed by the Belgian cosmologist, the Abbe G Lemaitre, of a primal atom from which the universe was born in the greatest explosion of all time. In a BBC lecture in 1950, Fred Hoyle disparagingly referred to Lemaitre's concept as "The Big Bang", a name which has stuck despite attempts to find a better one (see *Sky and Telescope*, March 1994 - "Creation" polled highest in their challenge).

Most cosmologists in those days, as now, favoured the Big Bang because it represented a straightforward solution of Einstein's general relativistic equations for the structure of spacetime. It also seemed to offer explanations for much of what is observed in the universe, notably the Hubble expansion and the formation of all the elements of the periodic table. Supporters of the Big Bang, such as Lucien Rudaux and Gerard de Vaucouleurs, in 1959¹ wrote "The formation of the elements must have antedated that of the stars; it must have occurred during a pre-stellar stage of the Universe, characterised by the exceedingly high temperatures and pressures which are necessary to produce the requisite nuclear reactions." We now know for certain that heavy elements, such as we are made of, are formed in the stupendous cauldrons of supernovae explosions, and we know from nuclear particle physics that such elements (those heavier than lithium) could not have formed in any Big Bang.

However the Big Bang gained the ascendancy in 1965, when Arno Penzias and Bob Wilson, of the Bell Telephone Laboratories, discovered microwave radiation pervading the universe. Its equivalent black body temperature is only three degrees above absolute zero and it was immediately seized upon as evidence supporting a Big Bang whose initial fireball radiation had cooled to that low value due to the expansion of the universe. Cosmologists and astronomers then flocked onto the Big Bang bandwagon, leaving Steady State theories apparently mortally wounded. Only a few brave souls, notably Hoyle himself, held their ground as heretics of the new cosmological religion.

Not having much cosmological expertise, only a basic training in physics and astronomy, I have always felt twinges of discomfort about the Big Bang.

In the first place, the Big Bang suspends the laws of physics at its very beginning, and again if there's a Big Crunch at the end. Also, time loses its meaning with the lack of a spacetime continuum. We get into some very deep philosophy here, not to mention the physical paradoxes implied by worm-hole theories of other universes beyond, or outside, or even inside, our own.

My second major difficulty with Big Bang scenarios is the fine-tuning of the four fundamental interactions underlying every physical force we know anything about. The Anthropic Principle, first enunciated by Bernard Carr of London University, suggests that the fine-tuning has been to ensure that sentient life, like our own, will emerge to give the universe meaning.

The fine-tuning is amazingly well-adjusted. If the strength of any of the four fundamental interactions was increased or decreased by only a fraction of a percentage point, we would not be here. There would be no chemicals for life. The light and heat which sustain us would be absent as celestial bodies like our sun, if they formed at all, would either explode or remain inert. We most likely wouldn't even have a planet to live on.

On top of this balancing feat, there is an unexplained set of apparently accidental numerical coincidences between the large numbers quantifying the universe and the strengths of the four fundamental interactions. For example the ratio of the strengths of the most powerful nuclear interaction (the so-called strong nuclear force) to the weakest (gravity) is close to ten to the power of forty, which just happens to be the square root of the number of charged particles in the universe, or rather, within the Hubble radius. This and other cosmic coincidences have been discussed in a semi-mathematical work by Paul Davies².

Over the past three decades, Big Bang cosmology has assumed all of the hallmarks of holy writ, despite the fact that it provides no explanation of any of the things we have been talking about. Every discovery of any relevance to cosmology has been taken as proof positive that the writ is right. Like holy writ, the Big Bang theory has made no successful predictions of hitherto unknown phenomena, such as the recent discovery by the COBE satellite of minuscule fluctuations in the microwave background radiation. These are being interpreted as the ripples in early spacetime which gave birth to clusters of galaxies, a claim resting on the implicit assumption that there was a Big Bang in the first place.

Theories bringing together and unifying the fundamental forces are held to depict the conditions of temperature and pressure existing in the very early stages of the Big Bang, before the first microsecond. Enormously successful books like *The First Three Minutes* by particle physicist Steven Weinberg³ trace a seemingly irrefutable line of development of our universe, but what if the matter in the universe came into being by some other means, under the influence of forces brought into their exquisite balance by a feedback mechanism or a self-organising characteristic of the universe that is beyond our present understanding?

Quasars were a discovery held to be proof of the Big Bang. Their enormous red-shifts, indicating great distance and age in the Hubble expansion, argued for their interpretation as artifacts of an early stage in the evolution of galaxies. So when a talented American observational astronomer, Halton Arp, gathered evidence of discordant red-shifts in connected galaxies, the Big Bang fundamentalists would have burnt him at the stake, if they could have. Arp was denied observing time on the large telescopes which are needed to settle such issues and he retaliated by writing a book defending his claims⁴. In perhaps the most shameful episode in the history of American astronomy, Arp was forced to emigrate to Europe to continue his work.

The Big Bang has never been as secure as its high priests would have us believe. Almost half a century ago the great astronomer Walter Baade maintained that the rate of expansion of the universe from the time of the Big Bang was too great for the galaxies to have evolved as far as they have done. His concerns have recently been bolstered from observations by the Hubble Space Telescope revealing stars older than the age of the (Big Bang) universe. The Big Bang is starting to show cracks which may not be patchable.

Doubters and dissenters are the ones who rescue us from these situations by making, or causing to be made, advances in understanding in any field. Fred Hoyle has always been an independent thinker and his continued dissent from Big Bang cosmology has spurred him and his student Jayant Narlikar to devise cosmological alternatives to the Big Bang. His original steady-state model was fatally flawed, but he has now developed a version having great promise: an oscillating universe. In his original model he invoked a "Creation field" which created new matter at a rate keeping the amount of matter constant in the observable universe. His mistake was in having his C-field turned on continuously everywhere. He now has it turned on only at times and places where mass is accumulating. "Creating more matter where there is already too much matter"? I hear you say. Yes, and the consequences are profound.

Hoyle's C-field eliminates black holes, causing instead outbursts of matter and energy, which is what we observe from the cores of galaxies and in supernova explosions. The C-field produces slow oscillations in the universe which allows it to be much much older and permits the existence of elliptical galaxies containing extremely ancient stars. The

expanded age-scale allows for a large population of near-dead stars which provide the missing mass astronomers have been searching for for years. The important point to note about Hoyle's revised theory is that it makes these predictions, a feature lacking in Big Bang scenarios.

It is rather ironic that Hoyle's C-field bears many similarities to a cosmic repulsion force invented by Einstein in 1917 to make the universe expand. Later he described it as the greatest mistake he ever made. But something very much like it was reintroduced by Alan Guth of MIT in 1980 to overcome the failure of the Big Bang to explain the problem of why different regions of the universe have the same properties. You could justifiably say it was brought back merely to prop up the bankrupt Big Bang.

But what about the microwave background radiation, the linchpin of support for the Big Bang? Hoyle has a simple answer for this one too, backed up by experimental evidence. When metallic vapours are cooled very slowly they form tiny needles, a fraction of a millimetre long. Clouds of them are formed in the wake of stellar explosions. Once formed the needles intercept star light and reradiate it as microwaves.

In his highly readable and most entertaining autobiography⁵, Fred Hoyle discusses his revised cosmology and I have drawn on many of his arguments. He regards the obsessive belief in the Big Bang and black holes as akin to religious fundamentalism, brooking no dissent. But there may be signs of change. Right here in Australia a cosmologist at Sydney University, Dave Crawford, has been developing another alternative theory of cosmology. It is pleasing to note that his heresy is being tolerated by his colleagues and by the establishment overseas, at least in some quarters. His work has now been published in the most highly respected publication in the field: *The Astrophysical Journal*⁶, whose new editor, Helmut Abt, is an unusually open-minded astrophysicist.

Like Hoyle and Narlikar's recent work, Crawford's has the great virtue of making refutable predictions, which is more than can be claimed for any Big Bang model of the universe. For example, Crawford explains the size of the Hubble Constant (and predicts a value very close to latest estimates); estimates the temperature of the microwave background (again getting very close to current measurements); solves the "missing mass" problem and gives an explanation for the baffling x-ray background radiation which has had theorists bluffed ever since it was discovered.

Theoretical cosmological models like Hoyle's and Crawford's, which provide answers sadly lacking in Big Bang scenarios, are now on the ascendency. They have a long way to go yet before the entrenched pundits revise their views, but I think we can safely suggest that the Big Bang is becoming shakier by the month and is in danger of losing its undeserved status a fact of creation. Maybe it is a fiction, like creationism perhaps?

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BIOCHEMISTRY

Pig Perfumes for Lonely Hearts

Anthony G. Wheeler

Introduction

You can find many claims made in popular newspapers and magazines. One that caught my eye claims 'science' to support it. Poppycock! The expression 'making a pig of yourself' may soon take on a whole new meaning, largely because of the range of scents for men - called 'pheromones' - now being promoted in men's magazines.

These are some of the claims being made for this exciting new product (the originals used lots of capital letters that I have omitted):

"Science discovers the 'secret' to attracting women!"

Errol Flynn had it ... so did Valentino; stags & stallions, rams, bucks & Tarzan all have it."

The secret is out. At last man has discovered a spray on male pheromone: A female attractant that really works."

"Spray on sex appeal."

Pheromones

Pheromones are real, and in general terms can be described as 'odoriferous chemicals secreted by the skin glands, or into the urine and/or faeces, of various animals'. The idea is that any airborne chemical is then detected by another individual of the same species, and alters the behaviour of that animal.

While the more familiar 'hormones' are secreted by one organ to change the activity of another organ in the body, 'pheromones' are secreted by one individual to change the activity of another individual.

Pheromones are produced by males to influence females, by females to influence males, and even by females to influence other females. And it seems that most species of mammals make use of them.

The most famous pheromones are those produced by insects. You may have heard of chemicals released by the females of some flying insects that are wafted downwind in the air to some capable male who is so sensitive that he can capture, identify and respond to as few as only a few molecules of this potent messenger. The receiving male promptly flies upwind through increasing concentrations of the pheromone to its source and reproductive consummation. A lot of work has been done on insects to lure selected pestilential species into traps using synthesized pheromones,

and so protect man and his crops. This goal has been achieved in many species, but this is hardly news of interest to your average reader.

'Female' pheromones communicate fertility to males

Pheromones are just as important and interesting in mammals. Those familiar with farmyards may recall seeing a ram or a stallion sniffing around the backsides of his females, who promptly pass a little urine. The male then appears to lick his lips (he actually takes just a few drops of urine onto his tongue), strains his lower jaw forward as if to stretch his neck, and curls his upper lip back while apparently sniffing the air with fast, shallow pants.

This is known as the Flehman response, here the male is vaporising the few drops of the female's urine and directing that odour into a small, specialized upgrowth from the nasal cavity, the Organ of Jacobson (less evocatively referred to as the vomeronasal organ). In this chamber the molecules of odour are concentrated and detected by special receptor cells, and, presuming the indication is right, the male will then mount the female. This is the mechanism by which many of our female farm animals communicate to their mates that they are 'in heat' (oestrus).

The pheromone produced by the female, the pheromone which triggers the mounting behaviour by the male, is only produced during the female's oestrus. Oestrus is the time of her oestrous cycle when she is most likely to conceive, and the only time when she will stand still when a weight (the male) is applied to her back.

Competitive mammalian pheromones

Males also use pheromones to communicate their maleness to attract reproductive females and repel possible rival males. This is the reason for red deer bucks urinating on the backs of their front legs from where the odoriferous urine is wafted to all and sundry.

More familiar to you may be the ritual deposition of carefully measured amounts of strong urine around their territory by our dogs and tom cats. Rabbits live in very tightly controlled communities that make the extremes of either fascism or communism, let alone the Big Brother of 1984, look liberal. The dominant males mark their territory with neat piles of odoriferous faeces deposited at strategic junctions in the warren's network of paths, and the influences of the dominant males and females are so overwhelming that by odour alone they can suppress reproductive activity in the

subordinate adults. (So much for the innocence of Watership Down.) And to avoid charges of sexism, the dominant female Mongolian gerbil in a community suppresses the attainment of sexual maturity by other females by the power of her smell.

You may well have observed the purely territorial use of pheromones too. Our pet female cat often rubs her scent onto things - doorways, furniture, etc This is how she warns other cats that this is her territory. (Humans mark their territory, but visually. This is one function served by cave paintings, hanging posters, pictures, etc Sure they are nice and/or informative to look at, but because they are familiar to us and not others they mark our territory.)

Pig breeders discover the boar's pheromone

The traditional method for producing baby pigs is to put the boar in with the sow each day after the previous litter has been weaned; when the sow is 'in heat' they will copulate and conception and pregnancy will follow. There was nothing seen to be wrong with this method, and indeed it was popular with farm-hands since it gave them the chance for a break from their labours (as well as something interesting to watch).

Nevertheless, change was on its way. Scientists and vets had discovered that the attributes of male cattle could be quantitatively measured in such terms of growth rate, carcass quality and milk yield. And from these bulls semen could be collected, with the valuable sperm diluted and stored so that females could be inseminated artificially.

With the ability to regularly collect semen twice or thrice a week and distribute it greatly diluted so that each ejaculation would serve hundreds of cows, an enormous selection pressure could be applied to the bulls by using only a few of the very very best, thereby improving quickly the genetic basis of the animals.

AI was promoted in the pig industry for similar reasons, and even had the advantage that the artificial insemination was technically easier in pigs so that the farmer could carry out this little ritual himself (if you take my meaning) unlike the procedure in cattle where a full-time professional inseminator had to be paid. All that was required was to choose from which prize boar you wanted to order your semen, establish when the sow was 'in heat', insert a rubber, artificial penis in place, connect the container of refrigerated diluted semen to the end, pour it in and hey presto! - one pregnant sow (with any luck).

Naturally farmers were sceptical at first, and most kept their boars in reserve, unused but ready, in case the new fashion should fail to live up to expectations. As it happened all went well, with artificial insemination being one of the success stories of modern agriculture. There was even a slightly comic side to the procedure since whether or not a sow was 'in heat' was established by the farmer, or his assistant, sitting on the sow's back.

Ordinarily a sow would be greatly offended and remove the burden in no uncertain manner (this was the comic bit), while a sow that was 'in heat' seemed remarkably indifferent

to being mounted and the persistent weight on her back, even planting her legs firmly so as to remain more immobile as she contentedly ate her breakfast with hardly a step to one side or the other to upset her rider (with the right sense of humour and the appropriate ribald comments this could be even funnier).

Once artificial insemination had proved itself the local boar's days were numbered. After all, why bother to feed and care for a very large boar that consumed considerable quantities of valuable feed, produced considerable quantities of unattractive waste, and contributed nothing, when a 'phone call to the local AI centre would be followed by the receipt of a couple of doses of semen from one of the best boars in the country within a day or two?

Also remember that boars (and to a lesser extent sows) are very large, deceptively quick, bad tempered meat-eaters; in other words they are a considerable threat to the farmer, his work-force, his family and any visitors. Soon it was apparent that keeping a boar was dangerous extravagance, and the farmyard boars were dispatched.

Now we come to the problem. With the absence of boars from the farms for some reason it suddenly became quite difficult to detect when a sow was 'in heat'; it seemed that no matter what stage of her reproductive cycle she wouldn't stand still with a weight on her back.

The problem was solved by a French gentleman (J.P. Signoret). It seems that the boar produces two steroids (androsterone and testosterone) in its testes that are secreted along with its saliva; these steroids are pheromones, and this is the secret.

You see in most animals copulation is a relatively quick in-and-out operation. Once the female cow, ewe or mare has stood to the male's mounting it is all over in a flash. But the boar has a prodigious 400 to 540 ml of semen to transfer, and that takes about ten minutes! It is for this reason that the boar has evolved a screw-like thread to the end of his penis, and the sow has evolved a complementary screw-like thread to the inner lining of her cervix. Consequently, despite the sow's odd step to one side or another to take a tasty morsel of food to chew during the ten-minute orgasm, the penis is held firmly in place with none of the semen wasted.

To further assist the anatomical adaptation the boar and sow are aided by another adaptation by which the ejaculating boar ensured that the female sow would be held stationary. This mechanism is the hormone and pheromone androstenone, which is contained in the boar's saliva. When the sow smells the boar's androstenone when she is in oestrus - she stands still. There is no doubt about this; she doesn't reflect on whether she feels like at that time, she doesn't ponder how attractive that particular boar is - she just stands still. As long as she smells androstenone and she is in oestrus, the sow stands still to permit the male to commence, continue, and complete his protracted intercourse.

So when farmers test their sows nowadays by sitting on their back to check whether they are in oestrus, first they

spray a little androstenone on the sow's snout (marketed in aerosol cans as 'Boar Mate' by Jeyes Animal Health Division). The sow thinks a boar is present, and if in oestrus will stand still to the weight of the pig breeder.

Coincidentally, a steroid very similar to androstenone is produced by the fungal organ truffles. Truffles grow hidden underground, and are typically located using pigs to sniff them out. The link between truffles, androstenone and sexuality probably explains the pig's success in locating these morsels.

Human pheromones?

Will a quick spray from a can of appropriate pheromone have the woman of our choice begging with unbridled lust for our attentions? According to recent advertisements for such products in 'men's magazines' there is no doubt: all our sexual limitations can be overcome with a quick spray.

Quite simply, many pheromones can be considered aphrodisiacs in that they induce sexually receptive behaviour in individuals that would otherwise run away, and surely this is what power- and sex-loving humans have been seeking for centuries. After all, what are perfumes, after-shaves, body lotions, and all the other smellies for if not to change our smell so that others regard us more favourably. For this reason one might think that the perfume industry would be intensely interested in the advances in the scientific understanding of animals pheromones.

Well if so, they weren't too quick off the ground. In 1971 I wrote to some 20 leading perfumers on this subject most replied that they had never heard of pheromones; one replied that they were aware of them but had no interest, one suggested that I had mistaken "perfume" for "pheromone" in the telephone yellow pages, and only one knew anything of pheromones helpfully referring me to an article in a recent copy of the perfumer's trade magazine.

That may have been the case then, but whether they realise it or not, one company at least suggests that its product has the power of a pheromone. Have you seen the T.V. advertisements for the female perfume 'Impulse' where the smell is sufficient to induce an attractive male to perform actions (he always seems to steal flowers) that he presumably would not otherwise have done?

This typifies the difference between a 'perfume' and 'pheromone': perfumes are attractive and may make us take more interest in their source, while pheromones are powerful odours that induce a qualitative change in our behaviour or endocrinology, a change that cannot be resisted no matter how bad the headache. Nevertheless, despite the advertisement 'Impulse' is only a perfume.

Meanwhile in rhesus monkeys, research has shown that the frequency of copulation may be directly determined by the quantity of five fatty acids (acetic, propionic, isobutyric, butyric and isovaleric acids) produced by microbial action on the vaginal secretions. These odoriferous acids apparently enhance the attractiveness of particular female monkeys to

male monkeys of the same species. Further, the amounts of these odoriferous fatty acids vary similarly in human females to what they do in the female monkeys.

Unlike with true pheromones, however, where there is no 'all-or-none' effect, there is considerable variation between male rhesus monkeys in the degree of their response to such smells. Furthermore, the status of this finding is made uncertain by the fact that other researchers have had no response from their male monkeys when they've repeated the experiment. And anyway in rhesus monkeys it was the male being attracted to the female. All of this information seems at odds with the often extravagant claims of the pheromone advertisers.

Human sexuality is tremendously variable, with satisfaction obtainable through such diverse routes as masturbation, homosexuality and relationships with inanimate objects and animals. Consequently it's impossible to defend any suggestion that a specific odour is necessary for orgasm by either sex. If such an odour were needed, it would have been noticed many times by many unsatisfied people. And from what is known of animal pheromones, their reactions are invariably specific.

As well as this humans are notoriously poor smellers, with only a tiny 0.0001 percent of their brain volume devoted to analysing odours, and are certainly devoid of the Organ of Jacobson that seems to be specifically involved in pheromone detection in mammals.

So what is the magic ingredient that pheromone manufacturers are flogging at exorbitant prices to under-achieving males? Some quick research reveals that it's not the fatty acids suggested by the rhesus monkey studies, but a steroid by the name of androstenone. And that's where the pigs come back into the story.

Selling human pheromones

"Science discovers the 'secret' to attracting women!"?

So what is this fantastic newly-discovered human pheromone that attracts women irresistibly to any man with a quick spray behind his ears? None other than androstenone. The very same androstenone found in boars' saliva and sold in 'Boar Mate'.

I have never heard of any claim about the effect of androstenone upon humans (other than the claims in capital letters made by the companies selling it). I've never heard of any female farm hands succumbing to unbridled lust after cleaning out the pig sties. I have certainly noticed no apparent change in the behaviour of the many classes of students in which I have sprayed 'human' and 'porcine' pheromones with gay abandon.

The success and variety of circumstances in which humans achieve orgasms suggests pheromones are not necessary nor useful adjuncts. The lack of an Organ of Jacobson in human noses is a strong negative indication. And I am not aware of truffles having a reputation as an aphrodisiac.

For all these reasons I am not convinced that a can of

'Aeolus 7' (\$27.50 a can) or 'Attractant 8' (\$29.95 a can) will improve my sex life. (See your latest men's magazines for the latest prices.) And even if it did, I am sure that 'Boar Mate' with the same ingredient would do it far cheaper.

Before your curiosity leads you to conduct an experiment comparing exposure to different odours, with one being 'Aeolus 7' or 'Attractant 8', take a little time to consider what behaviour you will observe.

Consider the consequences of what might be the behaviour of your subjects if 'Aeolus 7' or 'Attractant 8' does work! Maybe this sort of experiment is best performed in the home rather than the office at work!

I strongly suspect that the male pig pheromone has absolutely no effect on humans - male or female - at all. But be warned: the pheromone does have a very real and strong effect on pigs. If you are tempted to try a little spray next Saturday night, make sure that you give farmyards a miss for a few days. Otherwise you might be in for the surprise (and experience) of your life.

Conclusion

Science is not just something to study at school and then forget. Your knowledge of science can help you to identify fraudulent claims, and save you embarrassment and money.

...Big Bang from p 36

As a somewhat lateral corollary to this topic, Fred Hoyle, in the last few pages of his book, has a word or two to say about religion and God. He concludes with the words "After a lifetime of crabwise thinking, I have gradually become aware of the towering intellectual structure of the world. One article of faith I have about it is that, whatever the end may be for each of us, it cannot be a bad one." Comforting words indeed to those of us of a sceptical persuasion.

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2. The Accidental Universe, Paul Davies, Cambridge University Press, Cambridge 1982.
3. The First Three Minutes, Steven Weinberg, Basic Books, New York NY 1977.
4. Quasars, Redshifts and Controversies, Halton Arp, Interstellar Media, Berkeley CA 1987.
5. Home is Where the Wind Blows, Fred Hoyle, University Science Books, Mill Valley CA 1994.
6. A New Gravitational Interaction of Cosmological Importance, David F Crawford, *Astrophysical Journal*, vol 377, pages 1-6, August 1991. ■

...Calendar from p34

2001 is the first of the 21st. The millennium technically begins on 1 January 2001. This won't deter people from feeling that 1 January 2000 is the changeover just as they did in the Middle Ages for 1000 AD. Never let facts stand in the way of a good story. [p222]

Interesting References:

Coyne: This is subtitled Proceedings of the Vatican Conference to Commemorate its 400th Anniversary 1582-1982. It includes a copy of the 1582 Papal Bull.

Richmond: A compendium of just about every calendar ever thought of including the submission of the World Calendar Committee to the League of Nations in 1931. Richmond was the organiser and secretary of the committee.

O'Neil: Both books are exquisitely detailed - more figures than you can poke a stick at.

North: The authority on astronomic and astrologic history. The Fontana series are superb.

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ALTERNATIVE THERAPY

Homeopathic

Jim Goulter

Recently I had occasion to call at local medical clinic for immunisation against hepatitis B. While waiting I browsed the many free leaflets on the waiting room table. I was disturbed to find a pamphlet entitled *Homoeopathy, The quiet achiever of HIV/AIDS treatment*.

The extravagant claims of the feature article so confidently elucidated, set me wondering as to the value of my impending immunisation. I made my concerns clear to the administering doctor who rolled her eyes in exasperation. She expressed her own concerns at the existence of such medical sabotage, and the difficulty it causes her profession. She had no say in policy on such material being available. Much of it is delivered by outside "support" groups for HIV positive patrons. The fact that such material is tolerated by a legitimate medical clinic demonstrates the inroads that this magical medical mythology has made into respectable medical institutions. Fortunately, only legitimate medical treatment was available at the clinic, provided by properly qualified medical people. Most disturbing however, is that this particular clinic is a major centre for the treatment of HIV positive cases in the region. The dangers of this poppycock are very real. One can imagine seriously ill people foregoing crucial medical treatment due to the influence of such drivel. Some excerpts follow...

In referring to the early 1800s:

"Due to its dramatic effectiveness against many of the serious, epidemic illness of that time, such as cholera, typhoid and scarlet fever ..."

Regarding a cholera outbreak in London: "the death rate of those treated by orthodox doctors was around 52%, those treated by homeopaths had a 13% death rate"

For an American cholera epidemic:

"... treated by orthodox doctors had a death rate of between 48% and 60%. Only 3% of 1,116 patients under homeopathic care died. This compares favourably with modern medical treatment of cholera."

The text is littered with more, equally extravagant claims and there is the usual allusion to conspiracies to conceal the "truth" about homeopathy. If homeopathy was as effective as claimed then clinical trials would have established it resoundingly and doctors would have accepted it eagerly. Its dramatic success would have caused the homeopathic led extinctions of many infectious diseases such as smallpox, long before "dubious modern medical practices" had a chance. Modern medicine now has polio on the verge of extinction: homeopathy has made no contribution to this.

Finally some of the references accompanying the text, presumably the source of the statistics regarding the "effectiveness" of homeopathy were dated 1900, 1866 and 1892. Maybe their great antiquity imbues them with credibility (and the homeopaths with credulity). After all, if it's old it must be good.

The truth of homeopathy is of course, that it has been found to be ineffective. Considering its 170 or so years of existence it has not been able to effectively immunize anyone. Modern immunisation on the other hand has produced dramatic results as the following figures testify.

Figures for infectious diseases in the US.

Disease	Date	Cases	Post Immunisation Cases (1987)
Measles	1917	527,136	3,655
Whooping cough	1927	181,411	2,823
Diphtheria	1927	106,924	3
Tetanus	1947	560	48
Rubella	1967	46,888	306
Mumps	1968	152,209	12,848
Polio	1947	10,847	NIL

In Australia the improvement ratio is similar.

Over recent years, UNICEF and the World Health Organisation estimate that 1,300,000 deaths from vaccine preventable diseases have been averted by their immunisation program but there is a long way to go. (Juan, p. 28)

Homeopaths claim that some modern medical practices are based on the homeopathic "rule of similars" ie "like will cure like". They cite as an example, the vaccination against small pox with cow pox (Ullman, p. 5). However, cow pox does not cause the same symptoms as small pox. Vaccination against small pox with cow pox was used because of the observation that milk maids who had been infected with cow pox did not contract small pox.

Hahnemann (who invented homeopathy) noted that quinine produced in himself, the symptoms of malaria, and concluded that "like will be cured by like" (Blackie, p. 16). In practice, the use of quinine is contrary to this principal ie if Hahnemann was correct a highly "potentized" preparation from an initial quinine sample would treat malaria far better than the ridiculously low potency (homeopathically speaking) of a

concentrated dose of quinine.

Homeopaths do not typically use a small dose of a substance; by their own admission, they use a non-existent dose (Ullman, p. 8). Even so Ullman seems unable to be reconciled with this, and persists in referring to “this extremely small dose”. He charges that most sceptics “are so unfamiliar with homeopathy that they cannot even describe the basic principles.”, that they object to it on the basis of the “extremely small doses”.

Not only is Ullman apparently unfamiliar with the major objections of the sceptics but he seems embarrassed by the fundamental homeopathic principle - mystical energy transfer. Firstly, the objection of sceptics is not just the “extremely small doses” but because of nonexistent doses. It is admitted by homeopaths that not even one molecule of the original substance remains in the typical homeopathic “medicine”.

Secondly, Ullman seems loath to mentioning the “principle” by which homeopathy has traditionally been claimed to work, the idea of some mystical “energy unknown to science” purported to be transferred from dilution to dilution by shaking. On pages 7 to 9 he manages to explain the making of homeopathic preparation (potentization); the dilution out of existence of the active ingredient and the alleged increase in potency with each dilution, without once mentioning this mystical energy transfer, a fundamental principal of homeopathy, and one which sceptics object to. One gets the distinct impression that he would rather avoid mentioning it.

Ullman attempts to support his argument with references to the ability of sharks to detect extremely small concentrations of blood in water, and the ability of moths to detect only a few molecules of a pheromone in the air. However, the molecules have to be present in order to be detected, and it takes highly specialised receptors to detect them; nor has the surrounding water been “potentized”, a “very precise pharmacological process” according to homeopaths.

The fact that it is not known why certain modern drugs work, does not give credence to the homeopathic cause, as Ullman would have us believe. That they do work can be verified in rigorous clinical trials, something that cannot be done for homeopathy. If homeopathy worked then an effective alternative cure for scurvy would be a potentized preparation derived from a substance that produces the symptoms of scurvy. Of course the proper cure for scurvy is vitamin C, preferably by eating fresh fruit and vegetables.

What is particularly disturbing about Ullman’s book is that it is marketed as medicine for children. While it does occasionally direct the reader to seek modern medical attention for serious diseases and illnesses, it consistently undermines this advice; best illustrated by example...

“Asthma is a potentially serious and even life-threatening condition. Infants and children with asthma should receive medical attention. Be aware that conventional drugs used for treating asthma, particularly steroids, can impair immune

function and lead to more serious health problems. The following remedies can reduce the distress that an acute attack can create, *but homeopathic constitutional care is necessary to achieve a lasting cure.*” (my emphasis) (Ullman, p.46)

The constant use throughout the book of words like “remedy” and “cure” in relation to serious diseases, including some with no known cure is a dangerous lie. Children who are denied proper medication for asthma are having their lives placed in jeopardy. Modern medicine is criticised when it uses animals on which to test new medicines and techniques. The alternative medicine community has solved this problem, they use their own children.

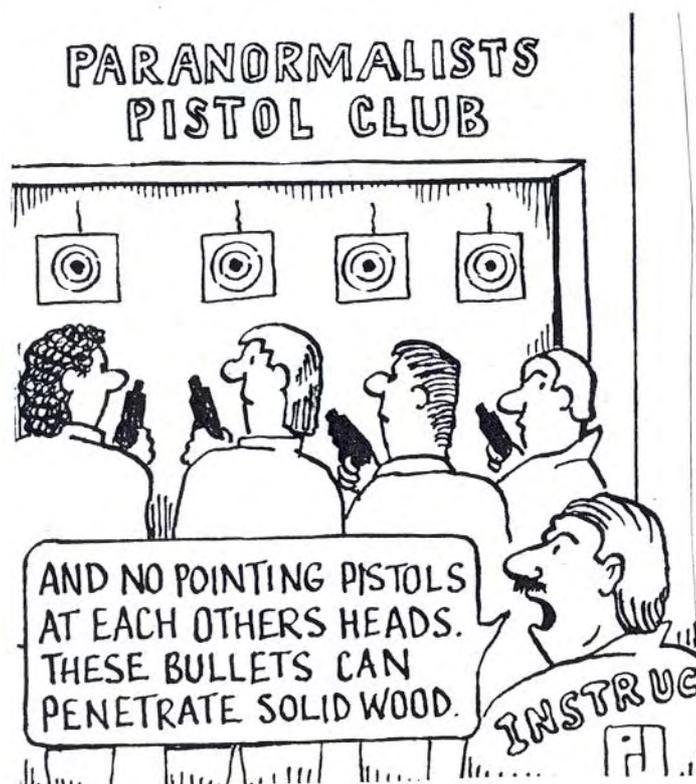
A curious thing caught my eye on the verso of the title page; there, arrogantly displayed in bold type are the words: The moral right of the author has been asserted. Obviously this is alternative morality.

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REVIEW

Science Besieged

Scott Campbell

Science Under Siege: Balancing Technology and the Environment; Michael Fumento, Morrow, 448pp.

In this book, Michael Fumento, an environmentally-minded scientifically-literate journalist, puts to close scientific scrutiny many of the claims made by environmentalists. What he shows is that many of these claims, which are uncritically reported by the mainstream media, are either completely wrong, or vastly exaggerated.

Why, you might ask, is such a book relevant to *the Skeptic*? Because it deals with claims that are scientifically testable, and which do not hold up. Because these claims, despite lacking scientific credibility, are presented by the media as though they are credible, in a way that almost exactly parallels the mainstream media's reporting of pseudo-science and the paranormal. And because many people believe that these claims are true, and that there is hard evidence for them, and that big companies try to suppress this evidence, and that the government and science ignores it, either because of their limited vision, or because they wish to preserve the status quo which they benefit from.

Fumento debunks such claims as the following.

'There is a cancer epidemic caused by the chemicals used in modern life'. This is false. There is no cancer epidemic occurring. One point that shows it to be false is that when the aging of the population is taken into account, the rate of cancer in industrialised countries is little different to that in non-industrialised countries.¹

'Pesticides are a major cause of cancer'. In fact, best estimates show that only 0.1% of all cancers in the US (about 500 a year) at most can be attributed to dietary exposure to synthetic carcinogens.² And only a fraction of these deaths are caused by the carcinogens in pesticides. Dietary exposure to natural carcinogens on the other hand, is estimated to cause 7.6% of all cancers. Fat, for example, is a carcinogen. And 3% of all cancers are caused by alcohol. But most people doesn't worry about alcohol and fats causing cancer.

'Dioxin is a deadly poison, which causes cancer and birth defects'. Again, false. Many human beings have been unintentionally exposed to amounts of dioxin that according to ignorant and irresponsible alarmists like Ralph Nader should have killed them hundreds of times over (such as occurred at Seveso in Italy, 1976), and all that happened to them was some headaches, nausea and in some cases, chloracne, which lasted a few months.³

'Agent Orange, which contains dioxin, causes cancer and birth defects'. Detailed epidemiological studies on Vietnam

veterans have shown that there is no link whatsoever between Agent Orange and cancer and birth defects. What about all those Vietnam vets who developed uncommon cancers such as testicular cancer at an early age? The proportion of vets who developed such cancers was no different to the proportion of people of that age who develop such cancers in the civilian population.⁴

'Food irradiation is dangerous'. Food irradiation is a well-understood process, and has been thoroughly tested. There is no reason to believe that it is in any way dangerous. It is just as safe as any other food storage method, such as freezing, canning, salting, shrink-wrapping etc, and it is just as safe as microwaving. It is a process that would be enormously beneficial to the world, in that it saves money, food, helps preserve the freshness of food, and would prevent many of the millions of food poisoning cases that occur each year in the US alone (which result in at least 4000 deaths annually), and which cause hundreds of millions of dollars in lost work time. It would also be of enormous benefit to Third World countries. Yet it has been stalled indefinitely because of completely unfounded and unscientific fears.⁵

'Electromagnetic fields cause cancer and birth defects'. Readers of recent editions of *the Skeptic* will be aware that this claim has virtually no foundation.⁶

'Video display screens cause cancer and birth defects'. Again, epidemiological studies show that this is simply false.⁷

In showing the baselessness of these claims, Fumento points out the mistakes made by the claimants and the media. One he calls 'the victim as epidemiologist' mistake. Many people and journalists assume that if someone has cancer, that person thereby knows how they got it. Thus, when US football player Lyle Alzado declared that his brain cancer was caused by taking anabolic steroids, many newspapers reported this claim as though it must be true, because he had the cancer.⁸ Likewise, we often see in the papers here how some unfortunate cancer sufferer declares that he or she is convinced that their cancer was caused by the nearby toxic waste dump, and this is reported uncritically, as though it must be, or most likely is, true.

But having cancer in no way gives you knowledge of what caused your cancer. There are millions of things that could have caused it, just as there is with any case of cancer. The person with the cancer knows nothing of the cause. Nor should we trust doctors who make claims about how a cancer was caused. Nothing in the cancer itself tells a doctor how the cancer was caused. Only an epidemiologist can tell us how it was caused, and quite often even they can't.

We should also note that the fact that someone who lives near a toxic waste dump or a nuclear power station develops cancer is no reason to be suspicious. Cancer occurs everywhere, and we should be surprised if there were no cancers in people who live near toxic waste dumps.

It is mistakes like this that lead to baseless media scare stories about 'horror' toxic waste dumps, or 'deadly' nuclear power station failures. These stories cause considerable but needless distress to the people who live in the area, and invariably result in enormously expensive lawsuits, and massive spending of public money. It takes years to eventually show that there was never any danger, but by that time, after the stress caused, the money wasted, the companies drained of money, it's no longer a story.

Fumento also points out that miscarriages and birth defects are common, and most can't be explained. Approximately 15% of all pregnancies miscarry, and between 2 to 3% of all births have at least one major malformation.⁹ Most shock horror stories get started because most people (including most journalists, who should know better) do not know this.

Once shock-horror stories get started, standard journalistic procedure is to find a scientist, any scientist, who agrees with the claims being made. This scientist often will have no professional competence in the field, but will be presented as an expert, and it will be claimed that science either agrees with the claims, or that science is seriously divided on the issue.

By this stage it will be almost impossible for the companies involved, even if they are totally innocent, and there is no danger to anyone, to be believed. Every thing they say, every bit of research they put forward to support their claims, is regarded by journalists and the public as tainted. Now, there are good reasons to be sceptical about the claims of big companies, but simply waving aside a company's claims without looking at what they are saying, and whether there is any good evidence to back up what they say, is wrong. What is also wrong is the fact that good, honest scientists who present evidence that supports the company often get accused of being part of the 'conspiracy', and have their reputations smeared in public.

And on the issue of vested interests, many people forget that many environmentalist activists have vested interests too. They have strong emotional commitments to their cause, and some of them have made environmental activism their career. They have money and reputation at stake. And if we assume that money distorts truth, then we cannot forget that many environmental lawyers are making staggering amounts of money.

What often happens in a damages suit against a big company is that the company knows that the jury, being mostly made up of people who are scientifically ignorant and who dislike big companies to start with, will find against them no matter what the evidence, and will award big, big damages, and so it chickens out and settles out of court, which makes it look guilty as hell.

It's not only private companies that are being financially

sucked down the drain unnecessarily. The taxpayer is as well. The US Environmental Protection Agency (EPA) estimates that \$115 billion a year is being spent on environmental protection in the US.¹⁰ Much of this money is simply wasted, spent on useless and unnecessary investigations, protections, schemes and regulatory committees. Many spokespeople for green causes are fond of pointing out that nature is not a limitless resource. The less thoughtful ones forget that the same applies to the economy.

Some of those concerned with power lines causing cancer have demanded that power lines be put underground (which, incidentally, would not block the magnetic fields which supposedly cause the cancer anyway¹¹). Some even say that this should be done even if there is no hard evidence, just in case they do cause cancer. This is part of the ridiculous 'protect the environment and us AT ANY COST' push. To put all the electrical cables in the US underground would cost hundreds and hundreds of billions of dollars.¹² Is it sane to spend this much on a supposed risk to health that has virtually no evidence to back it up?

Taking measures to stop the greenhouse effect have been estimated to cost between \$800 billion and \$3.6 trillion.¹³ And there is a push in Australia for a carbon tax, which would cause enormous strain on the economy. Do we really want to spend this much on something that has no hard evidence to back it up (see Ian Plimer's article in *the Skeptic* Vol 14 No 3, for support of this claim), and which is being pushed by many of the same sensationalizers who pushed the 'new ice age' in the 1970s, such as Stephen Schneider?

We might be less inclined to spend this much when we find out that Schneider told *Discover* magazine in October 1989 that scientists should consider stretching the truth 'to get some broad-based support, to capture the public's imagination'. He also said 'We have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of the doubts we may have...Each of us has to decide what the right balance is between being effective and being honest'.¹⁴ I wouldn't trust someone like this to tell me what the weather report for tomorrow is.

A more responsible person might reply that the National Academy of Sciences has lent qualified credence to the greenhouse effect. But then, this Academy warned in 1977 that a new ice age is upon us, citing *delining* average global temperatures as evidence.¹⁵

Fumento also severely criticizes the 'cult of the natural', and the double standards that exist for 'natural' and 'synthetic' chemicals. In the US and Australia, synthetic chemicals have to undergo incredibly stringent and mostly useless testing procedures to be approved for use in food products and as medicine. Chemicals that are supposedly 'natural' do not. Yet many extremists want to make it enormously more difficult for synthetic chemicals to be approved. Some of their proposals would make it virtually impossible for any synthetic chemical to ever pass, which is just fine by these extremists, for according to them, we should be better off without the evil synthetic chemicals altogether,

because that which is natural is 'superior', perfectly safe, and somehow just better. Which is nonsense.

Plants have developed powerful defence systems to protect themselves, and as a result contain all sorts of nasty, dangerous natural chemicals. For example, peanuts contain aflatoxin, a natural mutagen that causes cancer.¹⁶ In fact, almost every plant product in the supermarket contains natural carcinogens, in amounts vastly larger than the incredibly minute trace elements of chemicals from pesticides. Which makes it hardly rational to worry about the pesticide chemicals. And some plants (for example, potatoes and celery) that were bred to be naturally pest-resistant were so toxic to humans that they had to be withdrawn from the market.¹⁷ And not only are there natural carcinogens in food, there are also many non-food natural carcinogens, such as sunlight, uranium and asbestos.

'Naturalists' make much of the fact that synthetic chemicals from pesticides are stored in body fat, but the same happens with natural chemicals, including many of the nasty natural carcinogenic toxins. The body does not have any way of distinguishing between 'natural' chemicals and 'synthetic' chemicals.

Studies show that roughly the same percentage of natural chemicals that are tested prove to be carcinogenic as synthetic chemicals. But the naturalists don't want to hear this, so when Bruce Ames, one of the most respected cancer researchers in the world, and previously a darling of the naturalists, started reporting on natural carcinogens, he was dropped 'faster than a melon with DDT'.¹⁸

The naturalists either sweep natural carcinogens under the carpet (metaphorically, that is), because it destroys their whole argument, or else they argue that most of the nasty toxins in plants can't really be carcinogenic because we have evolved in harmony with nature, so our bodies must have developed ways of resisting any adverse effects these chemicals might have. This argument is a very bad one, though, for cancer is primarily a disease of older people, and can take years to develop. It thus affects people after they have reached child-bearing age, and so would have no effect on evolutionary development. (And after all, if the argument worked, it should not be possible for the sun to cause skin cancer, which it undoubtedly does).

So far in this debate, it has been taken for granted that many chemicals have been shown to be carcinogenic. But how do we know whether something is carcinogenic? The answer, in most cases, is that scientists pump gigantic amounts of it into rats and hamsters and other animals, to see whether it gives them cancer. Not surprisingly, it often does. Fumento argues convincingly that deciding whether something is a human carcinogen on this basis is far-fetched indeed. It is most likely that the sheer volume that is given to the animals causes the cancer.¹⁹ Yet the naturalists want to increase the testing doses for synthetic chemicals, while discontinuing the testing of natural chemicals).

If animal testing is useless, why does it continue? Because there is no other way of testing whether a chemical is carcinogenic, other than by administering it to humans and

waiting at least 20 years, and the activists have pressured the government into doing something. Even though that something doesn't work, it appeases the activists, which is what counts.

So whenever you read that something is carcinogenic, you need to ask, does this mean that it has been conclusively shown to be carcinogenic to humans, or does this simply mean that it has been shown to be carcinogenic to rats when given to them in enormous quantities? And even if something is in the first category, you still need to ask, how likely is it that it will give me cancer? For example, the risk of getting cancer from sunlight is greatly exaggerated by the media, and the risk of getting cancer from living near your average toxic waste dump and from the leakage of radioactive materials is incredibly exaggerated by the media.²⁰

Fumento laments the passing of old-style environmental groups like the Sierra Clubs and the Audobon Society. Whatever the faults and limitations of these groups, at least, Fumento says, they had realistic views about nature. Unlike the city-dwelling pampered extremists of today, they spent a lot of their time in the wilds, and they saw the ugly side as well as the beautiful side of nature. They did not see everything that humans did as a blight upon the land, and they did not have an irrational fear of technology. Nor did they rely on sensationalist and pseudo-scientific claims, and mischievous law suits.²¹

In blasting the ignorance and idiocy of extremist environmentalists, some well-known and, in some cases, well-respected names get a serve, including Paul Ehrlich, Jeremy Rifkin, Al Gore, and even Carl Sagan, and especially Paul Brodeur, Ralph Nader and Samuel Epstein. (Sagan's serve might surprise those who are familiar with his high standing in some sceptical circles, but he does have the habit of presenting himself as an expert on issues that he has no expertise in, and getting it wrong. His claims about the oil well fires in Kuwait is an example).

I think anyone concerned with environmental issues, as I hope we all are, should read this book, or something like it. You cannot rely on the media to inform you properly about the scientific facts (after all, you already know that the media cannot be trusted to get scientific facts right). The book is comprehensive and detailed, and it is very well-written, clear and easy to read.

Footnotes:

[1] Michael Fumento, 'Science Under Siege', New York: Morrow, 1993, p59. All page numbers in these footnotes refer to this book. [2] p72. [3] pp 109-13. [4] ch 5. [5] ch 6. [6] ch 7. [7] ch 8 [8] p 84. [9] p 86. [10] p 361. [11] p 251. [12] p 251. [13] p 361. [14] p 361. [15] p 361. [16] p 62. [17] p 66. [18] p 60. [19] pp 69-71.

[20] See *The Nuclear Energy Option* by Bernard Cohen, New York, Plenum Press, 1990, for more on the supposed dangers of radioactive materials and nuclear power stations.

[21] See pp363-5. ■

REVIEW

The Nature of Science

James Gerrand

The Unnatural Nature of Science, Lewis Wolpert. Faber & Faber 1992. 191 pp. pbk \$15.95.

This work by the Professor of Biology as Applied to Medicine at University College, London, does a lot to explain why only 6% of our population, whilst living in a scientifically created civilisation, are scientifically literate.

Science is *unnatural* because it involves a special mode of thought. It is not common sense. It is common sense to think the sun goes round the earth; it required a lot of consideration of evidence and hypotheses before Copernicus could claim his unnatural conclusion that the earth went round the sun. "If scientific ideas were natural, they would not have required the difficult and protracted techniques of science for their discovery."

This mode of thinking is best learnt by working as a scientist. But most people cannot be scientists and they usually and unfortunately learn what science they know by rote. The new program of science education in primary schools - **Primary Investigations** - initiated by the Australian Academy of Science and to be introduced Australia wide this year should be a big step forward in providing a better understanding of the scientific mode of thought.

Wolpert points out the distinction between science and technology. Science produces understanding, technology produces objects. Technology - agriculture, metal-working, engineering, building, etc - is very much older than science. The three inventions to make great changes in Renaissance Europe - printing, gunpowder and the magnetic compass - were Chinese imports and owed nothing to science.

The peculiar nature of science is responsible for the fact that, unlike technology or religion, it originated only once in history, in Greece about 600 BC. Human curiosity had hitherto been devoted to man and his relation to nature, not to nature itself. Wolpert does not try to account for this single origin but clearly a society that allows freedom of expression of ideas is a prerequisite. Greek science died out with their city states. Science was reborn in Western Europe with the Renaissance and the Reformation when new ideas were circulated and the shackle of church conformity was being broken. The Protestant ethic encouraged a belief in progress and rational inquiry. Robert E Burns in his newly published book "The Wrath of Allah" reports that though there was a brief flourishing of science in isolated areas and short periods during the "Golden Era of Islam", by the 14th century Islamic fundamentalism finally succeeded against secular knowledge.

Wolpert points out the important differences between creativity in the arts and science. "In the arts it is intensely personal and reflects the feelings and ideas of the artist. Scientific creativity is always constrained by self-consistency, by trying to understand nature and by what is already known." As physicist Richard Feynman puts it; "we look for a new law by... First we guess it. Then we compute the consequences... If it disagrees with experiment it is wrong. In that simple statement is the key to science..."

Scientific genius is also different. "Because science is a communal effort, in the long run the existence of scientific geniuses may be irrelevant; given time, resources... all discoveries will probably be made. ... Not for Hamlet or *Così fan tutte* - there are no replacements for Shakespeare and Mozart".

"A peculiar feature of science... is that discoveries can only be made once", unlike art where one masterpiece may encourage others. Scientists move on to new pastures.

In his chapter dealing with the philosophy of science Wolpert states "Not only are most scientists ignorant of philosophical issues but science has been wholly unaffected by the philosophers of science..." Francis Bacon, father of modern science urged "Throw aside all thought of philosophy or at least to expect but little and poor fruit from it".

How do we distinguish between science and non-science? Wolpert lists a number of criteria: confirmation by independent observers; be self-consistent; explanations capable of being linked with other branches of science; a small number of laws able to explain; ideally should be quantitative and its theories expressible in mathematics. Social sciences suffer from the difficulty of carrying out experiments. The paranormal claims are just too improbable. As regards religion - a belief in a God - how can a scientist deal with a non-existent entity?

The aversion to science by many people is based on the concern felt about ethical and social implications. Nuclear weapons and genetic engineering (and locally and currently wood-chipping) arouse considerable anxiety. Wolpert suggests the responsibilities of scientists are that they must inform the public about the possible implications of their work and be clear about the reliability of their studies. But the final responsibility must remain with the public. He quotes Thomas Jefferson: "I know of no safe depository of the ultimate powers of the society but the people themselves,

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REVIEW

Rescue Mission

Steven D'Aprano

Rescuing the Bible from Fundamentalism,
John Shelby Spong, HarperCollins, 1991.

John Shelby Spong, Episcopal bishop of Newark, New Jersey is concerned that the majority of people in Western society now believe that Christianity and the Bible are dated and irrelevant in our modern world. He fears that by their very indifference, the Bible will disappear. According to Spong, the growth of Christian Fundamentalism is not a sign that religion is booming, but is the last gasp of a dying philosophy. When times change too rapidly and people become fearful, they are naturally attracted to organisations or philosophies that will justify their own way of life. In the midst of rapid political change, Europe is presently witnessing the growth of many neo-Nazi and fascist political parties. Similarly, fundamentalist religions (whether Christian, Islamic, Hindu or Jewish) appeal to frightened and insecure people.

Rescuing the Bible from Fundamentalism asks several questions of great importance to Christians. These include: what relevance does the Bible have to us today? Could Jesus, a Jew, really have claimed that the Jews are the children of Satan? Must Christians turn their backs on either modern knowledge or the Bible? Spong has written *Rescuing the Bible* to show that a true Christian can love God and yet still acknowledge that the Bible can be wrong. Spong argues forcefully that the fundamental truths of the Bible transcend the petty human prejudices, the mistakes and the propaganda that fills so much of the Bible. The true meaning of the Bible can only be found by rejecting literalism. A literal interpretation of the Bible is not only offensive to us, but also to God.

Spong clearly and simply demolishes the literal stories of Jonah in the belly of the fish¹ and of Ruth, and yet shows that they are powerful works of protest, filled with passion and meaning. To take them literally debases them.

For the sceptic, *Rescuing the Bible* contains a great deal of ammunition to use against fundamentalists. Spong points out that Mark, Matthew and Luke contradict each other on the stories of Jesus' birth, life and death. Did Joseph and Mary live in Bethlehem, as Matthew tells us, or was it Nazareth, as Luke believed? At the same time that Luke tells us Mary, Joseph and Jesus were returning peacefully to Nazareth, Matthew says they were fleeing for their lives to Egypt. As Bishop Spong says, "Maybe both Evangelists are wrong, but certainly both of them cannot be right."²

Spong also points out that much of the morality in the

Bible is (or should be) utterly repugnant. For example, Lot protected God's angelic messengers from gang-rape in Sodom by offering his two virgin daughters to the mob.

Each time the Pharaoh relented in response to the plagues and was ready to allow the Jews to leave enslavement in Egypt, God hardened his heart so that more plagues could be visited upon the Egyptians (*Exodus* 10:1, 10:20). Perhaps most horrifying of all, if "a spirit of jealousy" came across a man, he could force his wife to drink a poisoned potion. If she died, her guilt was proven, but if she survived, she was presumed innocent (*Numbers* 5:11ff). After being found innocent, *Numbers* 5:28 states that the woman must then "be made pregnant with semen". (Is there another way?)

When this book was first published, Spong was the target for a great deal of criticism (much of which was nasty, virulent and downright personal) for his suggestion that the Apostle Paul was homosexual. Spong has taken great pains to deal with this matter in a sensitive fashion, stating that he does not say this lightly or in a sensational manner. He does not suggest that Paul ever acted on his homosexual feelings, but he does explain that Paul's extreme self-hatred³ can only be fully explained by a deeply religious man who has feelings and thoughts which are abhorrent to himself. Paul's conversion from Jewish zealot and persecutor of Christians to the greatest Christian was because of love. The God of Christ could love Paul despite what he was. Paul refers to a thorn in his flesh, a messenger of Satan: "Three times I have sought the Lord about this, that it should leave me; but he said to me 'My grace is sufficient for you, for my power is made perfect in weakness'" (*2 Corinthians* 12:9).

Although this is the most controversial suggestion in *Rescuing the Bible*, I believe that it is not the most important. It is a side issue, nothing more. It merely illustrates Spong's greater argument: that the Bible cannot be read literally. It shows Spong's belief that the truth contained in the Bible is about love. When discussing homosexuality, even the most rabid TV evangelist claims that "Jesus loves the man, but not the act". Why then the horror at the suggestion that Paul may have been tormented by homosexual feelings?

Bishop Spong is a highly educated Christian who cannot believe in a hypocritical God who forbids murder but encourages genocide, or a God to whom women are barely tolerated and homosexuals are despised. He realises that the biblical stories of creation and the Flood are impossible, that

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REVIEW

Of Bosons, Bosies and other Matters

Sir Jim R Wallaby

The God Particle: if the Universe is the answer, what is the question, Leon Lederman with Dick Teresi, Delta 1993.

Hands up all those who know what a Higgs boson is! Right, will all those who raised their hands please stop reading this immediately and go back to reading the mind of God.

Now we have disposed of those people, I assume I am left addressing that small sub-section of the human race who comprise the category 'non-physicist'. We Wallaby's have refrained from dabbling in physics ever since a remote ancestor, Sir Isaac Wallaby, observed an apple falling upwards and developed his Universal Theory of Levity (or Ytivarg as he also named it). The resulting furore cost him his position as Master of the Royal Mint, which was then awarded to a minor functionary named Newman or Fenton or something like that.

When the term Higgs boson first swam into my ken, I believed it to refer to one of the more arcane practices of the leg spin bowler. A not unnatural mistake as I am sure all my non-physicist readers will agree. After all, Jim Higgs was one of the more accomplished practitioners of the art in the dark interregnum period AB-BW (After Benaud-Before Warne). A 'bosie' is an archaic name for the googly (an off break bowled with a leg-break action) and the term 'spin' was also bandied about. All perfectly logical to me.

But all of that is behind me, since I read *The God Particle*. Leon Lederman is a physicist who shared the 1988 Nobel Prize for Physics for the experiment that proved the existence of the muon neutrino. He was also, between 1979-89, Director of Fermilab, one of the world's major particle accelerators used for the discovery of ever more obscure building blocks of the universe. Professor Lederman is a nuts and bolts physicist, experimental rather than theoretical, and he is a very funny writer. Dick Teresi is a former editor of *Omni* magazine, and one imagines he is responsible for ensuring that all the sentences contain verbs and the commas are in place; no mean feat the editor of our own esteemed journal assures me, when dealing with the writings of many whose vocations lie within the sciences. (In fact, in his own crude way, he claimed "The average scientist wouldn't recognise a gerund if it bit them on the bum".)

The book is a history of the search for the fundamental units of matter, commencing with Democritus, the Ancient Greek who first proposed an indivisible something that lay at the heart of everything (the *atomos*) and continuing through the history of final, indivisible particles that turned out to be

no such thing. On the way, Lederman introduces us to all the great names of science who have advanced our understanding of the fundamental nature of matter and entertains with his personal observations of them.

No dry old history this; fact mixes with anecdote and many a good natured side-swipe at his theoretician colleagues. Speaking of those who are proposing Grand Unified Theories (GUTs), superstrings and supersymmetry, he says "Some of these speculations are truly profound and can be appreciated only by the creators, their mothers, and a few close friends". On the pyramid nature of science "The physicists defer only to mathematicians, and the mathematicians defer only to God (though you may be hard pressed to find a mathematician that modest)."

Referring to the fact that most of the great theoreticians of the past did their best work when barely out of short pants, he states, "It is a fact that when Dirac and Heisenberg went to Stockholm to accept their Nobel Prizes, they were, in fact, accompanied by their mothers".

Along the way he produces a delicious anecdote on how Erwin Shroedinger (the famous cat owner) set out to solve a major problem in quantum theory. Shroedinger booked into a Swiss chalet for two weeks, "...taking with him his notebooks, two pearls and an old Viennese girlfriend. ... placed a pearl in each ear to screen out any distracting noises. Then he placed the girlfriend in bed for inspiration. Schroedinger had his work cut out for him. He had to create a new theory *and* keep the lady happy. Fortunately he was up to the task. (Don't become a physicist unless you are prepared for such demands)", is Lederman's summation of the affair.

But this is not merely a recounting of quantum tittle tattle, Lederman traces the discovery of ever more fundamental particles and describes the ever larger and more energetic machines that are required to give the experimental proof to the theoretical speculations. He was the driving force behind the proposed Superconduct-ing Super Collider (SSC), the 70 km circumference machine which was planned to be built in Waxahatchie, Texas to allow collisions between particle streams at energies never before achieved and which was supposed to unlock the secrets of what may be the ultimate particle. After this book was written, news came that the US Government had withdrawn funding from the SSC project and, having read of Lederman's enthusiasm in the book, I can imagine how great a blow he must have suffered.

This is the domain of energies of trillions (or more) of

electron volts and times lasting trillionths (or less) of a second with all the mysterious sounding language of the quantum state (come to think of it, the analogy with leg spin bowling is probably extremely apt). But no mystic is Prof Lederman. In one interlude in the book, he skewers the publicists of the views that quantum physics and eastern philosophy are in some way connected and has words to say about "...some PhDs in science who push totally off-the-wall things like 'seeing hands', 'psychokinesis', 'creation science', 'polywater', 'cold fusion' and so many other fraudulent ideas."

In somewhat gentler vein, he gets in some digs at those of his theoretical colleagues whose prognostications seem to stray from science into theology. Referring to God throughout the book, invariably as 'Her' and 'She', he leaves it to the end to give us his tongue-in-cheek picture of God, not as a gentle and caring New Ageish Mother Earth type at all, but as a "Margaret Mead or Golda-Meir or Margaret Thatcher type of deity". A mind-numbing concept, as I am sure everyone will agree. He even concludes the book with a section headed "Obligatory God Ending", showing that if he had not been obsessed by physics, he could have profitably followed a career writing lurid scripts for Hollywood.

And, of course, the "God Particle" of the title refers to the Higgs boson I mentioned in my introduction. A curiosity of the story, and perhaps a minor disappointment, is that Peter Higgs, the English physicist who theorised this thing, and who gave it his name, is himself given only a few passing references in the book, being described as "of Edinburgh University" when he proposed the concept and as "of Manchester University" and "doing other things" now. I would like to have learned a bit more about Peter Higgs, whose name may be forever associated with the ultimate particle, just as I did about so many of the other seminal names in particle physics through the book.

Much as I would like to be able to tell the readers all the inside information about this very important particle, and why it might lead to a final understanding of nature, that would be like a reviewer of a Whodunnit revealing whodunnit - definitely a lapse of ethical standards. Or, to be absolutely truthful, although I felt I was with Professor Leon Lederman as he went through all the steps from Democritus' atomos to Higgs' boson, I am far too canny an old Baronet to risk exposing my fundamental ignorance of fundamental physics in this review.

Finally, all I can say is, if the enterprise of science excites you; if you are intrigued by the acquisition of knowledge; if you would like to have some understanding of the deep, fundamental nature of the universe and of the people who discovered so much of it; if, like me, you do not feel like spending several years of unremitting toil in acquiring a PhD in this most arcane of subjects, and if you are not one of those physicists we disposed of in the first sentence, then this is a book I would recommend to you most highly. ■

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epilepsy is not caused by demon possession, and that the centre of the earth is filled with molten rock and not the souls of the damned. At the same time, he loves his God and his Bible. He easily shows that a literal interpretation of the Bible is self-contradictory and diminishes the Bible.

However, Rescuing the Bible does not satisfy the atheist or agnostic that the Bible contains insights which could only have been inspired by God. Spong is writing for a Christian audience, people who are already convinced that the Bible contains something which all secular books lack. It is assumed that the reader agrees with Spong that the Bible is special. Not flawless and perfect, but still unique. Nevertheless, he argues his case with passion, and it is hard to come away from reading his book without admitting that there are some passages in the Bible which hold valuable lessons for us all.

References

- 1 The Bible never refers to the creature as a whale.
- 2 Spong, p 213.
- 3 Paul states: "I am carnal, sold under sin. I do not understand my own actions" (Romans 7:14, 15), "Nothing good dwells in me, that is, in my flesh. I can will what is right but I cannot do it" (Romans 7:18), and "I pummel my body and subdue it lest after preaching to others I myself should be disqualified" (1 Corinthians 9:27). There are many other examples that illustrate Paul's extreme self-loathing. ■

...Nature of science from p 26

and if we think them not enlightened enough to exercise that control with discretion, the remedy is not to take it from them but to inform their discretion." Spoken like a good modern-day Skeptic, with our concern that we and the public be enlightened.

One important unnatural nature of science that the author does not deal with is that any person in adopting a scientific approach to arriving at a decision has to be prepared to be unpopular if the decision runs counter to the popular view. A scientist has to be prepared to "stand up and be counted" on the evidence, not on its "political correctness".

I have just touched on a number of salient matters that the author covers in a very informative, enlightening and readable text. I strongly recommend the book to all who wish to understand more about how science paves the path to knowledge. ■

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REVIEW

Magic and Science

Geoffrey Guilfoyle

Where Science & Magic Meet, New Revised Edition
Serena Roney-Dougal; Element Books, 1993

This book was presented to me as a Christmas present by an acquaintance who knows I have a passing interest in the 'unexplained'. The title aroused in me a surge of encouragement. At last! A book which explains in rational and scientific terms how psychic phenomena work.

At least that's what I thought it might discuss. I should have known better. Reading the blurb on the back caused some disquiet. The author is a psychologist with a passion for parapsychology and has a limited education in the physical and biological sciences. Not exactly encouraging. My enthusiasm fell further on reading the introduction by the author in which she makes her philosophy clear. These two quotations from page 5 should set the alarm bells ringing in any sceptic.

"The emerging magical way is linked with the magic of the Earth and its sacred sites. It has to be because we are becoming very aware of the need to be in tune with the Mother in order to prevent her destruction. The new magical way is the spiritual side of the Green movement.

"In parapsychology we have the clearest bonding between science and magic. I shall show how the essential philosophy behind modern quantum physics is akin to that of the pagan world-view that seems to be emerging at the moment. I shall present some research of mine into the pineal gland which fuses the ancient teachings of the East with regard to the chakras and the third eye or second sight of the West, with modern neurochemistry, and I shall link this with modern earth mysteries, the fairy faith and the popular modern view of paganism and witchcraft."

Yep, eco-neopaganism combined with New Age mysticism and old age folklore. So where is the science? Well, it is there ... sort of. Quantum mechanics is invoked to explain the sub-atomic link between the psychic world and science. The author tries to apply (by analogy, extrapolation, and direct comparison) what occurs at the sub-atomic level with the neurology of the brain in general and the subconscious in general.

I don't pretend to understand quantum physics (and let's face it, who other than a theoretical physicist does?) but I found her argument perfunctory, irrelevant, and completely unconvincing. As I understand quantum theory it can't be applied to the biological or macro world. Doing so would be like claiming that because the Great Pyramid of Khufu

(Cheops) is narrower at the top than it is at the base the Egyptians must have also built the Empire State building and the Saturn V rockets.

Chapter five deals with electromagnetism, but not electromagnetism as science knows it, rather electromagnetism as the proponents of the New Age wish to see it. For example electromagnetism is used to explain auras without first asking 'Do auras exist?' Same with dowsing. She doesn't ask 'Are water diviners psychic?' but instead advances geomagnetism as one possible explanation for their abilities. Did you know that electromagnetism also has noticeable healing powers and can affect psychic ability? I thought not. Just don't expect any proof from the author.

Chapters six and seven deal, respectively, with the Fairy Faith and the reawakening Goddess. Both are philosophical tracts devoid of any scientific merit. Same with the final chapter covering the supposed emerging relationship between science and mysticism.

The only other science appears scattered among a liberal dose of anthropological speculation and eastern teaching in the chapter covering the pineal gland. Not being a biochemist or neurosurgeon I can't comment on the genuineness of the research presented (just 10 pages). Given that most of the chapter is given over to a discussion of the pseudoscientific yogic chakra system, and that the ten pages on the pineal gland are sprinkled with unproven and unprovable assertions regarding psi ability, I have many doubts.

Rhine, Geller, Reich and orgone energy are all trotted out in passing and implicitly or explicitly given credence. So are auras, crop circles, UFOs, ley lines, elves and pixies and long legged beasties and things that go bump in the night. (And I mean this literally. The author spends an entire chapter discussing the fairy faith of old and states that such belief needs to be revived. She offers no proof for their existence other than being mentioned in folklore and as an explanation for much unknown phenomena.)

Now hang on, I hear you cry, wasn't Wilhelm Reich a crackpot and orgone energy complete bunkum? True, but not to Serena Roney-Dougal who believes that ancient British barrows are orgone energy accumulators. That's one of the problems with this book. Too often the author assumes that if A=B then C=B and D=B and so on, no matter how tenuous the connection.

"There is a strong folklore linking stone circles, other sacred sites and ley lines with psychic events, people who live in these areas having 'second-sight', apparitions, haunted

houses, fairy legends and so on. Psychically they are the most 'charged' area of Britain, and with this hypothesis connecting psi with the pineal gland with the EMF [we can at last begin to get a glimmering of understanding into what this 'charge' is. Presinger and Cameron have noticed a relationship between poltergeist-like episodes and geological fault zones, and this link is considered incontestable fact among certain dowsers who have a wealth of anecdote." (p154)

"Many people feel that sacred sites, beacon hills, etc., are a sort of Earth acupuncture point, a site of Earth chi energy, and that ley lines are the meridian channels for this energy. This is an analogy that I have used for many years, because it seems intuitively to fit. Thus the ancient practice of lighting beacon fires on the beacon hills at Midsummer and other sacred days is a bit like moxapuncture (sic) of the Earth's meridians." (p160)

Fairy folk, crop circles, magic mushrooms, Stonehenge, the temple of Apollo on the island of the Hyperboreans, astrology, ancient initiation rites, circle dancing and recharging the Earth through psychic energy are all also inter-linked. (pp177-181) But no mention of Santa or the Tooth Fairy.

Although this book is a revised edition and published in 1993 Geller still gets a mention, albeit briefly, and a photograph which shows him holding a bent spoon. So it isn't surprising that Ms Roney-Dougal accepts the validity of the long discredited (even by believers in psychic phenomena) JB Rhine and says about his critics:

"Some of these experiments were so outstandingly successful that the only charge sceptics could bring against Rhine was that of fraud. And, as his work has been repeated by others, this charge has to be altered to a grand conspiracy of fraud. As no one can ever prove such a charge this is not scientific and is definitely 'not cricket'. To attack a person's ethics and morality just because you do not like the findings of their research is in itself immoral and unethical." (p9)

I was under the impression that Rhine's methodology was challenged more than his integrity. And what does she mean by 'As no one can ever prove such a charge'? Presumably this invalidates James Randi's exposure of Uri Geller and Ian Plimer's debunking of Creation 'Science' geology.

In fact, the author doesn't approve of sceptics and scepticism in general. Our American counterpart gets this serving: "There is a group of people who call themselves The Committee for the Scientific Investigation for Claims of the Paranormal (CSICOP - or Psi cops!). Reading their magazine *The Sceptical Inquirer* is a fascinating study of perceptual defence and cognitive dissonance ..." (p19)

Yes, we are a static and closed-minded group, we sceptics, always demanding PROOF of the existence perpetual motion machines, ESP, Atlantis, elves, and the like. Unlike we dogmatic and unbending nay-sayers Serena Roney-Dougal is refreshingly open minded and delightfully accepting, as the following quotations will show.

"I have always objected to the so-called Second Law of

Thermodynamics which says that entropy is always increasing and the Universe is becoming more run down, chaotic and random, because it is so obviously totally untrue ..." (p70)

Personally I've always objected to the Theory of Gravity and henceforth intend to ignore it. So next time you see a UFO floating over your house don't panic, it'll probably just be me. Serena Roney-Dougal offers no proof for her assertion beyond some vague talk of life and the life-force creating an evolving order. In any case she seems to be taking about a different Second Law to the one I learnt in secondary school.

"The power of the 'magic' circle as a means of generating forces of what we now call psychic or parapsychological abilities is well-illustrated in the oft-quoted claim that the witches called up the storm that defeated the Spanish Armada in the sixteenth century, and also the fog that prevented Hitler's invasion in the twentieth century ..." (p221)

Wasn't it British navy which defeated the Spanish Armada? As for the fog.... I thought it was a combination of the German failure to gain air supremacy, Hitler's disinterest in the proposal, and a preoccupation with the upcoming invasion of the USSR which was responsible for the abandonment of Operation Sea Lion. Silly me. I now know better. It was a group of patriotic witches (no doubt operating out of Glastonbury where, incidentally, the author lives. Yes, that Glastonbury).

"Some of these people [psychic surgeons in the Philippines] really do heal others. They do it in a very dramatic way with plenty of blood around the surgical incision, which has been done with a finger, and then bits of gall bladder or whatever are produced ..." (p47)

However Ms R-D reads *The Sceptical Inquirer* and must therefore know that these operators are frauds ... or does she?

"...though there might be some trickery at some point, this normally allows the atmosphere to become so charged that it allows the psychic realm to manifest, and this is when the real psychic or magic phenomena can begin to operate for what is really needed."

Take that, James Randi! But my bet is that if the author is ever taken seriously ill she'll check herself into the nearest hospital rather than fly to the Philippines for treatment.

"The geomagnetic anomaly associated with areas in which UFOs are most commonly found, affects our pineal gland which produces beta-carboline which takes us into a psi-conductive dream state of unconsciousness where we are both psychic and 'think' at the collective unconscious level of our mind, in dream images, hallucinations, and archetypal primary process thought. It is at this level of our minds that we are most in touch with, or at one with, the world mind, which is manifesting in UFO form." (p151)

Talk about using one piece of pseudoscientific nonsense to reinforce another piece of pseudoscientific nonsense!

"Overhead power cables seriously damage your health. Common complaints are dizziness, feelings of weakness, poor concentration, headaches, nausea, insomnia, asthma and skin rashes, blackouts, heart attacks, leukaemia - wet and windy

weather makes it worse as does pre-thunderstorm weather.” (p127)

Each working day half a million Melbournians spend between 1 to 2 hours travelling to and from work in train and trams that are powered by overhead cables suspended, uninsulated, 2 to 3 metres above them and carrying a high voltage electrical current. At home and at the office they are surrounded by live electrical wiring hidden in the walls and the ceilings. Day in day out for decade after decade. One wonders how the poor wretches survive. Maybe the government is covering up the true extent of the damage. But I leave that for the conspiracy theorists to pursue.

“It occurred to me some years ago, when I was trying to explain some aspects of quantum physics to a lay audience, that Einstein’s famous equation, $E=mc^2$, can be seen as a symbol of the shift that is occurring from a materialistic world view to a spiritual one.” (p243)

Serena Roney-Dougal teaching quantum physics to a lay audience! The mind boggles. This is akin to Uri Geller teaching deep sea diving to a group of non-swimmers.

“If you accept such abilities as telepathy, clairvoyance and precognition, then you must realise that we are literally potentially omniscient. Thus at a subliminal level we are potentially divine, potentially omniscient, potentially able to know everything that ever has been, is and will be in the whole Universe.” (pp15-16)

“So belief is absolutely vital to magic just as disbelief has been vital to the creation of the soulless, modern mechanistic, reductionist culture in which we live now.” (p47)

“What is unusual about psi is that it is outside space and time as we know it and so the knowledge comes as a vision or hallucination, as a feeling or intuition, as a dream or even merely a hunch.” (p10)

“Our psychic sensitivity appears to be strongly linked to electromagnetism; it is also attracted by pointed objects, and there is a suggestion that church steeples were specifically constructed so as to enhance the electrostatic properties of that place. There is a connection here with the wizard’s pointed hat, and with the wearing of horns since they are pointed also.” (p126)

“What amuses me here is the transparent connection between the little green men of UFOlogy and the Green Man of the pagan religion. That UFOs are a modern form of fairy folk becomes more and more apparent the more I look into it.” (p149)

This book is full of such pearls of ‘scientific’ wisdom. Sorry, Serena, but I prefer to be a closed-mind sceptic than a ‘fair-minded’ believer such as yourself.

In summary: Scientific Content: 5% Piffle Count: 95% . I wonder if the publishers can be sued for false advertising? The worst thing about this silly book is that it isn’t even a good laugh, just laughable. No wonder parapsychology is struggling for acceptability. ■

Bubonic Plague and the Great Fire of London

Ron Seidel

“The Great Fire of London in 1666 may have been a terrible thing but at least it stopped the Plague in its tracks.”

I have seen and heard this opinion countless times and never thought to question it. It makes sense; the cleansing flame sweeping away the dirty congested little alley ways that were rebuilt with clean wide streets where the contagion could no longer gain purchase. It was coincident; before the fire there was plague, after the fire there wasn’t. It was well supported; I don’t recall any contrary opinion. And yet it is patently ridiculous as is evidenced by the simplest of observations.

As I was browsing through my old *Scientific Americans* recently I came across an article called The Bubonic Plague by Colin McEvedy in the February 1988 issue. It raised these questions: If the fire cleansed London what mechanism released Paris and Amsterdam from the plague at about the same time? Wouldn’t the mass of refugees represent an ideal breeding ground for contagion? In fact even the most rudimentary study of the two events makes the link impossible.

The plague had already had a long history from the middle of the 14th century when the famous Black Death episode took out a quarter of Europe and then faded almost completely for a while. In fact there had been an outbreak in the 6th century of similar proportions during the reign of Justinian followed by repeated but diminished epidemics in the next two centuries. After the Black Death the pattern was similar; repeated but less widespread epidemics for four centuries except that its subsequent precipitous decline was permanent because we had finally figured out what caused it. It still turns up sporadically (10 cases in the US in 1986 and a near epidemic very recently in India) but can never again reach epidemic proportions because we know its cause and have an effective treatment.

This history should suggest something of the nature of contagion. An American pathologist, Theobald Smith, opined that ‘pathological manifestations are only incidents in a developing parasitism’ and that in the long run milder forms of disease tend to displace more virulent ones. This is quite likely in the case of the plague because there does exist a close relative of the plague bacillus that does not induce visible illness in rats but does confer on them a high degree

Continued on p 57...

FORUM

In which Skeptics can assert, challenge, debate, dispute, refute, discuss, wrangle, plead, or generally argue the toss about items which have appeared in *the Skeptic*, or ideas which they wish to propose.

Against misrepresentation: a plea to Plimer

Ian Plimer is a naive, gullible, self-promoting, and simple-minded nerd. And he's wrong as well! Actually all that is not even half true — indeed it involves serious misrepresentation. I have adopted the rhetorical device of hyperbole to capture the reader's attention - especially Ian's - and I do have bone to pick with him.

There are some falsehoods, misrepresentations, and distortions in his book *Telling Lies for God* which should not be allowed to pass without challenge. First I want to stress that most of the book is admirable and right. I say emphatically that Ian's stance against so-called creation "science" is sound and defensible. To put it bluntly (I won't offend many readers of these pages), creation "science" is a load of garbage, and Ian is right to oppose it.

His methods of fighting the good fight however are not always admirable, defensible, prudent, or fair. There is a moral dimension to the debate. It is important to be right, both factually and morally. I hope it is clear that from here on this is a dispute among allies. In the course of his book Ian attacks North American skeptic and philosopher Jim Lippard, who is variously characterised as "naive", "unsophisticated and wrong", "culturally insulated" and "not in the search of truth but attempting to sensationalise himself".

In the spirit of solidarity with a philosophical colleague (a unity rather less pronounced from within the community) I will gently chide Ian for some scholarly and moral improprieties.

Anyone familiar with Jim's patient, painstaking and dispassionate analyses and dissections will suspect a degree of distortion and unfairness in Ian's charges. However defending Jim against unsubstantiated abuse is not my main concern. Jim's main offence has been to challenge the methods which Ian recommends for confronting creation "science", and that is the issue that I want to address.

What divides Ian and Jim is "the premise that the controversy between creation 'science' and science can be solved by rational debate and the use of the scientific method". Ian rejects this premise as "naive". Jim, however, endorses it, and so do I. Rational debate is not of course going to persuade creationists to change their views. But I don't think that this fact can be appealed to sanction alternative and less edifying avenues of confrontation.

Suppose we reject rational debate as an avenue for

confronting creationism. What then is the alternative? Presumably it leaves us such techniques as bullying, coercion, rhetoric, intimidation, and sophistry. I believe that we should, in general, reject such devices of disputation. They have no role to play in the economy of scholarly debate. (Perhaps they have a role to play elsewhere: I won't pursue that issue.)

The fact that Ian does not believe that reason can effectively confront creationism does not of course imply that reason is impotent to do so. Ian I think displays a distressingly pessimistic view about the power of reason to establish and buttress truth. But when we debate creationists who in any case are we trying address? We won't persuade Duane Gish and his ilk of course. That's out of the question. We should rather be trying to persuade those whose minds are receptive to the powers of reason and evidence. Such minds may be a little more open. And such minds may not be impressed by bullying, abuse, threats and intimidation. Getting down in the gutter may be an effective way of meeting the opposition on what you perceive to be its own level, but it is not a very edifying stance, and one which is not calculated to impress disinterested observers.

What particularly disturbs me about Ian's position is that by example he sanctions the very departures from rational discourse and argument which creationists exploit in developing a perverse and profoundly mistaken worldview. Call me a naive child of the Enlightenment if you will, but I believe it is perilous to depart from the hard-won canons of reason on which the whole edifice of rational, systematic, scientific understanding rests.

In his very unsympathetic discussion of Jim's writings Ian is short on argument and long on rhetoric. I have not tracked all the points in their dispute in exhaustive detail, but my reading has persuaded me that Ian has not paid Jim the courtesy of reading his writings as carefully and scrupulously as Jim has read Ian's. This is disappointing from someone who is supposed to be a professional scholar. The basic point however — and it is an ethical point — is that we cannot consistently and fairly point out the sloppy and slipshod standards of inquiry which prevail among the proponents of shonky belief systems (like creationism) unless we scrupulously observe these standards ourselves.

I believe that Jim unquestionably has truth and reason as well as the moral high ground on his side in his dispute with Ian. And I repeat that they are both united in their rejection of the mistaken claims of creation science. It must be particularly galling for Jim to be portrayed by Ian as a stooge

of a movement which he has in fact done much to oppose. Aside from these blemishes Ian's is an admirable book. It's just a pity, really, that there isn't a bit more philosophy in the science curriculum.

(Dr) William Grey
University of Queensland

Ian Plimer Responds

One of the first papers I ever wrote was strongly criticised in the scientific literature by my then closest personal friend. He is still my closest personal friend. This was a great lesson about the nature of criticism and I welcome the criticism by Dr William Grey.

The statement by Thomas Merton was in mind when I wrote *Telling lies for God*.

"If a writer is so cautious that he never writes anything that cannot be criticised, he will never write anything that can be read. If you want to help other people you have got to make up your mind to write things that some men will criticise."

The book was not written for creationists; I have no intention of taking away the life-jacket for the insecure followers of creationism and I expect comment on the book, especially cacophonous creationist criticism.

My comments regarding Lippard derive from his correspondence with Barry Williams, Barry Price and myself. His resultant article ignored information provided by our esteemed President, Barry Price and me, and he did not use public domain information about creation 'science' in Australia. However, my principal criticism of Lippard is that he does not understand the fundamental nature of creationism and wants to treat creation 'science' as a subject for philosophical argument.

Creationism is not a great debate between two world views which can be addressed by rational argument. Creation 'science' is the political arm of religious fundamentalism. The target is our children. It has nothing to do with science, theology or rational argument. One cannot argue rationally with those who espouse irrationality. There have been numerous books and rational debates debunking creationism, but creationism is still on the ascendancy. I make no apologies for bringing creationist battles into the bear pit because it is only here that the media and the courts can provide the public focus.

By now, Lippard must realise that his writings are regularly used by leaders and followers of creationism to support their position. Lippard's approach to creation 'science' is philosophical whereas mine is political. I have no dispute with Lippard, he just needs time, maturity and learning. It might irk Lippard to know that he has made himself appear as a stooge of the creationist movement but this situation would not have arisen if he had been somewhat more

pragmatic. One can only take note of the words of German theologian Martin Niemoller who wrote about the rise of Nazism in pre-World war II Germany:

"First the Nazis went after the Jews, but I wasn't a Jew, so I did not react. Then they went after the Catholics, but I wasn't a Catholic, so I did not object. Then they went after the workers and I didn't stand up. Then they went after the Protestant clergy and it was too late for anybody to stand up."

I wonder if Jim Lippard would have tried to argue rationally with the Brown Shirts?

Astronomical claims challenged

This is a 'more in sorrow than in anger' letter, concerning the article on the so-called Greenhouse Effect by Ian Plimer (Vol 14, No 3). From what I have seen, Ian does an excellent job as a Skeptic, and so I am sorry to have to criticise him, especially since, in broad sweep, I agree with his scepticism regarding the Greenhouse Effect. But the Skeptics must keep their own house in order, and challenge ill-based (and flagrantly wrong) statements, else someone else will do it for us, to our disadvantage; and to the disadvantage of the quest for scientific truth.

I would imagine that anyone with detailed knowledge of any subject has often found that newspaper reports on that subject have errors, sometimes grossly misleading ones. In my own field of astronomy never have I read a newspaper report longer than a single paragraph (not enough space to make mistakes then) which was entirely correct. Thus I (and I am sure many others) may infer, correctly or not, that all newspaper stories are wrong, to some extent.

To any practising scientists a distinct, but related, phenomenon often recurs: one is reading a research paper, even in a good, refereed, journal, and one finds something that is obviously wrong, which makes one cautious about accepting ('cautious about accepting'? - why didn't I just write 'sceptical'?) the conclusions of the paper. Then again, sometimes one comes across a paper which contains reasoning (or lack of it) which is utter crap, in which case one (or at least I) tends to reject the whole lot: which may of course be a baby and the bathwater situation. Thus, to persuade the most sceptical amongst us, one must be sure that no crap creeps in to anything that one writes, and unfortunately Ian Plimer's article did contain some examples. I will mention a few before moving on to some generalities which I think may be usefully considered.

My suspicion was initially raised by the section which began 'Is the globe warming?' Here we learnt that each of the ten glaciations in the last 17 million years 'comprise an ice age and a warmer interglacial period and probably result from orbital changes of planet Earth.' This of course is the

famous Milankovich cycle theory (which Plimer later mentions by name). I mention this section here, before passing on to my major grievance, to keep things in sequence, but I note that an essential part of this idea is the variation in the obliquity of the ecliptic (astronomer's jargon for the tilt of the Earth's spin axis), coupled with orbital variations; to mention the latter in isolation is akin to the belief held by many that the cause of seasonal change is the varying distance during each year between the Sun and the Earth. That has an effect - for example it seems that it produces, at least in part, the contrast between season lengths and severities in the two hemispheres -but our spin axis tilt is the major driver of the seasons. Despite this aside, my major reason for quoting that passage was to demonstrate the use of the word 'probably', for reasons that I discuss below.

But here is the major complaint. Concerning the terrestrial situation 1,000 million years ago we are told that 'At this time, the Earth's orbit was considerably different from the orbit today, probably [that word again] because of impact with a giant meteorite or asteroid.' That is pure, unmitigated crap-spreading. First of all, we don't know what the Earth's orbit was like in the distant past (but maybe Plimer was meaning to refer to the obliquity of the ecliptic? - I know that George Williams at the University of Adelaide is investigating past values of that parameter through geological techniques of the type mentioned by Plimer). Studies by celestial mechanics leave open the question of the stability of planetary orbits, and indeed the whole solar system, over billion year time-scales.

But the silliness comes from invoking a massive impact. If Comet Halley were to hit the Earth (which it could do, but not soon) then it would release energy equivalent to about (to within a factor of three or so) 200 million megatons of TNT. That would produce, it is generally believed, a global environmental catastrophe similar to that which seems to have occurred at the end of the Cretaceous (the famous dinosaur killer, the gathering evidence says). However, the impact would make no real difference to the Earth's orbit. Comet Halley has a mass less than one part in a million million (one in ten-to-the-twelve) that of the Earth. Its impact would slowdown the Earth by less than one tenth of a micron per second, so that its effect upon the terrestrial orbit would be comparable to the amount that your car is impeded by running into a gnat as you drive along.

Even if one invoked a giant comet - say a few hundred kilometres in size, since we know now that such objects exist in the outer solar system - still the orbital change would not be significant. Nor would the terrestrial spin axis be substantially altered. But such impacts would have major effects upon the climate, for extended periods.

Whilst talking of impacts, I mention the comment made that 'Our planet's atmosphere has derived from thousands of millions of years of degassing of the planet during its

evolution and cooling,' a definitive statement which seems to ignore several recent studies which ascribe the majority of the terrestrial supply of water and other volatiles to a cometary source. Things were pretty hot on (and in) the Earth to start off with, and scaling up from the five largest lunar maria it seems that the Earth would have been subject to at least fifty very large impacts, each of which would be expected to have desiccated the planet. The water and volatiles would have arrived later, in smaller projectiles, as things cooled off.

My next gripe is with the numerous other definitive statements made, some of which are wrong ('Magnetic storms or sun spots occur every eleven years'), but all of which give the impression of 100% certainty (OK, tautology, I know) when we are just not that secure in our knowledge. For example, 'Some mass extinctions of life and most minor extinctions resulted from climate change.' Come on, we just don't know that for a fact, although the idea is plausible.

And that brings me back to the word 'probably.' My own view is that it is probable that the word 'probably' is best never used in scientific literature. I have already quoted two examples; elsewhere we read that 'The origin of the global oxygenation of the atmosphere is unknown however it is probably due to ...', and 'It is probable that the decrease in atmospheric CO2 ...' There are probably other examples. Scientists (OK, *mea culpa*) have a disinclination to write 'possibly' (or, even better, 'plausibly') when dealing with any matter about which they are unable to be dispassionate. Whenever I see 'probably' a neon-flashing sign saying BIAS seems to appear before my eyes.

There are a couple of other points that I could (usefully, I hope) bring up. One is that I was bemused that Plimer discussed the effect upon sea level of melting 'polar ice', but did not mention that melting of the Arctic ice cap - but not including Greenland, and soon - would not affect sea level, as Archimedes could have told him. Second, I found it a little bit strange that Plimer made a point about needing to stipulate the year pertaining to any measurement, 'If the height of Mount Everest is quoted accurately...' If that beast is rising at two centimetres per year (which is a uniformitarian statement in itself) then I would have thought that one would only need to quote the date of measurement to the century, since it seems unlikely that (at least prior to the availability of in Swedish, where 'en data' means 'a computer.' What hope is there for the great unwashed if such a reputable and upstanding journal as this should print such erroneous English? I guess that invites criticism of my own grammar, not least the personification in the last sentence. We could all do better.

(Dr) Duncan Steel
Anglo-Australian Telescope
Coonabarabran, NSW

Ouch! After waxing lyrical in all sorts of venues about the difference between heat and temperature in regard to firewalking, I fell into the trap myself with the background radiation reference. My apologies all round, especially to Harry Edwards, who used to think I was infallible. Regarding the 'data is' reference, our proof reader, a Mr Sven Larsen, has been severely admonished, given a scathing lecture on the dangers of multi-culturalism and a third class air ticket back to Stockholm.

Barry Williams

Doubts about Biblical Doubts

In replying to my letter "Bible Doubts" (*Letters*, Vol 14, No 3), Ron Bernardi and Peter Plane (*Forum*, Vol 14, No 4) demonstrate exactly the ill-informed prejudice and lack of careful scholarship that I was concerned about.

They each claim, without any evidence, that many Bible stories were plagiarised from other cultures. Pointing out similarities between ancient traditions and religions is not the same as showing derivation or historical priority. The fact that there are similarities between some Bible records and traditions from other cultures simply shows that the story had spread rather widely or that similar stories had been developed independently. Bernardi and Plane also confuse orthodox church teaching with Bible teaching. For example, their comments about a 'polytheist Three-in-One god' of Jesus being 'a god who has been around since creation' are irrelevant in discussing the logical consistency of the Bible since these concepts were not developed until hundreds of years after the Bible was completed.

I would like to thank Alan Towsey for his reply (*Forum*, Vol 14, No 4) to my letter, which was at least reasonably informed and supported with some evidence. He argues that Isaiah 7v14 is referring to a birth contemporary with Isaiah. I agree. Matthew's gospel claims it was also a prophecy of the virgin birth of Jesus. As Towsey points out, some of Matthew's claimed fulfilments of prophecy are clearly out of context. Matthew sometimes seems to use 'prophecy' in the sense of a historical parallel rather than a prediction. In my first letter, I was not arguing that the virgin birth was predicted by Isaiah but that the translation 'virgin' in *Isaiah* 7v14 is not unreasonable. I did not mean to imply that 'virgin' was the only possible translation of the word. There is much to debate about what the word *almah* actually means, hence the variety of translations of this verse. Towsey presented some of the textual evidence for the translation 'the young woman is with child' (eg New International Version, New American Standard Bible). There is sufficient doubt about the translation that either rendering is possible (see the article 'Virgin' in the International Standard Bible Encyclopedia, Eerdmans, 1988).

Regarding the difference between the genealogies of Jesus in Matthew and Luke, Towsey prefers the explanation that

"the Jews were more interested in genealogy than accuracy". Is there any evidence for this assertion? I know of no other ancient Jewish genealogy which is clearly false and it does not seem plausible that they would have recorded a genealogy they knew to be wrong when they were so particular about more mundane things. There are a number of plausible explanations to explain the differences, and to assume one or both genealogies are wrong is not necessarily the simplest explanation. Towsey also comments on the difference in the number of generations in Luke's record compared to Matthew's. However, it is common in Semitic genealogies to skip generations (eg Ezra 7:1-50; there are also examples in the king lists of Egypt and Mesopotamia) and Matthew seems to have followed this practice.

Finally, may I reiterate my concern that effective scepticism can only take place when the sceptics are sufficiently informed of the issues involved. Cheap shots only make the shooter feel good - they contribute nothing to rational debate and do not encourage a genuine search for truth.

(Dr) Rob J Hyndman
Dept of Mathematics
Monash University

Doubts about doubts...

I refer to the letter from Rob Hyndman critiquing David Lewis' article "Fundamental Doubts" (Vol 14, No 3). His simplistic apologetics under the guise of 'biblical scholarship' cannot go unchallenged. I propose to deal with his points in the same order he made them:

1. Matthew's genealogy for Jesus in fact follows the ruling line and Luke's the non ruling line. However it is also widely accepted by biblical scholars that these genealogies are symbolic rather than factual. To explain further, Matthew's genealogy is divided into three parts:

- a Abraham to David;
- b David to the Babylonian exile;
- c Babylonian exile to the kingship of Jesus.

These parts comprise 14 generations each. To achieve this balance, Matthew had to omit three kings (Ahaziah, Joash and Amaziah) and mention Jeconiah twice, as the last king pre-exile and the first king post-exile. Why the fascination with the number 14? Apparently the ancient Hebrews were also fascinated with numerology and since 14 is the numerical value of the Hebrew name 'David', perhaps Matthew may have meant to emphasise Jesus' relationship with David. In fact, the genealogy appears to function more as a condensed version of Israel's history than a genuine attempt at tracing Jesus' ancestors.

Given the above considerations it is certainly not (as Dr Hyndman puts it) "certainly possible that both genealogies are true". In fact, it is highly improbable that they are true, especially as Luke traces Jesus' line back to Adam, who did

not exist.

2. As for Joseph being the father of Jesus, Dr Hyndman may have a point. However, it has always baffled me as to why there should be so much effort put into establishing a genealogy for Joseph, and then not using him as a biological father.

3. With regard to Jesus' parents being amazed at finding Jesus in the temple, it is worth quoting the entire passage (Math 48-50):

(48) "And when they saw him they were astonished; and his mother said to him, 'Son, why have you treated us so? Behold, your father and I have been looking for you anxiously'. (49) And he said to them, 'How is it that you sought me? Did you not know that I must be in my father's house?' (50) And they did not understand the saying which he spoke to them."

Certainly, until Verse 50, Dr Hyndman seems to be on solid ground; but that verse makes it clear that Jesus' parents had apparently forgotten about all the signs and visitations which attended his birth, otherwise they would surely have understood what he was saying to them.

There is no biblical scholarship required here, just simple English comprehension.

4. With reference to whether the Hebrew word "Almah" refers to virgin or not, there exists an unambiguous word for virgin in ancient Hebrew, namely "Betoolah" (Websters New World Hebrew Dictionary). If Isaiah had intended to specify a virgin birth, presumably he would have used that. However, that still does not change the fact that Matthew lifted a prophecy made 700 years earlier, for a totally different purpose, and applied it to Jesus; a somewhat cavalier approach to prophecy, but one guaranteed to work (especially with a fortuitous mistranslation thrown in!) I think David Lewis' point still stands.

5. Finally, as to the alleged discrepancies in the gospel resurrection accounts; most biblical scholars agree, that (with the possible exception of John) the gospels were not written by people who personally knew Jesus. Therefore, in no way can the resurrection accounts be called 'eye witness'. At best, these accounts are several times removed from the source and many years removed from the time of occurrence. To expect them to be historically accurate is a forlorn hope, and one not borne out by the texts themselves.

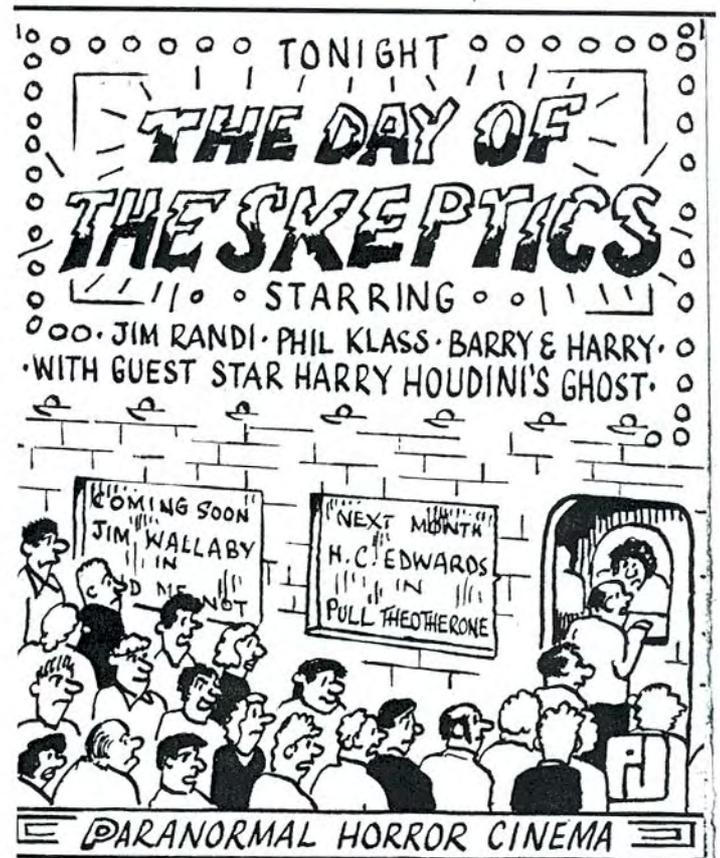
As to possible harmonisation; sure it can be done, with enough effort and ingenuousness. But what is the point? Ptolemaic astronomy could probably be made to agree with general relativity by the addition of enough epicycles, but WHY BOTHER? As a theory, it is obsolete, untenable and operates under assumptions which have been shown to be false.

Similarly, the theory that the Bible was written with divine inspiration, and that therefore must be true, is obsolete. After 2000 years of determined effort, the scriptures still cannot be harmonised to everyone's satisfaction. Contradictions abound and with deeper knowledge, they multiply rather than

diminish. A classic case of a theory in crisis. Surely the assumptions of the theory must now be questioned?

Why not accept the Bible as human history, with human frailties and apply the same tools of historical analysis that have been used elsewhere with great success, and try to find out what really happened? This, of course, is being done by many modern scholars, but the faithful refuse to accept their conclusions.

C S Nagy
Sth Yarra VIC



Great Fire from p 52

of immunity to the plague. Natural immunisation.

Another simple observation is that the fire only destroyed the central part of London, least affected by the plague, and left untouched most of the overcrowded suburbs where the plague tended to thrive. In fact, apparently, there were only three deaths caused directly by the fire. The plan to blow up houses in the path of the fire, that eventually stopped it, suffered costly delay because tenacious aldermen whose houses were first in line would not permit it.

Finally, provoked by this to do a little further research, I found this modest but illuminating fact: The 1665 outbreak known as the Great Plague began in about June and was all but gone in late November. People were returning for Christmas. The fire didn't happen until September 1666! ■

FORUM

Cannibalism?

Michael Pickering

Introduction.

In recent issues of *the Skeptic* there has been some debate about the existence of Aboriginal cannibalism. Richard Buchhorn (1994) had raised the issue of the argument 'against' and has subsequently borne the brunt of opposition claims 'for' (Towsey 1994; Lewis 1994; Snowden 1994). Towsey (1994:69) asked "Are there any anthropologists among our Skeptics who have any real evidence one way or the other."

I now belatedly enter this debate (my apologies to Richard Buchhorn). In all humility I probably rate as knowledgeable on this matter (eg Pickering 1985; 1989; 1992; Howie-Willis 1994: 178-179; Bahn 1991: 31). In 1984 I carried out an exhaustive study into the issue of Aboriginal cannibalism (Pickering 1985). I provide a summary of my findings here. I do not expect readers to take the summary at face value. A copy of my thesis, submitted to the library of the Skeptics, accompanies this article and I invite use and comment.

This study initially aimed at examining the cultural significance of Aboriginal cannibalism, an area which had largely been ignored by serious documenters and researchers. Before I could examine the social significance of the act I had first to be sure, firstly, that the act really existed and secondly, that I had adequately descriptive materials upon which to base the analyses.

Through examining the available and copious published data I was stuck by the lack of evidence, in the form of objective descriptions, for cannibalism. While other institutions were described in detail usable information about cannibalism was scarce. Readers were expected to take the accusation at face value. In effect I had nothing to work with.

There emerged a clear conflict between the popularity of the belief that Aborigines were cannibals and the objective evidence. The focus of research changed to the question of whether there was, in fact, any real evidence for the existence of institutionalised Aboriginal cannibalism at all.

My research examined published and unpublished documentary descriptions of 'cannibal acts'. Four hundred and forty accounts were obtained from 298 sources. These accounts were classed according to the origin of the account and the level of description provided. Few of the accounts stood up to close scrutiny. Most were either unsubstantiated or second-hand accounts of unsubstantiated descriptions. For those few that accounts that provide substantiating evidence there are usually grounds to suggest that those claims that

provided some substantiating evidence were either unreliable (even though graphic), were the result of misinterpreting other activities for cannibalism, or were reporting crisis stimulated events rather than conventional institutionalised practices..

The origin of the species

The belief that Aboriginal cannibalism existed as a social institution owes more to popular 19th century social attitudes than it does to reliable evidence of the practice by Aborigines.

Social evolutionary theory argued for a social, technological and moral hierarchy, ranging from 'primitive' peoples on the bottom to particular European peoples at the top. Cannibalism was seen as one of the institutions characteristic of a primitive society. Colonists came off the boats and headed into the bush armed with Bibles, rifles, and the preconception that Aborigines were, amongst other things, cannibals. Not surprisingly they found it every where they looked. By far the majority of reports came from untrained reporters untrained in ethnographic methods and usually not favourably disposed to alien cultures occupying lands over which they had territorial ambitions (e.g. pastoralists, police, tourists, missionaries, clergy, journalists).

But.....

At this stage someone usually jumps in with a 'But what about X's writings?' They then usually quote some popular text. Even those people more favourably disposed towards Aboriginal culture were not immune to prevailing social values and similarly expected to find evidence of Aboriginal cannibalism.

Early anthropologists and ethnographers, armed with contemporary social theory derived largely from the combination of a colonial ethos and social Darwinism, similarly misinterpreted certain acts and statements as evidence of cannibalism. The overall result was that the significance of other social phenomena was ignored through such phenomena being misinterpreted as cannibalism. Many authors, academic and popularist alike, readily accepted the concept of an Aboriginal institution of cannibalism; a relic of the intellectual baggage of their teachers.

Thus it is not surprising that quite eminent academics wrote about cannibalism. However, few of these authors based their discussions on first hand research, or for that matter, on the first-hand research of skilled ethnographers. Instead they unquestioningly accepted 'historical sources', documents that

often achieve their prestige on the basis of their age more than on the quality of their scholarship. It is when we examine these sources that it becomes apparent that there is much to be questioned.

For example, Charles Sturt, soldier and explorer, recounted a description by a stockman who told him “ That fellow, sir...who is sitting down, killed his infant child last night by knocking its head against a stone, after which he threw it on the fire and then devoured it.” Sturt then “... went up to the man and questioned him as to the fact, as well as I could. He did not attempt to deny it, but slunk away in evident consciousness”. Sturt admitted he did not see the act but concluded “...the very mention of such a thing among these people goes to prove they are capable of such an enormity (Sturt 1833:22-223). This is a second-hand account. Sturt tacitly admits to communication difficulties. Self-consciousness (embarrassment at the disgusting insinuations of an alien?) is seen as an admission. Sturt obviously had a preconception that Aborigines were cannibals.

Later authors misquoted Sturt. Mackenzie, a clergyman, changed this account into “Captain Sturt ... *witnessed* (my emphasis) a black fellow kill his infant child by knocking its head against a stone, after which he threw it on the fire and devoured it (Mackenzie 1852:117). Strachan reported that Sturt “...witnessed a black fellow kill his infant, by dashing its head against a stone, after which he threw it on the fire, and then *greedily* (my emphasis) devoured it (Strachan 1870:116). Over forty years the second-hand account becomes first-hand. The alleged consumption becomes greedy.

Mackenzie (1852:127) recounts ‘A respectable gentleman named Morrice...came lately on a party of fifty or sixty blacks in the very act of roasting pieces of human flesh...the body of a female.’ Andrews (1920:33) then recounts Mackenzie’s “...having seen 50 or 60 ... engaged in eating a man.” The second-hand account becomes first-hand. The female becomes male.

Daisy Bates was a journalist. The majority of her reports of cannibalism appear in newspapers and when she was approaching 70. I have counted 49 accounts of cannibalism in 19 of Bates books and articles. Most of these accounts were repetitions of four specific examples; the first was an anecdote provided by an old woman recounting a single episode in her childhood where a reference was made to suggest to her that a piece of meat was human.

The second was based on a group of migrant Aborigines arriving at Ooldea with some bloodstained bags ,utensils and no children. This was sufficient to suggest to Bates that the owners of the gear and the children had been eaten. The third was when a missionary pointed out a woman who was supposed to have eaten her child. The fourth was when a pregnant woman at Ooldea disappeared into the bush to give birth and came back without the child. Bates considered the child had been eaten. She described the motive as “...custom...coupled with an overwhelming desire for the soft

flesh and fat of the little baby” (Bates 1921). Bates later recovered the bones which she sent to the South Australian Museum. The Professor of Pathology at the University of Adelaide, J. B. Cleland identified the remains as cat.

Of the 440 accounts that I have examined the most descriptive ‘first-hand’ account comes from Sievwright (1844), a Church Minister and the Protector of Aborigines in the Port Philip district. This account is too long to reproduce here , however, Sievwright provided a graphic description of preparation and consumption of human flesh which he claims to have witnessed (Siewwright 1844 In Eyre 1845:255-9). There are mitigating circumstances that cast doubt upon a very descriptive account, however, the principal one being that Sievwright was found by the Colonial Office to be an “unmitigated liar” (Bridges 1972:58).

What has happened? Why did authors lack the simple ability of correct citation? Why did accounts become embellished? I think because it was politically expedient.

At the end of the day the evidence for cannibalism is extremely poor. Like UFO’s, it was only witnessed by untrained observers who were specifically looking for it. The incidence of cannibalism was exaggerated by conjecture, misinterpretation, bias, and outright lying. A popular love for ‘gory stories’, particularly those at the expense of alien cultures, has ensured that the myth is perpetuated.

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Unlucky numbers

It takes some time for *the Skeptic* to reach me here in the (other) colonies. It has only just come to hand. I would like to expand on some statements by yourself and other correspondents regarding Brisbane City Council and the unlucky number 4. The Japanese do indeed have this superstition that 4 is to be avoided; however, it is incorrect to state that the Chinese do not.

In terms of language, one cannot refer to Chinese as one group. I have only been in Hong Kong for six months and my Cantonese is rudimentary, but I can tell you with confidence that the Cantonese consider the number 4 to be most unlucky. It is associated with the word 'death' or 'die'. Mandarin has the same association, but I am told folk from Beijing tend to be more rational and it is not really an issue. I have been unable to verify this - maybe you can find a more scholarly source. I have no idea what happens in the many other languages in China, but those Chinese are unlikely to be buying land in Australia in the near future.

At any rate, the Cantonese are just as important to the Queensland real estate agents as the Japanese. The flow of economic refugees from Hong Kong will grow towards (and probably after) 1997. (For those who are unaware, the Peoples' Republic of China gets HK back from the British in 1997. While the Cantonese are not exactly fond of the British, there is a general perception that the Communists are unlikely to improve matters - one need only compare Hong Kong with Shanghai to get some idea. Most Hong Kong professionals already have their British, Australian or Canadian passports).

These Brisbane entrepreneurs should also note that the Cantonese consider 8 most auspicious: it is associated with wealth and prosperity, and 38 means "easily gaining property and wealth". 14 is very bad and 18 very good, as 1 is associated with 'certain' or 'definite'. They also dislike 7 for reasons

Letters

We welcome letters from our readers on any topics that may be of interest to other Skeptics.

We reserve the right to edit letters for reasons of space or clarity

unknown. 9 has an association with 'dog' and 'cock' (as in penis) but does not seem to suffer any prejudice as a result. People here pay millions for number plates like 388 (I presume 1398 is owned either by a madam or a vet). Maybe we should number houses only with permutations of 1, 3 and 8.

The reason for the superstition is interesting. Cantonese is a tonal language - words have entirely unrelated meanings depending on whether the voice rises or falls, stays high, stays low etc I have had the experience many times where I repeat an address four times to a taxi driver as "Wan Kau Dai Haa" and am met with a blank look, only to have recognition dawn and he says "Oh, Wan Kau Dai Haa" as if to say "why didn't you say so?" The words '4' and 'die' (and all the other associations) involve the same consonants and vowels but quite a different tone. So I find it extraordinary that the Cantonese can make this connection between words that are as different as 'god' and 'gone' are in English, to the point of renumbering houses. I guess it is not as extraordinary as an Australian elected council going along with this nonsense.

**R D England
Hong Kong**

Taxonomical suggestion

In a recent newspaper article I read, it was proposed that chimpanzees and gorillas be reclassified as *Homo Paniscus*, *Homo Troglodytes* and *Homo Gorilla* due to the closeness of their genetic relationship to us, *Homo Sapiens*.

I now propose the reclassification of creation 'scientists' as "*Creationist Bacilli*". This makes perfect sense to me as all creationists I have met and read about appear to have the intellectual capacity of your average bacterium.

As creation 'scientists' exhibit a tendency towards extreme homophobia, they should therefore be excluded from the hominoid family. They also refuse to accept that they have evolved, so they should be placed on the evolutionary tree in accordance with their beliefs: at the bottom with the other single (brain?) celled creatures.

In conclusion, it is our Darwinian evolved duty that we noble and mighty *Homo Scepticus* if not smite, then generally annoy and inhibit the tainted and vile activities of the disreputable *Creationist Bacilli*.

**Mark Dawson
Gordon ACT**

Of course(s)

Re your request in Vol 14, No 4 for information on tertiary courses. We don't teach naturopathy or the like here! There are some courses which look at nuttury in a critical manner.

ZL216: Evolution, for 2nd year zoological students has as its description:

Synthetic overview of organic evolution; definitions, assumptions, principles, philosophy & historical background; sources of evidence including developmental biology, comparative and functional anatomy,

theoretical morphology,
biogeography, genetics, epigenetics,
palaeontology, taxonomy,
exobiology, cryptozoology.

Biblical inconsistency

When this was introduced several years ago I asked at a faculty meeting whether cryptozoology was, as I understood, "looking for dinosaurs in Africa". The answer was "Yes; to show how silly it is"

Two subjects in the Department of Studies in Religion - clearly the right place for them!

RE287: Witches, Pagans and the New Age:

Historical and phenomenological approaches to old and new forms of Paganism, with emphasis on beliefs & rituals, & their modern developments.

RE299: Controversies in Biblical Interpretation:

How is the Bible to be interpreted? Is it creation science? history? myth? secret code? patriarchal propaganda? Competing ways of interpreting the Bible.

(Dr) Ken Smith
Mathematics

Dept University of Queensland

Does anyone else have any strange courses to report? **Ed**

Correction

I realise that you are tired of all the fuming, but Steve Basser's latest attack on David Lewis (Vol 14, No 4 p 60) needs one correction. The report does exist. The reference he seeks is given in my book Don't Panic, Panic. I repeat it here. It is 'ABS Catalogue No 4382.0 "1989-90 National Health Survey Smoking, Australia" 18 May, 1992'.

(Dr) John L Farrands
Glen Waverley VIC

Ian Plimer's book, *Telling Lies for God*, may convert some borderline creationists and redirect a few potential adherents, but the majority will remain unaffected. As the Bible admits miracles, miracles can solve most problems of Noah's Ark discussed in the book. For example, to assist the overworked crew of Noah feeding thousands of pairs of animals, everyone on board could fall into a deep sleep (as in the fairy tale *The Sleeping Beauty*) and wake up when the flood is over. To make the Ark a plausible proposition, I suggest that a creation scientist should compile the minimal list of miracles required.

There is however, a wider issue that cannot be solved so easily: believers of any religion may deny obligation to prove what they believe in, but the more thoughtful among them will feel their belief ought to be consistent.

When non-Euclidian geometries were discovered, it was important to prove their consistency. Without consistency, Einstein would not have investigated whether or not one of them applied to the world we live in. Similarly, if a religion shows inconsistencies, the thoughtful believer will want his religion to be adjusted to make it consistent. Consistency is required for religion as well as for science.

One inconsistency of the Christian religion comes to mind: since the Bible forbids innocent children to be killed; a god who is good * would not allow the earthquakes and floods to kill them. That must be the work of the Devil. Hence, God is not omnipotent, but shares his power with the Devil.

To believe God to be good and omnipotent is inconsistent with the Bible. Either goodness or omnipotence must go. Christians abandon omnipotence and believe in the Devil, while Jews abandon goodness and

believe in a cruel God.

* "Good" is what the Bible says you should do.

Hans Weiler
Croydon NSW

Of course *any* claims made by *any* believers, regardless of their implausibility, can be accounted for by 'miracles'. The problem for the creation 'scientists' is that they insist that they have scientific evidence for their beliefs and, as you know, when you talk science, you cannot invoke miracles. If the creation scientists were honest and referred to themselves as creation 'fundamentalists' or 'literalists' and did not pretend that their views were scientific, then they would have less trouble with Skeptics. Of course then they would have no excuse for trying to have their dogma included in science classes. **Ed**

Chomsky defended

The contributors to the Forum on Language in *the Skeptic* (Vol 14, No 4) variously acknowledge Noam Chomsky's contribution in the field of linguistics.

His application of his linguistic skills to the statements of a successions of US Presidents, politicians and media commentators, and analysis of the political and social processes involved in *The Manufacturing of Consent* (the title of a series on Chomsky shown on SBS TV a few years ago) constitute a more immediate and far reaching contribution.

By encouraging scepticism in this area, he has reduced the likelihood of further Vietnams, east Timors, Palestines etc, and made it harder to manipulate public opinion by exploiting, through demonisation, future Ho Chi Minhs, Yasser Arafats, Gaddafis and Sadam Husseins.

I recommend his writing to all fellow Skeptics

Richard Buchhorn
West End QLD

Hands off?

I refer to Daryl Haslam's letter (Vol 14, No 4) suggesting inconsistencies in the stance of Australian Skeptics re religious matters. Like Daryl, I am not totally comfortable with the 'hands off' approach of Australian Skeptics, but nevertheless feel that it is probably best to maintain the status quo. One needs to take a pragmatic view of these matters, and I add the following argument to Barry's reply.

To many people, questioning religion is synonymous with denigrating religion, and we need to be careful not to alienate potential Skeptics. Nothing raises the hackles of a believer (even a 'part timer') faster than rigorous questioning of creed. Much better to continue to encourage rational and critical analysis of all matters paranormal.

At the individual level, this scepticism will automatically extend to personal religious beliefs. The result of this introspection may be a deepening, or more likely a radical lessening of 'faith', but in any case the sceptic will generally feel much more comfortable in his/her stance.

Many people (including scientists) are quite uneasy in their faith (or lack of it), aware that they are practising largely out of habit, or turning their back on religion mainly through laziness. They are unsure how to set about making an informed decision - a good dose of scepticism is a useful starting point.

**John Wilkes
Inverell NSW**

Out for the count

The Skeptic Vol 14, No 4, contained an article by Geoffrey Sherrington entitled Mother Nature can count to decimal 1869. The opening sentence, intimating that birds can count made me suspicious, as it is widely known by hunters that they cannot.. Two hunters

enter a hide and one leaves. This reassures the birds who then assume that no-one is at home. By the time I had got past the Fibonacci Numbers, Phyllotaxia and Parastichy, I was reasonably sure that friend Geoffrey was having a lend of us. On closely examining the three drawings with phyllotactic patterns, it can be seen that A has 24 points, and B and c each have 34; yet they are supposed to have "a divergence angle equal to A, 137.3 degrees; B, 137.5 degrees and C, 137.6 degrees.

Merde di Toro!

The only difference between the three drawings is lack of completion of two of them. The spirals are purely an optical effect caused by the 'bricklaying' of the dots. On straight lines, bricklaying gives vertical rows, horizontal rows and diagonal rows of opposite hand.

If concentric circles are drawn, with evenly spaced radials drawn from the centre, the diagonals become spirals without recourse to mathematics, mysterious happenings, or pineapples with rough phyllotaxic ends.

Nice try Geoff, but you should have held your article back for the April 1 issue.

**Clive Robbins
Cromer NSW**

Musical notes

This note is in response to various correspondence concerning the key in which music is played. I recently came across a paper by Physicist Lance McCarthy of Flinders University which nominally is a discussion of various approaches to tuning string instruments. However, he makes a point about stringed instruments generally, which is that the open strings will resonate in sympathy with the other strings when there is an harmonic relationship. That is, if there is an open string tuned to some frequency and another (stopped) string is playing another frequency, then the open one will resonate if one of the frequencies is an integer multiple of the

other. This resonance will change the quality of the sound.

So, if you're playing a violin in G major, say, there will be a lot of Gs and Ds about and there will be corresponding resonance, because violins have strings tuned to G and D. Now, if you play the same piece transposed a semitone, there won't be as many harmonic relationships with open strings and the music will sound different unless you do it by retuning the instrument as a whole, of course.

In *the Skeptic*, Vol. 13, number 1, Blair Alldis proposed an experiment involving an A-B blind listening test in which A is a string quartet, say, and B is the same music performed flatter and slower, recorded, and played back faster. In light of the above, I would bet that sensitive musicians, and even, perhaps, I, would be able to spot the difference. However, the fact remains, as Mr. Alldis has pointed out, that no-one has, to his or my knowledge, actually done it.

As McCarthy points out, good composers had a good understanding of all this, which is why they write as they do in the keys they do. (Presumably, of course, they usually acquire their knowledge by long experience of careful listening.) Bach, in his cello suite number 5 in C minor, even specified that the A string be retuned to G, in order to get the sonorities he wanted.

In short, string instruments do have certain "home" keys, and there are other such instruments, notably brass.

Given all this, what's the position with orchestral music? Well, orchestras are made up of strings, brass and other instruments. So I think you could make a case that pieces would sound different in different keys (apart from the pitch, I mean) but, again, you'd have to do the experiment to be sure.

**D.G. Colquhoun
Marrickville NSW**

Reference: A.L. McCarthy. On Resonances and the Violin Family, II: The Diatonic Scales, Coupled Resonances and Vibrato. Flinders University of SA School of Physical Sciences, FUPH-R-184. July 1982.

Pleiades

A question that has always intrigued me and one that I have posed in this magazine more than once is “Why do New Agers and UFOnuts insist that they are in touch with beings from the Pleiades? And isn’t that an extremely unlikely place for inhabited planets to exist. So I called up astronomer, Dr Duncan Steel on Internet for an answer, and here it is.

Barry Williams

Pleiades? There’s something funny going on there, I’m sure. For example, in English we call them “The Seven Sisters”, whereas the Japanese for them (in the Latin alphabet) is “Subaru”, as in “motor car.” And if you look at the symbol on the back of every Subaru car, there are only six stars. This obviously proves that the Pleiades are not members of a distant star cluster at all, but actually a formation of gigantic spacecraft close by the Earth, such that perspective effects mean that from Europe, North America and Australia one sees seven, but only six from Japan.

Ah, but you did ask for my professional opinion, and not the ravings of a loony. As you surmise, the Pleiades would be one of the least likely places that one might expect to find life, intelligent or not. The cluster is a group of mainly B-type stars (there are also some fainter A- and F-type stars), and that means that they are hot and young. Such stars tend to be much more massive than the Sun, and thus evolve very quickly, time-scales for their evolution being counted in units of ten million years (whereas for solar-type stars the units are tens of *billions*). In the case of the Earth, it took about 500-700 million years for things to cool down enough in the solar nebula, and big planetesimals to stop hitting the

I Want to Know

In which Skeptics can seek information from informed readers, or provide answers to questions posed by curious readers

Earth, for life to proliferate here. In the case of a B-type star it would have evolved and gone supernova (bang) before such a time had expired, so that even if there were planets formed with the stars it seems unlikely that any form of life would be able to form/evolve before it all fried up.

I must not leave you without a proper explanation for the Seven Sisters/Subaru symbol conundrum. It seems that although six stars are now easily visible with the naked eye (Alcyone, Maia, Atlas, Electra, Merope and Taygete), in the past a seventh (Pleione) might well have been brighter than it is now (hence seven visible). Mind you, since the Japanese have had a civilisation which has continued for longer than ours in the west, especially with regard to astronomical records, one might have anticipated that we would call them the Six Sisters, and they would have seven stars on their automobiles.

(Dr) Duncan Steel
Anglo Australian Telescope
Coonabarrabran NSW

Titanic

I have been reading Darryl Reaney’s book, *The Death of Forever*. In it he claims to have an authentic instance of precognition, where an author, Morgan Robertson, in 1898 ‘predicted’ in a novel, *Futility*, the sinking of the *Titanic* in 1912. Mr Reaney then speculates that this author may have been receiving “messages from the future”.

I wonder if you could include this in “I Want to Know” in the next issue and perhaps furnish an assessment of whether this is an instance of genuine precognition, or whether we have yet one more gullible author. If, as I suspect, it is the latter, then it is a shame, as the

book has otherwise quite a lot to recommend it.

Charles Nagy
Sth Yarra VIC

Martin Gardner, in *The Wreck of the Titanic Foretold?* (Prometheus, 1986), makes a plausible case for this being an example of selective presentation of data.

He includes the text of the original novel, and a number of other items from the same era about ships striking icebergs in the Atlantic. He pointed out that the fictitious *Titan* and the real *Titanic* were typical in size and speed to the vessels that were being built for the transatlantic run at the time and that the possibility of large and fast ships hitting icebergs was being seriously considered by maritime experts.

Some of the ‘facts’ in the novel and the facts of the Titanic wreck are similar but a lot more differ considerably. The only real coincidence is in the names of the ships, thus a myth arose (if Titanic’s sister White Star line ships *Britannic* or *Oceanic* had been involved, the myth would probably have been less persuasive).

This story should be considered in the light of the sort of predictions psychics make about earthquakes in California; sometime they will be right, but they have been wrong many times. I suspect it does not differ in effect from the person who visits a clairvoyant and remembers the hits and forgets the misses - a selective use of data.

Of course it may be true that Robertson had received messages from the future; there is no real way of checking the facts, but a small application of Occam’s Razor would urge caution in believing that this was the case.

Ed

TECHNOLOGY

The Skeptic BBS

Alynda Brown

The Benefits of Technology (or something else to be sceptical about)

No you haven't escaped the computer age because now the Australian Skeptics have a Bulletin Board Service on-line.

Run in two parts these two boards will launch the Skeptics kicking and screaming into the late 1990s. The Skeptic 1 is located in beautiful downtown Randwick and will operated during business hours. The Skeptic 2 situated in Bowen Mountain, which is more like an eastern suburb of Perth for those of us who have to drive here, will be open 24 hours.

If you like a good argument (and if you say you don't I won't believe you) a BBS is a wonderful arena for these types of discussion. A computer Bulletin Board operates just like a bulletin board in an office. You can post messages which can be either public or private. You can carry out the most vitriolic of arguments without worrying about the other person decking you. You can run discussions on just about anything as there is the capability to hold hundreds of different discussion areas.

There will also be some file areas available. This won't be a games board because there are plenty of those around. You will however be able to get your nearest nerdy friend to download some communications software for you to set up your modem along with other computer utilities which you will find handy.

Don't feel daunted by the concept. You'll find that the BBS community is extremely willing to help new users. When you log onto a BBS you will see a series of menus where you can choose the section you want. On all menus typing the letter 'C' will sound a bell on my computer. If I'm home I'll come and give you a hand or a quick tutorial if you need one.

What Will It Do For Me? (or something to be happy about)

One of the most important aspects of the BBS is that you will be able to send any articles you may have written for The Skeptic to the BBS which may then be sent to the editor. Just write your article and save it as a text file. Then upload that file to the BBS. A text file goes through faster than a fax. Thanks to the wonders of modern technology your article will then be sent to the editor.

The first time you log on you will need to fill out a quick questionnaire. This is so that I can verify that you are who you say you are if I should get suspicious. You also enter a password so that no one else can log on as you. You won't get the questionnaire again so just be patient.

After the questionnaire you will see the news bulletins. On subsequent log ins this is the first screen you will see. This is where I can put the latest skeptical news. This will be for things like upcoming TV and Radio appearances of our distinguished members, book releases, newspaper articles etc. I have to put these in so if you have information then leave me a message.

Message areas are being set up and a FIDO NET facility enabling mail and messages to be sent and relayed

to BBS around the world, but we will see if we can't get the Oz messages first.

The sysops are new to the game and are still learning, but teething problems will be worked out as the boards are used. The hours are fluid at present, but we will see what happens after the first few weeks. We will keep users and all Skeptics posted as things progress.



Skeptic 1 BBS (02) 519 5827
Sysop John Hansen
Modem speeds up to 9,600 baud
Hours 9am - 6pm 7pm - 11pm

Skeptic 2 BBS (045) 72-1790
Sysop Alynda Brown
Modem speeds up to 14,400 baud
Hours 24 hours

WA Skeptics Notice

The WA Branch will hold a meeting on Tuesday, March 28, at 7.30 pm. The venue is Grace Vaughan House, 227 Stubbs Tce, Shenton Park.

The speaker will be Roger Summers, a psychology graduate, who will speak about his personal contact with a Near Death Experience.

The new address for WA Skeptics is PO Box 899, Morley WA 6062 and contact numbers are 275 5422 or 276 5568.

Stop Press

The NSW Teachers Federation journal, *Education*, March 1995 edition, has sounded a warning to teachers in NSW State schools about visits to their areas from the Creation Science Foundation's Creation Bus.

This vehicle, mentioned in these columns in the past, and loaded with films, videos and other items of creationist dogma, has been travelling around Australian rural areas, peddling their anti-science propaganda.

Teaching creation 'science' is illegal in NSW State school science classes.

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A *Current Affair* (9 Network) on Feb 28, ran an item on 'clairvoyant' Tom Wards. Wards had visited the Victorian town of Corio and had given virtually identical readings, including the same 'lucky numbers', to five different women. The problem was, as is common in country towns, the women knew each other and exchanged notes.

We hate to say "We told you so", but Wards was our very first Bent Spoon winner, in 1982. Seems he hasn't improved since.

If we know that country folk tend to know and talk to each other, one would think a clairvoyant would.

About our Authors

Alynda Brown, who lives in semi-rural NSW, studied music and runs a computer business, as you can tell by the language she uses.

Prof Nikolai Bogduk is Professor of Anatomy at the University of Newcastle. His own neurosis is the resentment that while he invested so much effort in becoming a medical scientist and pursuing the truth, others simply peddle for profit ideas that they made up over night with no conscience about the veracity and reliability of those ideas.

Scott Campbell is at the School of Philosophy at UNSW. He is shortly leaving to take up a post as Visiting Scholar at Oxford (where he will undoubtedly unlearn how to play cricket).

Steven D'Aprano has a BSc and a \$23 DD and would like to scotch any rumours about him (except perhaps the one about the ferret). His ambition is to have a disease named after him.

Harry Edwards, scourge of psychics, is one of the first Australians to receive an eight digit phone number. He is consequently extremely difficult to contact.

James Gerrand is an aviation consultant and is a former Secretary of Australian Skeptics. Despite this, he is a nice bloke. Jim Goulter lives in Northern NSW and is doing a course at Southern Cross University. He denies it is a course in Natural Therapies and we believe him.

Dr William Grey, peripatetic philosopher, is currently basking in the sun at the University of Queensland where he teaches courses in professional and applied ethics — including 'Science and Ethics', which attempts to provide remedial virtue for the morally challenged.

Geoffrey Guilfoyle assures us he is dull and boring, which, he asserts, admirably qualifies him to work for an accountancy firm in Melbourne.

Peter Johnson, cartoonist and Adelaide resident, denies he had anything to do with the recent crop circle in that city. We think he knows more than he is letting on.

Dr Colin Keay is a retired astronomy professor, which means he now only looks at stars for fun. In his spare time, he keeps the Hunter Skeptics on track.

Dr Michael Pickering is an anthropologist and works as a Regional Officer with the Aboriginal Areas Protection Authority in Alice Springs.

Roland Seidel claims to be a left handed, right brained mathematician, with a central bias, and who are we to disagree?

Dr Ken Smith is at the Dept of Mathematics at Qld University. A Christian, Ken is a frequent target of creationist attacks, in which he acquits himself very well indeed.

Dr Duncan Steel, of Adelaide University and the Anglo-Australian Telescope, is, not surprisingly, an astronomer.

Andrea Stevenson farms a property in NSW, but has a Victorian Postcode. Such mysteries make life interesting.

Sir Jim R Wallaby is the descendant of a long line (of what, we are not sure).

Dr Tony Wheeler teaches science in Central Queensland. His knowledge of pig sexuality astonishes all who know him.

Barry Williams, writes this column and is far too modest to list his qualities herein (and if you believe that madam, you will believe anything).