SCANDAL EXPOSED: “PSYCHICS” MAKING MONEY BY CAUSING PAIN TO FAMILIES OF MURDER VICTIMS

PET “PSYCHICS”
FROM THE HORSE’S MOUTH

CENSORSHIP
DO NOT READ THIS ARTICLE

PETER ELLERTON
CRITICAL THINKING WINNER

BRAIN GYM
GRAY MATTER NOT EXERCISED

The Curiosity Show Amazes and Entertains at the 2008 Convention

2008 CONVENTION ISSUE

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Cover art by Richard Saunders
I Did it, Somehow

We've all seen it before. It's the farewell party for the retiring 'loyal servant' of innumerable years' service; the gold watch has been presented; the speeches made; strong drink has been taken. It's starting to get maudlin when the Guest of Honour struggles up onto the stage, grabs the microphone, and to the background of Frank Sinatra spinning in his crypt, he launches into his unique rendition of My Way. I'm not going to do that, but I hope you'll forgive a little self-indulgence as I write my last Editorial.

Simple maths tells me that I have written 75 of them since I became Editor, but I was writing them before I took over, so as it is too difficult to go through all those old magazines to find out exactly how many, perhaps you might indulge me in my cricket-related fancy, that it probably numbers 87 in all. And every one of them drew sweat and tears, if not blood — it has been the hardest part of the job, by far.

A nostalgic look at our history through snapshots and personal observations.

Had I not been watching TV one night in 1979, I would not have seen Dick Smith talking about the need for a skeptical group to investigate implausible stories about pseudoscientific subjects. Had I not seen him, I would not have written to him, telling him I wanted to join. Had I not written, he would not have conveyed the message I might never have heard of the Skeptics, or I might have noticed it as another of those many worthy organisations that I haven't bothered joining. By the concatenation of such unlikely coincidences are lives irrevocably changed.

Our very first National Skeptics Convention was held in Sydney in 1985, with crews from four of the five TV networks there to cover it. If we never again achieved that level of media interest, it did set a trend that led to the 23 subsequent and successful annual conventions in every state capital (apart from Perth) plus Canberra, Newcastle and the Gold Coast. It is my proud boast that I am the only person to have attended every Annual Convention and I have loved them all.

The Third World Skeptics Convention, in Sydney in 2000, with the chance to meet Paul Kurtz, who started the modern Skeptics movement, and many other leading Skeptics from around the world.

Meeting James Randi for the first of several times, during his visit for the notorious Carlos hoax he organised. Meeting and hosting Richard Dawkins and his wife Lalla on their visit for a Skeptics Convention. Years later having dinner with Richard and Lalla at their home in Oxford.

Over the years, my Skeptics involvement has led to my meeting many people I would otherwise only have admired from afar. I also once met Uri Geller, who tried hard to convince me he was fair dinkum. He failed.

My very first on-air media interview about the Skeptics was with Pru Goward (now a NSW MP) on ABC Radio 2BL. Over 30 years I have done hundreds of media interviews and have enjoyed most of them, but curiously I can't remember my first TV interview.
Taking over the responsibility for editing *the Skeptic* from Tim Mendham in early 1990, when he suddenly resigned. Talk about non-plussed; where could I find another experienced editor in a hurry? Tim’s suggestion that I do it, set me back on my heels. I had no experience at all, but there was a magazine to produce and not much time, so I agreed to do just one issue, with the understanding that someone else would be found to take it on as soon as possible. And here, 19 years and 75 issues later, someone else has been found. I know that Karen will do a great job and I certainly hope she will have as much fun doing it as I did.

Looking back at 30 years of active Skepticism and almost 20 of editing, there are a number of things about which I feel pleasure and a certain degree of pride. It has always been my aim to make *the Skeptic* into a journal of which we could be proud. With the assistance of lots of people who knew what they were talking about, I feel that we have gone a long way towards achieving that.

Upgrading the appearance and layout of the magazine, has been a constant theme; when I compare the first issue I edited with this one, that improvements is manifest. But a magazine is not just paper and staples; what really counts is what it contains. The aim has always been to broaden the range, quality and number of contributors; history shows that this also has been a pretty successful endeavour.

Receiving a solicitor’s letter is always a cause for concern, but the one in 1994, telling us that we had received a bequest in the will of Stanley Whalley of Noosa, was anything but. A million dollars has benefited our organisation in many ways over the past 14 years, not least, from a personal viewpoint, that it has allowed me to spend the past 12 years as a ‘professional Skeptic’.

With the Skeptics as an organisation, I have always felt it important that we retain a politically non-partisan stance — skepticism is a way of looking at things, not an ideology. Our targets have been specific issues, not causes. And Skeptics come in all flavours.

When I look around at recent Skeptics gatherings, there are noticeably more female and younger people present than had hitherto been the case. That has been a most gratifying confirmation of our aims to broaden our appeal outside the “bearded old blokes” image that Skepticism had acquired.

One benefit of this younger participation has been their easy familiarity with new technology. Among those leading the push is Richard Saunders, met by chance at the World Convention. Thanks to Richard’s skills we produced the world’s first Skeptic CD, our annual conventions have come to life on DVD, and much more.

Two maxims have always guided my approach to my role as a Skeptic — “always take the task seriously, but not yourself” and “everyone has the right to believe what they like, but they have no such right to be taken seriously”. Moreover, I am convinced that one of the most important attributes for a Skeptic is a sense of humour, and I must add that a sense of the absurd is pretty handy as well.

I have mentioned just a few of the many fine people I have met through my long association with the Skeptics — I’d like to mention many other people whose counsel I have valued and who have made my job easier, but it would fill too many pages of the magazine.

However, I must mention with gratitude you, our growing number of readers — without your loyal and enthusiastic support it would all have been pretty pointless. It has been both a pleasure and an honour to provide you with whatever service I have managed. I thank you for your friendship, loyalty and interest. I can now revert to my amateur status with every confidence that the Skeptics is in safe hands, and with the hope that somewhere along the line, I have made a difference.

Thank you and farewell.

Barry Williams

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Around the Traps

As it's a time of renewal all round, and as we have no idea whether the Bunyip's contract will be renewed under the new regime at Skeptics Central (we don't have photos of the new Editor consorting with an underage goat, for a start) some reminiscing seems to be in order.

After years of looking at the more weird manifestations of the human propensity to believe almost anything, which ones have stood out as the most egregious examples of irrational perversity? It's not easy to choose, but here are some of them, in no particular order.

**Crop circles.** If there was ever a competition to find the most ridiculous fad to attract serious interest, this one would have to among the unbackable odds-on favourites. Yet plenty of people did take it seriously, speculating about what it all meant. Possibly messages from higher intelligences (who appear to have achieved space travel and invisibility, but not the ability to communicate in a language anyone understands).

**Breatharianism.** There have been people who have survived without food for some length of time, but only for a limited time, and then they die. In parts of the world that is all too tragically common. Why someone would decide to make a cult out of it, boggles the sane mind.

**Spoon bending.** Why do people think this is mysterious? Why do people want to bend spoons anyway?

**Alternative and complementary medicine.** Self-prescribed remedies for self-diagnosed ailments. Not to be confused with complimentary medicine, ie, someone saying, "You are looking well" and then you feel better.

**Earth rays.** Entirely undetectable radiation, presumably harmful, that has even caused hospitals to change their layouts in some foreign lands.

**Feng shui.** Interior decoration with faux mysticism added.

**Iridology.** A diagnostic tool with precisely no predictive (or diagnostic) ability.

**Homeopathic vaccination.** Homeopathy itself is ridiculous, but this version has the added attraction of being positively dangerous, especially if you are planning to visit a yellow fever area.

**Alien abductions.** Carried out by denizens of Betelgeuse IV, who have an unhealthy interest in the human fundament.

**Hail cannon.** Aiming bangs at clouds to stop hail forming. If thunder doesn't do it, why should this?

**Creation science.** The theology of God the Conjurer, capable of pulling fully functioning universes out of His Hat.

**Astrology.** The whole Universe is worried about my career and sex-life.

**Moon landing hoax.** The conspiracy theorist's conspiracy theory. This one vies with the “9/11” and the “Kennedy Assassination” conspiracies for “the most portentous claim based on the least evidence” accolade of all time.

I'm sure I've missed some of your favourites, so write and tell the new Editor about them. She is as wise as she is beautiful (if blackmail is not available, try flattery).

Ciao for niao.

Bunyip

We note with sadness the recent passing of two long-time and committed Skeptics. Sydney Bockner from Adelaide, was a distinguished psychiatrist, and Alan Towsey from Tahmore, NSW was a retired headmaster and accomplished linguist.

Both had contributed articles and letters to the Skeptic over the more than 20 years they had belonged among us and although I had only met Sydney on a couple of occasions, I more frequently came into contact with Alan. Both had provided me with advice on their respective areas of expertise over the years, and their wisdom was much appreciated.

Both men lived full lives into their early 90s, but the death of good friends always comes too early. Our sympathies go to their families.

Barry Williams
Not-So-Flash-Williams

Faster than a speeding deadline...
More powerful than a local mentalist...
Able to leap faith in a single bound...
Yes its Not-So-Flash Williams...
Strange visitor from the same planet...
Who came to Earth with powers and abilities much the same as other men...
Not-So-Flash Williams...
Who could change the font of mighty essays...
Bend spoons with the aid of Richard Saunders...
And who, disguised as Barry, mild mannered editor of a too often overlooked but much loved rag, fought a never ending battle for truth, justice and the vigorous application of the methods of science to navigate the treacherous straits between scepticism and credulity.
He came, he scanned, he set a lot of type.

Out With the Old

In With the New

Is-It-Any-Wonder-Karen

Ready to battle the Forces of Darkness with her Lasoo of Truth and Keyboard of Exposure.
Go forth unto this waiting world with pen in hand
A new journey to be started.
A new promise to be fulfilled.
A new page to be written – and edited – and spell checked...

This encomium was penned by author, playwright, cartoonist, comedian and life-long Skeptic, Paul Livingston, under the influence of his muse, Flacco, whose musings tend to a) a... or b) b... ...muse his listeners, depending on their state of sobriety.
Few real-life murder mysteries have captured the public imagination as have Perth’s so-called Claremont serial killings, a series of abductions and murders of three young, blonde women, last seen leaving up-market suburban nightspots in 1996 and 1997.

The crimes caused untold grief for those left behind. Eleven years later the unsolved cases still inspire waves of media publicity, and recriminations.

Unscrupulous psychics have made the crimes their own hunting ground, so much so that on September 27 this year, three psychics decided to join forces to capitalise on public fear and curiosity for entertainment and profit. For good measure they threw in the names of a couple of other young women who had disappeared in Western Australia over the past 20 years.

What they evidently forgot, or didn’t care about, was that standing behind each young woman whose name they hyped was a legion of family and friends who found distressing this attention at the level of a carnival side-show. The so-called psychics, familiar to many Skeptics, melodramatically named themselves the Psychic Task Force.

They were Scott Russell Hill, who modestly bills himself as the world’s most accurate psychic; “ghost whisperer” Anthony Grzelka and spirit medium Deb Malone, who is regularly gifted credibility with invitations to appear on high-rating television programs such as Channel Seven’s Sunrise.

The Psychic Task Force members promised to use their combined paranormal powers for a live investigation into the Claremont serial killings, bait that was apparently irresistible for a mostly young audience that filled the 2,300 capacity Burswood Casino theatre twice over at a ticket price of $135 a head.

Listeners to Perth’s local Nova radio station could not swipe their credit cards fast enough after Scott Russell Hill of Sensing Murder fame, and a former radio jock, went on air to demonstrate his so-called powers, and sweep this vast audience towards the Burswood on the crest of his psychic wave.

Email campaign

After the stage show, a long and excitable anonymous email spread like wildfire through Western Australia’s vast Internet social network.

It warned young women to be on the lookout for a man whose identikit allegedly unfolded on stage from the visions of the psychic taskforce, his image projected onto a big screen, while the Task Force sat beneath the picture churning out grave “facts” that police running Australia’s most expensive murder investigation had failed to uncover.

The success with which this hokey act preyed on the fears and
gullibility of its audience jumps off the computer screen in some of the extracts reproduced below.

**Gullibility manifest**

They depressingly show that skeptics still have a lot of work to do among the under-30s, the target Nova FM audience:

*I have just seen the most amazing show... and have just seen the face of the Claremont serial killer - if he crosses my path I will know him in a heartbeat!!*

The show was by 3 psychics who have done an AMAZING investigation into the Claremont killings. And the information was too incredible not to pass on.... oh and by the way - he is planning on striking again very soon so make sure you let as many females know this info as soon as you can.

So.... the killer is about 35 years old now, possibly as old as 40. He has been killing for quite some time — the Claremont girls were not his only victims. In fact if you remember Julie Cutler and Hayley Dodd then you will already know he was operating well before Claremont.

The psychics know where Sarah is located but it is going to be difficult to get her remains as they are underneath limestone in Henderson. This area was redeveloped very soon after he hid her body there — in fact he knew this would happen as he works in the area.....

So things of interest — this man is not a taxi driver, he actually drove a blue Ford Falcon (can’t remember the exact model as I am hopeless with car shit!!) and he definitely knew Sarah — that is why she got into his car. He was a casual friend of one of Sarah’s friends — that is why she trusted him despite not knowing him well.

The psychics also have the name of this friend and they can use this to verify the information to the Police. He is very clever, cold and calculating — everything was well planned and he went out knowing exactly what he was going to do and how he would make it happen. He had a plan.

*She was actually taken from a car park behind Club Bayview — as was the case with Jane and Ciara. This guy picked these girls because of their hair — and he has kept their hair as trophies. He interacted with these girls before taking them AND YES he is the man on the CCTV vision that has just recently been released — and yes he was talking to Jane on that footage. I had a really good look at an identikit picture of this man. He is of Mediterranean or Italian background. He has dark hair and dark eyes. I felt absolutely sick when I looked at him and as the violence escalated with each girl. Sarah was still alive when he took her to Henderson — she actually tried to make a run for it when they got there - but to no avail. He is driven by issues with his mother — whilst she did not physically harm him, she put him down a lot and he suffered mentally at her hands. She did this because of issues with his father. He has an inferiority complex and this is why he goes after the high class girls — when they reject his offers they are signing their own death certificates.*

Personally — I have no doubt that Sarah is talking from beyond the grave and she has tried to make her efforts known by linking in to high profile media personalities like Scott Russell Hill. She has timed it to coincide with all the latest hype about Claremont - particularly with the release of that footage not so long ago ...

*I think these psychics have absolutely nailed this case — they have really detailed information and it will be easy for the Police to validate if it is real or not.*

Needless to say, the killer has not struck again, and nothing the Psychic Task Force “revealed” has led to any perpetrator being identified. In fact police said it damaged their investigation.

They do not even know for sure that the three Claremont victims were abducted by the same person.

**Obvious question**

The obvious question arises: If the psychics know so much about the murders, why not go straight to the police? Why did they feel the need to first expose all this personal, gruesome and possibly vital information before a paying audience?

Apart from the obvious advantages to their bank balances, they must surely be aware that no psychic, anywhere in the world, has
ever provided vital information that led police to solve a crime. The dismissive attitude of police is outlined in the author’s *Murder and Clairvoyants*, published in *the Skeptic* in 2004 (24:1).

One can only imagine the feelings of the relatives when they heard of the Psychic Taskforce’s babbling about the manner in which these poor women died.

Briefly, the tripe outlined in the email is a mish-mash of publicly know facts, rumour and speculation about the murders that have been swirling around Perth for 12 years.

**Bad slip-ups**

But the psychics took a big risk when they clearly channelled the outer lunatic limits of Google rather than the spirits of the deceased women. Here is where they badly slipped up:

Bodies of two of the women thought to be victims of a Claremont serial killer were discovered and minutely examined by pathologists in the usual way. Police know exactly how the women died and how they were treated. But police investigating this case threw up a cloud of secrecy around the entire investigation. All police involved in the task force were made to sign secrecy oaths. Very few details of the crimes were made public.

When secrecy is imposed, speculation thrives, and rumours, dangerously inaccurate, were rife in the community, even making their way to schoolyards and fringe Internet sites, an easy resource for any psychic looking for sensational material.

**Rumour and speculation**

Ten years ago, the rumours and speculation about the state of the bodies became so bizarre and persistent that despite their obsessive secrecy, police were compelled to go public with a statement about what had NOT happened to the bodies of the murdered women.

The visiting psychics evidently missed or ignored this fact as they trawled Perth folklore.

**Outrage and disgust**

Don Spiers, the father of teenager Sarah Spiers (18), abducted from Claremont, reacted with outrage and disgust to the show and the email. His daughter’s body has not been found.

His harrowing, tearful experiences were outlined in the article *Murder and Clairvoyants*. He said for years he listened to psychics because, clinging to every thread of hope, he worried that a person with real information might be coming forward posing as a psychic. He has since revealed he suffered depression as a result of his many fruitless searches, some seven hours’ drive away, while acting on psychic “certainties”.

“Psychics just want to make money from other people’s grief and misfortune,” Mr Spiers was quoted as saying.

The Burswood event was about “profit-making, not solving the case”, he said. “It upsets me that they are still trying to gain from the death of my daughter and the other girls after all these years.”

**Another tragic case**

One of the extra names the team gratuitously threw into their three and a half hour stage show, supposedly a victim of the Claremont killer, was that of Hayley Dodd, a 17 year old who was far from home when she disappeared from the farming locality of Badgingarra north of Perth in 1999.

She too has a mother, father, family and friends. When Margaret Dodd heard that the name of her daughter, who is presumed to have been murdered, had been raised during the psychic show she was more than curious.

She grimly noted that the psychics had got wrong the order of the disappearances of the young women. She recalled that she had previously emailed Scott Russell Hill for help after seeing him on his laughably transparent television show *Sensing Murder*. He never replied. That’s why I was so angry they could use Hayley in a moneymaking show, Mrs Dodd said.

Here he was, up on stage, making money out of other peoples’ suffering. It’s hurtful. Now there’s this long email about the show circulating with Hayley’s name in it. That’s how we found out that they had been using her name to make a buck. I cried all over again.

Margaret Dodd is no stranger to the extra pain that so-called psychics inflict on the families of murder victims. From the time Hayley disappeared, Mrs Dodd was plagued with psychics who claimed to be in contact with her daughter.

One stumbled badly, starting her cold reading with two spectacular misses.

The psychic said Hayley’s spirit had sat in her kitchen and eaten breakfast, Mrs Dodd said.

She said Hayley loved Vegemite toast and really wanted to get her driver’s licence.

But we’re from England. She hated Vegemite and already had her licence. The psychic was just guessing.

Despite living daily with the tragedy of the loss of Hayley, Mrs Dodd has retained her feisty sense of humour.

*It’s amazing how many people are psychic in this world*, she said, her voice heavy with irony.

She now has two phone numbers, one listed and one not. When the listed number rings, she steels herself to tackle another psychic.

*When one has nothing, one tends to grasp at straws, no matter how obscure they may be*, she said.

Mirroring Don Spiers’ experience, psychics had sent her on tearful searches of bush near Moore River and other far-flung locations half a day’s drive away, all to no avail.

Another psychic who charged $30 for a reading said that Margaret was an aristocratic French woman who had been beheaded in a previous life. She then fed Mrs Dodd distorted versions of information that had been published in the press about her daughter’s case.

**Continued p 16 ...**
The Australian Skeptics Annual Convention Dinner, held in Adelaide on Saturday, October 11, saw announcement of the winner of the third Australian Skeptics Prize for Critical Thinking. The winner, Peter Ellerton, a science and philosophy teacher from Queensland, was presented with a cheque for $10,000 and a certificate. The following paper describes the ground-breaking work Peter has been doing to further the education of our children.

I have been a teacher of science and philosophy for many years in Queensland schools, am currently Head of Curriculum at Calamvale Community College in Brisbane, and in 2004 became the Queensland Studies Authority panel chair for the senior subject Philosophy and Reason, which has been taught in one form or another since 1911. At this stage about 9 schools in Queensland taught the subject and my role was to moderate all assessment across the state and to ensure standards were consistent between schools (while teaching it myself). I became convinced of the effectiveness of the course in developing critical thinking skills in students and my position allowed me to collect data on a large scale to support this. I therefore decided to do what I could to further promote the teaching of critical thinking in schools and to make it easier for teachers to establish and maintain courses in this area.

I began by establishing a network of teachers throughout the state who taught the subject at the senior level. Through this network we shared resources, assessment, ideas and projects and helped raise awareness of the potential of the course. The network quickly extended to include academics, state education representatives and teachers from other states. I also undertook a public relations campaign to increase the profile of teachers and schools who were involved in the project, and to promote the benefits to students who took these courses. I approached Alan Saunders from Radio National's Philosopher’s Zone, who was keen to interview me on his program.

Shortly after this I published an article in the Skeptic entitled 'It's Logical to Teach Philosophy' wherein I again extolled the virtues of teaching these skills and outlined some current efforts to expand this in QLD and across the states. The number of schools now offering the subject has grown to 15 since I began this project. It became apparent that demand for this subject was rapidly increasing and I was approached by a software engineer who had heard the broadcast and offered his services in whatever capacity might be useful. The interview had
been replayed earlier this year and
more enquiries were forthcoming
from Australia and from overseas. I
decided to increase the efficiency of
my efforts and established the
Australian Philosophy Teacher’s
Network and a website that was
able to grow to meet demand and to
bring key players across the country
together to discuss issues and freely
share ideas and resources. I con-
tacted people such as Professor Alan
Tapper and Dr Stephan Millet in
WA, Dr Phil Cam in NSW, Dr Gil
Burgh in QLD, Dr Sue Knight and
Carol Collins in SA, and other
academics, as well as classroom
teachers, publishers and people with
an interest in the process.

The website (www.pactiss.org) was
launched in July of this year
and was named PACTISS.org, for
Philosophers and Critical Thinkers
in Senior Schools. It comprises
hundreds of teaching resources
brought together in a sophisticated
content management system that is
fully searchable and organised in
several systems to maximise index-
ing and location of resources. Sylla-
bus materials from all the states
currently involved are provided, as
well as RSS feeds from many
skeptic, philosophical and scientific
organisations. In the short time it
has been live, the site has had over
5000 visitors from over 70 countries,
with an average time on site of over
7 minutes. It also has the advantage
that not only can anyone download
for free, but anyone can upload
material and share through a very
simple registration process that is
also completely free. It is important
to realise that no one is making any
money here and the entire project
has been put together without
charging anyone for anything. I have
contacted several people/organisa-
tions and sponsorship of the website
also looks likely in the future. As
this project has progressed, interest
has grown from several areas, and I
have promoted articles in Education
Queensland’s in-house magazine Ed
Views on Philosophy and Reason,
and there was a feature article
entitled ‘Just Think — It’s Impor-
tant’ in the education section of the
Sydney Morning Herald education
section recently.

What can be done?
There isn’t a school or university in
the world that doesn’t claim some-
where in its promotional material
that its students will become critical
thinkers. Ask them to point to the
bits in the courses that achieve this,
however, and the conversation
becomes a little vague; general
harrumphs and claims of ‘embedded
across the curriculum’ abound,
usually with some discussion of
Higher Order Thinking Skills
(HOTS for those not used to edu-
speak) thrown in. The sad truth is
that not much is done in many
places to accomplish this as an
explicit outcome. Let me use that
word again — explicit. You see,
rather oddly, it is not always as-
sumed that the best way for stu-
dents to understand something is to
teach it to them. Explicitly teach it.
There it is, that word again. Let me
explain.

We have all learned about math-
ematics in school, and we have all
been exposed to some science and
history as well. So how many people
can clearly state the difference
between deductive and inductive
reasoning? How many know which
can be used when? What are the
strengths and limitations of each
and how does this apply to these
areas (Maths/Science/History/etc.)?
How can we determine the reasona-
bleness of an argument using these
ideas? My point is that the questions
I have just raised form part of a
large arsenal of tools that we need to
do this critical thinking stuff prop-
erly, and yet we are not taught about
these things explicitly. We are
expected instead to pick them up
while doing other stuff. Kind of like
how the Karate Kid learned karate
while Mr Miagi was getting him to
wax his car. Now, this can work in a
funky, Zen kind of way, but for the
best bang for your buck you can’t
beat explicitly teaching the skills.

In Queensland I teach a subject
called Philosophy and Reason to
students in Years 11 and 12. I’m
going to give an outline of what goes
on in the classroom and how this can
be adapted to form the basis of any
class in critical thinking, clear
thinking, rational thinking, or any
other way you might care to label it.
The stuff I present here is very
general and could be adapted to
almost any year level, some of it
even at Year 1. And, I have to tell
you, it works just great on adults as
well.

Just about the first thing of which
we need to make students aware is
the difference between an assertion
and an argument (I will include as
assertion all types of denial, since
the statement ‘dinosaurs did not live
before people’ is logically equivalent
to ‘dinosaurs coexisted with people’
— the latter a denial and the former
an assertion). This is not as simple
as it seems. Obviously one is just an
unsupported statement and the
other a justifiable conclusion, yet if
only the conclusion is presented, it
can be hard for the student to
understand which one is being
delivered. For example, the state-
ment ‘science cannot be relied upon
for truth’ may be either, depending
upon the background, context and
intent of the speaker. So we need to
train students not just to recognise
this in others, but to be wary of
expectations that they should be
believed because they assert some-
thing is true. One’s conviction of
belief is meaningless unless backed
up by a reasoned argument.

I must confess here to a delicious
and possibly malicious pleasure. In
some of my classes I have asked
students to complete a survey in
which they are to agree or disagree
with a number of statements,
including one which claims that
‘everyone’s views should be re-
spected’. I am happy to report that
the general response, very positive
initially, usually changes to the
negative. I do enjoy making it clear
to students that, while we may and
should respect people, respecting
their views is another thing entirely. Something of a creed in the classroom is that if all views are equal then all views are worthless. Teachers aren’t supposed to do that, but then maybe that’s part of the reason for the educational quagmire in which we find ourselves. Naturally then, we need to determine how to judge and construct arguments, and here is the first tool in the tool box.

**Deductive Logic**

Here is a nice deductive argument:

*All gronks are green* (premise one).

*Fred is a gronk* (premise two).

**Fred is green** (conclusion).

We can use this to understand that the strongest type of argument is a deductively valid one, but first let’s explore our argument structure. Firstly, we have statements we presume to be true for the purposes of our argument; these are called premises. If we can agree on the premises, then in a true deductive argument there should be no dispute about the conclusion. In the argument above there is no way that the premises can be true and the conclusion be false. It is not a matter of opinion that Fred is green — if you think he is not green (and you accept the premises as true) then you are wrong.

Now, if all arguments were deductive, it would seem the world would be black and white (except for gronks...). Surely the truth of all things would be clear. Unfortunately the solid outcome of a deductively valid argument can be mimicked very easily and things which seem ironclad in their conclusion can be seen to be very shaky. This is a favourite trick of politicians, the ID movement and other snake oil salesmen.

Consider this convincingly put deductive style argument:

*Homosexuality is unnatural* (premise one).

****** (hidden premise).

*Homosexuality is wrong* (conclusion).

There are two shifty aspects to this example. The first is that the second premise is not expressed in the argument. This is not uncommon. Of course it’s not too hard to guess what it is — yes ‘unnatural things are wrong’ fits neatly in the slot. Usually, if a premise is very weak, it is deliberately left out of the structure of the argument. If you were ignorant of biology and of the many examples of homosexuality across a wide range of species, or if you believed it a purely cultural phenomenon, then you might be swayed to accept the conclusion since you accepted the premise. However once it becomes clear that to accept the conclusion also means accepting the second premise, the whole argument seems foolish indeed. Unnatural things are wrong? Polyester is evil? Vaccination is morally rotten? Digital watches are to be spurned as chronological corruption? The hidden premise and the lure of deductive certainty is a trap to be avoided. Always consider what premises you must acknowledge if you embrace the conclusion.

So, that’s deductive logic. Mathematics is defined by it (1 + 1 = 2 is one of the many premises on show) and yet the teaching of mathematics does little to develop an understanding of deductive logic and its uses and limits. I taught maths for years and never mentioned it.

**The Point at Issue**

Before we leave this topic, it’s worth discussing the idea of the ‘point at issue’. This is absolutely critical when engaging in an argument. If you can’t agree about the topic, you’ll never convince each other. Again, the seemingly obvious can be deceiving.

Recently I bought a dress for my fairy-mad, three year old daughter in the Gold Coast hinterland. The shop assistant, on handing it over, informed us with complete earnestness that it was ‘made by a real fairy’. I was about to open my mouth and question how this could be, when I realised that we were not working the same point at issue. The thing is, she probably defined a fairy as someone who believed certain things and engaged in certain practices (kind of like defining a modern witch). I was imagining some Tinkerbell tailor. We could have had a grand old argument if we had gone off without realising the point at issue was different for each of us.

Same thing with something like cricket. Who is the greatest batsman of all time? Well, until you can agree on what ‘greatest’ means, the argument goes nowhere (The most centuries? The most runs? Best streaker-whacking record? You see what I mean.) Is a foetus human at 20 weeks? Define human. Without agreement on the point at issue the argument should be shut down.

**Inductive logic**

Consider my first premise in the previous section — ‘All gronks are green’ (and no, I have no idea what a gronk is, but that’s not required for the point). How do I know that all gronks are green? Have I seen them all? If so, well that’s OK, but if not, what have I done to come to that conclusion? Welcome to the nature of science.

Unlike most of mathematics, science is essentially inductive in nature, at least the bits that extend our knowledge. Notice that the conclusion that Fred is green was kind of included in the premises of my deductive argument already? I really didn’t learn anything new here, I just extracted the information from the premises. If I want to learn new things, I have to abandon the crutch of certain deductive knowledge and make my own way along the occasionally thin ice of inductive reasoning. This is without doubt the biggest tool in the toolbox. Knowing what inductive reasoning entails and how to wield this subtle, complex and powerful tool really separates the players on the cognitive field.

There is not much of a bridge between the premises and the conclusion in a deductive argument. It’s really more like a deck built out
using the supporting structures of the premises. In inductive reasoning, on the other hand, there can be a long bridge of reasoning separating the premises and the conclusion, and determining the strength of this bridge is really what this bit is all about. Here’s a good example from both my earlier argument and from a classical point of view.

Each time I have seen a raven it has been black. Now, assuming that I have seen many ravens of both genders and in many locations at all stages of their life-cycle I might make the generalisation that ALL ravens are black. Of course, one white (or at least non-black) raven blows that out of the water (this is what is meant by a ‘counterexample’).

In another example imagine I have discovered, while digging, a fossil skull of an organism which fits no contemporary or so far known extinct animal. It has large, pointed teeth and a jaw able to extend through a large angle. I know that animals alive today with these characteristics are predators, or perhaps scavengers, and so I declare *Ellertonius Goldcoasterii* a carnivore. I have used here a simple analogy between existing organisms and my discovery.

Notice that in both the examples above I have extended my knowledge beyond the information available to my immediate senses (ie, my premises). What is really quite shocking is the realisation that ALL inductive reasoning is either analogy or generalisation. Yup, all reasoning chains that extend our knowledge involve constructing generalisation and/or analogies. Know how these work and you have the tools to analyse any argument (given the particular factual background).

How should we understand the Chinese economy? What are its similarities to and differences from the American economy? Would those things which work in America work in China? The argument turns on the strength of the analogy. Intelligence seems to have evolved independently in some form in disparate life forms; octopuses, parrots, humans, dolphins, etc. It seems likely that, if life exists in many other places in the universe, it would also be represented by many reasonably intelligent species.

Interesting generalisation. The periodic table of the elements, in which columns of elements share similar characteristics and physical trends move across the rows and down columns is a triumph of analogy and generalisation in its chronology of discovery and in its overall organisation.

For the teacher, the priority then becomes teaching the particulars of what makes a good and bad analogy or generalisation. Do the similarities in an analogy outweigh the differences? Is the characteristic in question really something that should be generalised? I won’t go into too much detail, suffice it to say that we can spend weeks on these topics and there is no shortage of material to draw upon — from the history of science to current media articles. The world is a veritable ocean of analogy and generalisation, both effective and outrageous.

**Skepticism**

So where does scepticism fit? Well, at a basic level we really don’t need to distinguish between skeptical analysis and clear thinking. In a sense it is unfortunate that it has become an ‘ism’. As some argue that atheism should be an unnecessary term (after all, partly defining someone by what they don’t believe seems a bit absurd — we don’t have a name for someone who doesn’t believe in bigfoot…), so too it seems unnecessary, or should be, to define the process of evidence-based reasoning as anything in particular. What a nice default position that would be. Unfortunately the somewhat whimsical initial use of a term (skeptical, that is) that means ‘doubter’ in the vernacular probably disadvantages us. Still, considering that we need to put a title on the magazine, the name is with us for better or worse.

As a teacher I simply introduce skeptical inquiry (and I try not to use the term ‘skeptical’ without following it with ‘inquiry’ — indicating that it is a process, not a conclusion) as analogous, if not equivalent, to evidence-based reasoning. What then becomes important is developing the process of reasoning to the point where we can classify arguments as one of four types, from strongest to weakest:

- **Deductively valid, inductively strong, inductively weak, and worthless.**

So claiming Fred is green is deductively valid and unarguable from the premises. An inductively strong argument will be one in which the analogy or generalisation is sound, such as ‘the sun has come up each day for the last umpteen years, it will come up again tomorrow”
row’, or that Ellertonii Goldcoatsius is a predator.

Inductively weak arguments include statements like ‘all the parrots around my house are green, so all parrots must be green’ (a rather hasty generalisation) or that ‘my last two dogs were really nice poodles, so my new Rottweiler should be a real sweetheart’ (an analogy where perhaps the similarities do not outweigh the differences).

Then you have the worthless arguments, in which the analogy or generalisation is so bad as to be without value, for example ‘sure he likes dogs, but so did Hitler!’ or ‘platypuses have been photographed in saltwater, so therefore they could have swum to Australia from Noah’s ark’ (no, really, I read this in Creation magazine).

Obviously we are talking about a very broad spectrum of arguments, many of which rely on knowledge of specific content or situations for meaningful discussion to occur. This is not to say, however, that the logic behind the claims must be hidden — though in truth it is a favourite tactic of politicians and technocrats to load so much specialist knowledge into an argument, as to render it entirely opaque to analysis by anyone but their peers.

Many people make this claim about climate scientists (and indeed other areas of science, such as evolution), but it must be said in their defence that you can’t get the message across one way or another without the use of scientific data.

Science

This leads us to the critical notion of whether or not we can trust science as a way of learning about the world. We cannot possibly make informed decisions about the world without some degree of scientific literacy. We may not need to know a lot about science content, but we need to know a bit about how science works. In doing so we cover topics such as developing and testing hypotheses and the difference between a theory and a law, something science teachers (and I’m one) know little more about than the general public. Now, don’t fade on me because I have used terms like ‘hypothesis’ and ‘scientific theory’; sure it puts some people to sleep, but there are few things more central to the major pursuits of skeptics than the understanding of these ideas.

Hypotheses, whether in the natural or social sciences, can be subject to a kind of ‘field guide’ that tells you if you have a good one or a dodgy one even before the verification or experimentation begins. I have five basic characteristics of a good hypothesis for my students to use, these are:

1. Does it explain all the facts? If it doesn’t, it has little value.
2. Is it the simplest of all the available hypotheses (Occam’s razor)?
3. Is it as least simpler than what it tries to explain?
4. Is it in accord with accepted principles outside the area of investigation?
5. Is it falsifiable?

If you answer yes to all, it’s probably a good one, though of course some may not score well on all criteria but still have merit. I usually use it first up to test the hypothesis that aliens cause crop circles. How likely is it that an advanced civilisation travelled halfway across the galaxy to do burnouts in your CornFlakes? Try the steps above for yourself.

This is a great opportunity to discuss pseudoscience in all its glorious manifestations, and also to explain some of the steps. I’ll take the trouble to elaborate particularly on the last step, as it’s often the one that defines a pseudoscience at a stroke.

How often have we seen a psychic move the goal posts during a so-called test of their abilities? Not Harry? Oh, I see, it must be something to do with another H name...’ or ‘the presence of a skeptical mind is clouding my abilities’(very often if we watched Richard Saunders in The One). Essentially what they are not doing is establishing the conditions under which their claim can be falsified. Any good hypothesis should be able to envisage or outline a scenario in which, if outcome X does or does not occur, the hypothesis is incorrect.

Consider evolution. If a fossilised human skeleton were to be found alongside a T-Rex in rocks of the same age then the theory (I’ll use theory instead of hypothesis here, but same idea) would be shattered. Good science, including good sociological science, abounds with examples of falsification. Homeopathy, acupuncture, iridology; well, you get the picture.

This naturally progresses into the idea of scientific theories and scientific laws, and nowhere is the disingenuous statement more brazenly made than in this area. It is possibly the single greatest reason, outside of blind, dogmatic biblical interpretation, that evolution loses traction with the general public and why science is so poorly understood and little trusted. So here is what I tell my students.

Scientific laws are descriptive in nature. They describe what happens but do not necessarily offer deep explanations. For example it is a law of nature that white light that passes through a prism will be refracted into its component colours — into a spectrum. This law makes the observation that the larger the difference in density between two media (say the air and the glass of the prism), the larger the angle of refraction. No explanation is given as to why this occurs.

Another good example is the law of electromagnetic induction. If a conducting wire is passed through a magnetic field then a voltage will be induced in the wire that can then create a current. Similarly, if a wire has a current pumped through it a magnetic field will be created. No explanation, just a description.

A theory, on the other hand, creates a model of the universe (or a bit of it) and tries to understand observed phenomena as a consequence of this model. So when we talk about light being a particle or a wave, and the prism as composed of atoms which interact with the light in certain ways, we create models or representations of reality which we conceptually manipulate to try and explain the laws.

But here is the critical sentence. A theory does not become a law.
They are fundamentally different creatures in most usages. Too often we see science texts in which a hypothesis becomes a theory which, if supported by enough evidence, becomes a law. Why is this significant? Because a theory will never become a law no matter how much evidence is gathered to support it.

Hypotheses and theories can only ever be supported, not proved. Until every experiment is run under every possible circumstance and across all possible timeframes we cannot say it is the truth. As Einstein said, no matter how many times his ideas are supported by evidence, it only takes one negative outcome to prove him wrong, and we can never be certain that this negative outcome is not lurking out there somewhere waiting to be realised. (I have to tell philosophers of science to get a cool drink and calm down at this point, as yes, I have made some brazen simplifications and some artificial divisions. But the thing is the idea works well as a teaching tool and as another ‘field guide’ for critical thinking — so sit down and try not to fume too much.)

So, when we hear, as Ronald Regan famously opined, that evolution is ‘only a theory’, we see the damage that follows. It’s as if it has not passed the test to become a law, or worse, that it is on the same cognitive footing as some vague, hand-waving theory about government conspiracies to sterilise redheads or something just as ridiculous. It’s not just a theory, it’s a theory that’s a solid as they come.

**Psychology**

We really can’t finish a course on critical thinking without discussing the landscape of our own psychology and the thinking processes, both sound and shaky that follow from it.

One of the most enjoyable units I teach is ‘Fallacies of Reasoning’, in which we investigate those wonderfully wonky ways of reasoning that are so beloved by skeptics. Circular arguments, hasty generalisations, *post hoc ergo propter hoc*, etc. The media is awash with them and it seems this is the stuff that stays longest in the minds of students — they often claim that it’s hard to read the newspaper or watch current affair programs in the same way as they used to.

We meander through the deep valleys of confirmation bias, in which we notice those things that play to our prejudices and ignore those that do not (a tendency which the cold reader ruthlessly exploits), scale the mountains of credulousness that come from accepting personal experiences or anecdotal stories over clinical testing and splash in the disturbingly cold waters of the Milgram and Stanford prison experiments, in which we must face sinister aspects of our nature in an attempt to understand its darker, irrational side. All in all a thoroughly enjoyable experience for a teacher if one of your goals is to get students to think.

So there is a crash course in critical thinking that usually takes about a year to cover in the appropriate detail. I would not wish to suggest that it is definitive, comprehensive, or even well researched, but it does seem to work. I’ve said before in this magazine that we need to give this stuff as high a profile in the national curriculum debate as literacy and numeracy. Critical thinking is at least as fundamental as numeracy (I won’t go as far as to say literacy) and it deserves its place on the national agenda.

A while ago I got a nice message from a teacher in Los Angeles saying that he found my website useful and was using it to construct a course in critical thinking for his students. Mine was the first and only collection of free teaching resources he had found (there are others, by the way). It struck me that if he had said he was teaching physics and that he had to go halfway around the world to find some resources, we would think there was something fundamentally wrong with his education system. Why so blasé about critical thinking?

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... Murder from p 10

I wanted to believe, Mrs Dodd said.

The psychic swore she never watched TV or read newspapers.

As I left her house the television was blaring in one corner and there was a stack of newspapers on the table.

She asked me if there was anything I would like to ask the spirits so I said:

Yes. Where is our TV’s remote? We’ve lost it.

All the spirits could offer that it would turn up one day.

Let’s have a bit of dignity here. People are hurting.

Despite her cynicism and many disappointments, Margaret Dodd’s next move shows the power the cold reader holds over desperate relatives who have lost a loved one.

After she complained to the three “psychics” about their exploitive Perth show, Debbie Malone contacted her in November.

The spirit medium could not let go. She threw poor Mrs Dodd another straw to clutch.

She was very apologetic about my feelings.

She asked me to send a piece of Hayley’s clothing, Margaret Dodd said.

I said to her, ‘If you can find her, find her. Don’t mess me around’. I’ve done it. I’ve sent the clothes. I’ll see what comes out of it, she said.

Now I want these seers to prove their credibility. If it’s a trick like Houdini then state it is only for entertainment; let them stick to the winning Lotto numbers.

Her turmoil matches the added actions of the otherwise sane people who run the FM radio station Nova, and their on-air presenters’ bubble-headed and unquestioning promotion of the psychic show.

While the murder victims’ relatives are left alone with their tears, those who exploit them can laugh all the way to the bank.
A Skeptic Reads the Bible

2. The Bible as a Guide to Conduct

In the first part of this series, I told how I had read the Bible over a couple of months, and came to some provisional conclusions. The Bible is not a coherent book, but a collection of writings which are often inconsistent with each other. There are different versions of the Bible accepted by different Christian churches, and the different translations can lead to different conclusions. In addition, we saw that treating the Bible as a scientific authority would involve giving up much of science as we now understand it.

The Bible as a Moral Guide

Of course, the great majority of religious believers would not attempt such a ridiculous exercise as treating the Bible like a scientific text-book. Sophisticated Christians accept that the Bible is not a scientific or historical treatise. Its inspiration, they believe, lies in its divine wisdom and moral power. Modern non-fundamentalist Christians use the Bible as a source of moral authority.

For example Jon Ronson describes how he took the Christian Alpha course. Nicky Gumbel, the driving force behind the Alpha movement, tells a woman that she has sinned in going to see a clairvoyant. Then this exchange takes place:

I would actually ask God for forgiveness for that, says Nicky. Oh, come on, snorts Suzanne, Where does the Bible say that? Deuteronomy, says Nicky. Oh, says Suzanne. (Ronson 2006: 58)

And, indeed, up to a point, the Christians are right. The Old Testament has many pages of sensible guidance for the Jews — and people generally — on how to live with each other. And the New Testament has some moral innovations that can reasonably be described as brilliant.

However, there is another side to this. Having ploughed through the Old Testament, I was astounded, and frankly horrified, by some of the things I found. Let me invite you to cast your eye down the following list of Old Testament laws, and come to a conclusion about their acceptability. Consider also whether they can reasonably be the commands of a merciful and loving God, who is proclaimed to have given them all to humanity. Read on:

- Working on the sabbath is punishable by death
- Adultery is punishable by death
- A priest’s daughter who becomes a prostitute shall be burnt to death
- A disobedient son shall be stoned to death
- Cursing one’s father or mother is punishable by death
- Foreigners can be bought as slaves
- A slave can be beaten to death without penalty, provided that a day or two passes between the beating and the death

Martin Bridgstock, a Senior Lecturer in the School of Biomolecular and Physical Sciences at Griffith University, is the winner of many Skeptical accolades.
• A woman who practises magic shall be put to death.
• A man who has sex with animals shall be put to death.

In my view, all of the laws listed above are intolerable in a civilised society. That doesn't mean that I approve of the proscribed behaviours. It simply means that the penalties are so grotesque that none of them could be taken seriously today. Further, how these can be the commands of a loving, merciful and forgiving God seems beyond reasonable imagination.

It is tempting to say that these laws and regulations were propagated in Old Testament times, and that nobody can possibly take them seriously. That might be so, except that in the New Testament, we find Jesus saying with perfect clarity that he affirms all of them:

_Do not think that I have come to do away with the Law of Moses and the teachings of the prophets. I have not come to do away with them, but to make their teachings come true. Remember that as long as heaven and earth last, not the least point nor the smallest detail of the Law will be done away with— not until the end of all things._

That is pretty clear, and we can go further. Paul also affirms his loyalty to the law, though in more general terms. He writes that:

_I do admit this to you: I worship the God of our ancestors by following that Way which they say is false. But I also believe in everything written in the Law of Moses and the books of the prophets._

So both Jesus and Paul explicitly uphold laws which are written in the Old Testament and, as we have seen, these involve proscriptions and penalties of a high degree of barbarity. Personally, I think the explanation is obvious to anyone who bothers to read the New Testament. Jesus was a Jew, and his message was pitched primarily at Jews. Indeed, at one time, after he had collected his twelve disciples together, Jesus explicitly told them not to preach to non-Jews:

_Do not go to any Gentile territory or any Samaritan towns. Instead you are to go to those lost sheep, the people of Israel._

This early focus on Jewishness explains Jesus' and Paul's statements above, and also why Matthew spends a good deal of effort establishing that Jesus was a descendant of King David, tracing his ancestry via Joseph: he wanted to make Jesus credible to the Jews. However, a little later he is proclaiming that Mary was a virgin, impregnated by the Holy Spirit. This, of course, directly falsifies his earlier claim. However, if I am right, Matthew was caught between his desire to proclaim Jesus' divine origins and to claim his royal Jewish ancestry. He tried to have both, and ended in self-contradiction.

Judging by the statements in the Bible, after Jesus' death the Christians tried to spread their message. They encountered substantial 'sales resistance' among the Jews, but much interest among Gentiles. However, that raised the question of whether Gentile converts should conform to Jewish law in all respects, including diet and circumcision. Some people argued that they should do so, but Peter, Paul and Barnabas went for a compromise: no circumcision, but some dietary restrictions. Finally Paul dumped the whole business and simply said that if you love one another, you are saved. To me, this story makes a lot of sense, but it raises uncomfortable questions about how far Christianity actually represents the original intentions of Jesus, and how far it represents the sales technique of tailoring the product to the potential market.

**Two other important matters.**

I'd like to point to two other issues which struck me as I read through the Bible. One is moral, the other intellectual. First, it is pretty clear that the Old Testament sanctions genocide or, to use that disgusting euphemism, ethnic cleansing. Again and again, not only do the victorious Israelites kill the opposing fighters, they kill everyone else as well in the opposing cities! Perhaps the most bizarre case of this is related in the book of Numbers. The Israelites have defeated the Midianites, captured the women and children and brought them, with a great deal of loot, to Moses. Moses flies into a rage, reprimands them, and gives the orders:

_So now kill every boy and kill every woman who has had sexual intercourse, but keep alive for yourselves all the girls and all the women who are virgins._

Now God became angry with Moses and the Israelites over a whole range of issues, but there is not the slightest indication that he was displeased with them over this. In addition, as most people will know, there are repeated statements that God has promised the land of Canaan (with some fairly unclear boundaries) for his people, the Jews. Take these two propositions together and you have a rather nasty charter which can be read as entitling modern Jews to massacre anyone who opposes their claims to Palestine (and territories beyond) and, by extension, modern Christians to kill anyone they regard as an enemy.

Does the Bible offer decent moral guidance and wisdom? Yes, mixed in with all the rest. The Old Testament has some fabulous passages of depth and wisdom, and also a great deal of practical advice helping people to get along with each other. In the New Testament, Jesus and Paul were great moral innovators, with their stress upon love for others. I do have some doubts about whether it is actually possible for humans to feel love for each other just because their religion requires them to, but that's not a matter relevant to my main argument.

The second issue is extremely important, but I will deal with it briefly. Biblical apologists often claim that Jesus, by his various actions fulfilled prophecies made in the Old Testament. This is one of the ways in which, they claim, the divinity of Jesus can be objectively ascertained. It's fairly easy to check these claims. They are mostly in the book of Matthew, and the _Good News Bible_ helpfully gives references to the
relevant Old Testament ‘prophecies’. I checked them all. If you are interested, do so too. It is a couple of hours' work. My conclusions are that the quotes are often mis-quotes, they are torn from context and most of them are so vague as to be useless. If creation scientists had produced such shoddy work, I would denounce it fiercely. So if some fundamentalist starts attempting to claim that Jesus was the Messiah as prophesied in the Old Testament, challenge him to produce the exact prophesies. Check them with a Good News Bible. At worst they will be too vague to be useful, and you will probably be able to point out mis-quotes to your fundamentalist.

Some conclusions.

Obviously reading the Bible once does not qualify me as a scholar. On the other hand, I read it as carefully as I could, and with the most open mind I could manage. I wasn’t out to attack any religious view, but simply to see how far a message emerges from the Bible, and how far it can be treated as an authoritative text. I suppose my main conclusions could be summarised as follows.

First, I saw no sign of any divine or superhuman wisdom in the entire book. I did see a good deal of brilliance and human wisdom, mixed in with all the other material, some of which was horrific.

Second, I found the Bible to be incoherent and internally inconsistent. It can be regarded as a huge textual Rorschach, onto which people can read whatever they want. Of course, the people who work hardest at these interpretations are professional theologians, and the odd religious fanatic. Perhaps the greatest of these interpreters was Paul. Most of the rest of us, I think, will not bother.

In my view, therefore, we should strongly resist the attempts of fundamentalists to make the Bible into some kind of scientific authority. It isn’t, and was never meant to be. We should also be very wary of people who seek any kind of wisdom or guidance in the Bible. They might find something good, or they might find something monstrous.

Finally, because the entire Bible is an incoherent work of advocacy, we should be wary of any attempts to treat it as an objective history. There may well be historical truth in it, but we are entitled to be skeptical about it, in the absence of verification.

Would I recommend any parts of the Bible for skeptical readers? Definitely yes, I love the book of Ecclesiastes, with its author staring bravely into the pit of his own mortality. Then there is the book of Esther, a grim story of political intrigue with thousands of lives at stake. In the Catholic Bible, I loved the book of Judith. People unacquainted with its story should read it. Partway through they will be exclaiming “Good grief, what a woman!” It is a stunning story. Then there is the book of Ruth, a sad, gentle story of good people which turns out happily.

Finally, in a different way, you may appreciate the New Testament books which start with the Acts of the Apostles, and then through Paul’s letters. Even if you don’t agree with Paul (and I don’t, on many matters), it is entertaining to watch a brilliant, agile mind trying to make sense of everything.

That concludes my analysis — impressions really — of the Bible. My main finding is that it is subject to a whole range of interpretations, none of which are really coherent, but all of which can find some support. Well, one more can play at that game. In my last article, I am going to argue that there is perfectly good support in the Bible for what skeptics do. That is, there is Biblical sanction for seeking evidence for the plausibility of paranormal claims. I do not expect my interpretation to sweep all before it in the theological arena. I do claim, however, that it is as plausible as most other interpretations which can be made.

Biblical References.

1. Exodus 31.14 (NEB and RSV seem to prescribe exile for working on the Sabbath, and death for ‘profaning’ it)
2. Leviticus 20.10
3. Leviticus 21.9 (NEB agrees. RSV says only that she shall be ‘burnt’, which might not mean death, I suppose).
4. Deuteronomy 21.18-21
5. Leviticus 20.9
6. Leviticus 25.44-46
7. Exodus 21.20-21
8. Exodus 22.18
9. Exodus 22.19
10. Matthew 5.17
11. Acts 24.14
12. Matthew 10.5-6
13. Matthew. 1.1-17; Matthew 1.20
14. Acts 15.1
15. Acts 15.23-29
16. Romans 13.8-9
17. eg. Deuteronomy 2.34 and 3.6
18. Numbers 31.17-18
19. eg Deuteronomy 1.7-8

Footnotes.

1. Leaving aside some implausible sexual and gynaecological shenanigans, which you can imagine as well as me.
2. Ouch!
3. Just to be clear, I am not saying that most modern Israelis or Jews actually take this view, nor that most Christians do. Indeed, Jewish people are often distinguished by their concern for human rights. I am saying that it is an intellectually defensible interpretation of many scriptural passages, and also that I suspect some people do accept this interpretation.
4. Personally, I am not angry at these ancient Christians. They had no concept of accurate scholarship, and were trying to justify something they thought extremely important. I am angry at modern fundamentalists, who make claims which could be checked with a minor amount of work, and should know better.
5. Eran Segev, who can read the Bible in Hebrew, pointed out to me that this book is the only one in the Bible which does not mention God. So sensitive atheists can look here, but they should steer clear of the additional chapters in the Catholic version, where God makes a heavy-duty appearance.
6. Unless they are fans of Gordon Ramsay, in which case they will say something rather different.

Reference

Martin Bridgstock argues that modern scepticism has biblical justification — and he has evidence to prove it!

In the first two papers of this series, we have seen that the Bible is in essence a collection of documents. These documents are not always coherent, and there are many overlaps and contradictions. It follows that many different messages and interpretations can be read into the Bible, though none of them will completely avoid the charges of inconsistency which can always be made.

In this paper, the goal is not to investigate the nature of the Bible, but to extract a message from it. The message will be the desirability of modern skepticism, that is, the insistence that paranormal propositions must be accompanied by an appropriate quality and quantity of evidence. My argument will be that there is a perfectly good case for the application of skepticism, if only one studies the Bible correctly.

Prophets
Let’s start with the prophets. Now the sayings and doings of prophets take up a very large part of the Bible. Isaiah, Jeremiah and John the Baptist are all examples of prophets whose words are presented as true. Therefore, according to the Bible, it is possible to make statements which by some paranormal means have truth beyond the knowledge of the speaker.

However, receiving the truth from prophets is not simply a case of opening one’s ears. It is also true, according to the Bible, that there are false prophets who can lead us astray. There are many statements to this effect. Here are a couple. Jeremiah recounts how God denounces some false prophets in these terms: The prophets are telling lies in my name; I did not send them, nor did I give them any orders or speak one word to them. The visions they talk about have not come from me; their predictions are worthless things that they have imagined.

And in the New Testament, we have Jesus denouncing false prophets in equally strong terms: Be on your guard against false prophets; they come to you looking like sheep on the outside; but on the inside they are really like wild wolves.

So clearly, there are false prophets and they are a bad lot, not to be trusted. Other passages in the Bible make the same point. However, things are not as simple as saying that true prophets tell the truth and false prophets don’t. Even true prophets get things wrong. For example, in Isaiah we read that prophets can become dreadfully drunk and then — like the rest of us — they talk a good deal of nonsense: The prophets are too drunk to understand the visions that God sends, and the priests are too drunk to decide the cases that are brought to them. The tables where they sit are all covered with vomit and not a clean spot is left.

In these circumstances we should not be surprised that prophets get things wrong. Now I don’t think they had breathalyzers back in Biblical times, so the problem was a real one. However, there is worse to come. In 1 Kings we find a prophet who simply lies. Indeed, God can actually make genuine prophets tell lies, and has done so.

So things are more complicated than we thought. Not only are there false prophets, but true prophets are not consistently correct. To make matters yet more complicated, false prophets, and people motivated by demons, can tell the truth. In Acts, we read of this little event: One day as we were going to the place of prayer, we were met by a slave girl who had an evil spirit that enabled her to predict the future. She earned a lot of money for her owners by telling fortunes. She followed Paul and us shouting “These men are servants of the Most High God. They announce to you how you can be saved!”

Now the essential theme of a large part of the New Testament is precisely that Paul was telling the truth, and was divinely inspired. That is part of the reason why he has churches named after him today. But here we have an evil spirit prompting someone to tell the truth. Apparently she kept at it for days, and became very tiresome. So how, exactly, do we tell who among the prophets we can trust, and who we can’t? There does not seem to be a simple answer.

Paranormal devices
The case is equally difficult when we come to divining, magic and other paranormal devices. Now the Christian churches generally denounce these forms of clairvoyance. Their
opposition seems to come from passages in Exodus b and Deuteronomy c. However, in other parts of the Bible, some sorts of divination do seem to be acceptable. In the Old Testament we read — a total of eight times — that there are devices called Urim and Thummim which it is apparently acceptable to use for divine guidance. On one occasion these are also described as sacred stones d. So although divination and magic are generally strongly disapproved of, there do seem to be devices which can be used for these purposes. We should note, however, that they sometimes do not work e.

So we have learned from the Bible that some forms of divination can work and are acceptable, while others do not work, and are not acceptable. The problem is that, as the Good News Bible tells us, we do not know what these acceptable forms are: each time Urim and Thummim are mentioned, a note is added to this effect. It is all very unclear.

So what do we do?

For both prophets and for other forms of magic and divination, we are faced with essentially the same problem. How are we to know what works and what does not? There are true and false prophets, and the former may lie (or be hopelessly sozzled) and the latter may tell the truth. There are acceptable and unacceptable forms of paranormal activity, and we do not know what the acceptable ones look like. What are we to do?

Jesus himself gives us a good start on an answer. He denounces false prophets pretty strongly, but then goes on to give us a good idea of how to spot them. You will know them (ie the false prophets) by what they do. Thornbushes do not bear grapes and briars do not bear figs. A healthy tree bears good fruit but a poor tree bears bad fruit. A healthy tree cannot bear bad fruit and a poor tree cannot bear good fruit. And any tree that does not bear good fruit is cut down and thrown in the fire. So, then, you will know the false prophets by what they do. f

Jesus seems to be telling us that we should judge the truth or falsehood of prophets — and by extension, people claiming paranormal powers generally — not by what they claim, nor by how they appear, but by what they actually accomplish. In the Old Testament, Isaiah quotes God as saying something very similar: those who claim to be gods should make prophecies and do awesome things to substantiate their claims g (and since they can’t, they are denounced as rubbish). In short, it is perfectly reasonable to read into these Biblical utterances the message that, faced with claims of paranormal wisdom, it is our duty to test them and see if they actually work. By their fruits shall ye know them!

Testing paranormal claims

We have now moved onto something like familiar skeptical ground. According to the Bible, we have a means of testing paranormal claims. We ask: can they be known by their ‘fruit’? And, indeed, it is fairly easy to find in the Bible instances of where this type of examination has occurred. For example, the prophet Elijah took part in a public contest with the priests of Baal to see who was telling the truth. Two bulls were cut up, and the pieces placed on two piles of wood. Then the 450 priests of Baal prayed furiously for hours, but nothing happened to their pile. Elijah heckled them quite nastily as they did so. h Then he had water poured over his pile of wood, and prayed to God. The result was spectacular:

The Lord sent fire down, and it burnt up the sacrifice, the wood, and the stones, scorched the earth and dried up the water in the trench. When the people saw this, they threw themselves on the ground and exclaimed “The Lord is God, the Lord alone is God” i.

The priests of Baal got their comeuppance, and all ended happily. Using Jesus’ terms, we can certainly say that the priests of Baal could not yield good fruit while Elijah, a true prophet, yielded excellent fiery fruit. Using skeptical terminology, we might say that the burden of proof was on Elijah and the priests of Baal. The latter failed to produce any evidence, but Elijah did so, and we might be tempted to conclude that he met Sagan’s balance for the amazing nature of the evidence (Caso 2002).

Of course, modern skeptics would want rather tighter controls on this test. They would want to be sure that the ‘water’ was not some combustible liquid, and that no surreptitious fire-making devices were used. Perhaps the ancient Israelite version of Randi should have been there to see fair play. Apart from that, it was an excellent public test of whose claims were correct.

There are other tests in the Bible as well. The prophet Jeremiah, for instance, was spoken to by God, but seems to have had some doubts about whether it was really God at all. This is a reasonable question, as assorted thinkers (eg Clifford 1879) have pointed out. So how is Jeremiah satisfied that it is actually God on the line?

The Lord told me that Hanamel, my uncle Shallum’s son, would come to me with the request to buy his piece of land at Anathoth... because I was his nearest relative and had the right to buy it for myself j.

This event happened, and Jeremiah bought the land. He was, apparently, most impressed with the prediction, concluding “So I knew that the Lord had really spoken to me.” However, this is pretty weak evidence for a divine visit. Hanamel was required by law to offer the land to Jeremiah. So, if he was after cash, or wanted to get rid of the land, a visit to Jeremiah was clearly very likely. The evidence does not seem strong enough to satisfy the modern requirement that extraordinary claims require extraordinary evidence. On the other hand, Jeremiah clearly wanted some evidence. He was on the right lines, although his judgement of the worth of evidence seems askew.

An early — and nasty — test of paranormal claims is narrated in Exodus. The battle of Moses to convince the Egyptian King to let the children of Israel go is well known. It
began with a preliminary battle of magic, with Moses and Aaron facing the King's magicians. Both sides made their sticks turn into snakes. Moses and Aaron had somewhat the better of this battle, but the King was not convinced. So then the assorted horrid plagues of blood, frogs and so on were unleashed, until finally the King was convinced and the Israelites left.

Now presumably, any modern skeptic would have been convinced after a plague or two, so it is tempting to conclude that the King was very stupid. However, there is a very ugly little passage before the plagues start in which God states that he will prevent the king from agreeing. So all the plagues and suffering visited on Egypt were not caused by the King's stubbornness: they were caused by God. This is thoroughly nasty, but it makes a key point for the readers of the Bible: just because someone is unwise or stupid, doesn't mean they are evil. Note also how skeptics can go about their work.

The Case of the Gobbling God

The second case concerns a greedy god. Each evening, large amounts of food are left before the God, and in the morning, the food is gone. Apparently the god has a healthy appetite. Now Daniel only believes in one God, and that God doesn't seem to do much eating. So he proclaims his disbelief in the greedy god and sets out to prove his case.

What does Daniel do? He scatters ash in the temple, where the food offerings are left. In the morning there are many human footprints in the ash. Case proved, it's a fake, and the greedy miscreants are led off for execution.

It is hard to think of more elegant examples of skepticism in action. In the first case, Daniel suspects that the evidence is not sufficient to convict a virtuous person, so he finds a way of showing that the testimony is inconsistent. In the second case — well worthy of Houdini or Randi — he shows that the god was not doing the eating, humans were.

Conclusion

Readers will be perfectly aware that the Bible is not a skeptical book. In essence it is a prolonged statement of what God wants from humans. As I've argued in the earlier papers, it is incoherent and in some cases contradictory. However, running through many parts of the Bible can be distinguished a thread of skepticism, of wanting to find the evidence for paranormal propositions, and it is this that I have highlighted.

To conclude, let me stress that if I am in error, I invite people with greater knowledge to correct me. As it says in Proverbs:

Anything you say to a wise man will make him wiser. Whatever you tell a righteous man will add to his knowledge.

Biblical References

a. Jeremiah 14.14
b. Matthew 7.15
c. eg Jeremiah 5.31
d. Isaiah 28.7 (Yuck!)
e. 1 Kings 13.18
f. 2 Chronicles 18.22
g. Acts 16.16-17 (NEB and RSV don't specify that the spirit was evil, though it was a confounded nuisance)
h. Exodus 22.18
i. Deuteronomy 13.1-10
j. Exodus 28.30; Leviticus 8.8;
Numbers 27.21; Deuteronomy 33.8-10; 1 Samuel 14.41; 1 Samuel 29.6;
Ezra 2.63; Nehemiah 7.65
k. 1 Samuel 14.41
l. 1 Samuel 28.6
m. Matthew 7.16-20
n. Isaiah 41.21-24; Isaiah 43.8-10
o. 1 Kings 18.22-29
p. 1 Kings 18.38-39
q. Jeremiah 32.6-7
r. Jeremiah 32.8
s. Exodus 7.11-12
t. Exodus 7.3-4
u. Daniel 13.48
v. Daniel 13.55-59
w. Daniel 14.1-22
x. Proverbs 9.9

Notes

1. Maybe they could have demanded that the prophets walk along a straight line while prophesying. Prophets falling off the line are drunk, and so false.
   “Woe unto ye O Israel . . . Oopsh!”

2. Modern skeptics would probably find this a bit rude. We always try to be polite to paranormal claimants during tests.

3. Apparently oak trees are very large and mastic trees very small, so this was not a minor boo-boo. If they'd been quicker-witted, perhaps the elders could have dodged the problem by saying that they were so busy watching what was going on under the tree that they didn't notice the tree itself.

4. I suppose it's time to come clean. Readers may have noticed that, in the

Continued p 27 ...
Modern science should indeed arouse in all of us a humility before the immensity of the unexplored and a tolerance for crazy hypotheses. — Martin Gardner

Who Should Fix Humpty Dumpty?

In the 19th Century, physicists thought that they were pretty much able to explain what went on in the physical world, using concepts that everyone was familiar with, like waves, particles and fields. Waves were like ripples of water on a pond or vibrations on a string. Particles were like rocks or billiard balls. Fields were a bit more abstract, yet with a little effort they could be visualised by sprinkling iron filings around a magnet.

Then Humpty Dumpty had a great fall.

With the advent of quantum mechanics it became very hard for physicists to visualise what actually went on in the physical world at the microscopic scale. We saw in Part 1 that photons don’t behave like waves or particles, but like some illegitimate offspring of both. (The same is true for “matter” particles like electrons and atoms.) Even worse, experiments have proven that realism and locality can’t both be true, ie, either particles don’t have a definite reality until they are measured, or instantaneous faster-than-light influences zap across the universe. Some experiments even suggest that influences can travel backwards in time.

Now, when it comes to using the equations of quantum theory to make predictions for outcomes of experiments, it doesn’t matter that Humpty Dumpty lies broken. For as long as the mathematics and the experiments match, all is well in the Kingdom of Quantum Mechanics, and the question of what it all “means” (if that question has any meaning) can be outsourced to philosophers. It is after all possible that the “truth” is beyond the comprehension of our minds. Many physicists are quite content with that position.

But is that attitude wise? When it comes to interpreting the equations and the experiments, it is first of all necessary to properly understand them, and here physicists have a distinct advantage. (Philosophers, by and large, don’t come from a science background.) Secondly, trying to understand the universe is a key motivator for many physicists. And finally, going beyond the mathematics, by creating a mental model of what’s going on, has tremendous practical utility. A famous example is the metaphor of space being like the surface of a balloon. Often physicists begin by thinking in terms of analogies, before looking for the mathematics to make their ideas rigorous.

In that sense, all of the following interpretations are valuable, because they are all potentially useful mental models that could lead to new discoveries. Obviously they
can't all be right. In fact, they are probably all false!

It doesn't matter. It's the physicists who should put Humpty together again!

Copenhagen Interpretation

This has been the standard interpretation of quantum mechanics for many years, although nowadays more and more physicists are willing to stray from the "party line". In this interpretation, a photon behaves like a wave which evolves deterministically, until the moment when a measurement occurs. Upon measurement, the wave collapses, resulting in a specific outcome. For example in the Three Mirror Experiment, the photon's wave travels along both path 1 and 2. However, when the wave hits detector 1 and/or detector 2, it collapses, leaving the photon at a specific location (at detector 1 or 2 but not both). This is not the way in which the waves in our macro-world behave. After all, when a water wave hits a rocky outcrop, the rest of the wave breaking towards the beach doesn't suddenly vanish. So what kind of wave is the photon? It is a probability wave, because it tells us the probability of finding the photon at any particular location.

In looking at things this way, the photon does not have a complete reality until it is detected. It therefore makes no sense to talk about it having a definite position before we measure it. Hence the Copenhagen interpretation not only abandons realism (see Aspect Experiment in Part 1).

The argument has been made (in my view convincingly) that the Copenhagen interpretation not only abandons realism, but implicitly abandons locality as well, because detectors 1 and 2 could be light-years apart, and as soon as the photon is detected at detector 1, the probability of it being at detector 2 becomes zero in an instant.

Within the Copenhagen interpretation, the outcome of a measurement is considered to be a truly random event. In the Three Mirror Experiment, for instance, the interpretation claims that there exists no information anywhere in the universe, hidden or otherwise, that would allow us to predict in advance whether the photon will arrive at detector 1 or 2. This is what Einstein objected to when he said, "God does not play dice!"

The Copenhagen interpretation has no problem explaining Wheeler's delayed choice experiment, because asking whether the photon travelled along path 1 or 2 or both is a bit of a barmy question to begin with. Before we measure it, there is no "real" photon, only its probability wave. If half-mirror 2 is inserted the probability wave will interfere with itself, otherwise it will not. Simple!

The main bone of contention within the Copenhagen interpretation is the question: When does a measurement occur? In other words, what causes a probability wave to collapse to become a "real" particle? After all, the measurement devices also consist of atoms that (according to the Copenhagen interpretation) also don't have real attributes until they are measured. So we need a measuring device that measures the measurement device, that measures the measuring device, that measures the measurement device...

It is hard to see how to break out of this chain, and it has even been proposed that there must be some measurer/observer outside the universe to make sure that the whole shebang has some reality. Now, while it is a fact that New Agers love quantum mechanics, theists generally view it, like most science, with suspicion. Yet isn't this a grander "proof" of the existence of the Flying Spaghetti Monster than any that Thomas Aquinas has dreamed up? We can but hope that Creationists never hear about this!

Anyhow, I digress. With respect to Schrödinger's cat, most people would agree that the cat must be alive or dead, but not exist in a half dead/alive zombie state. (And yet, how can we be sure?) So, somewhere in the chain from a photon on a half-silvered mirror whose probability wave travels along both path 1 and 2, and the cat, the probability wave must collapse.

The Copenhagen interpretation is a bit vague on this, except to say that the probability wave obviously collapses somewhere along the line. So various add-ons to this interpretation have been proposed:

For example, the collapse could be akin to what happens in thermodynamics, where reversible processes become irreversible because of the size/complexity of the system. For example, Humpty Dumpty breaks when he falls on the floor, but Humpty Dumpty hardly ever jumps up from the floor to become whole again. Perhaps there is a certain matter threshold at which our quantum probability egg breaks.

Alternatively, the collapse could have something to do with information. The Quantum Eraser Experiment shows us how the outcome of an experiment is affected by information that is only available in principle. While it is possible to erase the information contained in a photon, the same is practically impossible to do for a cat.

Then there is the view that atoms interacting with other atoms can never explain the collapse, that we need something outside the materialistic world. Do we know of anything like that? Why, yes — consciousness. This idea should not be dismissed out of hand in the hands of serious scientists. After all, consciousness exists, yet it is hard to find a place for it within Newtonian Physics. Perhaps quantum mechanics can't explain it either, but it seems foolish to ignore the possibility. However, the Quantum Eraser Experiment could be problematic for the consciousness-causes-the-probability-wave-to-collapse explanation, because in that experiment it suffices for the information to be available in principle in order to affect the outcome of the experiment, ie, a conscious observer is not required.

This Copenhagen interpretation therefore answers our three mysteries as follows:
Mystery 1: A single photon/electron can behave like a wave and interfere with itself. This wave is a probability wave.

Mystery 2: A single photon/electron can behave like a particle. When this happens, the wave from Mystery 1 appears to vanish. This “collapse” is caused by an act of measurement.

Mystery 3: The outcome of experiments are random as far as we can tell. Does this mean that “God plays dice”? Yes! We can only talk about probabilities.

Hidden-Variable Interpretation

The hidden-variable interpretation is an attempt to construct a mental model of the micro-world which resembles our “common sense” understanding of the world, harking back to the days when waves where real waves and particles were real particles. The first such attempt was by Louis de Broglie, while the most popular current version is by David Bohm.

The hidden-variable interpretation claims that particles in the microscopic realm (photons, electrons, etc) always have well defined momenta and positions, whether we measure them or not. This interpretation thus allows us to keep realism. In this view, quantum uncertainty is a result of our ignorance (like our difficulty in predicting the weather a few months in advance), and not due to the fundamental uncertainty of nature, ie, we are still living in a Newtonian clockwork universe.

In this interpretation, a photon has both a wave and a particle associated with it. The wave is called a pilot wave (in older hidden-variable theories) or quantum potential (in modern hidden-variable theories). The name was changed to emphasise the analogy between the quantum potential (which affects the path of all particles) and the electric potential (which influences the path of every charged particle). Physics is not immune from marketing!

Looking at the Four Mirror experiment with the hidden-variable interpretation, we think of the photon travelling along path 1 or 2, but never both. However, the pilot wave will go along both paths 1 and 2, and at the half-mirror 2 it will interfere with itself and “push” the photon towards detector 1.

From our discussion of the Aspect Experiment, we know that if we want to keep realism, we have to jettison locality. Therefore, Bohm’s theory allows for explicit faster-than-light influences. According to the Special Theory of Relativity, this entails influences that go backwards in time, with the potential for causality violations. (There is more wriggle room in the Copenhagen interpretation to get oneself out of this conclusion, because its non-locality is implicit.)

Because a photon consists of both particle and pilot wave, there is no mysterious collapse of the wave, which proponents of the hidden-variable interpretation cite as a major advantage. However, this interpretation has its own mystery — why do parts of the pilot wave suddenly stop affecting the motion of the particle as soon as a measurement occurs? For example, in the Three Mirror Experiment we could detect the photon at detector 1 and then direct the pilot wave from path 2 at the photon that was just measured, but it will have no effect on the photon.

Proponents of the hidden-variable interpretation claim that the pilot wave is still there (after measurement), but that it can no longer affect the particle, and they call it “empty channels”. Except for the terminology, there seems to be little difference between this and the probability wave collapse, so one might as well talk about the collapse of the pilot wave upon measurement.

Another drawback of this interpretation is that it introduces unobservable quantities: the hidden variables and the quantum potential in addition to the particle. (According to Occam’s Razor we should favour a simple interpretation to a more complex one.) Finally, the Leggett Experiment seems to rule out the most reasonable non-local hidden-variable theories.

Mystery 1: The wave is a pilot wave (also called quantum potential).

Mystery 2: There is no collapse of the wave. A photon consists of both wave and particle. The pilot wave influences the path of the particle. (But now we have the mystery of the empty channels!)

Mystery 3: If only we knew the photon’s hidden variables, then we could predict the detector at which the photon ends up.

Transactional Interpretation

The transactional interpretation is a Johnny-come-lately, being first proposed by John G. Cramer in 1986, but it has already been recognised as a serious contender. The interpretation arose from the observation that the equations of quantum mechanics have two solutions: one forward-in-time, and another backwards-in-time. We already saw various experiments such as the Aspect experiment, the Delayed Choice Quantum Eraser Experiment and the Dopfer experiment which (to various degrees) suggest the possibility of backwards in time influences. So rather than struggling against it, kicking and screaming, why not embrace the concept? In fact, Einstein’s Special Theory of Relativity can cope with faster-than-light/backwards-in-time particles (tachyons). As long as causality is preserved, why worry?

Another advantage of the transactional interpretation is that it is compatible with the results of the Afshar Experiment while, according to John Cramer, the experiment falsifies the Copenhagen and many-worlds interpretations. It should be noted, however, that this view is not universally shared by physicists.

To examine the Three Mirror Experiment using the transactional interpretation we have to look at it from the viewpoint of the Flying Spaghetti Monster who sees all of time at once. We have one photon source (the laser) and two photon sinks (the detectors). The laser sends out a forward-in-time wave as it ejects a photon. “Meanwhile” detectors 1 and 2 send out back-
wards-in-time waves, indicating their readiness to absorb a photon. The forward-in-time and backwards-in-time waves meet up, and their interaction decides the likelihood of the photon arriving at detector 1 or 2.

**Mystery 1:** The interference is caused by waves that go forwards and backwards in time.

**Mystery 2:** The collapse of the wave does not occur at any particular moment in time. In the Three Mirror Experiment, the fact that the photon will arrive at detector 1 (or detector 2) is in a sense “hardcoded” into the universe.

**Mystery 3:** From our temporal point of view, the outcome of a measurement is entirely non-deterministic and we can only talk about probabilities. On the other hand, the Flying Spaghetti Monster already knows what will happen.

**Many-Worlds Interpretation**

This interpretation was first proposed by Hugh Everett in 19579. But the interpretation that I will be describing is the improved version (in my view) developed by David Deutsch10.

In this interpretation, the Three Mirror Experiment is explained as follows: as the photon hits half-mirror 1, the universe splits into two copies. In one universe the photon goes along path 1 and into detector 1. In the other universe the photon goes along path 2 and into detector 2. In one universe Schrödinger's cat is dead, in the other it is alive.

In the Four Mirror Experiment, we again have the universe splitting into two copies after the photon hits half-mirror 1. Let’s call the universe in which the photon follows path 1, universe 1, and the universe in which the photon follows path 2, universe 2. The photon will hit half-mirror 2 in both universe 1 and 2, and as a result the two universes are now totally indistinguishable! It was the idea of David Deutsch that in those special cases the two universes will re-combine, and it is this re-combining that causes the interference.

This leaves the door ajar for testing this interpretation, because it might just be possible for a conscious observer, who was split in two (together with her universe) and then recombined, to report on this fact. Unfortunately (or perhaps fortunately?) our messy brains are unsuitable for such a delicate experiment. A conscious computer is required9, which presents a slight problem.

But there exists a much more straightforward way to test the interpretation, although it isn’t recommended: quantum suicide. If the many-worlds interpretation is correct, then it should be impossible to extinguish one’s consciousness, no matter how hard and how often one tries. Guns will jam and bushes will break falls, no matter how unlikely this seems. Our consciousness, the reasoning goes, is only able to perceive those universes in which we exist, no matter how improbable they are. Unfortunately, while this experiment might convince a single individual that the many worlds interpretation is true, it will be most unconvincing to the folks in the vast majority of universes in which the suicide succeeds. So on balance, this experiment seems hardly worth the trouble.

It should be noted that while an infinite number of universes sounds bizarre, is it really any more bizarre than the notion of an infinite number of galaxies? Of course we can see a few billion (but not infinite!) galaxies, while we just observe a single universe. Still, it should give one pause not to be too quick to dismiss this “crazy” sounding idea.

At a more mundane level, there is the question of how this interpretation accounts for different probabilities of outcomes, eg, if there is a 2% chance that a photon will be detected at detector 1, and a 98% chance of it being detected at detector 2, does the universe split into 50 copies, in 49 of which detector 2 is triggered, and one in which detector 1 is triggered? And if so, might there be an upper limit to the number of universes spawning with each measurement? If so, there is the possibility that probabilities of outcomes might be quantised, which could be another way to test this interpretation.

The many-worlds interpretation holds the honour for being both the cheapest and most expensive interpretation. Assumption wise, it is the cheapest, because based on a single assumption — multiple universes — we can pretty much explain all the phenomena of quantum mechanics, such as wave collapse, quantum randomness and wave-particle duality12. Metaphysically speaking, this interpretation is the most expensive, because it requires a very large number, possibly infinite, universes.

One of the interesting features of the many-worlds interpretation is that it is deterministic. After all, by playing out all possibilities, the element of randomness is removed. Unfortunately Albert Einstein died a few years before Everett proposed his interpretation; it would have been fascinating to know what he would have made of it.

**Mystery 1:** There is no wave! It’s the universes that are interfering.

**Mystery 2:** The photon is a particle, but there are multiple copies of it in multiple universes. Hence there is no collapse.

**Mystery 3:** In the Three Mirror experiment, having the photon detected at detector 1 or detector 2 (but not both) is a result of us only being able to perceive a single universe. What really happens is that the photon is detected at detector 1 and detector 2, but in different universes.

**Conclusion**

For a long time it was thought that it would forever remain impossible to distinguish between the interpretations, because they were built on top of the same mathematical formalism. However, this turned out not to be entirely true, leaving open the tantalising prospect of one day being able to determine the correct interpretation. (Or at least to eliminate some of the wrong ones.)

However, despite some arguments for and against each interpretation,
we probably can’t get rid of any of them yet. Until more conclusive evidence becomes available, we have no choice but to either reserve our judgement or, alternatively, choose to “believe” in one of the interpretations based on our inclination.

If you like the idea that consciousness is an integral part of the universe and that free will exists, then the consciousness-collapses-the-probability wave version of the Copenhagen interpretation will appeal to you. In a sense, it puts us back at the centre of the universe, except that this time round the centre is not Earth or humanity, but beings with consciousness.

If you prefer the micro-world to behave pretty much as the macro-world does, then the hidden-variable interpretation is your least bad choice.

In the transactional interpretation, the universe is frozen. Time and free-will are illusions. Hence the notion of backwards-in-time messaging is not a problem, since these messages are just part of the whole. If you like to collect crystals, then this one might be for you!

If you think it is reasonable to believe in unobserved universes, but not in unobserved Flying Spaghetti Monsters, then the many-worlds interpretation might appeal because of its conceptual simplicity — and because it offers solace for every mourned might-have-been.

These are only a few of the more popular choices, as there are still other interpretations out there. They are all more-or-less weird. The weirdness is there for a reason — to explain the experiments. Ironically, it might well turn out that future experiments will show us that our current interpretations, far from being too weird, aren’t nearly weird enough!

So skeptics, please reserve your scorn for the Quantum Healers, Quantum Neuro-Linguistic Programming, Quantum Leadership, Quantum Hypnotherapy, Quantum Counseling, Quantum Chakra, Human Quantum Energy and conceivably, Quantum of Solace. But leave those physicists alone!

**Acknowledgements**

It is my pleasure to thank Dr Peter Jarvis, for proof-reading and making me aware of some exciting new developments. And, last but not least, for having encouraged my interest in quantum mechanics many years ago.

**Corrigendum**

Part 1 mistakenly placed the University of Innsbruck in Germany when, in this universe at least, the said university is in Austria.

**References and Notes**

2. For an eloquent presentation of this argument see: Gribbin, John. Schrödinger’s Kittens, Phoenix 1996
4. See: www.venganza.org/
6. Is Bohm’s interpretation one of the “most reasonable” non-local hidden-variable theories that has been ruled out? John Cramer wrote that the “reality” tested by the Leggett Experiment, “is whether the photon source is initially emitting the entangled photons in a definite state of polarisation. It is this version of reality that has been falsified by the IQOQI measurements.” This might well be a knockout punch to Bohm’s hidden-variable interpretation. See: Cramer, John G. (2007). The Experimental Evidence against Objective Reality, Analog Science Fiction and Fact, December, e-print at www.npl.washington.edu/av/ altvw140.html
8. See, for example, the webpage by distinguished physicist William G. Unruh: axion.physics.ubc.ca/ rebel.html. This and the previous reference also are an excellent example of how the discussion of interpretations can get quite passionate.
10. See chapter on “Desperate Remedies” in ref [2].
12. It may even be possible to derive quantisation phenomena from this interpretation, because quantisation might be necessary to reduce the number of universes after splitting to a finite number.

...Bible from p22

first two articles, I argued that the Bible is not consistent, whereas the argument here has assumed that it is. Of course, this last article has been written to demonstrate that by selective quotation from the Bible you can prove almost anything. So skeptics need not go spluttering into their beer about my change of perspective.

**References**

I wrote this paper in 1988 for a university seminar on the philosophy of science. It turned up during 2008 when I was clearing the clutter before moving house. As the passage of twenty years didn’t seem to have made it too out-of-date I decided that it could do with another airing.

Introduction

Reading Martin Gardner’s book *Fads and Fallacies in the Name of Science* (Gardner, 1957) in 1988 is a depressing experience. It is not depressing because of the contents, but because the contents are so topical and applicable more than thirty years after the book’s publication. Except for a prediction that Dianetics and its associated “religious” fraud, Scientology, would soon disappear, the book reads as if it had been written last week. If one were asked to state a single word which best represented the Zeitgeist of the late 1980s, a strong contender would have to be “superstition”.

Shirley MacLaine makes far more money peddling her nonsense about reincarnation and astral travel than she ever did out of films. Peter Brock destroyed a career, a business, and long-standing friendships because he believed that orgone energy could make a racing car faster (see Tuckey (1987) for this sad story). Nancy Reagan consults an astrologer, and even if she doesn’t use the predictions to sway her husband, suspicions are raised and his influence eroded. Steve MacQueen spent the money he had earned as an actor on useless laetrile treatments in a vain attempt to beat cancer.

The Co-op Bookshop at Macquarie University carries books by Uri Geller on a shelf labelled “Popular Science”. A self-proclaimed elite group of Sydney’s investigative journalists accepted a made-for-the-occasion Californian channeller, virtually without question, gave him thousands of dollars worth of free advertising, and then denied responsibility when the fraud was exposed, instead criticising the ethics of the journalist who had set it up to test (and, as it turned out, confirm) their gullibility.

These are just the well known people, and they can look after themselves, but what of the less known, “ordinary” people who may follow their examples? Someone must be buying all those books and crystals put out by MacLaine and the other New Agers. Five hundred people at least were attracted to a performance by the fake channeller, Carlos, mentioned above.

Table 1 shows the counts of the entries under various categorisations in the latest (1988) *Yellow Pages* for Sydney. Someone must be supporting all these businesses:

I feel that at this point I should state my own position and prejudices, in case they are not quite clear. I am an empiricist, specifically a scientific realist, and I am pre-
pared to accept statistically-based induction as a reasonable basis for knowledge. I am a skeptic, but some things are so highly probable that it seems irrational to doubt them. I am a liberal, in the sense understood by Mill and Bentham, in that I would allow anyone to think and do whatever they liked, as long as no harm came to anyone else, although people must be protected to a certain extent from the effects of misfortune and their own folly.

Classes of Knowledge and Belief
People can have beliefs and knowledge bases for three different reasons. Firstly, they believe or know something for rational reasons based on the reality of the universe. As example, I see my empiricism, inductionism, and skepticism as cases of this kind of belief, as well, of course, as being the bases for all my other beliefs and knowledge in this class.

The second class contains religious, moral, aesthetic, or ethical beliefs. These may not (and perhaps should not) be logically justified, but their basis in faith must be recognised. Beliefs in this class may or may not have an observable effect. Liberalism is an example of an ethical belief which affects others, but, as Blaise Pascal pointed out, belief in God may have absolutely no effect in this life but an enormous effect in the next.

The third class is nonsense, which has no effect on anything, and cannot be justified in any way. I was predestined to be a methodical, rational empiricist because I was born on the cusp of Virgo and Libra.

All of these belief classes are valid, and most people have all three, although none are mandatory. People lacking beliefs in the third, nonsense, class can be extremely boring and humourless. People lacking religion, morals, and ethics are extremely unpleasant. Anyone without rational beliefs is probably mad. There is only a problem when the boundaries become distorted or overlap. These three classes are discrete and contain qualitatively different types of elements.

It was no accident that I used the word “knowledge” only for elements of the first class, and said “beliefs” for the others. All this preamble is a way of saying that there is a qualitative difference between science (which is basically the first class), non-science, and nonsense. If this difference exists, then there must be a way to detect it.

I.a. the systematic study of man and his environment, based on the deductions and inferences which can be made, and the general laws which can be formulated, from reproducible observations and measurements of events and parameters within the universe. b. the knowledge so obtained.

Other definitions include ...

... an open system based on skeptical enquiry, ... its ultimate appeal is to evidence. Scientists use inductive reasoning to formulate general laws from specific observations.

(Schadewald, 1986)

The stuff of scientific research is essentially the work of those who seek facts by experiment or observation — which will either support or undermine an existing scientific concept about the nature of things.

(Miller, 1984)

What distinguishes science from the other works of the human imagination is precisely the insistence on testing, on subjecting hypotheses to the most intense scrutiny with the help of empirical evidence.

(Langley, Simon, Bradshaw & Zytkow, 1987).

I see science basically as defined by the dictionary, with an added aspect of skepticism.

What separates science from other beliefs is the fact that its belief structure is always under challenge. This presents an apparent paradox, in that, of the three belief classes, the only one whose contents can be doubted is the one containing “truth” and “facts” about the world, and beliefs go into the “non-factual” classes if they rely on irrefutable absolute truth!

This is not a problem, however if the strictly disjoint nature of the classes, as stated above, is observed. It is precisely this skepticism which demarks science (and other areas of knowledge) from pure belief — scientific theories can be tested and rejected if found wanting. It should be noted that I do not separate what is conventionally called “science”

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from other forms of skeptical enquiry which seek to gather knowledge. Any activity which expands knowledge by a process of theory invention, appraisal, modification, and so on should only be distinguished from other activities of the same sort by the subject matter, and this should make little or no difference to the epistemological basis for enquiry, although the problems, theories, and methods may differ enormously.

With this interpretation, many of the conventional barriers between science and other areas of study break down. For example, archaeology, anthropology and history all fit the definition of scientific activity and are complementary. Certain areas of philosophy also can be included.

Analysis of the poetic and aesthetic qualities of Shakespeare’s work is not scientific, but investigation of esthetic qualities of Shakespeare’s work and evaluation of theories. method of enquiry, and the source of proof.) What is important is the gathering data and start announcing when they are going to stop arcane data. Of course, if he really frequency distributions and other observations of word-length frequency for this cycle being repeated, each iteration building on the results of the last. The requirements for a valid theory are set out in the next section of the paper.

My own field of endeavour, the development of computer software, can be seen as a model of the method set out above. At the lowest level, we use strictly algorithmic means of problem solution, but this breaks down as the pieces become larger.

For more than thirty years, people have been trying to apply the low-level engineering and logical constructs to create some kind of metamethod, but all attempts have failed. There are an enormous number of ways of carrying out the process of production of something useful, simply because the range of problems to be solved is huge and intellectual capacities vary from creative genius to plodding dullard (for most of us positions on this continuum change frequently).

This does not mean that there is anarchy, or that no progress is made, or that there is really no method. We delineate problems, suggest theories to solve those problems, build test equipment (programs) to test the theories, find new problems, and so forth. Much like science, in fact.

What is a ‘Scientific Theory’?

We have seen from the language used to define “science” that an a priori case can be made for positing a difference between science and non-science. Derived from that analytic difference, an empirical test can be devised. This is simply that the theories of science are open to empirical validation, whereas those of non-science are not. The following set of rules or criteria for evaluating a theory as scientific or not are based on those defined by Root-Bernstein (1984). At the highest level, there are four major categories of criteria — logical, empirical, sociological, and historical.

To be logically valid, a theory must be parsimonious, applying the principle of Occam’s Razor, so that nothing unnecessary is postulated. It must be logically consistent within itself, in that it must not rely on contradictory assumptions. It must be logically falsifiable, so that conditions in which it would be proved to be untrue can be imagined, and tautologies can be avoided. (This is an essential part of devising any test procedure.) It must have clearly stated boundary conditions, so that there is no doubt about what data and observations are relevant.

Creation science seems to be ruled out by these logical criteria, as it is impossible to imagine how a theory requiring an omnipotent creator can be falsified. Some of feminism looks a bit shaky too, with its inconsistent claims such as that women and men differ only through the social construction of gender, but that women are naturally more caring and peace-loving than men because they bear the children.

For empirical validity, a theory must be empirically testable itself, or must provide predictions or statements about past events which are themselves empirically testable. This appears to be a tautology, but it is important to stress it. There are some theories, such as those of astronomy, which are not testable as such, but which make statements about how things should be. This leads to the next condition, which is that theory must have actually made verified predictions or retractions. If all of its predictions have been falsified, then it is hardly a valid theory. Astrology seems to be in this position.

Other empirical criteria are that the theory must offer reproducible results, otherwise it is merely a statement about the observation of some highly improbable event, and
would be of no use to someone designing an experiment. The theory must also define the criteria for deciding whether observations are to be considered as facts, artefacts, anomalies, or as irrelevant to the theory. If such distinctions cannot be made, so that anything is possible under the theory, then no test can be devised. These last two criteria are the ones which seem to provide the most trouble for parapsychology researchers — their results cannot be reproduced, and almost anything seems to be valid data.

Sociological criteria are similar to what Kuhn (1970) was referring to, when he talked about changes in paradigm, although I am applying them here without necessarily requiring a total revolution covering all theory in the particular branch of science. A theory must address the problems of past theories by resolving problems or anomalies which defied previous theories. It should provide a new set of problems to work on in the future, and posit a method for solving these problems. If it does not do these two things, then it offers nothing which cannot be learned by other means. These sociological criteria, together with falsifiability and reproducibility mentioned above, provide the main means for correcting existing theories. It is only by building on past theories and creating new ones that any progress can be made.

This leads to the last major class of theory criteria — historical. To be valid historically, a theory must meet all criteria met by its predecessors, or be able to prove their irrelevancy. It must be able to explain all of the data observed within the paradigm of the replaced theory as either fact or artefact, but must not of course claim that something previously explained is now anomalous. Finally, it must be consistent with any ancillary theories which either attached to the replaced theory or have now become attached, if these theories have been independently established as valid.

In summary, then, a valid theory must explain more than its predecessors without contradicting anything which has independent validity; it must be possible to devise a test which could falsify it or it must make predictions which can be independently assessed; testing of the theory should be independent of the experimenter, that is, it must offer reproducible results; it must have a priori validity, in that it must be logically consistent and bounded in possibility. Validity is of course not proof, but if a theory satisfies all, or even most, of the above criteria, then it can be accepted as providing a useful description of reality. In other words, it is a theory which can be called part of science.

Why does it matter?
When choosing the title for this paper, I had little trouble with “fact” and “faith” as names for the first two categories of belief. For the last category, the term “fiction” was deliberately chosen over such equally alliterative options as “fallacy”, “fantasy”, “folly”, or “foolishness” because it implies a consciousness of the fact that what is in this class is somehow “untrue”.

In other words, one of the elements in the “fact” category is a metastatement (or set of such statements) which partitions the holder’s set of beliefs according to whether he holds them because they have been verified empirically (to some acceptable level of probability), or he holds them because some higher authority requires them or they support his ideological framework, or he holds them for no reason other than choice. That is, he holds them because they are facts, through faith, or knowingly as fiction.

When I described myself as a liberal before, it may have seemed that this had little relevance to the subject of the demarcation between science and non-science. I would like, however, to repeat that this means “that I would allow anyone to think and do whatever they liked, as long as no harm came to anyone else, although people must be protected to a certain extent from the effects of misfortune and their own folly”. The relevance is that, providing people have a correct categorisation of their beliefs as set out above, then almost any set of beliefs is acceptable.

If people want to believe that UFOs contain little green men from outer space, if they believe that little pyramids will sharpen their razor blades, if they talk to plants, if they believe that their dogs are telepathic, or if they think that the inhabitants of Atlantis watched television, then there is no problem. The world needs eccentrics and people with differing views to make it an interesting place. The problems arise when people make categorisation errors — at this point “fiction” becomes “fallacy”, “fantasy”, “folly”, or “foolishness”, and their beliefs become pathological, and intervention to protect them and others is justified, even for the most liberal of observers.

There are still some who would argue that pathological beliefs are acceptable, and in some cases this may be so, but there are areas such as biology, medicine and health, anthropology, and sociology, where confusion of either faith or fiction with fact can have literally lethal effects.

More than six million people died because lunatics among the Nazis allowed racist ideology to dictate anthropology, although some people may have lived longer because the same (or similar) lunatics used astrology to select battle times and also impeded the work of real scientists trying to make atom bombs. Goodness knows how many died in the famines caused through the USSR’s rejection of Mendelian genetics because it conflicted with a materialist ideology.

In 1978, more than 900 people committed suicide in Guyana because a quack cancer-curer destroyed their boundaries between religion and reality. Less shocking, but closer to home and more immediate in time, doctors in Sydney hospitals are currently treating a spate of children
In footnote 3 to his article “Quantum Quodlibet”, Michael Lucht quotes me as saying “no compelling argument or evidence requires that quantum mechanics ... provides instantaneous, holistic connections across the universe.” Lucht adds, “The Aspect Experiment, as we shall see, begs to differ.”

I have written in detail about the Aspect experiment and its implications in two books, *The Unconscious Quantum* and *Timeless Reality*. By “instantaneous holistic connections” I mean some kind of useful information transfer at superluminal or even infinite speed. On page 137 of *Timeless Reality* I give references to seven papers proving that faster-than-light communication is impossible if the axioms of relativistic quantum field theory are correct. We have no reason to think they are not, after fifty years or more of successful application with no observed violations. Lucht may mean something different by “instantaneous holistic connections,” but this is what I mean.

Now, of course I do not deny that the Aspect experiment and many other experiments involving quantum effects can be puzzling. But that is only to the person who has trouble understanding quantum mechanics in his own mind, or who is seeking to go beyond physics to metaphysics where empirical evidence provides no guide. (If it did, it would be physics and not metaphysics.) Not a single one of the experiments Lutz mentions shows any violation of the theory of quantum mechanics that has been pretty much intact since 1930. That’s why the results of the Aspect experiment, which disagreed with classical ideas but agreed beautifully with conventional quantum mechanics, was greeted by most physicists with, “Ho hum. So quantum mechanics is correct. What else is new?”

Nevertheless, the quantum experiments are interesting to philosophers and philosophically inclined physicists, of which I am one, who like to speculate about ultimate reality, an unending task since there is no way without data (or divine revelation) to decide what that reality “really” is. In *Timeless Reality* I show that the philosophical “paradoxes” of quantum mechanics can be explained most economically in terms of conventional physics, if we accept the fact that time is reversible. Lucht mentions with awe an experiment that indicates the possibility of “backward causality.” In fact, all quantum experiments, including Aspect, can be more simply understood by including backward causality. I did not invent this idea. Again see *Timeless Reality* for references. Indeed, you have a philosopher right there at the University of Sydney who knows more about this subject than I or anyone else: Huw Price, author of *Time’s Arrow & Archimedes’ Point*.

The reason not to look in awe at the notion of time reversibility is the fact that you will not find evidence for a fundamental arrow of time in astronomical observations, laboratory experiments, or theoretical equations. The arrow of time of common experi-
ence, as Ludwig Boltzmann showed over a hundred years ago, arises from the fact that our macroscopic world is composed of huge numbers of particles moving in largely random motion. This results in many phenomena being highly more likely to occur in one time direction than the opposite. For example, nothing prevents a flat tire from re-inflating spontaneously. All that has to happen is that a large number of molecules of air outside the tire be all moving together in the direction of the puncture and so move in to refill the tire. This is not impossible, just highly improbable.

At the level of quantum events, time can run either way or both ways. As Richard Feynman showed in 1947, a particle going “forward” in time is equivalent to an antiparticle going backward in time. There is no way to empirically distinguish one from the other. This is how you can have a particle be in different places at the same time, one of the common occurrences in the quantum world, without superluminal motion. The particle goes forward in time, then turns around and goes backward, and then forward again passing through a different spatial point than it was at the same time “earlier” in its path.

In 1953 the French physicist Olivier Costa de Beauregard proposed that the type of experiment eventually realised by Aspect and his collaborators (generally called “EPR experiments” since they were inspired by a 1935 paper by Einstein, Podolsky, and Rosen) could be understood in terms of backward causality without the need of superluminal connections.7 Lucht continues to promulgate the myth that Aspect and other quantum experiments are “nonlocal.” Two events in space-time are defined to be nonlocal if one cannot find a reference fame in which they occur at the same place in space without moving faster than the speed of light. The Aspect experiment in “forward” time appears nonlocal since it seems to imply superluminal connections. However, when you run a film of the experiment backwards you will see that no superluminality is required and thus the experiment is local.

When you confront a philosophical or mathematical paradox in physics, the last thing you should assume is that something profound and beyond comprehension is happening. Almost certainly, you are making a logical or mathematical error. Quantum mechanics has a lot to offer, but one of those things is not magic.

**Notes**

1. Michael Lucht, “Quantum Quodlibet” the Skeptic (28;3 footnote 3).

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**Faith, Fact. from p 31**

who have been kept on virtually fat-free vegetarian diets, resulting in damage to their metabolic and digestive systems, and many doubtlessly well-meaning people are accepting a crackpot anthropology which is based on poor statistics, distorted history, ignorance of linguistics and archaeology, poorly done real anthropology, the “myth of the noble savage”, and a good dose of fiction, and which could lead to the establishment of a system of apartheid dividing Australians who also happen to be aborigines from Australians who are not.

The issue of the demarcation between science and non-science is more than just a philosophical mind exercise. As shown above, when people lose the ability to distinguish between fact and fiction they may also lose the power of rational thought, and the consequent delusions can have tragic results. There will always be charlatans who know the difference but pretend there is none, just as there will always be cranks and crackpots who deny a difference because they cannot see one.

It is the task of rational people to defend against both groups, and the only defence is a clear understanding that there is a real, qualitative difference between science and non-science. They are different, and the difference is absolute. Some beliefs can be proved, some can not, and nothing can be both.

**References**


Brain Gym®

A Cautionary Tale

The question I'm addressing is this one: how can something proven to be grounded in pseudo-science gain so much traction in educational circles? I'm going to tell you a bit about Brain Gym®, provide some evidence to support my assertion that Brain Gym® is pseudo-science, and I'm also going to be describing my own 'encounter of the first kind' with Brain Gym®.

A cautionary tale is a story told to warn its hearer of a danger of some kind. They were very popular in the Victorian era. Alice 'had read several nice little histories about children who had got burnt, and eaten up by wild beasts and other unpleasant things, all because they would not remember the simple rules their friends had taught them: such as, that a red-hot poker will burn you if you hold it too long; and that if you cut your finger very deeply with a knife, it usually bleeds; and she had never forgotten that, if you drink much from a bottle marked “poison”, it is almost certain to disagree with you, sooner or later.' All societies, not just Victorian ones, generate their own cautionary tales. Sometimes the primary purpose of relating cautionary tales is to prevent people infringing on that society's taboos.

In the three The Science of Discworld books, author Terry Pratchett, mathematician Ian Stewart and biologist Jack Cohen draw parallels between the 'rules' of Terry's fantasy world and the way things work in our world. The idea that there are three archetypical stories: tribal, barbarian and civilising — is outlined in the second book. The underlying messages of tribal stories are: 'do it this way because that's what we've always done and it works' and 'don't do it because it's taboo, evil and we'll kill you if you do.' In the barbarian story, it's 'that way lies honour, booty and much wealth (if only I can get a djinn or a gun). The civilising story is the quest undertaken by the third son following the failure of the first and second sons. The third son learns from these failures and succeeds. Because it learns from its mistakes, science is a civilising story. My encounter with Brain Gym® contains elements of all three story types.

'Brain Gym®' is a commercial training program created in the 1970s in California by Paul and Gail Dennison. It consists of a series of 26 movements divided into three categories. The claim in the literature and on the Brain Gym® website is that these movements help people 'enhance their experience of whole-brain learning' and that they can help anyone get better at anything. Dr Dennison has a PhD from the University of Southern California. His research area was beginning reading achievement and its relationship to thinking. The rationale, if I may call it that, behind Brain Gym®, consists of elements cobbled
together from all over the pseudo-scientific ball park.

A lot of it is derived from Applied Kinesiology (AK). AK is an alternative therapy based in chiropractic, to which elements of Traditional Chinese Medicine have been added. AK proponents include chiropractors and naturopaths. They believe that there is a universal intelligence of a spiritual nature called chi which runs through the body, and that they can determine the health of bodily organs and nutritional deficiencies by measuring muscle resistance. One core belief is that the body knows the difference between good sugar (fructose) and bad sugar (glucose). A drop of sugar is placed on the subject’s tongue. The AK practitioner then tries to push the subject’s upraised arm down to a horizontal position while the subject resists. Resistance means it’s the good sugar! No resistance means it’s the bad sugar.

There is 150 years of scientific research showing that these movements are ideomotor responses. They are unconscious actions — movements we make that we aren’t even aware of. The term ‘ideomotor action’ was first coined by William B Carpenter in 1852 to explain phenomena like dowsing. In 1853 Michael Faraday reported on his investigation into table-turning. His conclusion: the table was being moved, in all likelihood quite unconsciously, by the people sitting at it, and not by some mysterious source of energy. These and other scientific studies done since Faraday’s time are described in Ray Hyman’s excellent article, “How people are fooled by ideomotor action”. It is available on-line via Quackwatch.

**Educational Kinesiology**

In a style reminiscent of the White Knight in *Through the Looking Glass*, Dr Dennison claims that Educational Kinesiology, the theory underpinning Brain Gym®, is his own invention. It is based on the following set of premises. Some individuals have problems with the brain integration mechanisms necessary to complete learning. The solution is to use movement repatterning to promote whole-brain learning. The Dennisons claim that Brain Gym® movements remove these ‘learning blocks’.

There are 26 Brain Gym® exercises, grouped into three categories to go with the perceived dimensions in the human brain:
- ‘Focus’ is the ability to co-ordinate the front and back of the brain;
- ‘Laterality’ is the ability to co-ordinate the right and left hand sides of the brain;
- ‘Centering’ is the ability to co-ordinate the top and bottom of the brain.

The claim for the first group, Lengthening Activities, is that they release tension and improve focus by removing ‘learning blocks’ between the front and back of the brain.

*Let’s try some Arm Activation. Hold one arm next to your ear. Exhale gently through pursed lips, while activating the muscles by pushing the arm against the other hand. The claim is that this ‘exercise lengthens the muscles of the upper chest and shoulders? If these muscles are shortened from tension, activities related to writing and the control of tools are inhibited.’*

The second group are the midline movements. These movements are meant to stimulate the left and right hemispheres of the brain, thus helping to overcome reading problems like dyslexia.

*Let’s try some Lazy 8s. We draw the infinity symbol in the air in front of us starting at a point in front of our eyes. We move our arm counter-clockwise — up, over and around. We do this 8 times and then change hands.*

In his explanation of why these midline movements are meant to work, Dr Dennison states:

*Cros motor activities have been used to activate the brain since our understanding of laterality began over a century ago. Noted authorities such as Orton, Doman, Delacato, Kephart and Barsch have used similar movements successfully in their learning programs.*

There is a golden rule that reference librarians learn. When attempting to verify the accuracy and reliability of a source, check it out in an area you’ve got some knowledge in. If it comes up dodgy, then the odds are that the whole thing may be dodgy.

Two names jumped off the page at me: Doman and Delacato. Their discredited theory of psychomotor repatterning postulates that the brain only works properly if motor skills are learned in the correct order. The extrapolation is that, through movement, the brain can be repatterned. Retardation can be cured through the implementation of a program including guided creeping, crawling and rolling.

The Doman-Delacato ‘technique’ was marketed to a very vulnerable target group — the parents of disabled children. It is expensive, time consuming, and incredibly labour intensive. It didn’t work then, it doesn’t work now and has been widely condemned by the major professional organisations concerned with cerebral palsy and mental retardation. There’s an excellent article on psychomotor patterning by Steven Novella available on-line from a number of sources.

**Chi whizz**

And now for the ‘chi whizz’ part of Brain Gym® with the third group of exercises, the Energy Exercises. These are supposed to ‘hook up the electrical circuits in our bodies’ so that ‘our inner system of communication works even better’. We can do one of these while sitting down comfortably without even leaving our seats. Our Brain Buttons are the soft tissue under the clavicle to the left and right of the sternum. We massage them deeply with one hand while holding our navels with the other hand for 20 – 30 seconds. Did you know that your Brain Buttons lie directly over and stimulate the carotid arteries that supply freshly oxygenated blood to the brain? As one of Brain Gym®’s chief critics Ben
Goldacre put it: ‘through your ribcage and without using scissors’?
A specific learning difficulties teacher made these comments about Brain Gym® on Ben’s Bad Science blog.
I am professionally trained and qualified to help those, even those labelled dyslexic, to learn to read. I do this by showing how the 44 phonemes: that is, sounds, that come out of their mouths in different combinations make words that match up to the 120 graphemes: that is, letters and groups of letters, in written English ... It is bonkers .... to think that if you stand on one leg a lot and do other such exercises, your literacy levels will miraculously improve without specialist literacy teaching. I find this a marvel of evolution.. Writing hasn't been around that long. It is a totally human construct and therefore has no biological innate aspect. Yet all those poor dyslexics whose brains are wired up wrongly for something that didn't exist when their forebears were still sitting in trees, can summon up the gift of literacy through some physical jerks.

Investigating
I first heard about Brain Gym® at the 2001 Skeptics convention from Queensland Skeptics president Bob Bruce. When Brain Gym® emerged on our Professional Development agenda, unlike most of my colleagues, I did have the benefit of some prior knowledge. I decided, as any good skeptic should, to go along with an open mind. However, this resolve didn't last very long. Some of the statements made by the presenter were so whacko (water being absorbed through the roof of the mouth was one absolute shocker) that I spoke up and challenged some of the assertions. This did not go down well. For my trouble I was 'spoken to' afterwards by the Powers That Be. I apologised for being rude, which I had been, but that was far as I was prepared to go. I was not prepared to accept the argument that 'Brain Gym® works so that makes it a good thing.'
At the time I was struck by the irony that a week or so earlier we'd had a really great Professional Development session on the scientific method and fair tests. I was left to ponder the question of why I was the only person to speak up.
Were my colleagues really behaving like the White Queen in Looking Glass Land and believing six impossible things before breakfast? Probably not. Teachers are practical people. We work on a similar principle to clinicians. If something works, it works and we use it. I very much doubt that after five hours spent in an unairconditioned Queensland classroom in February that very many of my colleagues were paying much attention to the presenter at all, let alone to the bogus science which was being trotted out. As a survival mechanism, teachers become experts in selective listening at sessions like these. We pick up on the bits which may prove useful to our teaching practice and ignore the rest.

Some good ideas
To be fair, there are some really good ideas at the core of Brain Gym® which even its most strident critics acknowledge.
- Proper hydration (drinking water) is a good thing.
- Exercise breaks and physical activity generally are also a good thing, and are especially valuable when working with young children.
Segue forward two years. I was sent a link to Ben Goldacre's Bad Science blog by a skeptical colleague. I emailed the link to 'Banging your head repeatedly against the brick wall of teachers' stupidity helps increase the flow of blood to your frontal lobes' to my colleagues with the comment: Brain Gym is pseudoscientific nonsense — here's the evidence.
The key point I wanted people to pick up on is towards the end of the article, that is, that people buy into bogus explanations much more readily when they are dressed up with a few technical words from the world of neuroscience. And guess what? I upset some people again! I posted this email in reply.

For those of you who say that Brain Gym works, my reply to you is that anecdote isn’t evidence. It can never be any more than a starting point for a proper investigation. The fact remains that the science underpinning Brain Gym is junk ... Come on, guys. We are teachers after all, and should value and actively promote the scientific method. We shouldn’t be promoting pseudoscience.

(I did get a private ‘hear hear’ from one colleague.)
Once again I was left pondering a couple of questions. Why were some people so committed to Brain Gym®? Why weren’t they even prepared to consider any evidence that they might be wrong? One obvious answer is that people just don’t understand the principles of science well enough, particularly the role of falsification. Science is unique in that it tries to find out why a proposition may be false, not why it may be true. This is something which is counter-intuitive. It doesn’t come naturally to us. The human tendency is to seek evidence to confirm what we already believe. But this is only part of the answer.

Cognitive dissonance
I got another insight when I found this book: Mistakes were made, but not by me: Why we justify foolish beliefs, bad decisions and hurtful acts, by social psychologists Carol Tavris and Eliot Aronson. They talk about cognitive dissonance. Cognitive dissonance is the unpleasant feeling we get when we hold two conflicting cognitions: that is, two conflicting ideas, attitudes, beliefs, opinions. If one of these cognitions is one which is important to us, in which we have a big investment, then that’s the one we are going to try to stick with, and we will look for
reasons to modify or abandon the other one.

This was something Leon Festinger discovered when studying a doomsday cult. The end of the world didn't happen as predicted, but only those people on the fringes walked away. The true believers, those who were in the deepest, bought their leader's assertion that the world had been spared because of their faith and celebrated their success.

This can be modelled in the following way with Brain Gym®.

Proposition A: Brain Gym® works.

Proposition B: Science proves that Brain Gym® doesn't work.

One of these has to go. For me, it is Proposition A. For the Brain Gym® true believers, it is Proposition B.

There are four self-justifying strategies that we use to reduce cognitive dissonance.

Minimisation: The bogus science doesn't matter because it works and it's probably not bogus anyway because science doesn't know everything let alone have all the answers.

Blame the victim: If Brain Gym® (or the Doman-Delacato technique) isn't working, it is your fault because you aren't properly committed and/or you aren't doing it properly.

Kill the messenger: I wasn't killed, but I was told to be quiet and stop upsetting people!

Dismiss the research when you don't like the results: A classic instance is described by Ray Hyman in the article previously cited. The results of a double blind test on the body's ability to detect the difference between good and bad sugar were given to a group of chiropractors who practiced Applied Kinesiology. One commented in all seriousness: and 'that is why we never do double-blind testing any more. It never works!'

If we are at the top of the pyramid of choice, we don't really care very much one way or the other what choice we make. Since our first steps are often morally ambiguous, we need to justify them.

The further we move down the side of the pyramid, the more committed we become, the more we need to justify our decisions and the more we become convinced that we always felt this way.

This was the real 'Ah ha' moment. It hit me why I was never going to convince the Brain Gym® 'true believers' or the Powers That Be. We're at opposite ends down at the bottom of the Pyramid of Choice. The lesson learned was that my efforts were better redirected to where I had a chance of making a difference; that is, to the bulk of my colleagues still at the top of the pyramid.

Recently I came across an article by Charlie Brooker in The Guardian: 'British schools are falling for the pseudoscience of Brain Gym. Why fill kids' heads with nonsense?'

Charlie says:

I care about the difference between fantasy and reality, both of which are great in isolation, but, like chalk and cheese or church and state, are best kept separate.

To which I say yes, yes, yes!
He goes on to say:

If we mistrust the real world so much that we're prepared to fill the next generation's heads with a load of gibberish about 'brain buttons', why stop there? Why not spice up maths by telling kids the number five was born in Greece and invented biscuits? ...

We, the adults don't just pull the wool over our own eyes – we knit permanent blindfolds. We've decided we hate facts. Hate, hate, hate them.

But while journalists like Charlie Brooker and Ben Goldacre make use of highly charged language to hook people on the emotional level to suit their purposes, it does run the risk, as I found out, of alienating people who take what is said in articles of this kind personally and get offended. Sometimes it is not a good idea to upset people, particularly if they have power over you in some way.

And now for some good news

The Times, on April 9 this year, ran the following story:

Brain Gym claims to be withdrawn

The creators of an educational exercise programme used in hundreds of schools in England have agreed to withdraw unsubstantiated scientific claims in their teaching materials. The Brain Gym programme, which uses 26 teacher-led physical exercises to help to promote learning, was at the centre of controversy this week after respected scientific organisations complained to local authorities about the company's training manual. Paul Dennison, a Californian educator who created the programme, admitted that many claims in his teacher's guide were based on his 'hunches' and were not proper science.

Some groups within the scientific community — the British Neuroscience Association, the Physiological Society and the charity Sense About Science, got pro-active and wrote to every local education authority in the UK, calling Brain Gym® on what it actually is. Apparently their efforts have resulted in Dr Dennison agreeing to withdraw the unsubstantiated scientific claims in his company's teaching materials.

I wonder if these claims will be removed in time for 'Expand Your Horizons', the Australian Brain Gym® Summer School, to be held at Trinity College at Melbourne University from 11th – 18th January 2009? It is not going to be a cheap exercise for anyone who wants to go along and find out. A master class with Paul Dennison costs $250. There are more expensive options: Vision Circles Teacher Training at $740 is the most expensive and Total Core Repatterning is $555. The cheapest is 'Switched on Selling' at $185.

I found one of the best statements ever made about science in Gaudy Night, a whodunnit set in a University College in Oxford in the 1930s.

One of the characters makes this statement:

The only ethical principle which has made science possible is that the truth shall be told all the time. If we do not penalise false statements made in error, we open the way for false statements by intention. And a false statement of
**Brain Gym**

fact, made deliberately, is the most serious crime a scientist can commit.

It will be interesting to see what kind of a scientist Dr Dennison is prepared to be. He is now on record as having acknowledged the possibility he made a mistake, but whether he can let go of something he has such a huge investment in is a moot point indeed and something only time will tell.

**Fighting the good fight**

Do I keep fighting the good fight? The answer is yes. If teachers want to be taken seriously as professionals we can’t appear to be condoning, let alone endorsing, pseudoscientific practices. We need to call programs peddled to us by snake oil merchants like Brain Gym® on what they are, and keep them out of education and our schools.

That being said, we need to remember that many of the stakeholders to whom we are accountable, school administrators, bureaucrats in government departments, politicians and the general public, find the easy answers and magic bullet solutions offered by these people to problems in education very attractive. Once they’ve bought into them, it makes it that much more difficult to obtain any kind of admission that they got it wrong, let alone to get them to do anything about it.

From here my plan is to use what I’ve learned more strategically and to better effect. I hope I’ve learned the right lessons from my mistakes, most notably from the huge one I made in confronting the Brain Gym® presenter directly while the PD session was in progress, something which proved counterproductive.

And to end on a positive note. For me, social psychologist Paul Meehl may well have captured the essence of what it is to be a skeptic when he defined ‘Skepsis’ as:

That passion not to be fooled and not to fool anyone else.

That’s a great principle and I commend it to you.

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**Convention Roundup**

We were a bit worried about the Adelaide Convention, when it seemed to be getting too late to get all the information out. In the event, concerns were groundless as it turned out to be a very good convention indeed and well up to expectations.

The carefully restored Norwood Town Hall, with its typical late 19th Century Victorian municipal architecture, was an excellent venue for the discussions, and contrasted nicely with the modern structure of Adelaide University’s National Wine Centre, the site of the Annual Dinner.

Proceedings began with excellent presentations on educational themes from Debra Panizzon, Kylie Sturgess, Margaret Kittson (paper is in this issue) and Mike McRae.

After lunch, many in the audience were taken back to their childhood, with a most entertaining demonstration of scientific principles by Rob Morrison and Deane Hutton, who reprised their long-running TV production, the Curiosity Show. They were followed by an enthusiastic Richard Saunders demonstrating what he does as a Mystery Investigator and discussing his role on the TV show, The One. The day concluded with a showing of the documentary, Flock of Dodos, based on the US trial which threw Intelligent Design out of schools in Pennsylvania.

Sunday started with scientists Barry Brook and Ian Plimer presenting their differing views on the causes of climate change, followed by questions from the floor. There was no indication that either speaker convinced the other.

The afternoon session saw thoughtful presentations on rationality and cognition from Nigel Dobson-Keeffe and Glen Smith before the convention concluded with the ever-feisty Loretta Marron explaining her battles to force health regulators to concern themselves with various forms of quackery.

The well-attended Skeptics Dinner served as the platform for the announcement of awards, as well as entertainment from magician and comedian, Nicholas Tweedie.

The $10,000 Australian Skeptics Prize for Critical Thinking went to Queensland teacher, Peter Ellerton, whose paper in this issue explains the outstanding work that won him the Prize.

The less-prestigious Bent Spoon Award went to Dr Kerryn Phelps, a former head of the AMA who has latterly lent her name to a clinic offering various unproven ‘alternative’ remedies.

A totally unheralded presentation brought tears to the eyes of retiring Executive Officer and Editor, Barry Williams, who was presented with a boxed-set of the Complete Works of Charles Darwin as a tribute to his work for the Skeptics over many years.

This Convention lived up to the quality we have come to expect from our groups and congratulations are due to Laurie Eddie, Nigel Dobson-Keeffe and all concerned.

As usual, the indefatigable Richard Saunders taped the whole thing and a 2-disc DVD is now available.
Readers of the Skeptic might remember an article I wrote a couple of years ago, which explained why the book *1421: The Year the Chinese Discovered the World* was wrong, in that it misused evidence to support a flawed theory.

You never know where such articles might lead. In my case, it led to me being the only non-archaeologist to give a talk at the New Ground Australasian Archaeology Conference 2007, and I thought I’d share with you some of my experiences. I was invited to give a talk within the theme of Secret Visitors, which discussed the attraction of fringe archaeology and its popularity with the public.

The conference was an impressive affair. There are several professional archaeology associations and institutes in Australia, and they usually hold their own annual conferences. But in 2007 they held a joint annual conference, as they do every few years, called New Ground, and held at Sydney University from 21-26 September. Roughly 450 delegates attended the conference. Most were professional Australian archaeologists, but there were also a few students and a few professionals from overseas. And yes, there was one non-archaeologist present. Needless to say, I was more than a little concerned to ensure I did a good job of representing Skeptics, and that my talk should be of a suitable quality for the conference. After all, there were four simultaneous streams of presentations, so delegates unimpressed by my talk could easily find something else to listen to.

The conference started with an official opening held at the Great Hall of Sydney University, a building which impresses upon the visitor the power and grandeur of knowledge.

The keynote speaker was Professor Michael Parker Pearson, from Sheffield University in the UK, who spoke about Archaeology and the Media. Professor Parker Pearson described how archaeology shows on TV have changed over the decades, and discussed the fraught relationship between the archaeological profession and the media. In the case of television shows, he explained how they've changed from talking heads in the 1960s to the more hands-on shows of today, *Time Team* being a classic example. But despite *Time Team*'s popularity with the public, Professor Parker Pearson said that the show is held in low regard by some archaeologists, because of what it fails to explain about the process of archaeology.

In the case of interaction with the media, he explained the difficulties both of getting archaeological stories into the media, and of ensuring the media get them right. He gave an example of one British media outlet describing how archaeologists had been “stunned” to discover a “secret underground village” near Stonehenge. In reality, the village was a...
perfectly normal prehistoric village, neither “secret” nor “underground”, and the archaeologists were simply excited by their discovery, not “stunned”.

What might surprise you was that the media outlet responsible for this story was the BBC. By contrast, a Murdoch tabloid which also reported the story got it essentially correct. Professor Parker Pearson’s opinion was that the tabloid, with experience of being sued for inaccurate reporting, limited itself to quoting the press release, while the BBC’s editors felt knowledgeable enough about the material to attempt to “improve” it.

There were three other speakers who gave presentations as part of the Secret Visitors session. Denis Gojak, the session convenor and member of the Skeptics, started the session by discussing 200 years of secret visitors to Australia, showing that unorthodox theories about Australia’s past have been proposed almost since the start of European settlement. He paid particular attention to the Mahogany Ship and the Gynpie Pyramid, and I’m sure readers are familiar with at least one of these “features”.

Dr Robin Derricourt then spoke about Raymond Dart, probably Australia’s most famous archaeologist. He initially spoke about Dart’s description of the “Taung Boy” fossil in the mid 1920s. This led to the naming of Australopithecus africanus as one of our more distant ancestors, and thus provided important evidence of human evolution, despite nearly a decade of official skepticism. Dr Derricourt then looked at Dart’s subsequent research, most of which is now considered to be well off track. Dart’s claims included non-African origins of Great Zimbabwe, Mongolian genes being present in African Bushmen, and his theory of an Osteodentokeratic Age, in which he proposed that early humans used bones, teeth and horns to make tools before they started using stone.

Finally, Stephen Nicholls discussed the way pseudo-archaeologists exploit public interest in archaeology, or “archaeo-appeal”, to gain unwaranted attention for their fringe theories. As an example he mentioned Greg Jefferys, a tireless promoter of the theory of the Stradbrooke Island Galleon. He then compared this with the general reluctance of mainstream archaeologists to employ archaeo-appeal.

My talk discussed the motivations of people who develop and promote pseudo-archaeology, and why it’s popular with the public. I then looked at how to combat it, and who should do it. It probably won’t be a big surprise to readers of the Skeptic that I think Skeptics have a useful role to play in countering pseudo-archaeology, because of our experience in dealing with other fringe theories — the techniques are easily transferable — but I added that it was important that archaeologists get involved in this activity too.

Finally, I discussed some of the methods and rewards available for combating pseudo-archaeology, mentioning the Australian Skeptics Annual Prize for Critical Thinking, Dr Martin Bridgstock’s course in Critical Thinking at Griffith University, the Bad Archaeology web-site (www.badarchaeology.net), and even archaeological fiction.

Unfortunately, our session started late, meaning there was no time for questions. But through the course of the day several delegates congratulated me on my talk and shared anecdotes of their own experiences with pseudo-archaeology.

With my talk complete, I had no further official duties for the day, so spent some time listening to other talks and chatting to a re-creation archaeologist. This man had an impressive display of carved mammoth ivory (which, unlike elephant ivory, can be traded freely, due to the mammoth’s extinction), flint sickles, and bronze swords and axes, all made by him or his students using what are currently considered to be original methods.

His display also described the recent rediscovery of the technique by which Sri Lankan blacksmiths, a thousand years ago, exploited monsoon winds to power furnaces which created high quality steel weapons. It was a fascinating demonstration of how people can learn by experimenting, in stark contrast to the behaviour of most pseudo-scientists, who, in my experience, concentrate on jumping to conclusions.

A few days later, my wife and I joined an archaeological tour of Sydney Harbour organised as part of the conference. Over the course of a sunny Spring afternoon we had the pleasure, along with about 100 other delegates, of hearing what archaeologists have uncovered in and around the harbour. The three main subjects were Sydney’s pre-European Aboriginal society, early Colonial history, and the Japanese midget submarine attack on Sydney in 1942. This last subject was all the more topical given the discovery of the previously missing third midget submarine offshore from Sydney’s northern beaches.

I had a wonderful time at the conference. Despite being very much an outsider, I was warmly welcomed by the other delegates, who were most willing to share their knowledge while at the same time being willing to discuss skeptical matters. They were, in other words, the opposite both of the stereotypical stuffy academics in their ivory towers, and, more importantly, of pseudo-scientists with their dodgy theories in search of supporting evidence. I’m confident that professional archaeologists are now more aware of the danger of pseudo-science creeping into their profession, while at the same time learning what Skeptics can do to help them limit its effects.

Finally, I should thank Denis Gojak for asking me to speak at the conference and for his assistance before and during the conference, and the Australian Skeptics for paying my registration fee for the conference.

Postscript:
As a result of my talk at New Grounds, I applied to give a similar talk at the Sixth World Archaeological Congress in Dublin in July 2008, and was accepted. Unfortunately I was unable to attend due to illness.
I wanted to test a pet psychic, but there was a slight problem. I didn't have a pet. Fortunately, my neighbours Matt and Bekah Johnson have two cats. There is Bizzy, a painfully shy toothless tabby, and Tennessee Jed, a plump, rambunctious tomcat. Since Bizzy rarely emerges from beneath the bed, Jed seemed the preferable feline subject for the investigation.

“Can I borrow Jed so I can test a pet psychic?” I asked my neighbours. “Sure!” they obliged, as though I'd asked if I could simply borrow a hammer, or for the proverbial cup of sugar. I had the pet, now I needed a pet psychic.

Call it animal communication, animal whispering, or interspecies telepathic contact, this is big business for a clientele of doting owners, nervous trainers and exasperated farmers. These psychic Doctor Dolittles claim variously to be able to perceive and understand the 'words', thoughts and feelings of non-human animals (including deceased pets) using clairvoyance, clairaudience, telepathy and channeling, and often to be able to diagnose and treat their diseases. There are hundreds of pet psychics in California alone. Here are some samples of their claims.

Reverend Sylvia Shaules, pictured above clutching a terrified-looking rodent, specialises in the mysterious-sounding “dreamtime messengers”, “totem animals” and “Giving Your Animal a Voice” (yes, her voice). Animal analyst Patrice Ryan (patriceryan.com) is pet psychic to the stars of Hollywood. For $400 per hour she'll perform “energy healing” on your pet. This sounds vague, but Ryan enthuses, “It’s truly a profound and enlightening experience.” Lori Wright (healingheartstrings.com) will practise hands-on or remote reiki on your kitty, and claims to be able to contact deceased pets, but she won’t (can’t?) “consult on lost animal situations”.

Buddy Love (liveperson.com) is “California’s Finest Male Pet Psychic” for whom “no problem is too big” [sic]. Love’s client reviews accuse him of being a slow typist during chat room readings while user “mykidzrule” complained of Love’s reading, “Completely opposite of what he told me last time.” Paula Brown (animalhearttalk.com) styles herself as an “animal feng shui expert” and prepares remedies for your pet’s health needs. Small animals have delicate constitutions, so this is a particularly dangerous practice, but since Brown’s preparations are “flower essences”, they probably only serve as pet placebos (or owner placebos).

Animal Intuitive Cindy Western (chatswithanimals.com) claims the
The Ballad of Jed

incredible ability to “hear the voices” of animals. She explains, “it’s like having a conversation with a person, but it’s a conversation between the minds.” Western “heals and cares” for your beloved pets with herbs, vitamins, aromatherapy and massage (is that like petting?). Animal communicator Kazuko Tao (animaltelepath.com) offers pet acupuncture and chiropractic. As a Registered Veterinary Technician, Tao should know better than to offer these integrative services.

Like Ace Ventura, Lydia Hiby (lydiahiby.com) fashions herself as a “pet detective.” A Dr Kevorkian for pets, she advises clients “when it is time to put an animal to sleep.” Hiby further claims she can communicate with non-verbal people, including “comatose, stroke victims, autistic children, etc.” But she won’t read deceased pets, instead she recommends the John Edward of pet psychics, Teresa Wagner (animalsinourhearts.com). Wagner is a “grief counselor” and pet medium who conducts séances with animals that have “crossed over Rainbow Bridge”.

But don’t be concerned about these wild claims, the pet psychic industry is regulated by a stringent “Code of Ethics”, devised by “pioneer animal communication specialist” Penelope Smith (animaltalk.net). Smith claims that telepathic communication enables “universal communication” across species...

Unfortunately, these pet psychics were either too far away, or unavailable. Instead, they all offered remote appointments, email or telephone readings upon supplying the name, age, sex, colour, breed and a photo of the animal. It was back to the clawing board for me.

Finally, I located Reverend Ann Savino (celestia.com), “The Bay Area Pet Psychic”. Savino is a “professional clairvoyant and staff member of the Academy for Psychic Studies. Her advertisement beams, “Psychic readings for animals. Animal communication and healing. Pet readings lovingly done — Give to those who give so much to you”. For a fee of $80, Ann agreed to travel from Berkeley to San Rafael to read ‘my’ cat. The following is a report of this appointment, laced with commentary and Matt’s responses to the reading. With Ann’s permission I video recorded the entire session.

On the appointed day, Bekah arrived with a very skeptical-looking Jed. He wasn’t happy about being whrenched from his turf. Released in my lounge room, Jed slunk around close to the ground and darted under a futon, where he stayed. Normally a cocky kitty, this behaviour was highly uncharacteristic. At first, I indulged Jed’s shyness, hoping that he would quickly assimilate to his temporary environment. Then he fell asleep. The time drew nearer to the appointment, and I needed to extricate him from his hiding spot. It wouldn’t take a pet psychic to deduce that something was wrong.

I called his name excitedly, but he stared coolly at me. I tried to lure him out with a very fun-looking fuzzy pineapple toy, and a tasty turkey snack, to no avail. So I had to adopt the tough love approach. I dragged aside the futon, grabbed Jed, held him firmly on my lap, and began petting him enthusiastically. It worked! Within minutes he was purring, frolicking around and rubbing against me.

I heard a knock at the door and did a last dash around the house, hiding copies of the Skeptic. Ann entered the room and Jed took one look at her before retiring to the corner, wrapping himself up in a ball and sleeping with one eye open, fixed on her. She seemed nervous, so I made small talk, “Have you ever read any bizarre animals, like a llama?” She seemed to relax a tad, “Mostly cats and dogs. Once I read a guinea pig.”

But not this time. Even “un-psychic performance artist” Lydia Hiby (lydiahiby.com) fashions herself as a “pet detective.” A Dr Kevorkian for pets, she advises clients “when it is time to put an animal to sleep.” Hiby further claims she can communicate with non-verbal people, including “comatose, stroke victims, autistic children, etc.” But she won’t read deceased pets, instead she recommends the John Edward of pet psychics, Teresa Wagner (animalsinourhearts.com). Wagner is a “grief counselor” and pet medium who conducts séances with animals that have “crossed over Rainbow Bridge”.

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“I’ll need a few minutes to centre myself and warm-up,” Ann explained. She sat there, eyes closed, hands outstretched as though she was warming herself over an imaginary fire. For five minutes. When she came to, like a mountaintop seer she asked sagely, “What questions do you have?” “Can you tell me about Jed’s past?” I asked. Of course, this implied that I didn’t know Jed’s past. “How long have you had him?” Ann asked. “Can’t Jed answer that question for you?” She shook her head. “No, I’m just wondering.” “About six months,” I claimed, waiting for Jed to ‘speak’ up. “Is he from a shelter?” she asked. “Can’t Jed tell you about his background?” I urged again, wanting to witness the psychic action. “I think he’s from a shelter. I can tell you haven’t had him long,” she stated.

Matt comments: “The psychic guessed that one. We got him from a rescue society that got him from the pound. He was one of a litter of kittens someone brought in.” Cat adoption is popular here in the States. Pet stores regularly hold “rescue days” for abandoned cats and kittens that are typically tabby moggies like Jed. But can we count this as a ‘hit’? As rescuing is a common practice, this was a logical question, followed by “I think he’s from a shelter”, admittance of a cognition-based conclusion.

Ann also assumed that I hadn’t owned Jed for a “long” period of time. Was this supposition based on my accent, that I ‘hadn’t been in the country very long myself? Or because I implied that I was unaware of Jed’s past? Or was this an observation based on Jed’s size? The latter is suggested by the following exchange.

“How old is Jed?” I continued. “He’s one year old,” Ann answered immediately, “but I can tell that by just looking at him”. Although not a psychic vision, this visual conclusion was inaccurate anyway. Matt reveals, “Jed is roughly three years old. We’ve had him since he was twelve weeks old.”

I was beginning to become frustrated with this un-psychic performance and Ann’s shameless questions. “How does Jed actually ‘talk’ to you?”
I enquired. She replied, “He sends me images. I read his aura. It’s like an energy field that contains pictures and information. I ask him specific questions and he shows me images.” So Jed ‘understands’ Ann’s complex questions, uttered in her English-speaking ‘inner voice’? Then she offered a disclaimer, “This reading isn’t full of hard-wired facts. I see images, like Jed playing in the grass and rolling over.” If I had to visualise a specific cat, I’d probably ‘see’ it playing, eating, sleeping or enacting other such typical cat behaviour too.

“Is Jed aware that you’re communicating with him?” I asked. “Yes,” Ann replied. I looked across at Jed, who was fast asleep.

“Where was Jed born?” I asked. Ann closed her eyes momentarily. When she opened them she announced, “He was born not far from here. It was here in Marin County. This was somewhere hilly, not downtown San Rafael. It was maybe a little north, like Petaluma. It was definitely in this area, within a 10-15 mile radius.” The truth was unpredictable. Jed wasn’t even born in California. Matt replies: “Jed was born in/around Jackson, Mississippi. This is over 2000 miles from Marin and not so much as a large hill in sight.”

I asked next, “Does Jed feel at home here?” “Let me tune into him,” she said as her eyes rolled back into her head. “He’s happy here. He feels secure and safe. He definitely feels at home.” She paused, “This is the most secure he’s ever felt. He knows that this is his home”. Sure enough, if Ann were psychic, she would ‘see’ images of Jed’s real home and real owners? But then she really drove the nail in, “Jed’s secure, happy and safe in this home. He knows he’s loved. He knows that you’re his mummy.”

This recalled to me the previous scene before Ann arrived. As Bekah left, she bent down towards Jed and said endearingly, “Goodbye son. I’ll be back soon.” It was very clear that she is the cat’s mother. Weeks later, I met Matt’s mother, Miss Linda, who said to me, “I hear you’re writing about our grandson.” “I’m sorry?” I replied, confused. “I hear you’re writing about Jed.” Either she wants grandchildren, or Jed is seriously entrenched as a member of the Johnson family.

But don’t let the truth get in the way of a good story. I allowed Ann to continue her storytelling. She began weaving a tale about Jed that would fused. All the fuss and attention you give him, it’s all new to him. He’s had other owners but he’s never been someone’s pet before you.”

“Jed had other owners before me?” I repeated in surprise. “Yes, Jed had three previous homes. They were all temporary, and they all neglected him. They didn’t give him any affection and then abandoned him,” she claimed. Jed had led quite an adventurous life during his first six months! I asked Matt if this could be possible: “No, other than the person that brought him and the other kittens to the pound when he was quite small.”

The story continued. “Jed also had three different names.” I asked her what these names were. She paused. “He was called something beginning with ‘P’. Also he was called ‘Buttons’. The previous owner just called him ‘Cat’.

“Would he benefit from having another cat around?” I asked, seeing Jed and Bizzy in the picture. “Yes, Jed had previous owners but he’s never had someone’s pet before you.”

In Ann’s story, Jed was impounded after a life on the streets. “He didn’t get a lot of attention in the shelter. There were lots of other cats.” He then became a foster cat foisted upon different homes. “He never had a steady owner before you. Until you, no one ever made the commitment to say, ‘You’re my cat’. Now he’s exteriorising a specific cat, I’d probably ‘see’ it playing, eating, sleeping or enacting other such typical cat behaviour too.

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past, other cats were his family, not people. The other cats were more dominant than him.” Matt responds with: “My butt! Jed is delusional in thinking that he is “Shere Kahn” from Rudyard Kipling’s Jungle Book. And he freaks out when Bizzy is not around. He searches for her and yowls pathetically when she is at the vet or when she was missing.”

Ann continued, obviously analysing Jed’s current introverted behaviour. “He’s very sensitive. He’s not the kind of cat that just walks up to people he doesn’t know. I know other cats like this too. My sister has a cat. He knows me well. He hides as soon as he sees me.” Who said pet psychics have a sensitive connection with animals? Matt responds: “Jed can be shy, but that quickly diminishes into a forceful attitude as I’m sure you are aware. He lived with his grandparents for the summer and took over their home in about 10 minutes re-arranging things to his liking. Some folks he likes, some he ignores, and some he attacks (mainly small children) with swift slaps to the top of the head.” I have personally witnessed Jed terrorising Bizzy, and attacking Matt, ambush style.

Ann began to wind down the session, “I’m going to take a look at your agreements; why you two came together to be neighbours?” Or, “so Karen could investigate pet psychics (americanspiritnews.com), where she contributed to the online American Spirit psychic newspaper, (americanspiritnews.com), where she conducts free readings for readers. There I found simple queries and answers about characteristic cat behaviour, as though Ann were a pet psychologist. My reading with Ann was a cat cold reading.

Cold reading techniques
Joe Nickell cites five general cold reading techniques that he has observed in pet psychics:
1. Noting the obvious. 
2. Making safe statements. 
3. Asking questions. 
4. Offering vague statements that most people can apply specifically to themselves. 
5. Returning messages to animals. (It was the message I received in response that invalidated this ability!).

On the basis of this session, Ann didn’t provide any evidence of psychic abilities, but instead appeared to employ similar techniques, either consciously or not. As confirmed by Jed’s owners, Ann was completely inaccurate in her reading of Jed’s age, place of birth, background, behaviour, health and my health. The shelter ‘hit’ was more miss, posed as a question, and then an uncertain claim with the caveat “think”. Most damning of all, Jed is not my cat, and my home is not his!

It’s an easy gig to speak on behalf of the voiceless. Animal communication, of a paranormal nature, presupposes that the pet is telepathic, is able to understand human language and thought, and able to respond in kind. “Interspecies communication” appears to be a visual and subjective or imaginative interpretation of the physical and behavioural traits of non-human animals. No matter how many commands your dog responds to, no matter how many words Koko can sign, no matter how many words your parrot can mimic, language is human-species specific. We don’t and can’t “know” what animals think. Despite our own linguistic abilities, it’s difficult enough to know what people think.

Reference
The strange belief of a growing faith

Former Massachusetts Governor Mitt Romney ended his campaign in February for the Republican Party nomination for the US presidency when it was clear he was failing to break his rival John McCain’s domination of the contest.

Before he waged a fervent campaign for the GOP presidential nomination Romney had a diverse career as a businessman, the organiser of the 2002 Winter Olympics and governor of the state of Massachusetts. However, a lot of the attention Romney attracted in his campaign was based on his religion — Mormonism.

The Church of Jesus Christ of Latter-day Saints, commonly known as the Mormon Church, despite its slow steady growth, wealth and carefully groomed family image has always been considered unusual by the general public. In the case of Mitt Romney the heavy scrutiny his religion received was clearly a hindrance, not a blessing.

The pugnacious, iconoclastic Christopher Hitchens, author of God Is Not Great, believed that Romney needed to openly discuss his faith, considering Mormonism’s strange theology and a past stained by racism and polygamy.

Mormonism received further major international media attention in April. The Texas Child Protective Services and heavily armed police units raided and removed all children from an isolated compound owned by a renegade polygamist Mormon sect, known as the Fundamentalist Church of Jesus Christ of Latter-Day Saints, in West Texas. The raid was in response to a phone call to an abuse hotline from someone claiming to be a 16-year old child bride being abused by her older husband. Admittedly, the mainstream Latter-Day Saints vigorously, and repetitively, distanced itself from the odd sect — yet the Mormon faith remained in the public spotlight.

The familiar image of proselytising yet pleasant, mild mannered male missionaries, called “Elders”, in white shirts and black suits door knocking is known to all. In spite of this sugary, earnest (almost naive) appearance the Latter-Day Saints are viewed cautiously.

So what are the common issues and objections to the Mormons? Let’s examine the controversy that looms around this religion.

Controversy

Firstly, the credibility of Mormonism certainly relies heavily on the credibility of its American founder — Joseph Smith. Born December 23, 1805, in Sharon, Vermont, Joseph Smith Jr. was the fifth of eleven children of Joseph Smith Sr. and Lucy Mack. In 1820 at Palmyra, New York, Joseph Smith claimed he saw God and Christ in a vision. They told him that all the churches at that time were corrupt, and that he, Joseph, would bring forth the true church.
Joseph claimed that several years later an angel, named Moroni, guided him to some gold plates on a nearby hill. On those plates, engraved in a reformed Egyptian dialect, was the sacred history written by ancient Hebrews in America. By the spirit of God and the use of a sacred instrument accompanying the plates called the “Urim and Thummim” (see stones bound by silver bows into a set of spectacles); Joseph translated the plates into English. The translation was published in 1830 as The Book of Mormon, which Smith asserted was an historical book of divinely inspired scripture, of equal authority to the Bible.

The Book of Mormon was the most correct of any book on Earth, and the keystone of our religion, and a man would get nearer to God by abiding by its precepts, than by any other book Joseph Smith said — However, just how correct is it?.

The Book of Mormon teaches that Native Americans and Polynesians are descended from ancient seafaring Israelites. Dr Simon Southerton, an Australian molecular scientist and ex-Mormon bishop, in his book Losing a Lost Tribe: Native Americans, DNA, and the Mormon Church, shows that current DNA evidence severely contradicts Mormon belief. DNA genealogy shows that Native Americans are originally from Siberia and Polynesians from Southeast Asia, not the Middle East. Thomas W. Murphy, an anthropologist, also came to the same conclusions after he completed his analysis of the implications of genetic research for The Book of Mormon in his article, “Lamanite, Genesis, Genealogy, and Genetics”.

“I think it’s fair to conclude that the Book of Mormon is a work of fiction”, Murphy stated in an article in the Seattle Post.

The Smithsonian Institution has also issued a statement stating it "considers the Book of Mormon a religious document and not a scientific guide". The National Geographic Society has also stated it hasn’t found anything either to substantiate the Book of Mormon. If Mormon scripture is supposed to be a factual history of the ancient Americas, with large, flourishing Pre-Colombian civilisations existing — where is the supporting evidence?

American writer Fawn McKay Brodie, in her biography No Man Knows My History: The Life of Joseph Smith, widely popularised the notion of Joseph Smith h as a possible religious huckster. Brodie, who was raised in a Mormon family, was (not surprisingly) later excommunicated by the Latter Day Saints.

Naturally, Mormons seldom criticise their founding prophet, teacher, and venerated leader. A historical examination of Joseph Smith’s life certainly paints a picture of an enigmatic and dubious figure. Historian Todd Compton, in his book In Sacred Loneliness: The Plural Wives of Joseph Smith, believed that Smith was married to at least thirty three women, possibly even more. One of the most disturbing elements of Joseph Smith’s polygamy was his penchant for marrying petite teenage girls. Indeed, the prophet’s love knew no boundaries.

Joseph Smith came from a poor family, after Smith’s alcoholic father lost the family fortune in bad business decisions. Smith’s education was minimal, yet he discovered early on his talent for public speaking. Interestingly, Smith learnt from his father and others the mystical art of finding buried treasure with seer stones. However, these magical meanderings saw Smith arrested in New York in 1826 for, though the details are shady, fraud.

Evidence

The most clear and documented evidence that seriously questions Joseph Smith’s credibility relates to The Book of Abraham. The Book of Abraham is part of the Pearl of Great Price, one of the revered canonical books of Mormon scripture. Joseph Smith claimed to have divinely translated the lost Book of Abraham from some Egyptian papyri he purchased in 1835. At that time Egyptology was a haphazard enterprise and as Jean-Francoise Champollion has only recently completed his translation of the Rosetta Stone, hieroglyphics were largely unreadable, so there was no way to validate Smith’s translation. But it is interesting to speculate that the news of Champollion’s work might have given him the idea in the first place.

After Joseph Smith’s death, the Egyptian papyri were given to his widow, Emma, who later sold them. For many years the papyri were considered lost, until 1966 when they were found again in the New York Metropolitan Museum of Art. Numerous Egyptologists examined the papyri and translated what it really said. It didn’t coincide at all with Joseph Smith’s translation in the Book of Abraham — it had absolutely nothing to do with Abraham. This appears to be a smoking gun that proves that Smith intentionally committed fraud, yet Mormon apologetics engage in some astonishing mental gymnastics by claiming it wasn’t a literal translation of the papyri, but a “spiritual translation”.

Whilst struggling through the tedium of The Book of Mormon, which I agree with Mark Twain’s assessment is “chloroform in print”, I was reminded of a statement by Michael Shermer in his book Why People Believe Weird Things. Shermer wrote “More than any other, the reason people believe weird things is because they want to. It feels good. It is comforting. It is consoling”.

Mormon theology teaches the God of Earth was once a man, who now lives on a planet near the star Kolob. We can become Gods, by following the teachings of Mormonism, and rule over our own universe — naturally, very appealing.

Latter-day Saint apostle, Orson Pratt, once wrote “convince us of our errors of doctrine, if we have any, by reason, by logical arguments or by the word of God, and we will ever be grateful for the information”. This sentiment realistically rings hollow.
as challenges to Mormonism scriptures and teachings are ignored, or simply dismissed as pointless, because Mormonism should be accepted on faith.

The current president, prophet, seer, revelator and general mouth-piece of God for the Latter-day Saints, Thomas S. Monson, remarkably stated in a Mormon magazine: 

*Should doubt knock at your doorway, just say to those skeptical, disturbing, rebellious thoughts: 'I propose to stay with my faith. I accept God's word. I wasn't with Joseph, but I believe him. My faith did not come to me through science, and I will not permit so-called science to destroy it*”.

In conclusion, it's not difficult to agree with Richard Dawkins' view that “Faith is the great cop-out, the great excuse to evade the need to think and evaluate evidence”.

Mormons often provide completely inadequate and weak responses to serious questions. When missionaries next knock on your door, and if you decide to speak with them, plant a seed of doubt but don't expect any instant results. Earnest young Mormons will ask you to accept a copy of the *Book of Mormon*, read it, and pray about it. As skeptics all we can hope they do is listen to the information we provide, and think about it.

**References:**

3 Shermer, Michael *Why Do People Believe Weird Things?* p. 275
4 “The BITE Model Applied Toward Mormonism's Two-Year Missionary Program” Steven Alan Hassan's Freedom of Mind Center [www.freedomofmind.com/resourcecenter/groups/m/mormon/BITE-missionary.htm](http://www.freedomofmind.com/resourcecenter/groups/m/mormon/BITE-missionary.htm)
Promoting Skepticism to the science fiction fraternity

Dr. Con (dragoncon.org) is a multigenre convention held annually in Atlanta, Georgia. The event began in 1987 as a gamers and role-playing fair that gradually morphed to include comic books, science fiction and fantasy, then science, and now skepticism. In their own words, Dragon*Con is “the largest multi-media, popular culture convention focusing on science fiction and fantasy, gaming, comics, literature, art, music, and film in the US.” This year the convention was held across 4 days, 4 hotels and with some 60,000 attendees.

This was not your usual convention of 9 to 5 seminars with civilised tea breaks, extravagant lunch buffets and networking. Instead, the four days of Dragon*Con had a relaxed 10-11am start, bellying a frenzied schedule of multiple, concurrent seminars, debates, workshops, concerts, shows, panels and podcasts that ran until midnight or later (or earlier), when the parties would begin. American geeks abandoned their computers and donned costumes, creating a surreal, often X-rated Halloween scene of comic book and movie characters, vampires, pirates, wizards, wenches and monsters. It was like being surrounded by tens of thousands of extras from a science fiction film.

The convention featured numerous “Fan Tracks”. These were subthemes that included animation, podcasting, robotics, horror, computer hacking, and now a new track for skeptics, the SkepTrack. The major attraction was the “Hall of Fame”, a room filled with typecast B-grade actors all “better known as” their characters. This guest of honour list included the drummer from The Monkees (Mickey Dolenz), the possessed child from The Exorcist (Linda Blair), Hercules (Kevin Sorbo), Batman (Adam West), Freddy Kruger (Robert Englund), the original Hulk (Lou Ferrigno), “Spike” from Buffy the Vampire Slayer (James Marsters) and “Kryton” from Red Dwarf (Robert Llewellyn).

As I registered as a SkepTrack guest (neither of honour nor B-grade actor), I overheard a female Australian accent. It was the strikingly tall ex-model and actress Virginia Hey, now designer of a line of soy candles and perfumes, and qualified in naturopathy, homeopathy, herbal medicine and “lightwork” (ie, “prayer for the good of man” according to virginiahey.com). A former cast member in the sci-fi TV show Farscape, Hey also attended Dragon*Con to present meditation and Reiki classes. There were even more Australians in attendance. Our own organisation was also represented by Richard Saunders and Kylie Sturgess. “You Aussies are turning up everywhere,” I was told repeatedly.

The SkepTrack was conceived, organised and hosted by Derek Colanduno and Robynn “Swoopy” Skeptrack at Dragon*Con

Karen Stollznow, a highly qualified linguist, will be the Editor of the Skeptic by the time slow readers reach this page.
McCarthy of the *Skepticality* podcast (skepticality.com). Other skeptical guests included James Randi, Phil Plait, Michael Shermer, author Michael Stackpole, and atheist lobbyist Lori Lipman Brown. The SkepTrack was an unmitigated success. Featuring seminars, debates, panels, live podcasts, cabaret shows and demonstrations, the SkepTrack rooms were frequently filled to capacity. I have memories of people being refused entry yet still pounding on the doors to be let in. However, the comparatively small community of guests and attendees provided the opportunity to get up close and personal with your favourite skeptic.

There was the X-track for non-skeptics too, including Patrick Burns of *Haunting Evidence*, members of the Atlantic Paranormal Society (TAPS) and Sci-Fi Channel’s *Ghosthunters*. The X-track offered the intriguing-sounding class “Tapping Your Psychic Potential”. Kylie and I tried to nab some “invite only” tickets. However, the course was cancelled (insert “due to unforeseen circumstances” joke here).

The Skeptics versus Believers debate was hotly awaited, a reprise to the scandalous event of the previous year. Michael Shermer, Steven Novella (*Skeptic’s Guide to the Universe* podcast), Ben Radford (*Skeptical Inquirer*) and Alison Smith (intern for the James Randi Educational Foundation) represented the skeptics. Unfortunately, the debate was dominated by the moderator’s self-indulgent pontificating. When the panelists could get a word in edgewise, a discussion ensued as to why religion is disseminated more successfully than science. Friar Bryan Small of the believer’s side observed, “Your textbooks are more expensive.” “At least we update ours,” quipped Radford. Point taken though, it’s time for us to start replacing the Gideon’s Bible with the *Skeptic* in hotels.

Last year’s debate degenerated into verbal fisticuffs when Graham Colanduno moderated the panel, and I was in auspicious company with James Randi, musician and podcaster George Hrab, *Point of Inquiry’s* D.J. Grothe, Lori Lipman Brown, and Ben Radford. The panelists emphasised the importance of attracting a youthful crowd to skepticism. In response, I emphasised the importance of attracting anyone and everyone. I voiced the need for encouraging critical thinking in all, and to avoid a ‘face’ of skepticism. “We need bums on seats” I closed eloquently. Seated beside me, Radford leant towards me and whispered, “When you said ‘bums’ I pictured transients.”

In a live recording, Kylie, Richard and I relaunched the *Tank Podcast* as *The Skeptic Zone* (skepticzone.tv/). The inaugural show began with a big bang with Phil Plait who spoke about his book *Death from the Skies*. We also interviewed Dr Ginger Campbell of the *Brain Science Podcast* (virginiacampbellmd.com/), discussing science fiction, medical shows on TV, and superstititions in the hospital Emergency Room. In keeping with the costume theme, Richard and Phil dazzled the audience by wearing sparkly pink and black feather boas.

On the final day, Richard, Kylie and I presented Global Skepticism, a panel about skepticism beyond the States. We were joined by a surprise guest, none other than seasoned skeptical traveller James Randi! We discussed the status of skeptical movements in India, China, the United Kingdom, New Zealand and Australia, and the unique pseudoscience and paranormal problems faced by these countries.

A personal highlight for me was spending time with a close friend. Michelle grew up living between her mother, the daughter of a Pentecostal minister (of the speaking in tongues, proving faith with poisonous snakes kind), and her skeptical father, a long-term fan of Randi. Along with her father, we enjoyed lunch with Randi, who performed tricks for our amusement. I gave Michelle a t-shirt for her daughter with the Skeptic Zone logo: “Thinking Caps Must Be Worn At All Times”. This was proudly worn to school, to the excitement of her science teacher who wants to get one too! (zazzle.com/skepticzone).

There is now a Skeptic Zone in the Bible Belt of rural Georgia.

As soon as the convention ended, preparations began for the following year. The website gushes, “Only x days until Dragon Con!” The next convention is scheduled to be held during the Labor Day weekend, 4-7 September, 2009. Dragon*Con’s SkepTrack promises to be a principal event on the Skeptic’s calendar.
And on the Seventh Day He Rested

I

sis it possible for time to warp and become somehow unreal? Can hours seem like days, and days stretch on into weeks? I now think this may be possible, but only in Atlanta, Georgia, during the long weekend of the convention known as Dragon*Con. If my memory serves me, I'm sure I arrived in Atlanta on Thursday August 28 and left the following Wednesday, but managed to squeeze in about six weeks worth of panels, parties, people, places, pizza, paranormal pranks, paparazzi and panic.

It was my old friend Dr Phil Plait, The Bad Astronomer, who warned that nothing could prepare me for the chaos that is Dragon*Con, the world's largest science fiction and fantasy convention. I expected there would be thousands of people, some of whom would dress up as their favourite charter from Star Wars, Star Trek and the like, with the odd TV or movie star into the mix. What I saw were tens of thousands of people (some put the attendance rate as high as over 60,000) who dressed up in the most incredible and elaborate costumes imaginable, and a ball room full of Hollywood stars of the large and small screen.

Be that as it may, I was there to represent the Australian Skeptics and the new Skeptic Zone Podcast by taking part in as many panels and talks that I could in the “SkepTrack” section of the convention. I had already signed up for 8 panels before I arrived, but I ended up doing 10 presentations in the space of three days.

To give you some idea, I spoke on Global Skepticism, Skepticism 101, Podcasting, Vodcasting, Skeptical Podcasting, the Skeptic Zone Podcast Live, Paranormal Investigations, Origami Pegasus, Origami Master Class and others that seems to have merged in my mind into some sort of blur. It is worth noting that most of the skeptic events were so popular that it was standing room only.

Being on stage with the likes of James Randi, Phil Plait, DJ Grothe, Steven Novella and others is something of a dream come true for any skeptic. I was gratified to discover that many of the attendees already knew of me from my various skeptical projects over the years, and also my recent appearance on the TV show The One which is available to the world on YouTube.

Joining me on a selection of these panel talks were Karen Stollznow and Kylie Sturgess from Australia. I must make special mention of their hard work behind the scenes in order to get me from location to location around the mega hotels, as well as preparing extensive background material. Ladies, I could not have done it without you. Both Karen and Kylie also took part in other panels in their own right as well.

Richard Saunders is a Vice President of the NSW Skeptics, who knows more about multimedia production than is good for anyone.

More fun and skeptical games among the SF community
The times between being on stage were an odd mix of grabbing a bite to eat, being interviewed by documentary makers and podcaster, finding time to look around the convention itself (covering four mega hotels), gawking at the big name stars including some of the original Star Trek cast, and ending up at various costume parties that went on all night. Seeing astronomer Dr Pamela Gay dressed in a corset, a fad at Dragon*Con, is something I won’t forget in a hurry! I also seem to remember getting some sleep at some stage, although I might be mistaken.

A highlight of the convention was attending a debate between skeptics and believers that almost filled one of the larger function rooms. It was really a no-contest, with the believers, some of whom were from popular paranormal TV shows, having no real evidence to support their claims. Then, right at the end with questions being taken from the audience, James Randi himself approached the microphone and threw down his $1,000,000 challenge. A great roar went up when the believers refused the challenge!

What all this shows is how popular skeptical events have become over the last few years. The Amazing Meeting in Las Vegas will attract over 1000 delegates in 2009, most of whom are young and keen. However, that is a dedicated skeptical event whereas Dragon*Con is first and foremost a popular culture meeting. Nevertheless, many of the attendees crammed into the skeptical meeting rooms were not necessary skeptics, but simply curious sci-fi fans. It seems to me that this was a major achievement of

the convention, and we can imagine how many new people have now been introduced to our way of thinking.

And then the fun was over. Kylie Sturgess and I stayed on for one extra day to relax and explore downtown Atlanta after almost all the 60,000 sci-fi fans had left. What had once been giant rooms packed with people dressed in all manner of costumes became simply empty giant rooms. The streets no longer teemed with Star Wars Storm Troopers (how they must have suffered in the 30C+ heat and high humidity) and the cafes and restaurants were quiet.

Almost overnight, Dragon*Con has become a major event on the international skeptical calendar. Members of the Skeptic Zone Podcast have already booked a room for next year’s convention in the hope of attending as, believe it or not, the hotels are already almost booked out already. 2009 promises to be even bigger than this year, with more big names in science and skepticism to be in attendance.

Thanks again to Karen and Kylie who also let me sleep on the floor of their hotel room, Phil Plait who looked after me in the days before the convention, and special thanks to James Randi who took time out to talk with me and share his insights.

You can hear interviews from our live recordings of the Skeptic Zone Podcast at the convention and see a short video of the mayhem by visiting www.skepticzone.tv

Who says skeptics don’t have fun?
If a tree casts out enough seeds, some will eventually fall on fertile ground — or so Charles Darwin told the world 150 years ago. Such happened with *The Great Divining Video*, a compilation of water divining tests by Australian Skeptics and friends from 1980, 1989, and 2003, together with discussions and demonstrations and self-tests. This was compiled and edited by Richard Saunders (one of his many skills), and released as a VCR and DVD.

At a Mystery Investigators show at the Australian Museum recently, it came to the notice of Tom Gordon, science teacher at Moriah College, the major comprehensive Jewish school, in eastern Sydney. He showed his students the videos as an exercise in scientific enquiry.

A group of four year 8 students elected to make divining the topic of a project. They reproduced the AS divining test, which involves locating a bottle of water concealed under one of 6 inverted buckets. Several students reportedly got well above chance, with Moshe in particular locating the correct bucket 6 times out of 6 trials.

What to do now? A scientist would “investigate further” — so Tom decided to contact Australian Skeptics. A group (Richard Saunders, Ian Bryce and Rachael Dunlop) visited Moriah College on 17 September 2008, to assist the students in their project, and talk about water divining and scientific testing.

Our first exercise was to reproduce the “divining self test”, with one bottle of water to be concealed under one bucket. The subjects were the students, each with a bent piece of wire. We then went through several steps designed to minimise the risk of false positives and negatives:

1. Check that the area is clear — no underground streams or power lines which distract the rods — the classroom passed.
2. See if the rods respond to a visible bottle of water, and reject any subjects which do not. This has never been a problem with “real” divining applicants, but the students’ rods appeared more hesitant.
3. Place a bottle under a bucket in full view and check that the rods continue to respond — so the material of the bucket is not interfering — all still OK.
4. Single blind — while the diviner is out of sight, the experimenter tosses a die and conceals the bottle accordingly (with some precautions, including also nudging the empty buckets). The diviner is recalled and performs the test — scans

Continued on p 55...
Somed time ago I bumped into a youth in a shopping centre precinct who was wearing a T-shirt which informed all and sundry, in large print, that he was a “C**t-Hunter”. The C-word is commonly heard on sport fields, in hotels and used extensively by fishermen and male actors in films about the Irish working class, as is well known. Nevertheless it is one of few remaining written taboos, never spelled out in daily newspapers and not to be found in my Microsoft Office spell-check. The young man, early twenties, was scrawny and dressed in gangsta garb: most of his underpants were exposed with his trousers so fashionably low that I cannot figure what kept them up, a back-to-front baseball cap on his head, tatts on the arms, cigarette between the fingers. Almost a caricature of an impoverished, undesirable “Westie”, just begging to attract some good old fashioned bigotry. Which is what I felt.

One of my own sons, on the other hand, has a T-shirt with two adjacent images — one is a triangle filled with scrawly black lines, the other of George W Bush Jnr. There are two arrows, one pointing to “Good Bush”, the other to “Bad Bush”. No guessing which is which. This T-shirt raised in me a wry smile and no feelings of disquiet.

What has this to do with skepticism? All sorts of things I think. Skeptics are meant to think for themselves, to see past visceral reactions and to judge on reflection, with a critical eye. We tend to believe in free-speech and are suspicious of censorship. We try to understand human behaviour, not to be easily swayed by social trends if they make no outward sense. Just guessing, but I imagine most skeptics have an aversion to bigotry, racism, sexism and the like. We certainly spend a lot of effort trying to find rational answers for just about everything imaginable.

The C-Hunter got me thinking. Were my feelings of bigotry justified? Are they ever? Is it explainable? The last question is the easiest to answer, and the answer is clearly yes. Bigotry is plainly related to tribalism, and we are tribal animals. The young man was not in “my” group, and was making a point of it. I certainly did not feel a part of his. And what sort of foolish mammals would we be if we could not discern patterns?

An adult man, stumbling and muttering incoherently, is someone a child should avoid — drunks can be dangerous. Such a man might, it is true, be sober and suffering a medical condition but this is not the normal pattern. As politically incorrect as it may be to state it, only a fool would deny that our original C-Hunter was more likely to have more socially unacceptable traits than the average youth in the shopping mall. In particular, one suspects he might be scaringly
misogynistic. Of course he might, beneath the bravado, be a sensitive new-age lad not predisposed to antisocial behaviour, or perhaps illiterate and therefore ignorant of the words on the T-shirt, but I estimate the probability of any of these as low, a view I believe most readers of this article would share.

So why were my hackles raised? Was it the “hunting” that was particularly offensive? Any young male in any Australian suburb who spoke about his predilection to C-hunting with a group of peers would likely draw guffaws and few would be offended. Quite the contrary. Moreover, well educated “bounders” of means and positions of influence, the complete antithesis of the youth described, including judges, lawyers (especially lawyers) and medical specialists, have been notorious C-hunters and often given grudging, if not overt, respect for their adventurous behaviour by other adults in polite conversation.

Was the C-hunter’s comment basically, bluntly honest? Surely there is a smidgeon of hypocrisy in my original feelings, and although I would like it known that I am only a very moderate user, the C-word has passed my lips on the odd occasion. Who knows, in a decade or two the T-shirt might be broadly acceptable, just as my son’s “Good Bush - Bad Bush” T-shirt, and the word “bugger”, are now.

Anatomy

Is there a major problem with the word because of what it refers to anatomically? If we consider the female reproductive tract then reasons for protecting it, via cultural and behavioural mores, seem appropriate. The female canal makes it possible for infectious agents to track from outside to deep within, actually into a body cavity (the abdomino-pelvic), the only such portal in the body as far as I am aware. Of course nature has provided women with extensive protective defences, such as an acid environment and mucous plugs, but if these are breached, infertility is a common consequence — a particularly bad outcome as far as her genes are concerned.

So there appear good biological reasons for keeping the site from public view and easy access. Boys will be boys, and it would be unnatural if most sexually mature males were not sexually excited by female genitalia, and possible consequences of intercourse (desired by the female or not) are not universally uppermost in the male mind it seems. Perhaps this is why, in many societies, the pubic region and much else that could provoke desire, is extensively covered and women tend to sit in “demure” positions. Even when not extensively clothed, token public coverings were common.

Culture

Cultures whose religious traditions derive from the Middle Eastern monotheist movements can have very extreme views on this issue. Nudity or sexual licentiousness in women was, as it still can be, a capital offence, but this is a somewhat skewed position. Examples of alternative norms abound, historical and current. Many people living within all of the rules of a complex human society, such as the Aborigines, often lived life naked. Some peoples in Africa still do. A female anthropologist living with a remote group in the Amazon, reported that the women openly admired her comparatively large clitoris, in (what we might call) complete innocence. And even the desire for privacy during sexual intercourse, the status quo in most societies currently, is not biologically hard wired, as Captain Cook’s sailors found in the paradise of Tahiti.

Modern day extroverted women, as opposed to paid sex workers, also push this boundary in some party venues. No, the C taboo cannot be a strongly biological phenomenon, unlike the avoidance of excreta (another of the once barely mentions) which surely is, being observed as much by household pets as by humans, and undoubtedly related to genetically driven avoidance of parasitic re-infection, amongst other things.

So, in summary, C-hunting is broadly acceptable, if not stated too baldly, and the spoken C-word has wide currency. The actual body part referred to has not always suffered from the bad cultural press that the Judo-Christian-Islamic heritage has widely bestowed on humankind.

Skeptics are skeptical about censorship, and supportive of free-speech. My guess at the “enlightened view” about the T-shirt scenario would go something like this:

The youth advertises the C-word, which is merely a word and one that is used quite commonly, at least in speech. It seems likely that he had made a conscious decision to cause offence, but no-one was hurt physically by him wearing the T-shirt. He is likely to have had an under-privileged childhood and therefore good reason for demonstrating antisocial behaviour. All in all, his wearing of the T-shirt is, in of itself, neither here nor there, best ignored and certainly not deserving of censorship or reprimand.

On the other hand, the bigotry I felt (and I am not by nature a very bigoted person), also requires explanation. My guess is most any woman would be able to clarify it better, but I will try. It is a visceral thing. The T-shirt had connotations many find unacceptable, related to the use and abuse of women and treatment of them as a sexual objects, with overtones of physical domination and disregard of the risk of infection or pregnancy. There are strong biological undertones here — a woman’s investment in procreation is comparatively huge and in times not long gone, pregnancy and childbirth were universally risky, life-threatening ventures.

And somewhere in the mix, at least for me and notwithstanding the fact that the T-shirt made no direct comment on young girls, is an almost subterranean discomfort about the issue child abuse. If the T-shirt had supported the latter, I believe that the need of censorship would be pretty straightforward and would be interested to hear how the opposite view could be defended.
But of course, in one important sense, it doesn’t matter if the issue can be easily rationalised or not. While skeptics are renowned for asking uncomfortable questions and raising uncomfortable issues, the youth’s lack of consideration for the feelings of others, indeed his decision to invoke discomfort, is just the opposite of what many of us aspire to, namely to be part of a compassionate, considerate society.

This is the best I can raise for feeling bigoted which, by definition, is to be prejudiced and intolerant. Compassion sits somewhere else. This seems to be a circular and problematic argument. This raises another C-word — the (presumed) Westie and I might both benefit from Counselling.

Post note
I only ever acted on similar feelings once, and it concerned a young man who attended one of my lectures wearing a T-Shirt with a prominent Nazi swastika. I asked that he not attend future lectures so decked-out, since for some this might cause great offence. He apologised, indicated that it was supposed to be funny, and never turned up in it again.

... Outreach from p 52

all buckets and indicates which he thinks contains the water. Sadly, all the students did no better than chance.

5. Double blind — only one person sees which bucket, and he leaves the room before the diviners return. Again, all the diviners failed.

The reasons for each of these precautions were discussed at length. No explanation was found for the strong positive results obtained privately by the students.

Rachael then described scientific testing, for example of a new drug on real patients, and what randomised, double blind and controlled mean.

A new effect in physics or chemistry would need to be published, then repeated and verified at least another 2 times by different groups before being accepted. And no result is ever final — new evidence can always come to light. It is the fact that a theory has been tested many times and survived that makes it strong.

I introduced probability and statistics, which year 10s are starting to learn. What result would you expect from chance alone? 1 in 6 with some variation. From a perfect diviner? 100%. A false positive (say 6 out of 6)? One sixth to the power six = 0.00021. How to get 1 in a million? And we described complementary events, mutually exclusive events, independent events and so on.

The students asked us to reproduce a different divining protocol — the Mitta Mitta divining tests, which they had seen on the video. Here, there are 10 buckets and each can have water or no water — selected by tossing a coin, independently. The diviner attempts to state yes or no for each bucket.

This is really 10 tests run simultaneously, which allows a large throughput of diviners. And the chance of a false positive can be made 1 in a million. Again, the results were in accordance with chance.

Thus we were delighted to have the opportunity to show the students some scientific testing and critical thinking. The visit was a very worthwhile opportunity for Skeptics outreach.

The Skeptics website, www.skeptics.com.au, links to our online shop, which has many resources for teachers and students.

Thinking about Critical Thinking?

Why not seek out those who are promoting it as potential nominees for the 2009 Australian Skeptics Prize for Critical Thinking?

Details on www.skeptics.com.au
Every week, one of the evangelical Christians who supported the teaching of Intelligent Design in Dover, PA schools drove to the nearest maximum security penitentiary to ‘bear witness’ to the inmates. On their release, he would find them jobs and homes. One, not yet strong enough to live alone, lived with him for months after his release. They became ‘best buddies’ as the Americans have it. This same man continued to support the Dover Area School Board when its members, to a man and woman, perjured themselves in court, telling Judge John E Jones that they had never discussed creationism at Board meetings. What set her apart from other journalists who converged on the Harrisburg, PA courtroom when the Area School Board tried to insert Intelligent Design into the science curriculum, was the fact that she was a local (she worked for the York Daily Record). She knew most of the plaintiffs and most of the defendants. Her father, the prison visitor, ran the local Christian Radio station, one of a plethora of ‘talk radio’ outfits that blossomed across the US after 1987, when the Federal Communications Commission rolled the ‘Fairness Doctrine’.

Forced by geography to be scrupulously fair, her book on the case is one of the best lay accounts of a complex and controversial trial I’ve ever read. That apart, she doesn’t write off people she knows as ‘wignuts’ and ‘nutjobs’, because she knows they aren’t. But she also doesn’t let them off the hook when they lie for Jesus.

Somehow, this book manages to rise above politics, skewering the comfortable notions of ‘Red’ and ‘Blue’ that have become part of the world’s political vocabulary thanks to the 2000-2004-2008 US election cycles. Her skill at noting the telling detail is particularly effective: one of the plaintiffs seems like a boiler-plate anti-affirmative action, gun-totin’ small-town Republican who cheerfully drinks in a pub 20 feet over the county border because, ahem, Dover is a Dry County. But he’s also a science teacher who knows the difference between science and religion.

One of the defendants, an upstanding member of the Board and successful local businessman turns up and chews gum throughout both examination-in-chief and cross-examination (no, it doesn’t bear thinking about. Lebo’s description is both hilarious and nauseating). This is quite apart, of course, from lying under oath.

Then there’s the George W. Bush appointed judge, who the defendants are completely confident they have in their pocket (they don’t, and his judgment is both a model of judicial reasoning and a textbook account of just why we have the separation of powers).

Best of all are the pen-portraits of the various lawyers, from the ACLU and the Thomas More Law Centre, both circling for a test case. The image of a lawyer engaging in a version of champery (Thomas More’s counsel encouraging the Board to change the school curriculum ‘and we’ll defend you when you get sued’) or putting full-page ads in local papers in order to drag in potential plaintiffs (the ACLU) certainly gives one pause, especially for those lawyers trained in Australia or the UK.

Comics (and others) on all sides of politics have had great mileage out of portraying the other side as
'liberal wiener's or 'right-wing nut jobs', without imagining just what or who is behind those words. This is particularly the case in the creation v. evolution battle. It is possible to make a strong case for some socially conservative positions (particularly on Roe v. Wade, in part because the court's ruling took the decision away from the legislature, thereby producing serious democratic deficit).

Creationism, by contrast, (even in its muted 'intelligent design' form) simply invites mockery. Not just 'unscientific', it's a ludicrous form of anti-science. In fact, Charles Johnson memorably described the newly-opened 'Creation Museum' in Kentucky as an 'Anti-Museum'. Instead of disseminating information, it actively obfuscates it — a visual version of 'if your baby does not like spinach, try boiling it in milk'.

Lebo's book is not particularly optimistic; at one point she laments 'we're never going to fix this'. She then comments:

My father will leave this world believing he will never again wrap his arms around his daughter; that despite eternal life (eternity? Oh God, what a concept), we will never be reunited. Rather, he believes that I will exist in a place 'where their worm dieth not, and the fire is not quenched'.

If you believe this, truly believe this, then how could anything else matter? The First Amendment, scientific reality, the truth? All this would mean nothing. I grasped this. And for those of us who don't believe, can't believe, we have to bear the weight of this fear.

Imagining our enemy's honour is likely the most difficult thing one has to do, and yet liberal democracy demands it of us. In ages past, we fought against and killed those who disagreed with us. Now we contest alternative visions at the ballot box, and try to be gracious winners and honorable losers. Lauri Lebo's book is a fine exercise in that tradition. I cannot recommend it too highly.

This review first appeared in Helen Dale's blog at www.skepticlawyer.com.au

Barry Williams

Are They Out There?

The author traces it back at least to the 4th Century BCE Greek philosophers, and follows it as a continuing theme for scientists and philosophers throughout subsequent history. The author subjects their various speculations to skepticism, but in a good natured way and without trying to destroy the pleasures of imagination.

Coming to more recent times, the book looks at modern scientific attempts to find evidence of other intelligent life. They range from signals sent and received by radio telescopes, plaques attached to the space craft and recent attempts to discover whether life (albeit primitive) does, or has ever, existed on Mars and other Solar System bodies.

Verma considers all the various modern hypotheses about the likelihood of extraterrestrial, intelligent life and makes some speculations of his own about the nature of any possible aliens. Along the way, he manages to subtly tell us a lot about science without seeming to teach or preach. As the author blurb states, he is not all dressed up to meet alien visitors, but expects to hear about signs of life on other worlds within his lifetime.

Surendra Verma is a reader-friendly sort of writer and this is a thoroughly enjoyable book that would make an ideal present at this gift-giving time of year.

The title comes from Fermi's Paradox — in 1950, while speculating on the possibility of intelligent life elsewhere in the Universe, the great physicist, Enrico Fermi posed the question; "If they are there, why aren't they here?" His point being that, given the age of the Universe and despite the vast distances involved, had intelligence emerged elsewhere, by now we should have some evidence of its existence.

As Skeptics, most of our experiences of propositions regarding extraterrestrial life, are coloured by the post 1947 fantasies of the UFO movement and assorted conspiracy theorists. Verma does not overlook these claims, but as a true skeptic he submits them to rational analysis and comes to much the same conclusions that any skeptic would — that the conclusions reached by proponents are not matched by the evidence — that the U in UFO remains 'Unidentified', which does not equate with 'Extraterrestrial'.

Speculation about extraterrestrial life did not begin with the space age, it has a long and colourful history.
Testing
Greenhouse

The crisis in the world markets pushed the issue of the enhanced greenhouse effect off front pages everywhere, and may keep it off for some time. By the time it returns, thanks to a surprise turn of events in solar activity, the debate may even reach some sort of resolution.

For as a journalist who has been harangued by scientists, held discussions with scientists, chatted with scientists, swapped emails and phone calls with scientists in Australia, the US and Europe, gone through more scientific literature and material from both sides than I care to admit, I believe I am in a position to propose a test. That test may take perhaps three to four years, or maybe just two.

For various reasons, temperature trends over that period may go a long way to ruling out, or giving some credence to, what are now various competing theories about climate. Why the next few years when global temperatures should really be averaged over five years or even 11 or 20 to get rid of all the noise, including seasonal variations and the weather? We shall see — but proposing a test, and seeing what happens, is certainly better than further, wearying debate.

To run through some basic points; as matters stand the proposition that industrial gases are substantially affecting the process of climate change essentially rests on a slew of computer models, the results of which are collated and periodically interpreted by the Intergovernmental Panel on Climate Change (IPCC). A fair sample of this approach to proving climate propositions is given in “Attribution of polar warming to human influence” (Nature Geoscience Online, October 30, 2008). The nine authors, led by Nathan P. Gillett of the Climate Research Unit of the University of East Anglica, a bastion of greenhouse theory, ran IPCC climate models with natural climate drivers, and the same models with human-induced forcings. After some fancy statistical techniques, it was found that the ones with the artificial factors was a better fit for historical records. In other words the computer models themselves are so rigorous and accurate that they can be used to prove propositions. About all that can really be said for this method is that a lot of senior and experienced scientists have endorsed it, including the nine authors of the paper.

Apart from this form of “proof”, everything else usually cited in the media — all the way from the reduction of summer ice in the Arctic, through to reports of species extinction in Africa, indicate that climate is changing (or has changed — an important distinction), but without telling us anything about what is causing the change.

One of the most important of those changes is the current undoubtedly high temperatures, but again the fossil records, ice cores results and the like are too imprecise — the error bars on results are too large — not to mention far too incomplete, for any meaningful comparison with present conditions. We know temperatures have been high before, several times, but that tells us nothing, particularly as there is no overall climate theory to connect it to.

So we are back to the models. We could pause and say a few harsh things about those IPCC models, including their failure to model anything earlier than 1900 or so, including efforts to model the extremely warm period in the middle of the Cretaceous, about 50 to 100 million years ago, when Antarctica was warm and forested (see New Scientist cover story, June 21), and that they also fail something called the Tropospheric fingerprint test, but let us wave all these doubts aside.

Various distinguished scientists have declared all the models need is further adjustment to deal with those issues, and they have one almost-win, which I propose as the basis for an easily understandable test.

Graphic evidence

The graph of temperatures from the Hadley Centre (dark line) in the UK (Hadley is used throughout this article, see the note on temperature tracking centres at the end), shows temperatures rose from 1990 up to 1998 (in fact, from the mid-70s up to 1998). Then temperatures see-sawed before dropping sharply in recent years, with at least a part of the drop being due to the la Nina climate cycle cooling the Pacific. I have included a five year average (medium line) to clarify the general trend.

The third line in the graph (pale line) is the uppermost limit of the IPCC forecasts made in 2001, which I started from the value of the actual five year mean in 1990 (the forecast starts in 1990, so that's when the graph starts). As I had to estimate it off the graphs given in the 2001 IPCC report it is there as an indication rather than a strictly accurate line (as you will note, it is also slightly wavy). As you can see up until two years or so ago it was possible for warmers to claim that measured temperatures were actually at the top of the panel’s forecasts.

This point was the subject of a paper, Recent Climate Observations

Mark Lawson is a senior journalist on the Australian Financial Review who, to his disgust, is made to produce a carbon quarterly, among a number of other reports.
Compared to Predictions (Science, May 4, 2007). The paper, which lists nine authors led by Stefan Rahmstorf, a Professor of Physics of the Oceans at Potsdam University in Germany and including the redoubtable James Hansen, is occasionally cited in the Australian debate as evidence that the Earth is warming faster than expected.

A closer look at the graph shows that the bulk of the warming took place before the forecast was made. In fact, the IPCC produced a set of forecasts where the actual temperatures for the decade before the forecasts were already above the temperature range given by their models. Again, let us wave those niggling doubts away. Prof Rahmstorf has assured me, by email, that the line has been calculated from the physics of climate change, and not adjusted or tuned to suit the actual results. So let us nail that forecast to the green-house mast, particularly as the next few years are crucial for that forecast.

In the 2001 forecasts, the slope of the top line of the forecast becomes steeper with every year but, as noted, observed temperatures have been flat-lining and even dipping in recent years, so unless observed temperatures also get a wriggle on, the top line will leave it far behind. Already the temperatures for 2008, at least according to Hadley and my efforts at estimation, are more than 0.2 degrees below the top line. Two or three more years of present trends and they will be so different we may be able to dismiss apocalypse. This is one part of the test I propose.

Why not use the IPCC forecasts released in 2007, which kicked off a lot of the present fuss about climate? They were only released in early 2007 and no-one has produced papers claiming the forecasts are a success. In any case, although I have not looked at the 2007 forecasts in detail, I suspect they have been reset.

Then what about the mid-range or low end of the forecasts? Given the way the forecasts were originally constructed, they are much harder to confirm, or dismiss, but recent developments will make the next few years worth of temperature trends most interesting to follow.

**Climate cycles**

Some climatologists, deciding that recent temperature results need explaining, have modified the IPCC models to take climate cycles into account, including the likes of *la Nina*, *El Nino* and the Atlantic Meridional overturning (AMO) circulation. There is a whole zoo of climate cycles, which scientists are only just beginning to understand, powerful of the climate cycles — expected to weaken towards its mean. Although Kennlyside has been at pains to stress he is only modifying the IPCC forecasts, his work seems to have enraged the hard-liners. There have been reports of Kennlyside being challenged to bets which he has, rightly, refused.

There are other climate factors at work. In April of this year, NASA announced that, despite *la Nina* fading away, the important Pacific Decadal Oscillation (PDO) had shifted from its warm mode to cool mode. One scientist who tracks the PDO, Don J. Easterbrook, at the Department of Geology, Western Washington University, has since stated publicly — albeit not in the refereed literature — that the PDO shift “virtually assures” global cooling for the next 25-30 years.

If the PDO and AMO are that important, then one would think we should see some cooling in the next few years. Although the climate record obviously has a lot of noise in it, overall the trend should be down. Lets see what temperatures do.

**Solar activity**

Then there are those who point to solar activity as the overriding factor in climate, with the sun now obliging us by deciding to test their theories.

The sun has a well-recognised 11-year cycle, marked by spots or cool, dark regions with strong magnetic fields. At the peak of the cycle, when the Sun may be giving off lots of flares and solar storms that affect satellites, it also has lots of sunspots. The last solar cycle peaked in 2001 and was pronounced complete by NASA in March 2006. At the time, a team from the National Centre for Atmospheric Research in the US, forecast that the next sunspot cycle would be 20 to 50 per cent stronger than the previous one. The Sun
responded to that piece of scientific hubris by deciding to stay quiet. Some spots from the new cycle appeared (scientists can tell which cycle the spots belong to by their magnetic polarity), but then no spots at all, and still no spots as this is being written in November 2008.

Solar cycles can vary quite a lot, but this prolonged lack of activity has prompted observers to invoke the possibility of another Maunder Minimum — a period from 1645 to 1715 with very few sunspots, which is associated with a sequence of bitter winters known as the Little Ice Age. In addition, and apparently as part of the same phenomenon, as far as anyone knows, solar wind pressure (see below) has fallen substantially (NASA press release Sept 23, 2008).

Just when the sunspots will start again is anyone’s guess, particularly as what scientists thought they knew about the Sun’s internal workings, has proved completely wrong. Two scientists at the National Solar Observatory in Tucson, Arizona, William Livingston and Matthew Penn, have forecast that the lack of activity will continue until 2014 (that date again — it is also about when the IPCC is due to report again). The pair plotted a general decline in magnetic strength and temperatures of the sunspots — a trend independent of the solar cycle — and extrapolated it to reach an end in 2014. The forecast is in an unpublished paper which the pair submitted to the journal Science three years ago. It has been dug out of the filing cabinet and circulated online.

Livingston told me, from his office in Tucson, that the paper had been rejected because it was making a strong statement purely on statistical grounds, and he understood that reasoning. However, he will wait for the right time before resubmitting it. As for what might happen after 2014, Livingston points out the his forecast is based on statistical analysis, rather than a physical theory, so he cannot say what will happen.

The role of the Sun in climate is hotly debated, with the ruling orthodoxy of the IPCC climate models assigning a major role to industrial gases, and only a minor one to solar activity. Various alternative theories say there is a strong link between the two, although the physical mechanism is still a matter of debate. The main theory is that when the Sun is active, the “wind” it generates (charged particles from the solar upper atmosphere) naturally shields the Earth from the full brunt of the ever-present cosmic radiation. When the Sun is inactive, there is less wind and so more cosmic radiation. That radiation, so the theory goes, seeds more clouds in the lower atmosphere — more clouds reflect more sunlight back into space, and that leads to cooler temperatures.

Now this article does NOT constitute proof or endorsement of that theory, so there is no point in writing to say that its been disproved, or some other theory is better, or whatever, for there is a test to hand. As noted temperatures have fallen, so instead of arguing about the matter, let us wait a few years and see what happens. Since this seems to be a sharp, natural test of the theory two may be even enough.

The test
So that is the test I propose. If temperatures fall noticeably (assuming the Sun remains quiet) then we should take a closer look at solar-climate-cycle propositions. If temperatures do not do much then maybe we should take a look at the warming-climate cycle proposition. If temperatures start to increase then we should stock up on sun block for the grandchildren.

Can we wait several years before doing anything? Most definitely, although a full discussion on why we can wait — no matter what the result — is worth another article. So rather than argue the point any more let us all watch global temperatures.

Notes on temperature tracking centres
There are two types, satellite and instrument. As the names suggest one relies on satellites, and so have no results back beyond the mid-70s. The other relies on a ground network of recording instruments. The instrument sites can obviously look back far farther, but the results necessarily have to be adjusted for heat island effects and so on, and that causes a lot of argument. The satellite sites are generally regarded as definitive, except by the warmers. To save argument on this point I have just used Hadley.

Hadley. Generally regarded as the most authoritative of the instrument centres. The Australian Bureau of Meteorology site links to the temperature tracks on the Hadley site. It is a part of the University of East Anglia in the UK and associated with the UK Meteorological Office, which are both IPCC bastions. www.uea.ac.uk/cru/data/temperature/hadcrut3vgl.txt

GISS - Goddard Institute of Space Studies. Part of NASA. The director of this instrument centre is arch greenhouse spruiker Professor James Hansen. Greenhouse proponents always quote this centre’s temperatures for the annual results, although results from this site are mysteriously higher than the others. Hansen was thrown on the defensive recently when GISS tried claiming, despite reports of unseasonal cold and snow across the world, that October, 2008, was the hottest October on record. data.giss.nasa.gov/gistemp/tabledata/GLB.Ts.txt

NOAA - National Oceanographic and Atmospheric Administration. Owned by the US Department of Commerce it is an instrument centre. Its results broadly agree with Hadley, although they start from a different base. isftp://ftp.ncdc.noaa.gov/pub/data/anomalies/monthly.land_and_ocean.90S.90N.1901-2000mean.dat

UAH - University of Alabama in Huntsville. A satellite centre, with a useful monthly commentary on climate trends. Director Dr John Christie is sometimes cited as a greenhouse agnostic. As the centre’s graph shows temperatures trending down for years, global warmers do their best to ignore this. site.vortex.nsstc.uah.edu/data/msu/1979-2011.txt

RSS - Remote Satellite Services. The site for this centre is the most difficult of all for the layman, but its results are broadly similar to that of the UAH.
John Gibbs
Gold Coast

When my first article, ‘Greenhouse — Not Even Science’, appeared in the middle of last year it was greeted with a (very worrying, for a variety of reasons) deathly silence, the solitary response being Robert O’Connor’s letter. We now have, 18 months later, a number of Forum contributors on the issue and if I now turn my attention to other greenhouse supporters more comfortable in the field, it is after giving due acknowledgement that without Robert’s contribution in keeping some sort of dialogue going, the present discussions would not have been taking place.

I will leave to others the more technical aspects of Scott Marshall’s piece but I would mention to Scott that in a recent re-reading of Oxford historian J.M. Roberts’ History Of The World, I was reminded that the English Channel made its latest reappearance about 7,000 years ago when rising sea levels caused Britain’s most recent separation from the continent. I mention this because Scott says:

John Gibbs wants a prediction made by greenhouse theory. OK — Hansen and others 20 years ago predicted the melting of the Arctic ice sheet — and it now looks like this will occur in the next 5 to 10 years.

Regular readers will be tired of my repeating the same things perpetually, but Hansen’s predicting the melting of the Arctic ice-sheet, when that has been occurring and the oceans rising for some 12,000 years is hardly stop-the-presses stuff (although, come to think of it, it has frequently featured in the headlines of newspapers, hasn’t it?). The fact that Scott seems to seriously believe that this process will be completed in the next 5-10 years is quite amazing, especially given that he acknowledges the current cooling trend. That’s what NASA has achieved, Scott tells us, from “…having spent US$1.5B per year on the subject!” Even if the Arctic ice-sheet is still there in 10 years’ time Scott, there’s no need to worry, they won’t be dropping greenhouse theory — it is only scientific theories that get dropped when their predictions prove inaccurate.

Much of this NASA money has been spent on computer modelling of course, for which Scott is a staunch defender. The problem is, though, that none of NASA’s models predicted the current cooling — they just predicted a constant rise in temperatures with the constant rise in emissions. The current cooling, somewhat paradoxically, doesn’t worry Scott at all because, he states, “…no-one says an increase greenhouse gases (sic) will lead to a never-ending increase in temperature.” [Well, actually, yes they do Scott, all the time; I know of no greenhouse computer modeller who had predicted the cooling post-1998. I would be most interested if you could name any who did.] What is claimed is that increasing greenhouse gases will make the planet warmer than it would otherwise be.

Now, I am constantly making the point that, with other factors clearly at work, for any supposed ‘greenhouse’ effect to be measurable, it is critical that what the planet’s temperature “would otherwise be” is calculated. Scott, while acknowledging the issue, gives no indication whatsoever as to what this non-greenhouse temperature is, or how it could be calculated. My point exactly!

In fact, I’m not sure that Scott understands what the skeptic’s position on this whole subject is, for he says: “The greenhouse skeptics had better be very sure of their position, because if they are wrong and the temperatures do in fact rise…” Scott, we are not saying that temperatures in the future will not rise, we are saying that they have been rising, in their usual zigzag fashion, the icecaps melting and the seas rising for some 12,000 years now. In view of this, how can you attribute global warming to human agencies?

Scott’s final question is “Do we take the risk?” a Pascal-style appeal to the emotions when scientific credibility cannot be established; Pascal, of course, used this very argument to encourage religious observance. Perhaps we should sacrifice a couple of virgins to the Gods as well, just to really be on the safe side?

Guy Cox says that demanding proof of greenhouse theory is taking “the traditional creationist line “! Now, we are used to the greenhouse faithful getting a little shrill when asked to produce evidence for their ‘science’, but this seems somewhat hysterical, even by those standards. However Cox can justify this creationist accusation because, he states, that I go on to say that I won’t listen to any arguments “unless and until one can explain what has been causing the continuous, sometimes extreme, variations in the Earth’s climate that have been taking place for billions of years.”
A Simple Econometrician’s Guide to Global Warming

It is perhaps not surprising that those with a skeptical mind should be more skeptical about global warming. Skeptics are well aware of the propensity for deception and delusion that can affect people’s perceptions and thinking. But are concerns over global warming just socially induced panic? Science is usually on the side of skeptics, but in this case, the apparent preponderance of world scientific opinion on the matter seems to be that global warming is real, human-induced and that the prognosis is dire.

In such a complex issue, it is perhaps easy to cite counteracting tendencies as evidence of alternative hypotheses that negate the global warming thesis. Some factors may cause warming, some cooling. Which is of greater significance, if any? It is difficult to find definitive proof of causation that would be convincing to all skeptics. Proponents of the dangers of global warming rely on complex global climate models that are opaque to non-experts.

In view of all this, and as a former teacher of Economic Statistics 101 at Monash University, I have been motivated to get some data together and see what light a multivariate regression analysis might throw on the issue.

In this procedure, a simple linear econometric model may be used to provide an explanation of average global temperatures over the last century. Greenhouse gases and solar radiation variation due to sun spots are contended to be warming factors and atmospheric sulphates and particulates are contended to be cooling factors. If atmospheric CO₂ concentrations were found to be a significant explanatory factor in such a model, then this may be convincing to those who suspect that far more complex and less transparent models may provide contrived results.

A simple linear model, therefore, may be as follows:

\[ \text{Temp} = a_0 + a_1 \text{CO}_2 + a_2 \text{Sulphate} + a_3 \text{Solar} + a_4 \text{Volcano}, \]

where:

- \( \text{Temp} \) is global average temperature (degrees C)
- \( \text{CO}_2 \) is atmospheric carbon dioxide concentration (ppm),
- \( \text{Sulphate} \) is atmospheric sulphate aerosols (kg/m² x 10⁻¹²),
- \( \text{Solar} \) is solar radiation (annual watts/m²),
- \( \text{Volcano} \) is volcanioc aerosol particulate mass (million tonnes), and
- \( a_0, a_1, a_2, a_3, \text{and } a_4 \) are parameters to be estimated.

These variables are generally considered to be amongst the most relevant exogenous determinants of climate. The model has been estimated by least squares regression for the period 1880-2007 using data obtained mainly from Meehl et al. For such a linear model, all likely exogenous explainers of global temperature should be included, in order to obtain unbiased results. However due to multicollinearity between greenhouse gases, only \( \text{CO}_2 \) was included.

The results are as shown in the Table below.

For such an analysis to global aggregates obviously sacrifices the benefits of geographical precision. However the results obtained are satisfactory in that more than 80% of the variation in global temperature is explained by the variables provided (\( R^2 = .81 \)). All the coefficients have the expected sign. The relative numerical magnitude of the estimated coefficients is a function of the units of measurement. What is perhaps more important is whether the estimates are statistically significant.

The results indicate that carbon dioxide is indeed a statistically significant determinant of global temperature. The t-value of 12.79 means that we can reject the null hypothesis that carbon dioxide has no effect on global temperature with at least 99% confidence. The probability value indicates that there is less than 1% chance that these results could be obtained if \( \text{CO}_2 \) had no effect.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Est. Coefficient</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-110.987</td>
<td>32.9797</td>
<td>-3.36531</td>
<td>[.001]</td>
</tr>
<tr>
<td>( \text{CO}_2 )</td>
<td>.011391</td>
<td>.890797 x 10⁻⁴</td>
<td>12.7874</td>
<td>[.000]</td>
</tr>
<tr>
<td>Sulphate</td>
<td>-.729352 x 10⁻⁸</td>
<td>.166501 x 10⁻⁶</td>
<td>-4.38047</td>
<td>[.001]</td>
</tr>
<tr>
<td>Solar</td>
<td>.787637 x 10⁻⁴</td>
<td>.242126 x 10⁻⁴</td>
<td>3.25301</td>
<td>[.000]</td>
</tr>
<tr>
<td>Volcano</td>
<td>-.011865</td>
<td>.350217 x 10⁻²</td>
<td>-3.38799</td>
<td>[.001]</td>
</tr>
</tbody>
</table>

\( R^2 = .812143 \)  \( \text{Durbin-Watson} = 1.40151 \)

John L Perkins, is an economist at the National Institute of Economic and Industry Research and is a founding member of the Secular Party of Australia.
The positive sign of the estimated CO₂ coefficient indicates that it does contribute to global warming. The coefficient value of .01 indicates that every 100ppm increase in atmospheric CO₂, is associated with a temperature rise of approximately 1 degree C. The results also show that sulphates and volcanoes have a significant negative (cooling) effect, and that variations in solar radiation have a significant positive (warming) effect on temperature.

This methodology has its limits, but the results broadly replicate what is reported from the climate models. Do they prove that CO₂ causes global warming? No, because proof is not something that is obtained from statistical inference. Do the results suggest that there is cause for concern, to the extent that we should take significant action? Yes. Prudent risk management means that we should give the planet the benefit of the doubt. If it transpires that our actions mean that we have conserved fossil fuels unnecessarily, so be it. At the end of the day, the responsibility is with the man who made the decision.

**Notes**

1. To all my former EcoStats students who just could not see the point of learning this stuff — see, it can be useful.
2. Temperature data obtained from GISS Surface Temperature Analysis data.giss.nasa.gov/gistemp/graphs.
3. For a more detailed explanation of the variables see 20C3M experiments www.csg.ucar.edu/working_groups/CCSM3_IPCC_AR4/20C3M.html
5. Note that water vapour is not an exogenous variable
6. For full statistical results and input data, see TSP output home.alphalink.com.au/~jperkins/gw.txt

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**Responses from p 61**

This is a plain misrepresentation: I didn’t say I ‘wouldn’t listen’ to anything and in fact I was presenting, again, the ‘what the climate would otherwise be’ point as discussed above. What I said was — and it should be noted that my ‘unless and until’ phrase was at the beginning of my statement not, as presented by Cox, at the end — “unless and until one can…” In other words what the climate is doing anyway, regardless of man’s possible influence, then speculations regarding any possible human contribution can have no scientific foundation (new emphasis). Clearly if Cox thought that it could have any scientific foundation, he would have said so, but instead we got blatant misrepresentation and comparisons with creationism — and this is just his first two paragraphs! It gets worse.

Cox states, “The most worrying aspect is another point made by Gibbs (and other climate sceptics), that CO₂ levels rise after a rise in global temperature. Well, it may have escaped their notice…” This is simple invention — I have never made any such point. (Why does he do this?). Another gross piece of falsification is where Cox says,” Of course if (as Gibbs claims) man-made CO₂ is actually causing global cooling…” I never made any such claim; it is, yet again, the ‘what the climate would be doing anyway’ point. It comes in the sentence immediately following the one quoted above ending “…can have no scientific foundation.” I went on to repeat a quote from my original article as follows: ‘…until the macro background is understood, the possibility remains that carbon emissions are actually having a net cooling effect on world climate.” (Again, why does he do this — does he think that no one, not even the author, will bother to check?) Cox seems to accept the fact that the hypothesis, that man-made CO₂ is causing global warming, needs to be falsifiable for it to be a scientific one and says that we just need to cut emissions and see if temperatures fall. However, he goes on, this will probably not happen in his lifetime so (surprise, surprise!) it’s not actually going to be tested.

But hang on, temperatures have been cooler since 1998 while emissions have surged ahead — doesn’t that prove that emissions don’t cause higher temperatures? No, says Cox, we are at a “sunspot minimum” in an 11-year sunspot cycle which determines how much radiation reaches Earth.” Cox tells us that we “need to realise” this. He doesn’t tell us from which authority he is quoting this, or at what point in the greenhouse debate it was established that sunspots were at times having a cooling effect on the world’s climate. He simply tells us that we must “realise” it.

Curses! I thought we had them there for a minute! As I mentioned in my original article, Karl Popper made great play of the way that ideologies which want to be regarded as science show great ingenuity in devising *ad hoc* excuses when the events of the real world contradict their ‘science’.

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**Renewal Time?**

If this magazine contains a coloured insert headed “Renewal Notice”, then, unless our records are wrong, it is time to renew your subscription. We again offer you the chance to take out a half-price gift sub for someone else at the same time as you renew your own.

If there is no insert, then it’s a fair bet that your sub still has some time to run. But you can still take out a gift sub, anyway.
Lost in translation

Eran Segev
Lane Cove NSW

Martin Bridgstock’s article, “A Skeptic Reads the Bible, Part 1” (28:3) correctly points to the obvious lack of logic, consistency and accuracy in the Bible. I would like to add another failure of the Bibles that he used, and that everyone but a handful of Hebrew speakers is subjected to: poor translation.

The Dead Sea Scrolls found in Qumaran in 1952 show that the modern Hebrew Bible is quite faithful to some ancient version that can be colloquially called the Old Testament’s “original”, though as Martin has pointed out, the Bible is a collection of writings and therefore there is no single original version. If the Hebrew Bible is the original, then any mistranslation adds to the inability to extract insight, let alone meaning, from the text.

In examples mentioned by Martin, I have picked up the following: in Exodus 4.24-26 (ref j), where the translation says “touched Moses’s feet” the original says “touched his feet”. ‘His’ could refer to God, to Moses or to the son; there is absolutely no way to tell which. Also, it does not say Zipporah touched the feet with the foreskin. It says she cut her son’s foreskin and touched his feet — that’s all. Maybe she cut the foreskin and then touched the feet without it? You can’t tell from the text. Whoever created the translation loaded the text with meaning not included in the original.

Another one, from Isaiah 30.6 and Isaiah 14.29 (ref(s): in Isaiah 30.6, the words EF’E and SARAF have been understood by ancient Hebrew scholars to be types of snakes, or synonyms of the word snake. Modern Hebrew uses EF’E for adder. There is no reason at all to suspect that the concept of dragons was known to the writers of the Bible, though a SARAF is mentioned elsewhere in Isaiah as having six wings, so it’s clearly a mythical figure. I have no idea where the reference to ambassadors comes from. It’s not from the book I’m reading…

In Isaiah 14.29 the words mentioned are NAKHASH (snake), TS’EFA (modern use: viper) and SARAF. That verse, is clearly a metaphor saying the Philistines are snakes and their progeny are flying snakes, (ie, even worse).

So the conclusion is clear: most biblical literalists, who face a mountain to climb anyway, when trying to explain away the logical fallacies and inconsistencies of the Bible, so they can show it as the true and inerrant word of God, are not even reading the right text!

Conspiracy or delusion?

David Frankland
Edgewater WA

The article on conspiracy theorists (Around the Traps, 28:3) made fascinating reading. Of course it’s easy to dismiss them as either irritating jerks (Area 51 nuts, Moon Landing Hoaxers, JFK assassination, 911 Truthers, Face on Mars, etc) or else morally repugnant crackpots (Holocaust deniers).

Yet has anyone considered they may be simply suffering from some type of mental illness? Remember all conspiracy theorists have one thing in common — a mindset that utterly rejects any opposing evidence, no matter how logical or reasonable. Opposition simply “confirms” the conspiracy is even bigger than they thought.

I remember once asking a “911 Truther” just what evidence he would accept to make him change his mind about the WTC buildings being blown up by hidden explosives and not hijacked planes. The answer was “none whatsoever”. How about a signed confession from Osama himself then? Certainly not. That would simply be considered more
Clarity corrections

Robyn Williams
ABC Science Unit
Sydney NSW

David Tribe's Forum piece on "Global Warming and Climate Change" (28:3) was both immense and full of errors. May I correct three from just one paragraph?

First, I did not try to get The Great Global Warming Swindle banned. I don't have such powers! In fact, I advised the head of ABC TV that, if such a flawed diatribe were to be put to air, it should be accompanied by substantial corrections and comment. This duly happened.

I was in this broadcast and would hardly have participated if I'd wanted it banned holus bolus. I've said, publicly, several times (quoted in the Sydney Morning Herald only a few weeks ago) that I'm against such censorship, even in this case.

Secondly, the brawl was in 2007, not 2008; and it is Professor Don Aitkin (ex VC at the university of Canberra), not Aitken.

The remaining (extensive) paragraphs I'll leave to others.

Mathematics and reality

John Warren
Annandale NSW

In the Autumn 2008 (28:2) issue of the Skeptic I wrote that "it is not possible to prove anything by words alone".

Bill Moriarty has objected, in the Winter edition (28:3), to that statement by saying that "At face value this would seem to be a dismissal of the whole of mathematics". Heaven forbid, no. Mathematics is a superlative tool for analysing a problem and getting a correct, usable, answer. The proof is in our engineer's ability to place a rocket on the moon.

However, mathematics is an abstraction from reality and one of my lecturers once admitted the he sometimes had to translate a maths equation into words so as to make sense of it. Words are a lower order of abstraction.

I call on the quote from Sir Guy Greene's keynote address to the Skeptics' 2007 Convention (quoted in John Gibbs' article in the Winter edition, p53. (28:3)) to support my statement. In that quote Sir Guy said "A basic but common error is to forget that a model is not real. A model is a useful tool, but only when it is used in conjunction with empirically based science". I take that to mean that words or symbols in a mathematical equation or model are not enough; it has to be proved by putting it into practice.

This is a serious and difficult question when evaluating models in the present climate change debate.

Chess problem

Justin O'Hagan
East Brisbane QLD

In "Jonathan Sarfati : Scientist" (28.3), Brian Baxter informs us that in 2006 Sarfati had a Chess FIDE rating of 2278 and title of FIDE Master (FM). Baxter writes that he might consult Sarfati on a chess problem "unless one of the 2277 people who outrank him is available". This suggest that Sarfati was the 2278th ranked chess player in the world in 2006.

I fear Baxter has confused "rating" with "ranking". Perhaps he needed to ask his "chess-playing friends" a few more questions.

The FIDE rating indicates the number of rating points Sarfati held in 2006. Tournament Chess players earn or lose rating points based on their results against other rated players. Ratings are adjusted up or down based on the most recent tournament results. The mechanics of this change process are implemented by FIDE (www.fide.com/).

FIDE's Top 100 Chart for October 2008 (ratings.fide.com/toplist.phtml) shows the current top rated player in the world is Grand Master Veselin Topalov with 2791 rating points. Clearly there are not 2790 players who outrank him.

The chess problem "unless one of the 2277 people who outrank him is available". This suggest that Sarfati was the 2278th ranked chess player in the world in 2006.

The hierarchy of chess titles for men from the top down is Grand Master (GM), International Master (IM), FIDE Master (FM), Candidate Master (CM). For a player to qualify for these titles they must have reached a specified rating level at some time in their playing career and also achieve favourable results (norms) in international tournaments involving other FIDE titled players. The title is valid for life, even if a players rating subsequently falls below the qualification level.

Jonathan Sarfati's FM title and 2278 FIDE rating indicate that he was indeed a very accomplished and successful chess player during his playing career. Given that most
active players with a rating of 1000 can easily defeat almost any non-tournament player; it is not surprising that uninformen members of the CMI would be in awe of Sarfati’s chess prowess.

I am not sure whether the “revealed word of God” has anything to say about chess - perhaps we can refer this question to Martin Bridgstock (‘A Skeptic reads the Bible”, 28:3) — but I have never seen reference to god or gods in any chess texts. I am, however, in little doubt that many professional chess players inhabit a parallel universe based on an 8x8 black and white, checker-board frame of reference.

As Brian Baxter suggests, Sarfati is qualified to comment on a narrow field of physical chemistry and chess. Personally, I am more impressed by his FM title and rating than his PhD — and don’t have the time or inclination to read any of his CMI writings. I am too busy struggling with this week’s chess problems in the Weekend Australian.

Demystifying the language?

Tim Train
Thornbury VIC

Kevin McDonald asks in his article for the Winter edition (28:2) of the Skeptic whether it is possible to entirely de-Godify our language. I have to wonder why anyone would want to, and what difference it would make, exactly. I’d like to enlarge on both of these points.

1. I was certainly both amused and bemused by the extensive, not to say exhaustive, list provided by McDonald of terms from the English language that include mention of Christian concepts such as ‘God’, ‘heaven’, ‘hell’, and so forth. But why an obsessive focus on a Christian God? And, for that matter, why even a focus on God at all?

From the standpoint of a skeptical observer with an interest in language, there are any number of dubious concepts and out-of-date ideas that are memorialised in the English language. To take just one example, when we say that a person is ‘in good humour’, we seem to be using a phrase that derives from an outdated medical concept, that of the four medical humours.

Indeed, examining McDonald’s exhaustive catalogue of terms involving God, one finds that it is not nearly exhaustive enough. We find plenty of other Gods or supernatural entities aside from the Christian one in our language. When we speak of ‘juggernauts’ and ‘jingo’, we invoke deities from Hindu and Basque cultures respectively. The terms ‘magic’, ‘magician’, and ‘magical’ come, believe it or not, from Persian — originally referring to the ‘Magi’, priests in the Zoroastrian religion.

We might say that someone is ‘off with the fairies’ or ‘away with the pixies’, is a ‘beautiful nymph’, or is ‘fawn like’, and in doing so we invoke whole pantheons of ancient beliefs and mythologies in our modern speech. Even to say that someone is ‘inspired’, is a ‘sprite’ or is ‘spirited’, we draw on ancient terms used to describe a supernatural entity. (The immediate source for the word ‘spirit’ is from classical Latin, but the metaphor and poetic imagery it describes are far older)

And of course we must not forget that the Anglo-Saxons, who first spoke English, carried with them a mythology of their own, which in turn left us with the names of the days of the week. So if we were really to extract references to supernatural deities, unsubstantiated beliefs, and traditional mythologies from our language, we would find ourselves confronted with a practical difficulty. How else are we to describe the days of the week, if not by the names which have been established by tradition?

As a related thought exercise, compare our names for astronomical bodies. It is easy to remember the names for the planets and astronomical bodies in our solar system, based, as they are, on a widespread and well-known body of Roman mythology. We also fairly commonly refer to the constellations, the ‘Southern Cross’ (presumably a Christian reference by our colonial ancestors), the ‘Andromeda Galaxy’, and so on. But who on earth (or, for that matter, on Mercury, Venus,
Mars, Jupiter, Saturn, Uranus, Neptune, or Pluto) could remember modern terms like SDSSp J153259.96-003944.1? Who would seriously want to?

And quite aside from the question of practicalities, such old naming conventions are more elegant; they have charm; they help to focus natural and positive human feelings of affection and curiosity on what would otherwise be remote or abstract objects of thought and language.

2. There is another point to be made regarding McDonald’s thought experiment in excising the Christian God from the English language, and it comes back to the point I made above about out-of-date ideas being memorialised in language (with reference to the medieval concept of the ‘four humours’).

Quite simply, all language is in a sense metaphorical. There is no way of setting aside the impure or arbitrary or senseless or meaningless parts of language from those parts which express their meaning clearly and obviously, with no reference to archaic beliefs or ancient traditions.

Even the simplest terms relating to abstract knowledge admit of obvious metaphorical interpretations. If we say that we ‘understand’ a subject, then we are not literally standing under something. If we say that we ‘see’ what something means, then we do not literally see what it means with our eyes. We can ‘grasp’ a meaning, too, but of course this does not mean that we lay our hands on that same meaning. So in this sense you can really be said to ‘see’ and ‘grasp’ and ‘understand’ an abstract idea, and we all know perfectly well what you mean.

The metaphors themselves are arbitrary and illogical; but the language that they are part of, is nevertheless a tool of great utility and simplicity. We can no more extract these metaphors of ‘seeing’ and ‘grasping’ and ‘understanding’ from our language than we can successfully extract metaphors relating to supernatural beings and deities.

And besides, there are some circumstances where these metaphors might be in themselves eminently logical, sensible, and practical. There is an ancient Indian tale regarding an atheist who reminded himself, day and night, that God did not exist, saying to himself, over and over again, ‘There is no God. There is no God. There is no God. There is no God. There is no God.’ Upon dying, the tale relates, this man — having kept the idea of God permanently in mind — was instantly united with the Godhead.

One can’t help but wonder if, in their attempts to investigate the amount to which religious terms and concepts extend throughout our language, people such as McDonald (and myself) might not have the same bizarre fate befall us as well.

It is a fate that both atheists, and God, might find annoying!
* Academic readers will be relieved to know that the source of this story is the esteemed academic publication, Larry Gonick’s Cartoon History of the Universe.

Not sneering, smiling

John Stear
Coombabah QLD

Michael O’Rourke “The village taxonomist” (28:3 p.63) seems to have read much more into my article “A Fundamental Question” (28:2 p 34) than was intended. I merely posed the legitimate question — are those believers who adhere to an inerrant Bible the only true Christians? A simple proposition I would have thought, but if Michael finds such tongue-in-cheek musings “tedious and irritating” then that’s his prerogative.

But his principal criticism of me seems to be that I “sneer at Christianity”. I’m not sure where in my article I actually sneered, unless pointing out that some Christians are pragmatic in the way they tailor their beliefs to fit the social climate is a form of sneering. Having said that, the passion I have for the Atheist cause prevents me from treating the purveyors of nonsense with anything short of disdain. It follows then, that I can’t agree on a blanket rule that says skeptics “have a duty to be respectful to those we disagree with”. Honest, yes; respectful? Not necessarily.

My remarks about Catholics and fundamentalism were posed as a question. If Michael is trying to make a point about my lack of knowledge of what “the Catholic hierarchy have actually written about the Bible” then I must confess I’ve found the results gained from seeking facts from religious sources often leave much to be desired. I suspect that what the Catholic hierarchy writes about their Bible might be no less disappointing.

Perhaps Michael, being a Catholic atheist, might have answered my question for me. But then one who, to describe another Catholic atheist, George Santayana, is “caught between the appeal of belief and the demands of critical thought”, might also supply a less than satisfactory answer.

Keeping the faith

Mark Avery
Glebe NSW

In the last issue (28:3), Kent Blackmore claims that the Skeptics should not take a public position about religious faith, and I, an atheist, agree with him. Yes, I can skip the articles, and do, but I don’t like how the Skeptic is changing. It is becoming a vehicle for whingers. Yes, creationists’ claims are fair game, but not matters of faith. Our beloved editor (beloved, irrespective of his editorial decisions) explains that ‘there has been no change in
policy’, that the themes have widened. But attacking faith (rather than claims) is a fundamental change. He also suggests that the Skeptic is running out of fresh subjects to examine.

But why not have a slimmer magazine? Heavens knows, it's not as though it's a struggle to find something else to read — or do. And what happens when we've flogged more subjects to death? Will we start getting recipes? “We need to fill the pages somehow,” the next editor will lament. But why not be like Mr Ed, the talking horse, who never spoke unless he had something to say?


Please, let the established atheistic magazines continue to preach to the converted, and let the Skeptic become thinner. Allow the Skeptic to retain its unmarred (but endangered) reputation for clear, fresh thought. Don’t let the Skeptic become a magazine for whiners. Attack claims, not faith.

Editor, if you intend to publish more anti-faith articles, at least do a poll. If you find that only atheists read the articles, then ditch the articles. An aim of the Skeptic is to open minds, not reinforce firmly held views.

In defence of faith

Barry Butler
Kambah ACT

The other day I came across your magazine and was interested in what it contained about faith and religion. I noted Sir Guy Green’s statements about Christianity and his criticism of what he saw as unhelpful “church” involvement in the controversy aroused at the time of Darwin's The Origin of Species by Means of Natural Selection. Popular mythology often oversimplifies what happened.


Likewise Galileo’s story is far more involved than most caricatures reveal. There are lots of books about the incident, including Finocchiaro’s The Galileo Affair: A Documentary History, University of California Press, 1989.

It’s unfortunate that Galileo has become a symbol of a modern dogmatism that encourages a war between science and religion. These two are not enemies. Science also involves faith — faith that my reasoning process can be trusted. I’m glad that Guy Green did remind us of the limits of science.

Some writers in the magazine, when referring to God and Christ, seemed to offer popular comments, betraying apparently little real examination of Christianity. The claims of Christianity have been scrutinised over and over again. There are a host of competent scholars, including scientists, whose books are worth reading.

C S Lewis, who held the chair of Medieval and Renaissance English Literature at Cambridge University, was no nong. He progressed from atheism through agnosticism to a robust faith which he defended with skill and plenty of logic. Jesus Christ is rooted in history. Jesus and the Logic of History by Paul Barnett; Apollo, is helpful.


I don’t expect your readers to rush off and look for these books, and I know in every debate, people and books can be lined up on opposing sides. While I believe that Christian faith is solidly based on adequate evidence, a whole mountain of evidence does not necessarily lead to what the Bible means by trust in a loving Creator and a personal commitment to the living Christ who died and rose again.

I am unlikely to see another copy of the Australian Skeptic, and I don’t expect to see if my letter is printed. But I hope that some of your readers would dig into at least one of the gospels in the New Testament and perhaps then find some competent Christian minister to discuss any of the pros and cons that may have arisen.

One winner

Greg Cummings
Hornsby Heights NSW

From a skeptical viewpoint it is hard to see how The One can be viewed as anything other than a great success for the wider rationalist community. The psychics marshall their forces and offer up the ‘cream’ of their profession, so to speak, to be tested under less than stringent conditions — and yet they obtain a 92% failure rate. As for anyone who has a belief in psychic ability after results such as these — well I just don’t know what we can do for them.

If the CIA does have psychics in it’s employ, Bin Laden is safe for the time being.

Two questions

Ken Woodman
Newstead TAS

I am a skeptic, and have two questions to ask you.
1. It is accepted by all scientists and most theologians that telepathy is impossible, that our brains can not
generate sufficient power to transmit our thoughts even a few feet to another person in the same room. Yet adherents of most religions strongly believe that it is possible to transmit our thoughts, in the form of prayers, to the Deity.

God created the Universe 13.7 billion years ago out of the ashes of a previously collapsed universe and made a lump of plasma about the size of a grapefruit which He then exploded at the speed of light, so now 1 3.7 billion years later He must be situated 13.7 billion light years distant from us, so that, our prayers must travel, not only that vast distance, but at billions of times the speed of light, if we are to receive a response in real time.

2. Adherents of most religions consider the Deity to be a living, loving Creature who loves all His subjects. That being so, I calculate that the Deity must be able to spend only a billionth of a second once a year to each of His subjects on this planet, not considering the millions of possible habitable planets circling the 4000,000,000,000 or so suns in the universe, on which there may be situated intelligent creatures.

Can you please obtain answers to these questions. To me they are unanswerable enigmas.

Response

Barry Williams
Editor Pro Tem

Religion, as an issue, has caused me as much angst as any other during my near-20 years of editing the Skeptic. I put my position in a debate on the topic of whether the Skeptics should tackle religion at our convention held shortly after I assumed the mantle of editorship, in 1990. That position can be found in Vol 10, No 3, or in the compilation, The Second Coming, on the Skeptic CD.

In general, I still hold to those opinions, that we should tackle testable claims made in the name of religion, but that the phenomenon of religion itself, or the mundane practices of various religions, were not really within the purview of the Skeptics as an organisation.

Let me make my personal position clear — I am an atheist, by which I mean that I have no interest in religion other than as a social phenomenon. I simply don't find it reasonable to believe any of the fundamental propositions that underlie all religions, and in that I include the various quasi-religions masquerading as political philosophies that brought so much grief during the 20th Century. Nothing that relies on dogmatic adherence makes any sense to me — I prefer by far to have some reason to believe.

There seems to be evidence that the willingness to believe might well be a genetic disposition brought about through evolutionary pressure. If that is so, then I don't appear to have it — whether that is an advantage of a disadvantage, I'll leave others to judge — but it doesn't seem to have done me any harm.

However, unlike some atheists, I harbour no particular antipathy to religion, partly, I suspect, because I grew up in a household where it didn't loom at all large. Or loom at all, come to that.

I do recognise that a large number of people find comfort in their religion, and that the religious impulse has led to some of the most wonderful art, architecture and music. I also recognise that dogmatic adherence to religion has led to some of the most gross outrages against human dignity and wellbeing.

I don't believe that any of these things tell us anything much about the nature of proposed deities, but they do tell us a lot about human beings. Human beings who have arrived at their present state after a long and tempestuous period of evolution through natural selection.

Having made my confession of lack-of-faith, I must say I do not think that we have lately shown any extra concentration in the Skeptic on religious matters. Certainly in 28:2 there were several articles with a religious theme, but they all looked at different facets of the phenomenon and could hardly be considered as a concentrated attack on faith.

I am well aware that not every item in the magazine holds the same interest for every reader — it would be miraculous if it were so. Skeptics are about as diverse a bunch, with as disparate a range of interests, as you are likely to find anywhere.

My aim has always been to make the Skeptic as interesting and informative to as many people as possible. I would like to think I have been largely successful in this endeavour, but inevitably the contents have reflected subjects that I have found interesting. No doubt, the new Editor will have a somewhat different perspective (not so many mentions of cricket, for a start), but I have every confidence that she will keep the interest levels and the quality as high as the readership demands.

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