Null Hypothesis

The Journal of Unlikely Science

£1.50

FORGET THE SWARM.. ..LOCUSTS FEEL THE FORCE

Also this month:

Edible gold
The Science World Cup
Whether weather is changing forever

Volume 2, Issue 8/9 - May/June 2006

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The Journal of Unlikely Science casts a wry eye over the world of science and technology. Published monthly, it caters for anyone who's ever laughed at, or been amazed by, the world around us. *Sections marked with an asterisk are based on material from published journals, scientific literature and research. Those without, may not be.

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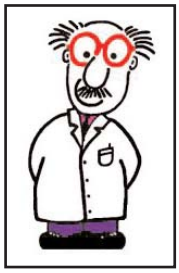
Cover Picture

Front:
Locusts: the eighth plague and a force to be reckoned with.
Photo: Ecophoto; Agency: Dreamstime.com

Back:
Giant tortoise, *Geochelone* spp. Slow-moving natives found on islands around the world.
Photo: Ryan Lebaron.

A quick word

Welcome to this new double issue, which will bridge the gap seamlessly between old and new as the *Null* moves forward with the times.



Quality is something we have always tried to bring you in the *Null*, as well as a generous helping of the weird and wonderful. Now, we are set to bring you even more with the summer launch of a brand new *Null Hypothesis* website packed with new features.

As well as the usual dose of the *Null*, available in a full colour electronic sauce, there will be more comment, news, downloads, job pages and our ever growing archive of *Null* articles.

This issue also features a look at junk chain e-mails, an interview with top science reporter Roger Highfield and brings you the low down on the (second) big event of the summer - the Science World Cup. Come on!

Lies, damn lies and statistics

No lies in fact, all real fascinating statistics.

A fully loaded supertanker travelling at its normal speed of 16 knots needs at least 20 minutes to stop.

The three richest people in the world own assets that exceed the *combined* gross domestic products of the world's poorest 48 countries.

An area of the Sun's surface the size of a postage stamp shines with the power of 1,500,000 candles.

Percentage of Africans using mobile phones: 6
Percentage of Europeans using mobile phones: 70

Sweden is the biggest national spender on ketchup, with Australia second.

The Other Lab

by Richard Bond

"These are the wilder shores of media irresponsibility... we need watchable dramas in which the science is done well"

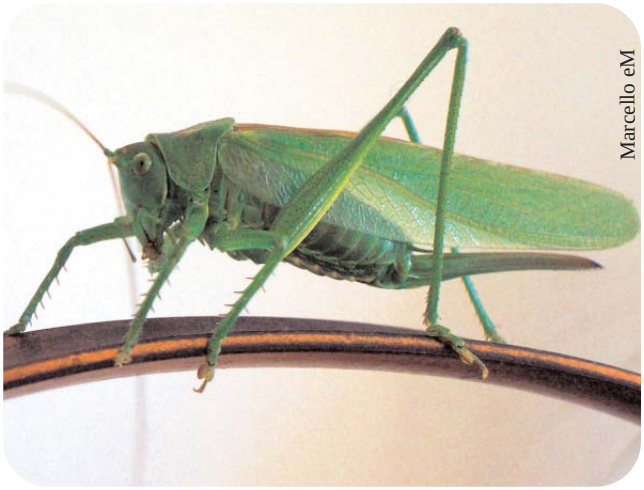
Lord Robert May, former Chief Scientific Adviser and President of the Royal Society, bemoans the representation of science in the media in It's science, Jim - but not as we know it, Times Higher, *February 2006.*

At a script conference in one of our leading film studios…

I'd like to welcome Dr Pennant of the Royal Society to this meeting.
Good morning everyone.
As you know, Dr Pennant has very kindly agreed to act as our scientific adviser on this production. To make sure that we don't stray onto some the wilder shores of media irresponsibility. Isn't that right Dr Pennant?
Absolutely, I'm here to ensure that the science in this production is done well. No misrepresentation or exaggeration, the sort of things that mislead the public, not to say give science and scientists a bad name.
Indeed. So to kick things off did you have any initial thoughts on the script?
I'm afraid I do. In fact it's difficult to know where to begin.
Really?
There's just so much to sort out. I suppose we'd better start with the title.
The title?
Has to be changed I'm afraid. Not scientifically sound.
Why, what's wrong with it?
Well, I don't quite know how to break this to you, but I'm afraid that, scientifically speaking, there's just no such thing as a 'were rabbit'.
Ah.
I'm afraid it would be wildly irresponsible to give the impression that such creatures exist, especially to such an impressionable audience.
I really must apologise Dr Pennant. That really was truly irresponsible of us. I will talk to those concerned immediately.
Good.
It's exasperating, it really is. I just don't know why creative and imaginative people feel that they have to make things up all the time.
Oh there's a lot of it about.
I'm sure there is. Shall we go on? I guess the physics of Wallace's 'Mind Manipulation-o-Matic' brain altering device is a bit iffy?
Yes I'm glad you mentioned that…

Studies of the bleedin' obvious

Locusts are probably not our favourite insect. Images of a plague of millions flying in haphazard directions, stripping the land of everything even slightly green, are what most people think of when one mentions locusts.


Marcello eM

But what about locusts as film critics? Researchers in the Division of Neuroscience at the University of Newcastle upon Tyne have been sitting them down to watch films in order to study their tiny brains.

A number of stimuli were investigated, and they found that when locusts crash land after flying into something, they do so without realising what they are doing - they can't determine the time to collision. They also found that in certain conditions, darker objects might be seen before lighter ones.

Is this important? Well it seems that giving the insects something to watch is altogether a better plan. What better film to show than *Star Wars* - the quintessential trilogy (now sextuplet). Scenes from Lucas's masterpiece were shown to locusts while their neurones were strictly monitored. From the famous opening credits, through the dark days of life on Tattooine, the swamps of Degobah and on to the final battles above the Death Star, the locusts were no doubt spellbound. The outcome - they "respond well to any rapid movement". Never!

How much popcorn they got through and what they thought of Yoda is not documented. One thing is for sure: fly they must, for only then an insect they will be.

Rind, F.C. and Simmons, P.J. (1992). Orthopteran DCMD neuron: a re-evaluation of responses to moving objects. I. Selective responses to approaching objects. *Journal of Neurophysiology* **68**, 1654-1666.

Orthopteran facts:

Locusts are the most frequently named bugs in the Bible. The full list (made in 1958 by entomologist W.G. Bruce) is: locust: 24 references, moth: 11, grasshopper: 10, scorpion: 10, caterpillar: 9, and bee: 4. Not even a mention for the humble ladybird or the butterfly.

The desert locust (*Shistocerca gregaria*) is one of the world's most destructive insects. A large swarm can eat 80,000 tons of corn in a day. To make matters worse, they can cover 300 miles overnight.

It is possible to calculate a close estimate of the outside temperature (in degrees Fahrenheit) by listening to how many times a Katydid (a small green grasshopper) chirps. The formula is: T=60+[(n-19)/3]. Where "T" is the temperature and "n" is the number of chirps per minute.

Periodical cicadas are among the longest living insects, with some living for 17 years. Male cicadas are also the world's loudest insects, and can be heard from a quarter of a mile away.

Do chain mail curses really lead to bad luck?

Dr. Tess Bridges
Risk Management Division, University of London

Inbox irritation

It's Monday morning at work. Coffee in hand, you gravitate towards your e-mail inbox, naturally having attended to your intray of urgent jobs first. You see amongst the work-related titles a message from a friend, and you open it up, hoping to discover a pithy summary of the weekend's more nefarious activities. Instead, much to your disappointment, you find a rather nauseating collection of platitudes or else an image of nastiness (for example, see figure 1).

The e-mail concludes with something like the following sign off: If you send this e-mail off to 50 people within the next five minutes you will gain enlightenment/millions/kittens, if you do not you will get bad luck for the rest of your life.

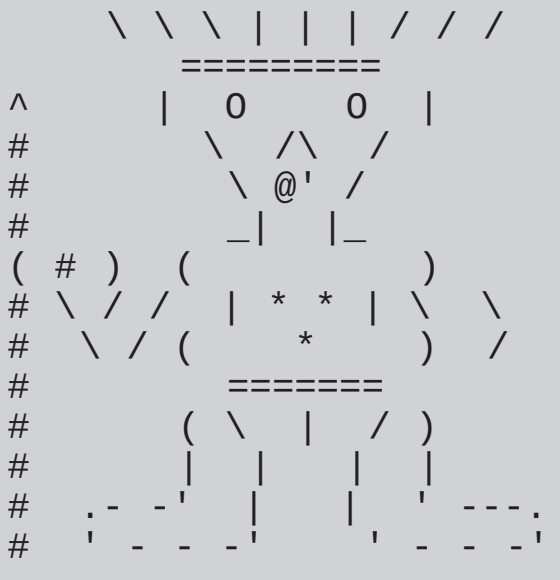


Figure 1 - Hawaiian good luck totem, found in chain mails circa 1990s. Luckily, such figures are rare today.

The principle content differs, though a startling number of these ephemeral e-beasts involve photographs of sunsets with meaningful quotations attached. The number of people you have to send the e-mail to varies, as does the stated time limit. What is consistent is that there's usually some threat (thinly veiled or otherwise) and thus a slightly uneasy feeling as you press delete.

The question, to discard, or to send on has led some organisations to construct guidelines for dealing with chain mails. Sandy Portincaso, writing for the *Christian Science Sentine*, suggests chain mail recipients ask themselves the following: "Does it [the e-mail] instruct, awaken…. promote meaningful discussions, lighten burdens, touch the heart, heal? These … keep me from sending items that would clog up someone else's mailbox or pollute his or her thought."[1]

The *American Federal Advice Bureau* also offers some reassuring advice: 'here's the scoop on chain mail: If it promises any kind of return - like money - it's fraudulent and illegal!… you could face legal action!'

> *"If you do not send this e-mail in five minutes, you will have bad luck for the rest of your life"*

Perhaps the best piece of advice, taken from an anonymous poem[2], 'Shakespeare on Spam', comments upon the following: "*of all conveniences, these are most oft' meet: The Bulk folder, "Select All," and "Delete"*".

[1]. from "*Internet Essentials*" by Sandy Portincaso, a sidebar article in Volume 102, No. 49 (2000-12-04) of the Christian Science Sentine]
[2]. Taken from **www.BreakTheChain.org**

Unlucky Incident	Pre-cursing	Post-cursing
Unexpected embroilment in conversation with mad persons on the London Underground	**6**	**9**
Theft of vital chocolate supplies	**2**	**3**
Theft of Biros in the workplace	**17**	**12**
Unwanted appearance of boss when e-mailing friends/ whining about job/similar	**26**	**31**
Mysterious and sudden appearance of ex-partner whilst gurning at broccoli in Tescos	**1**	**0**
Being queue jumped by Tony Soprano look-a-like	**0**	**1**

Table - comparison of unwanted events during a one month period pre and post e-mail cursing

Rationally, we all know that chain mails are an evil combination of kitsch and empty curses, best relegated to the trash. But, could there be any truth in what they say?

Testing the water

The null hypothesis was that there's no difference in luck engendered by deleting malevolent e-mails. Episodes of ill fortune were counted for a month prior to the study. The number and type of incidents were then compared with outbursts of unluckiness observed after receiving a variety of different chain e-mails, all with curses, again for a period of one month. The substance of each of the chain mails was graded 1-10, where 1 represents a statement almost acceptable by modern standards and 10 represents the manifestation of utter tatt, for example:

'*No one can go back and make a brand new start - anyone can start from now and make a brand new ending...*'

Then the severity of the threat was graded, 1 being a mere hopeful wish that the recipient would avail him/herself of the opportunity to revel in fluff, and 10 being eternal damnation. All e-mails were binned after categorisation. Missives from Russians seeking marriage, purveyors of *Viagra*™ and advertisements for the enlargement of organs not found in 50% of the population were eliminated from the study.

A large supply of comforting foodstuffs such as pistachios, chocolate and tea were stockpiled in accordance with EU directive *345.299b* that clearly states 'no university member of staff should be exposed to overtly cutesy quadrupeds with mournful expressions on an empty stomach.' A careful record was kept of the time since deleting the message and thus incurring the curse, and also of any particular episodes of bad luck entailed.

"Fourteen chain mails suggested I was undervaluing important people in my life"

The answers: the truth

Regarding the serious question, that is, were any of these threats successful, it seems unlikely; my life circumstances and accumulated misfortunes are summarised in table 1.

A total of 79 chain mails were received within the month. Of these, 21 contained unwanted advice regarding my spiritual development and 14 suggested that I was undervaluing the important people (unspecified) in my life. 12 gave me advice on how to maximise the usefulness of the hours of my day, making the erroneous assumption that I harbour a secret desire to increase my productivity. 5 chain mails made the revelation that love was a very important quality and that the world would be a nicer place with more of it, a thought that had not hitherto occurred to me. The rest were incomprehensible. Despite the initial benevolent tone of the mails, 87% of them then took a more sinister tone, ordering me to circulate the material at the risk of incurring some wrathful misfortune.

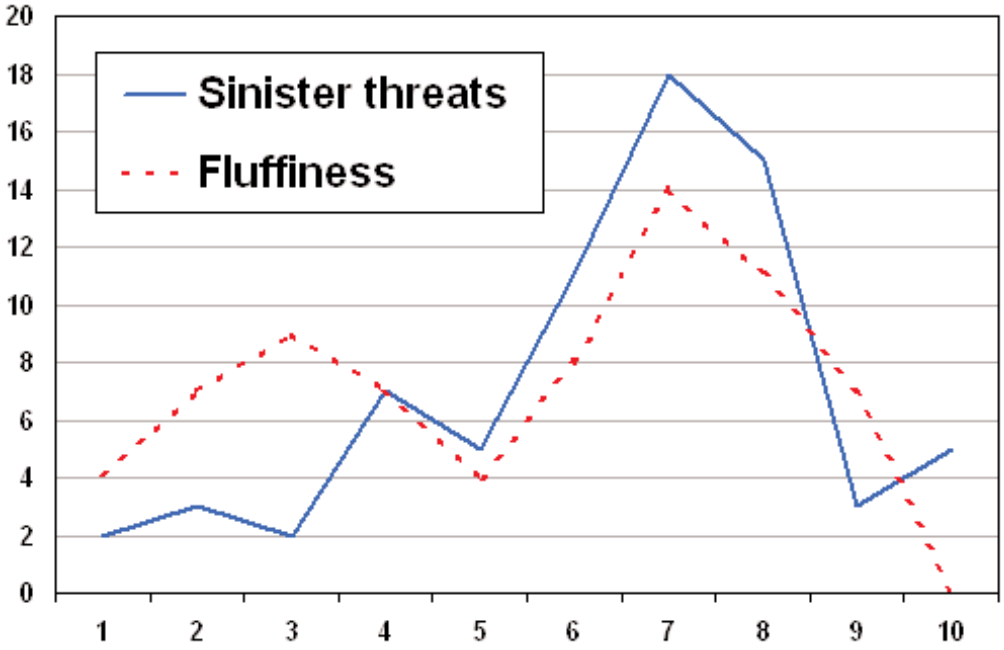


Figure 2 - The relationship between initial fluff and the progression to sinisterness in the 79 e-mails collected. Fluff quotient is shown in pink, sinisterness in blue.

An interesting pattern emerged: the more syrupy the principal content of the chain mail was, the darker and more evil natured the following curse was. This is shown on figure 2, where it can be seen that numbers of e-mails carrying saccharine affirmations and dire warnings follow the same pattern of distribution:

The 'bad luck counts' were analysed with statistical tests. These showed there was no difference ($p = 0.655$) between the two counts of observations, and thus the null hypothesis must be accepted. However, it is interesting to note that this researcher was marginally less likely to suffer coco-theft following the e-mails, and rendered slightly more vulnerable to gangsta-sized queue bargers.

Curses and conclusions

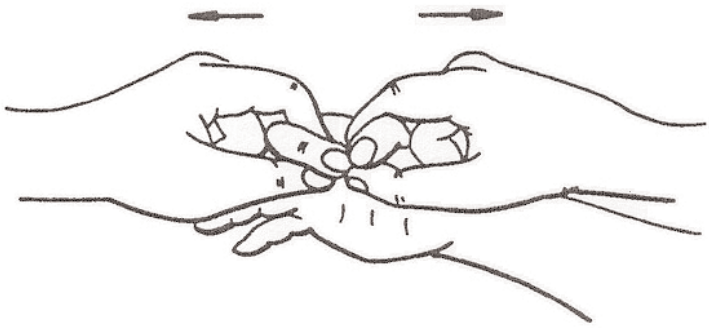
It is perhaps a salutary observation that incidences of bad luck are fairly perennial regardless of one's chain mail status. It is to be hoped that this paper will give readers the confidence to delete at will, and thus maybe, in one distant, virtual inbox in the future, we may be relieved of the horror of chain mails.

However, one of the greatest weaknesses of this research is its failure to attempt to the more serious question: if I had sent one of these chain mails to over 100 people, would I now be employed as *Cadbury's* chief taste control officer, married to Johnny Depp, and the proud owner of an *Alpha Romeo spider*?

Dr. Tess Bridges is an archaeological geneticist and freelance journalist currently based in London.

Patent lunacy

With medical testing in the news recently, it is important to give the latest novel inventions priority when it comes to technological advances in the field. These, however, are probably best left on the shelf.

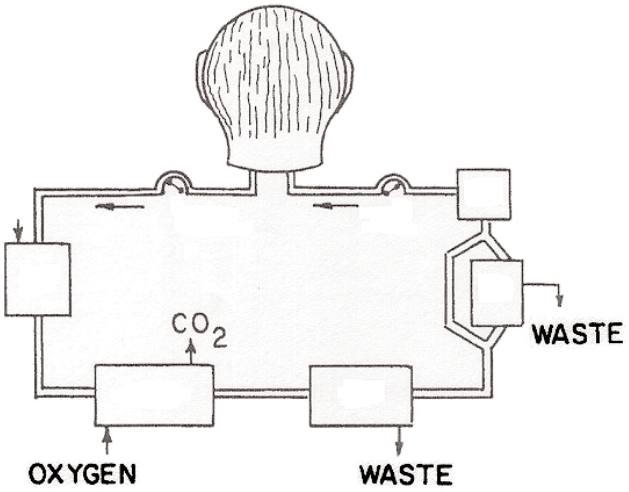


O-ring imaging test

Is it a new torture method for getting information out of your enemies? Is it a new playground game, that is set to sweep the nation as marbles, cat's cradle and Donkey Kong did in years-gone-by? Is it advertising a new medical superglue?

No. It's none of these, and to be quite honest, we are not really sure what it is meant to be. The attached dialogue claims that it's "a method of imaging an internal organ of a patient for purposes of medical diagnosis" where the person's internal organs are "non-invasively externally probed" - sounds like highly dangerous madness to us.

Head transplantation



The inventor of this particular gem calls his contraption the 'cabinet' but that, sadly, is where the sanity ends. Billed as providing physical and biochemical support for a head that has been 'discorporated' - that's chopped off to you and me - this is more like something from a Frankenstein movie.

Just connect the right tubes up to the oxygen supply and nutrient broth, join the blood inlet and outlet tubes and you're ready to go. The cabinet provides support for the head, and a number of drugs and other substances can be administered to the head while it sits on top of the unit.

Of course, there is the danger of being arrested long before you begin to use this bizarre contraption, unless your name is Mr Hyde or Mrs Shelley. Go create.

More patents next month, but do you have ideas above your station? What unlikely item would you like to see invented that still remains just an idea inside your head. Let us know at **letters@null-hypothesis.co.uk**

Thanks to Dr. Jeremy Kaye for patent assistance.

15 minutes with...

Roger Highfield has been the science editor for the *Daily Telegraph* for over ten years. He's also one of the judges on this year's FameLab. The *Null* gets the scoop.

Roger, what got you interested in the media?
For the first year of my doctorate all I did was prepare samples (Langmuir Blodgett films - which makes me a nanotechnologist) and write software. For the sake of my sanity I started to work on student radio and the university paper, *Cherwell*.

What was your background before you got into journalism?
I went straight from university to journalism. When I finished my doctorate I managed to get a job on a magazine called *Pulse* - nothing to do with vegetarians or soft porn but aimed at general practitioners.

If you were not a journalist what other profession would you have chosen?
Hedge fund manager. Then I might have enough money to do what I want to do.

What were your favourite subjects at school?
Both chemistry and English literature - which is probably why I ended up where I am.

You then went to university and did a PhD there - what did you do that in?
Neutron scattering. I was the first person to bounce a neutron off a soap bubble (made of heavy, deuterated, soap).

Who is your inspiration?
I have been lucky to meet many inspiring people through my job. David Attenborough, Barry Blumberg, Tom Stoppard and Jim Watson to name a few.

Iceland - alien and dramatic

What do you think is the most important invention ever made and why?
The car. Because it has had a pernicious effect on cities, childhood, social life and the environment that we still don't fully appreciate.

If you could have invented something what would you like it to have been?
Something really useful and fundamental, like a wheel, light bulb or a ball bearing.

What do you think is the most important current issue facing the world?
Overpopulation, the underlying driver of climate change.

So, what do you think the world will be like in 50 or 100 years time?
Warmer, degraded and depleted.

What country would you most like to visit and why?
Iceland. Something alien and dramatic about its landscape- well at least the pretty pictures that I have seen of it.

Who do you most admire in the world of science?
Anyone from the harder physical sciences, such as physics and chemistry... there is a wonderful rigour and clarity that is sadly lacking in fields such as sociology, psychology and medicine. Although maybe not the cosmologists - there's speculation, wild speculation and, of course, cosmology, as the old joke goes.

Talking of the cosmos, if you had the opportunity to be a space tourist, would you?
Fly me to the moon. Or better still, to Mars so I can find a few bacteria and end speculation about Martians once and for all.

Next time, we put the questions to ocean expert John Gould. Make sure you pick up your *Null Hypothesis*

And time travel? Where would you go to if you could borrow the *TARDIS* for the day?
I once did a biography of Albert Einstein with an old friend and I would love to visit the 26-year old Albert in 1905 and see him at work during his *annus mirabilis*. I think he would be quite interested in the *TARDIS* too. I would take my wife, since we never seen to find enough time together.

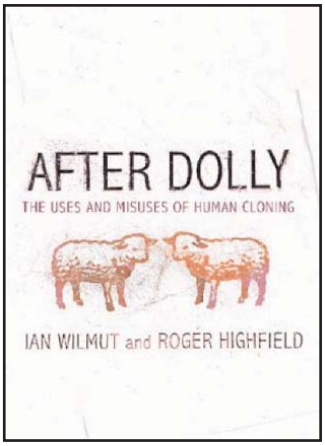
Do you think that science gets enough column inches in the press?
No. Particularly my stories.

You've written about diverse subjects such as Carol Vorderman's brain, boy's DNA put into rabbit eggs and living computers - what ranks as your most bizarre story?
I must have written thousands of stories over the years and I have reached the point where I just can't remember them all, though mind control parasites, studies with severed feet to find the spring in our step must be among them. So far as researching stories goes, using magnetic fields to tinker with my brain was pretty odd, particularly since it did seem to boost my ability to remember. I did once have to chase a gene therapist on a university campus, albeit for a rather non bizarre story. There is also something about penguin stories that I find daft - all I said to the news editor once was 'penguin prostitution' and that was enough to sell him the story. I also liked crashing the new *Airbus* A380 passenger plane not once but several times in a simulator.

Do you think there a place for humour in science?
I can remember a lot of good natured banter in the lab when I was a boffin and I think humour is part and parcel of science. Science is done by people, after all.

If you could have a special power for a day, what would it be and why?
Mind reading, because I am curious. Not sure I would like what I would learn, though.

We've heard you say your book '*Can Reindeer Fly?: The Science of Christmas*' is one of your favourites, do you ever get bored of people asking you about if Father Christmas exists?
The annual interviews about the book, Santa and all that have tailed off a bit now. But I really can't complain about having to deal with the fallout of a book that has been published in a lot of countries, including four or five editions over here. And it did get the world's shortest book review as well (No. *Loaded*).

What do you get up to in your free time - do you think scientists ever really switch off?


I try to write books and try to control my own mad genetic experiment (two small children) to ensure it does not go horribly wrong. I think scientists are as varied a bunch as anyone else and I am sure some of them do switch off, even if it is with the help of copious amounts of ethanol.

What do you consider to be your greatest achievement?
Surviving in Fleet Street for 20 years. I still expect I will find my belongings in a bin liner outside the office one of these days.

Roger Highfield's new book: After Dolly. The Uses and Misuses of Cloning is out in July published by Little Brown. Order a copy in advance at www.amazon.co.uk

An eye on the weather

The GPM logo
NASA/JAXA

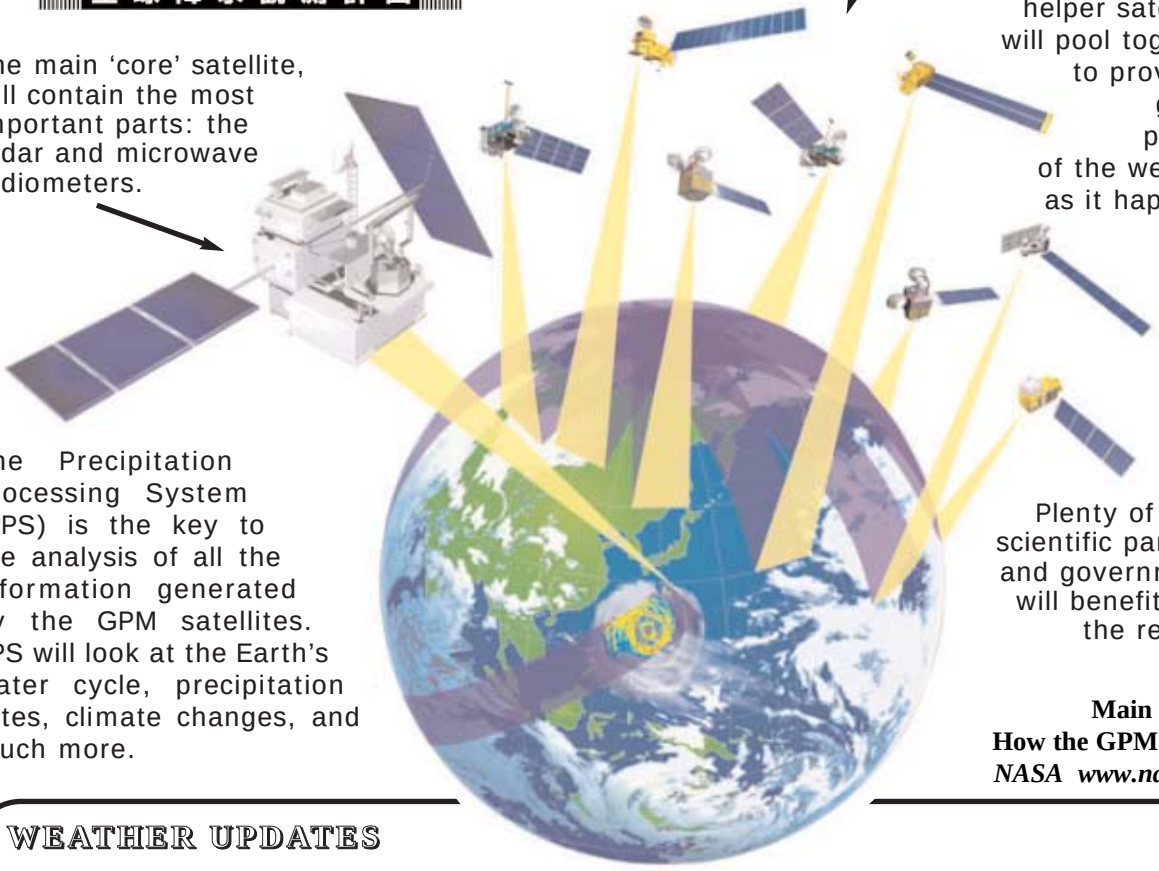
WHAT IS IT?

The **Global Precipitation Measurement satellite** (or GPM for those who like their shortcuts) is a new joint venture between the space agencies of the US and Japan - NASA and JAXA. The aim of the project is to give us the best current information on the world's precipitation. Rainfall is very tricky to measure because the weather is a chaotic system and is, therefore, quite random. Weather systems can also evolve very rapidly.

Up to eight smaller satellites at different orbits to relay information to base via the core satellite. These will pass data to the ground every three hours.

The sweeps made by the eight helper satellites will pool together to provide a global picture of the weather as it happens.

The main 'core' satellite, will contain the most important parts: the radar and microwave radiometers.



The Precipitation Processing System (PPS) is the key to the analysis of all the information generated by the GPM satellites. PPS will look at the Earth's water cycle, precipitation rates, climate changes, and much more.

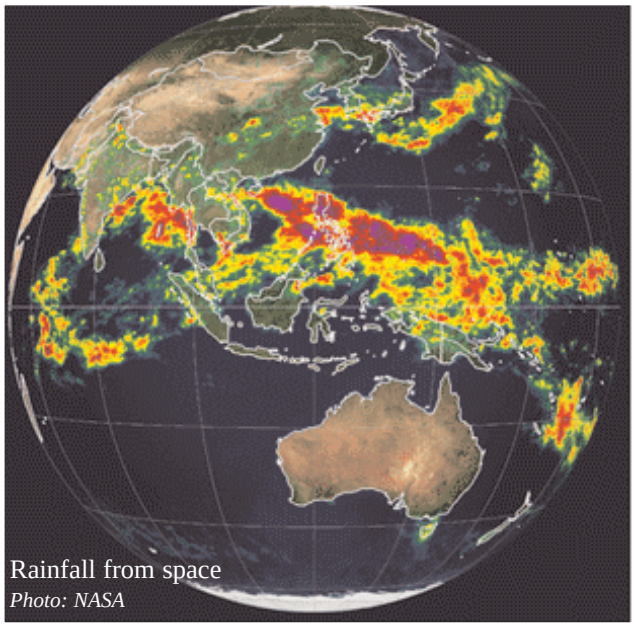
Plenty of other scientific partners and governments will benefit from the results.

Main Photo:
How the GPM works
NASA www.nasa.gov

WEATHER UPDATES

The GPM will give us a unique rainfall update every three hours, and is even able to measure snowfall and rainfall over oceans - something that has always proved difficult to obtain accurately because of the hugely variable rain pattern at sea coupled with poor or inaccurate rain collecting instruments on most vessels. Large-scale events such as El Niño (the reversal of ocean temperatures causing nutrient upwelling changes in the Pacific Ocean) may also be studied during this project.

With water restrictions in place over large parts of the UK, it seems like the good old British weather has been letting us down. But is that the same for the rest of the world? A new satellite program is just beginning to find out - the *Null* investigates.



Rainfall from space
Photo: NASA

GPM - SCIENCE for the FUTURE

Rainfall is essential for providing fresh water for everyday life, but how it arrives is poorly understood. Within a single storm there could be several different levels of heavy to light precipitation and include hail, snow and rain - the very reason why intensity and distribution of global rainfall is being studied from space - the only place where we can get an unbiased view of the whole world. From 407 kilometres above us GPM will be able to see as little as a 0.254 millimetres or rainfall per hour, can discriminate between snow and rain, and will monitor 80% of the globe.

Several other satellites are already in orbit as part of the earth observation satellite program. These include the *Defence Meteorological Satellite*, *Aqua satellite*, the *Advanced Earth Observing Satellite II* and the *Tropical Rainfall Measuring Mission Satellite* and will be able to give us a clue to how the GPM will work best.

Maybe, finally, we'll be able to have a picnic without the rain spoiling it!

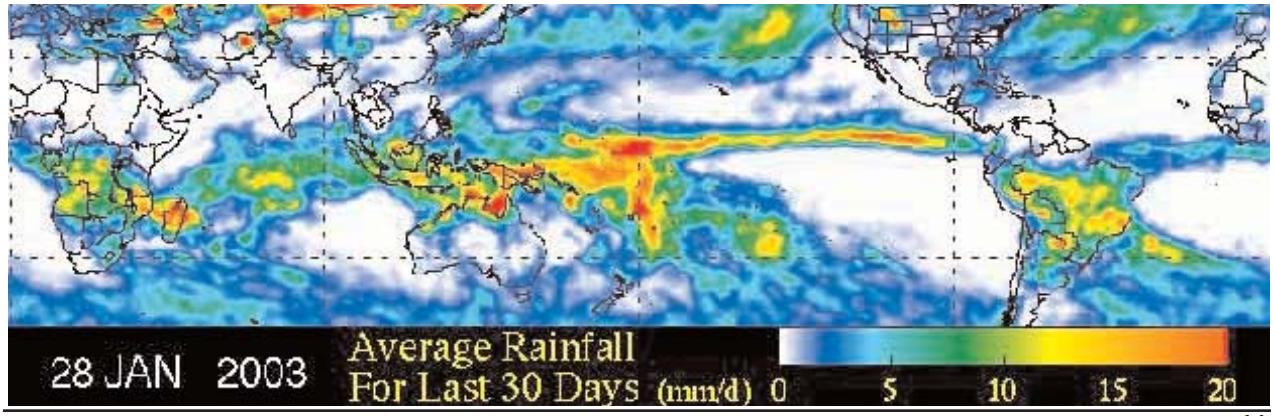
WHY DO WE NEED TO KNOW?

This scientific project will increase our understanding of climate change, help us follow the global water cycle and enable us to improve our predictions of the weather - something us Brits have been trying to do for ever! It could also have important disaster prevention in trying to predict areas at risk from floods and landslides, which have frequently been linked to global climate change caused by human economic activities.

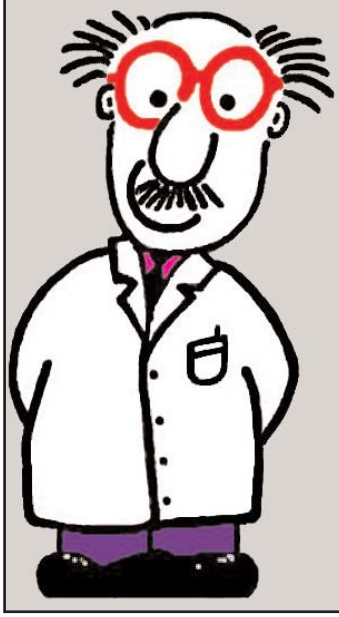
The cost of the project is upward of £636 million - a small price to pay for such important global information? Well, although the mission won't begin until 2011, there is a lot of work to do in preparation, not least to prepare the series of satellites that will collect all the data. A single 'core' satellite which will provide the main equipment of radars and microwave radiometers to measure rainfall. It will be the command centre for up to eight smaller satellites that will be involved in different orbits that will update the rainfall data as it happens.

The patterns of rain and snowfall are probably more important than most people realise. Snow and ice can cause disruption in some parts of the world, while providing essential fresh water when they melt in other areas. The huge amounts of water vapour that condense into rain causes heat release which powers winds and storms that destroy our towns and possessions. Water is life to most plants and almost all land animals - yet it can flood out streets, drown people and harbour disease.

Below: a TRMM (*Tropical Rainfall Measuring Mission*) map showing average rainfall in January.
NASA www.nasa.gov



Changes to your *Null Hypothesis*



The *Null* is soon to take on a new format, as we will be moving from the printed pages that you've come to know and love to the wholly more portable format of electronic pdfs and the Internet. You'll still get the same wacky science, up-to-date news and nuggets of the bizarre, but it will be much more accessible.

A pdf version will be available from the website and can be downloaded when it becomes available. The website will also offer a huge number of resources as part of our growing number changes to make science more fun, wild and accessible than ever before.

We hope that you'll bear with us as we go through these changes and enjoy our new bigger and better format.

www.null-hypothesis.co.uk

No more tears (or beers)?

A new wonder pill could bring the end of hangovers and, with it, the end of alcohol and pubs - should we be alarmed or happy?

It's been a long week at work, and you're just gasping for a pint of beer. But, instead, you pop open a bottle of pills, choose the desired brand of beer and open wide. Drink as much as we want, get merry but not paralytic and, best of all, wake up feeling fine the next day ready to face the world.

Sound too good to be true? Well, not so says University of Bristol psychopharmacologist David Nutt. A cocktail of drugs that could allow all this to happen and, therefore, reduce the risks associated with of one of the country's favourite pastimes. The new drugs will mimic the effects of alcohol without any of the bad points - surely this is the work of geniuses.

Alcohol gives you all its good (that nice happy feeling, relaxation and sociability) and bad (memory loss, aggression, nausea, loss of balance) points by hooking up with GABA-A receptors in the brain. The new designer drugs could mimic the good points, but leave out the bad - allowing you that warm glow without the staggering home!

Better still, is that we could also see the gradual elimination of liver damage, as the drugs would be specifically designed to prevent this. The idea is not without controversy, and there will be political and moral issues regarding new recreational drugs. Plus, of course, people may not want to give up their favourite tipple!

Nutt, D. J. (2006). Alcohol alternatives – a goal for psychopharmacology. *Journal of Psychopharmacology*, vol. **20**, p 318.

‘Thing’ of the month


Sarah Avayou

This month:

~ tattoos ~

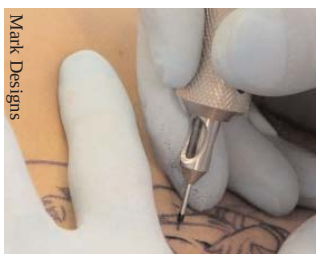
More and more people are having tattoos these days for a great many reasons: for spiritual purposes, to remember kids or friends, to show solidarity to a military group or football team - whatever your reason, it's always a personal one. But where did this body painting all start?

It is claimed that the art of tattooing has been around for over 14,000 years. They certainly date back a long way, Ötzi the 5,000 year old ice man found high up in the Italian/Austrian border had 57 tattoos on his body, probably applied as a treatment for his arthritis.

The word tattoo comes from the Tahitian world “tatu” meaning “to mark something”. Originally, the purpose of this method of body marking varied according to the culture. In Borneo, women had their particular skills tattooed on their arm to increase their marriage value; women in western Asia used tattoos to show social status, Dayak warriors tattooed their hands to gain respect and the Maoris of New Zealand developed a facial tattoo called *Moko* which is still used today. In many countries, tattoos around the wrist were thought to ward off illness and evil.

Despite earlier claims, among the first recorded tattoos in history were from Egypt at the time of the pyramids - the mummified remains of priestess Amunet were found with several dots and lines on her face and body. The Egyptians spread there art to other civilisations and before long Persia, Greece, Arabia and China were trying their hand at tattooing. The Greeks used tattoos to distinguish their spies; Romans used them to mark their criminals.

In Britain, early Saxons used them in ceremonies, often having the family crest marked on their bodies. However, not all were in favour and after the Norman invasion in 1066 tattoos were banned, hated by the governing French, and not seen again in the West until the 16th century. Meanwhile, in the East, they were flourishing - becoming increasingly popular in Japan, but not for the same reasons. Over there, they were again used to mark criminals - first offenders getting a line on their foreheads, a second offence added an arch, the third another line - which spelled the word ‘dog’. This could also be the origin of the “three chances and you’re out” idea. Before long it started to become popular in normal society in Japan, as even royalty had elaborate tattoos.


Mark Designs

While Captain Cook was trawling about in the South Pacific in the late 1700s, he brought back a heavily tattooed Polynesian called Omai. He was an instant hit attracting people from miles around to view his body painting - soon, the upper-classes were all following suit with tattoos of their own. It may have swept the nation, but the main barrier to this was the way they were made. Firstly, every puncture of the skin was done by hand, the ink added at the same time. Things got a little easier when Samuel O’Reilly patented the first electric tattooing machine in 1891 and suddenly tattoos were readily available to anyone at reasonable cost. His basic design included moving coils, an ink tube and a needle - the same items found in today’s tattoo guns. A motor pushes the needle into the skin at a rate of about 3,000 punctures per minute, inserting a tiny drop of ink 1/8 of an inch under the skin each time.

Everything changed again in the early 1920s when tattoos became seen as freakish. Travelling circuses of the time featured heavily tattooed men and women as exhibits to peer at. And so the art of tattooing went underground, with those getting it done keeping it quiet.

During World War I tattoos were associated with the military - used almost like passports to show where people had been stationed. After World War II tattoos were associated with bikers, sailors, drunkards and delinquents. This view was not helped by a bout of hepatitis and other diseases in the USA in the ‘60s which made people much more aware of the dangers of tattooing. Suddenly tattoo parlours received bad press and everything had to be sterilised under new rules. With regulation in place, tattoos slowly made a comeback, and today there is a whole new attitude to them as a fashion symbol. It is now seen as a fine art, with tattooists famous for their enterprising designs and phenomenal artwork.

Science World Cup 2006

GROUP A

GERMANY - Carl Zeiss.

COSTA RICA - Clodomiro Twight.

POLAND - Marie Curie.

ECUADOR - Clodoveo Mora.

The hosts Germany go through with Poland. Carl Zeiss, the optical meistro, could see right through the Costa Rican defence. Marie Curie was too much for Ecuador's palaeontologist Mora. Twight, the Central American toxicologist caused a stir when he tested his own urine sample shortly after the game.

GROUP B

ENGLAND - Humphry Davy.

PARAGUAY - Silvio Pettirossi.

TRINIDAD & TOBAGO - Floella Benjamin.

SWEDEN - Carl Linnaeus.

England ease through with Davy proving he is a class above of the rest. Linnaeus, with his dazzling long Latin names cruised into second place for the Swedes. Ex *Play Schooler* Floella and airline pilot Silvio were a long way behind. But thanks to Davy's laughing gas everyone had fun.

GROUP C

ARGENTINA - Bernardo Houssay.

IVORY COAST - Tannella Boni

NETHERLANDS - Christiaan Huygens.

SERBIA & MONTENEGRO - Mihajlo Pupin.

The first big shock! The Argies go out as Holland and Serbia & Montenegro get through to round two. Both taking advantage of their physics backgrounds. Philosopher Boni and Houssay, a physiologist, had nothing to offer.

GROUP D

MEXICO - Jacob David Bekenstein.

IRAN - Ali Javan.

ANGOLA - Pepetela.

PORTUGAL - Vasco de Gama.

Bekenstein and de Gama go through in a tough group. The former's black hole research proving crucial as the opposition midfield never came our for the second half. Angola's writer Pepetela had no answers; Jivan's gas laser trickery earned him and Iran several red cards as De Gama sailed away with the group.

GROUP E

USA - Thomas Edison.

CZECH REPUBLIC - Gerti Cory.

ITALY - Leonardo DaVinci.

GHANA - Ayi Kwei Armah.

Italy's pasta-eating inventor and USA big-gun Edison progress at the expense of the Czechs; with Edison providing some sublime floodlighting for the evening games. Ghanian writer Armeh didn't turn up, while the Czech Cory's defence simply disolved like the very glycogen he studied. The Italians look strong this year.

GROUP F

AUSTRALIA - James Harrison.

JAPAN - Chiaki Mukai.

BRAZIL - Dr. Francisco Di Base.

CROATIA - Nikola Tesla.

In the shock of the round, Brazil go out! Japan and the Aussies go through with potential dark horses Croatia only managing third place with physicist Tesla. Fridge inventor Harrison had magnetic ball control, while Mukai, the first female Japanese astronaut, blasted past the Brazilian neuroscientist.

GROUP G

SOUTH KOREA - Hwang Woo Suk.

TOGO - Gilchrist Olympio.

FRANCE - Louis Pasteur.

SWITZERLAND - Daniel Bernoulli.

Pasteur glides through for France like a knife through pasteurised butter. Switzerland, with aerodynamics expert Bernoulli, swerved the ball all over the park. South Korea are disqualified for fielding their cheating DNA scientist - disgraceful. Olympio has to go back to his books as he feels the force of the big players.

GROUP H

SPAIN - Vasco de Balboa.

UKRAINE - Oleg Antonov.

TUNISIA - Prof. Ben Lakhdar.

SAUDIA ARABIA - Al-Idrisi.

Spain, with the help of their explorer de Balboa, use the full length of the pitch to top group H. Ukraine's Antonov, creator of the world's largest aircraft, finish second. Saudi cartographer, Al-Idrisi, didn't really map out the opposition, while Tunisian infrared expert Lakhdar failed to use his full spectrum of shots.

While the world's best teams battle it out in Germany this month, the *Null* is holding its very own competition to find the world's best science nation. Pick your team, and settle back for a very different battle of the giants.

SECOND ROUND 1 - winner A vs runner-up B

GERMANY **vs** SWEDEN
German Daniel Fahrenheit turns up the heat to beat Swede Anders Celsius. Too hot to handle on his own turf.

SECOND ROUND 2 - winner C vs runner-up D

NETHERLANDS **vs** MEXICO
Dutchman Anton van Leeuwenhoek had Mexican Luis Herrera-Estrella under his own microscope - an easy win.

SECOND ROUND 3 - winner B vs runner-up A

ENGLAND **vs** POLAND
Poland's Józef Kosacki and his mine detector were unable to detect Michael Faraday who was simply electric.

SECOND ROUND 4 - winner D vs runner-up C

PORTUGAL **vs** SERBIA & MONT.
Nikola Tesla's electric form deserts him as he is beaten by Ferdinand Magellan, Magellan sails away with the tie.

SECOND ROUND 5 - winner E vs runner-up F

ITALY **vs** AUSTRALIA
Providing his own Italian radio commentary, Guglielmo Marconi eases past *Vegemite* inventor Cyril P. Callister.

SECOND ROUND 6 - winner G vs runner-up H

FRANCE **vs** UKRAINE
Antoine Becquerel uses all his radioactive trickery to beat Ukraine's helecopter inventor Igor Sikorsky.

SECOND ROUND 7 - winner F vs runner-up E

JAPAN **vs** **USA**
Hideki Yukawa tried to dazzle veteran Benjamin Franklin with his mesons and protons, but Big Ben knew better.

SECOND ROUND 8 - winner H vs runner-up G

SPAIN **vs** **SWITZERLAND**
Swiss psychoanalyst Carl Gustav Jung cleans up over Spaniard Manuel Jalón Corominas, inventor of the mop.

QUARTER FINAL A - winner 1 vs winner 2

GERMANY vs NETHERLANDS
German Gerhard Mercator showed his global domination over Johannes van der Waals, who simply came unstuck.

QUARTER FINAL B - winner 5 vs winner 6

ITALY vs FRANCE
Allessandro Volta's peppered the French goal with a battery of shots. Jean Baptiste Le Marcke had no answers.

QUARTER FINAL C - winner 3 vs winner 4

ENGLAND vs PORTUGAL
Charles Darwin helped England's evolution as a world force, thrashing Bartolomeu Dias who was all at sea.

QUARTER FINAL D - winner 7 vs winner 8

USA vs SWITZERLAND
Robert J. Oppenheimer blasted past Alexandre Yersin, the bubonic bacteria scientist - sadly plagued with injuries.

SEMI FINAL 1 - winner A vs winner B

GERMANY vs ITALY
Max Planck's quantum theory overwhelmed the Italian planetary expert and tournament favourite Galileo Galilei.

SEMI FINAL 2 - winner C vs winner D

ENGLAND vs USA
Birds are no match for brawn, as Isambard Kingdom Brunel bridges the gap over John James Audubon.

SCIENCE WORLD CUP FINAL

GERMANY vs **ENGLAND**

A tense first half sees local hero Albert Einstein pitted against science heavyweight Sir Isaac Newton. In a game of two halves, Newton's superior grasp of motion and gravity show through as he takes the title 4:1.

WORLD CUP WINNERS: ENGLAND

Eye on science

Our round-up of some of the most interesting recently-published research

Later and later for Antarctic birds

Yet again, there is more talk of climate change this month and now it's seabirds that are in the spotlight. According to new research published in the Proceedings of the National Academy of Sciences, birds in some of the world's coldest regions are breeding later - all because of global warming.

French scientists analysed egg-laying records dating back over 50 years and found they are linked with the amount of East Antarctic sea ice. Birds now arrive at their colonies an average of nine days later than they did in the 1950s and, in addition, lay eggs two days later.

This seems to contrast with the findings from the Northern Hemisphere during the last century, where spring events such as the arrival of migrant birds and tree blossom have been occurring earlier. It is thought that this earlier push has increased the availability of food supplies in these areas leading to a later arrival down south.

Sea ice reduction has been linked to a decline in krill stocks, the main food of birds and mammals in the Southern Ocean. Other factors are also at work here, but these still need to be identified before final conclusions can be made. Later breeding could have consequences for the new young birds, which would have to take their first flights during the harsh winter season.

Barbraud, C. and Weimerskirch, H. 2006, *Proceedings of the National Academy of Sciences.*

In the beginning...

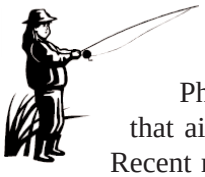
Top scientists have, once again, stated that science backs the theory of evolution, warning schools against the teaching of creationism. Some schools are promoting creationism alongside evolution, something which may “withhold, distort or misrepresent scientific knowledge and understanding in order to promote particular religious beliefs”, according to a Royal Society statement.

The Department for Education said that creationism was not being currently taught in schools.

From Venus with love

The *Venus Express* arrived in orbit around our nearest planetary neighbour at the end of last month, after a five-month trip.

The probe will orbit the hot planet to try and find out more about its dense carbon dioxide atmosphere, which has experienced a huge greenhouse effect. Temperatures on Venus reach an average of 467ºC - hot enough to melt lead.



No phishing

Phishing is a form of Internet fraud that aims to steal valuable information. Recent research into this new but rapidly growing topic shows that the fraudsters could be catching us out more than we think. An academic study showed that a huge number of people could not tell legitimate from fake online banking websites produced by the phishers.

Forty percent of users failed to spot most phishing sites, while the most sophisticated site caught out 90% of the test subjects. Most of the people caught were fooled into thinking it was a legitimate site but didn't read the address bar, status bar or other security indicators which often give a big clue to unsafe sites. New work will begin on how to make fake sites far more obvious to the everyday user.

SPOTTING THE RED HERRINGS

- Check the address - fake sites often use names that are not related to their target. For example, *HSBC* might own *www.HSBC.com* but not *www.HSBC-secure-member.com*.
- Retype web links rather than click on them - to avoid re-direction to fake sites.
- Spell check - some fake pages are full of mistakes!
- Most online banks use links starting "https" rather than "http".
- Numbers - if the e-mail address has a lot of numbers it could indicate a problem.
- Browser add-on toolbars are produced by companies like *ebay*, *Netcraft*, *Geotrust*, *Cloudmark*, *Comodo* and *Phishing.net* can flag-up fake sites.

Watery comets

Last year, NASA sent a 370kg projectile headlong into a comet. It sounds like quite a fun game, but there were reasons for this boyish behaviour! Nasa's *Deep Impact* probe released the projectile and sent it hurtling towards the 14 km-wide comet called *Tempel 1*.

The plume of particles that was released were examined by several Earth-based telescopes - and after most had finished their studies, one telescope, the Swift X-ray Telescope, continued looking for 60 days, and found that the comet kept releasing water for 13 days after the initial impact. This is a longer time scale than had previously been thought and it's hoped that this information will help scientists understand the nature and construction of comets in more depth.

Comets usually release material all the time as they fly, especially when then get closer to the Sun. The new longer release time has puzzled scientists on the project, but they speculate it could be something to do with the comet's icy coating, making it easier to lose material loosely bound to the surface.

Traffic delays for the next 50 miles

Not more motorway road works, but in fact a new scheme that is set to make shipping faster and easier. Work is about to get underway on giving the Panama Canal, the 50-mile stretch of man made water that links the Pacific and Atlantic Oceans, a facelift.

The shipping lane handles about 5% of all world trade every year - making it one of the most important routes. Recent economy growth has led to a surge in shipping, leaving the canal out in the cold because of its poor capacity. But the new plans, at a cost of £4.3 billion, will widen it at several key areas allowing larger container vessels into the canal. There will also be new approach channels at either end so that a third lane of traffic can pass through.

The whole project is expected to employ up to 8,000 people and take about seven years.

Top of the clicks

The music industry had a first last month, the first song to get to number one without selling a single copy in the shops. *Crazy* by Gnarls Barkley got to the top spot based purely on the number of downloads it received - more than 31,000 on all Internet sites. Previous rules only allowed downloads to contribute to the number one chart position if they were in addition to shop sales, but new regulations allow Internet downloads to be taken into account, as long as the song is available in the shops the following week.

No doubt this will be the first of many such chart toppers to reach the goal via the 'net.

News in Brief

Offshore wind energy in the UK is in desperate need of government money if it is to succeed as a useful future resource. A new report has shown that the industry is at a "critical stage" and economic and environmental opportunities could be lost unless it gets further backing.

Following some successful organ transplants last month, there is renewed hope that home-grown bladders will become routine in the near future. The team, from North Carolina's Wake Forest University, is now working on growing other organs including hearts using the same technique.

Astronomers have discovered a blue ring that surrounds the planet Uranus. Saturn has one too, but the new ring is most likely to be from one of the planet's moons, which reflects blue light. All other rings around Jupiter, Saturn, Uranus and Neptune are reddish in colour.

We welcome contributions to this column. Articles should be recent and presented as a summary or review. Include authors and full citation to us at: **letters@null-hypothesis.co.uk**

Edible Gold

The gourmet and the alchemist

Joe Kissell
Curator of Interesting Things

I like to think of myself as an open-minded person, someone who is tolerant of those with different beliefs, however wacky they may seem to me. Every rule has its exceptions, though. A few years ago while travelling in England, I met a woman who claimed her diet consisted solely of durian - the smelly tropical fruit that looks like a medieval weapon. That was weird, but I was prepared to overlook it - I've heard of stranger things.

During the course of our discussion about food, however, the woman asked if I'd heard of edible gold. I cheerfully replied that I had, which was true - I'd seen a TV show years earlier about chefs using gold leaf as a decorative but edible garnish on dishes in extremely upscale restaurants. I assumed that's what she was talking about. But she seemed very surprised that I should know about this, and in a hushed, conspiratorial tone, began excitedly talking about how the ancient Egyptians had discovered that by eating powdered gold, one could become immortal. Very clearly, she believed this too. O…K. Right then and there, all my good intentions of open-mindedness went out the window - that was just way too strange for me to get my brain around.

Later, when I consulted Google to see if I could learn any more about this seemingly outrageous claim, I was shocked and dismayed to find there are tens of thousands of Web pages describing, with great seriousness and credulity, a miraculous substance usually referred to as white powder (or powdered) gold. I spent the better part of an afternoon trying to sort out all the bizarre and competing claims about this stuff - a futile exercise that left me scratching my head. While I can't claim the slightest expertise in this, ahem, esoteric field, I thought I'd make an attempt to distil, in my alchemical way, the essence of some of these claims for your consideration.

All That Glitters

Let's begin on some solid footing: culinary gold. If you walk into your nearest gourmet supply store, you can probably find, for about US$20, a box of gold leaf (sheets, flakes, or sprinkles) manufactured expressly to enable you to impress your friends at your next dinner party. These unbelievably thin pieces of nearly pure gold add an impressive touch to chocolates, soups, sushi, and just about anything else you can think of. Because the quantity of gold is so small, the price is not unreasonable; yet these gold highlights make a meal appear to be extravagant and give restaurants an excuse to charge exorbitant prices. And yes: it's safe to eat (if not particularly flavourful). Metallic gold is biologically inert - that's why dentists can use it for fillings, caps, and crowns. (Gold salts, on the other hand, such as auric chloride, can have toxic effects over time.)

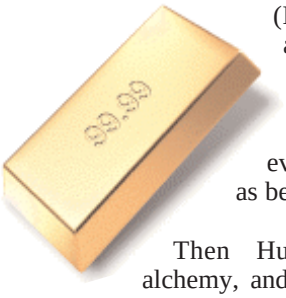
Some purveyors of herbs and mineral supplements sell a gold colloid: that is, a suspension of extremely tiny particles of metallic gold in water or another liquid - or solid pills made from such a suspension. In a gold colloid, each particle contains (according to one source, at least) a mere nine atoms or so of gold. A daily dose of colloidal gold ranging from a few drops to a few teaspoonfuls is supposedly enough to provide a wide range of health benefits. Here, at least, there is a wee bit of scientific support. A few studies performed at the behest (and expense) of a gold colloid manufacturer found their product to be effective in managing rheumatoid arthritis and also, intriguingly, increasing I.Q. scores in their test subjects. I'd have greater confidence in independent testing, but the claims are at least plausible.

Fool's Gold

Our next step is one decidedly outside the realm of scientific certainty. David Hudson, a farmer living in Arizona, was trying to extract gold and silver from the tailings of an abandoned mine in the mid-1970s. In the process, he found a mysterious substance that defied analysis, despite years of experimentation by reputable laboratories, undertaken at great personal expense. Here the details get very fuzzy, but it seems that Hudson eventually concluded the white powder he'd found was gold in a monatomic (or, as he called it, monoatomic) state, in which each atom was physically separate from all others, rather than being joined in molecular groups as is more common. (There are some good reasons to doubt that Hudson's gold truly was monatomic, but that's neither here nor there.) He also, somehow, developed a process for creating (or separating) this special form of gold from ordinary metallic gold - though how he managed to figure this out without any scientific training is unclear.

In any case, this white powder gold, according to Hudson, has some rather amazing properties: it is

allegedly a high-temperature superconductor and, when heated in just the right way, weighs less than nothing - it can levitate. And, of course, it has a long list of incredible health benefits. Hudson received patents in Britain and Australia (though not, interestingly, in the U.S.) for this special form of gold and 10 other elements, which he referred to collectively as Orbitally Rearranged Monoatomic Elements (ORMEs). (I should interject that the awarding of a patent does not mean that a government agency has successfully reproduced the invention in question, or even that they have validated it as being scientifically sound.)



Then Hudson began reading about alchemy, and he became convinced that his white powder gold was the stuff of legend - well, many legends, in fact. He equated it with "manna," "the philosopher's stone," "the food of the gods," and "the elixir of life," among other things. Hudson believed he had rediscovered an ancient alchemical formula. He began promoting this belief in New Age and mystical circles, which eagerly latched onto it and have been proclaiming it as truth ever since. And, naturally, numerous companies sell solid or liquid forms of "white powder gold" supposedly created using variants of Hudson's recipe.

Hard to Swallow

Needless to say, consumers have to take the composition of this substance on faith. Maybe it really is monatomic gold, maybe not. But if it is, so what? That doesn't make it magical... and it certainly doesn't make it the philosopher's stone. You'd think claims of room temperature superconductivity could be tested readily enough, and that if true, they would be headline news. You'd think a substance that possesses anti-gravity capabilities would attract some scientific attention. And you'd think that if this substance had any meaningful health benefits - let alone the promise of an indefinite lifespan - researchers would be tripping over themselves trying to demonstrate this in objective studies, the better to sell more of the stuff and benefit all of humanity. Curiously, none of this appears to be the case. Hudson himself, meanwhile, has reportedly halted his research, partly due to heart disease-an ailment apparently beyond the healing capabilities of his magical elixir - and partly due to actions by the U.S. Environmental Protection Agency that he considered harassment.

Whatever else can be said about white powder gold, I can testify that it has the magical power to give me a headache - merely by reading about it.

*Reproduced from Interesting Thing of the Day (**http://itotd.com**) with permission from alt concepts, inc. Joe Kissell is a writer based in San Francisco.*

World Wild Websites

Tried and tested by the editors, websites that are definitely worth a look.

Artistic site
www.youdraw.com

www.youdraw.com

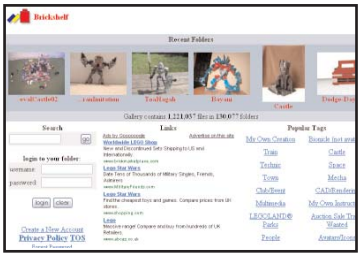
Feeling creative? Draw something on the screen, give it a title and send it in to get posted in the big book of drawings. View thousands of pictures in the gallery, vote for your favourite piece of art or create and send an e-card to a friend.

Useful site
www.dooyoo.co.uk

One for you house owners. Find useful product information, impartial consumer reviews and compare prices of most household items. Whether it is appliances, photography, computer software or audio/video equipment - it gives you the latest up-to-date reviews.

Fun site
www.brickshelf.com

Pop back to your childhood (or possibly adulthood) with this *Lego* related site. Firstly, see the huge array of photos sent in by people who have built pretty much anything you could ever want to see out of the brick stuff, then, having located your old set from the loft, download the instructions of all the original sets - go forth and build something!



www.brickshelf.com

Does God have a PhD?

Dr. Geoff Halsey
London University, UK.

Once again, an accumulation of what I have found through various resources - I can't claim to have written them, but the collecting work is all mine.

Why God doesn't have a PhD:

- He had only one major publication.
- It had no references.
- It wasn't published in a peer-reviewed journal.
- Some even doubt he wrote it by himself.
- It may be true that he created the world, but what has he done since then?
- His co-operative efforts have been quite limited.
- The scientific community has had a hard time replicating his results.
- He never applied to the ethics board for permission to use human subjects.
- When one experiment went awry he tried to cover it by drowning his subjects.
- When subjects didn't behave as predicted, he deleted them from the sample.
- He rarely came to class, just told students to read the book.
- Some say he had his son teach the class.
- He expelled his first two students for learning.
- Although there were only 10 requirements, most of his students failed his tests.
- His office hours were infrequent and usually held on a mountaintop

Why God may have a PhD:

- His publication is incredibly well cited.
- No matter the time of day and no matter where they were, he's always watching his experiments.
- He has the largest and most statistically relevant sample. (Although he began with only two subjects)
- Although his office hours were infrequent, one could always call for him wherever he was, or try to contact him via one of his numerous secondary offices.
- Even if he invented the universe, life and love and also wrote the most known masterpiece, he never complained for not obtaining a Nobel Prize in either physics, medicine, physiology, peace or literature (respectively).

- His examiners never found a question he could not answer.
- He was so dedicated, that he even included his son in his experiments.
- And to finish, he did all this at a time where no company sold enzymes, power supplies, lab equipment etc. and also had to analyse his results without Excel or even a portable calculator!

I think all this proves he deserves an honorary PhD.

Why He doesn't give a damn about a PhD:

- He's the boss.
- His only publication is still the most influential in the field, with millions of citations a year.
- Sure He didn't write it Himself, but with 12 grad students, would you?
- Everybody says "Amen" to His opinions.
- Disagree with Him, and you may end up in hell.
- He's well known for being a hard worker: six days a week non-stop; rests only on the 7th.
- Nobody can beat His 4.5 billion years of field work and 3.5 billion years of DNA expertise.
- Most agree He was the first one to be awarded a Nobel prize. Nobel himself.
- His research facilities are simply the best: Even well funded scientists will admit they work in conditions which are "far from Heaven" when asked.
- He doesn't depend on grant money.

A plaice in science

Something fishy is going on in the world of research - the *Null* gets to the bottom of it all.

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Sexy Neanderthals

Archaeological correlates of the sexiness of *Homo Neanderthalensis*

Alun Salt
School of Archaeology and Ancient History, University of Leicester, UK.

Once again the government has launched a crack-down on yob culture. In the forthcoming year Neanderthal behaviour will not be tolerated, yet little research has been done on why men act as Neanderthals - some people say drink, others say peer-pressure and the influence of the media. One possible reason is that it's a mating display. But, despite this, the results of archaeological excavations now lead to the inescapable conclusion that Neanderthal men were sexy.

It's difficult to excavate sexiness. We can't even find Neanderthal genes in our DNA, as DNA studies suggest that it's unlikely that Neanderthals have contributed to the modern human gene pool. However, if Neanderthals are our ancestors then they would no doubt have passed on some of their appearance to some of the world's most desired stars. The average height of a Neanderthal man is thought to have been around 170cm, making them the Tom Cruise of the prehistoric world. In contrast the distinctly unsexy John Travolta is 188cm (Neanderthal women were slightly shorter, a Kylie-sized 155cm). Certainly one could snipe that Neanderthals seem to have been chinless, but in modern humans it's regarded as a sign of breeding - Neanderthals may have all been members of the aristocracy. They also lived lives of excitement and danger, the bones of Neanderthals have evidence of breaks and dislocations. Neanderthals seemed to have lived life on the edge, sometimes literally.

Evidence of Neanderthal hunting has been discovered at foot of the cliffs of La Cotte de St Brelade in Jersey. It's all rather sophisticated. Rather than walk up to the nearest mammoth with a club and try to whack it over the head, the Neanderthals worked together to drive mammoths and woolly rhinoceroses over the cliff edge. This is not unlike hunting as practised by modern humans in later periods, however, the bones at the foot of the cliffs date from 250,000 years ago, which means they are definitely the work of Neanderthal hunting as modern humans did not yet exist. It requires planning, forethought and a large helping of courage. Again Neanderthals have shown they are prehistoric Tom Cruises.

They were also extremely brainy, more so than modern humans, and this is posing quite a puzzle. The cranial capacity of a Neanderthal is around 1650cc. The modern human has just 1500cc, which makes them 10% more brainy than the average modern human. Once again the Tom Cruise comparison rears its head, but Neanderthal brains are strange. Despite being larger they don't seem to have ever been as adaptable as modern humans. Currently archaeologists believe that Neanderthals had little or no capability for symbolic thought, so while they had impressive brains, they don't seem to have used them to their full capacity. Steven Mithen, professor of Palaeolithic Archaeology at Reading University, has likened the Neanderthal mind to a Romanesque cathedral. It may be big on the outside, but instead it's cramped, gloomy and you can't hear much going on. I would like to make clear to Mr Cruise and his lawyers that my analogy has broken down.

"Neanderthals are the Tom Cruises of the prehistoric world"

So much for lust, but would a Neanderthal man be a keeper? It can be hard to unpick the threads of family life, but Palaeolithic archaeologists have been fortunate in finding some persuasive evidence in the Shanidar cave of Iraq.

The Shanidar I burial is of a man who lived to around 40 years, old by Neanderthal standards. His right arm was withered, possibly since birth and he also appears to have had a gammy right leg, making it impossible for him to run. He certainly couldn't run fast enough to avoid breaking bones in his right foot or suffering damage to his skull, which may have left him blind in one eye. Healing of the bones shows that while his injuries were serious, they could not have been fatal. This is puzzling; this man was not lucky by nature and so his survival into old age needs to be explained.

It is possible that sympathetic rhinos volunteered to kill themselves in order to feed the man. This would

not be a successful long-term survival strategy and would thus explain the lack of rhinos in Iraq. However, archaeologists do not favour this explanation. Instead they argue that it was provision of food and support by other Neanderthals that ensured the man's survival. If they are right then this would be a demonstration of a Neanderthal's nurturing instincts.

"Neanderthals were fun-size and, therefore, ultimately sexy"

Shanidar IV, another burial site in the same cave, also reveals flower pollens among the bones. Hayfever sufferers can testify to the omnipresence of pollen and so may not be surprised to find it in a cave. Grass pollen certainly travels well, but flower pollen is heavier and so less likely to waft into a cave. The easiest explanation for the pollen is that someone put flowers there - but this is controversial!

Some archaeologists do not believe that Neanderthals were capable of symbolic thought, which the placing flowers would disprove. Others have argued that simply placing flowers may not have been evidence of funeral rites; instead they say that after a few weeks at the back of the cave granddad may have started to whiff a bit and the flowers were an attempt to put an end to that. However the argument is resolved the key point here is that Neanderthals will bring you flowers. But would the romance last? If Steven Mithen is right, then it might - he thinks Neanderthals would sing to you.

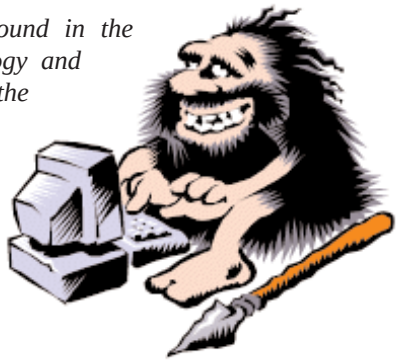
The theory, like any other involving the words 'Neanderthal' and 'symbolic' is controversial. Briefly, Mithen builds his case on observing other primates in the modern world. Gibbons are most well known for singing and, when they're with a partner, they combine to sing duets and compose ring tones. Mithen also notes that Gelada monkeys sound particularly sophisticated, interspersing their calls with those of their companions. He argues that archaeological evidence would indicate limited symbolic behaviour and so 'language' would be unlikely. However holistic messages sung as whoops or wails could convey complex emotions and information with being language.

It is possible that in the evening, bands of Neanderthals would gather round the fire and bond over a collective warble under the setting sun. Equally it would seem equally plausible that a Neanderthal man trying to chat up a woman would do so with rhythm and melody. Or what would sound like melody to a Neanderthal, as he notes the grunts of great apes are less tuneful than those of monkeys.

It would therefore seem that Neanderthals were the ideal partner as they were intelligent, expressive and caring. Furthermore, rather than being short, they were in fact 'fun-size' and were thus the ultimate in sexiness. Where can the discerning woman go to find her own Neanderthal on her summer holidays?

One suggestion would be to travel to southern Spain as the first Neanderthal skeleton was found on Gibraltar. However, for the classic Neanderthal experience, you may wish to visit Germany this summer instead. Neanderthals are named after the Neander Tal (New Man Valley) in Germany. It was the skeleton found here with the recognisably pronounced brow ridges and stooped stature that lead archaeologists to the conclusion that the Neanderthal was something quite different to modern man. If you find groups of men in Germany this June grunting or chanting inarticulately and attacking things as a mob then you may well have found your very own Neanderthals.

Alun Salt can be found in the School of Archaeology and Ancient History and the i-Science Centre at the University of Leicester where, surprisingly, he is single.



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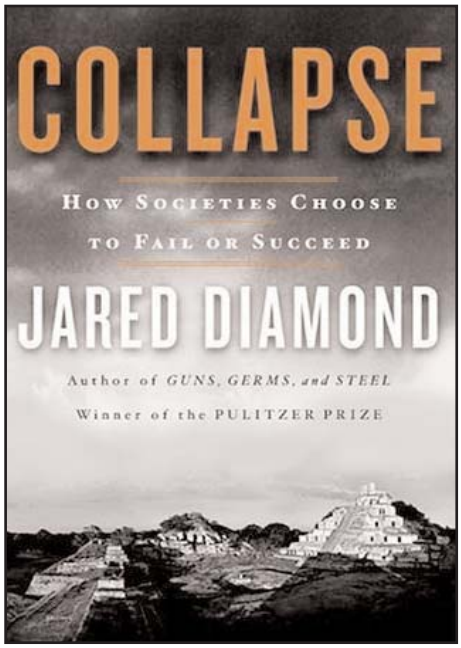
Gibbon ringtones may be found with a search e.g. www.google.co.uk/search?q=gibbon+ringtones

Something I read in a book

Collapse: How Societies Choose to Fail or Survive.

Reviewed by Stephen Eustace.

The world is on a collision course between environmental damage and environmental protection; which horse will win the race? Only our motivation, sense of purpose, and belief in conserving the planet for future generations can tip the balance one way or the other. If you choose to read articles that challenge the way you interpret the world and our role within it, and to be motivated by what you read to make the world a more sustainable place, then you ought to embrace *Collapse*.



Jared Diamond has developed, through extensive research and collaboration, a fascinating interpretation of past and present societies that conveys a compelling message - embedding the realism of our current situation by underlining the roles of environmental issues such as deforestation; soil erosion; water shortages; climate change; and agricultural practices within political, cultural and social values. The integration of these factors has ultimately lead to overexploitation of available resources, exponential human population growth, political instability and the successive collapse of civilizations.

From the eerie statues on Easter Island to the mysterious ruins of Mayan civilisations; through Viking history and the eventual demise of the Greenland Norse; to the recent Rwandan Genocide, Diamond highlights the inappropriate value systems which were resultantly unsustainable in unbeknown fragile environments and unpredictable climates. Through the combination of scientific discovery and his comprehensive knowledge of how modern society operates, Diamond prepares the reader to understand the decisions made by past leaders and why we should learn from their relative successes and mistakes.

A disquieting parallel can be drawn between many historical failures and modern governments that endorse short term economic globalisation policies. He examples Australia as a first world economy struggling with a third world environment, and China whose desire for and eventual acquisition of first world living standards, resulting in an increase per capita impact on the environment, will destabilise the boundaries of human sustainability. The structure of his writing is addictive and clever, considering all the threats to our continuing existence and the horse race of ever-increasing intensity.

However, we can take inspiration from relative success stories: New Guinea highlanders, Tokugawa Japan and the changing attitudes of big businesses now tackling environmental problems, to alter the course of our future for the benefit of all civilizations. By raising public awareness of the need to balance human consumption alongside the environment gives reason for hope in our ability to learn from history and be survivors. A life changing read.

[**Jared Diamond**, *Collapse: how societies choose to fail or survive.* Penguin Books, ISBN 0-1430-3655-6, 2005].

If you ve read a good science book recently, why not get your review published in *Null Hypothesis*. Write a review (of about 350 words) and send it to us at:

letters@null-hypothesis.co.uk

Science mutters

We have all heard the scaremonger stories that our mothers used to tell us about watching too much TV. Jonah Newton tells us more on the dangers of becoming inhuman.

Who can forget that loving snarl and cut of those words: Sit back! Do you want to have square eyes? But did this prevent any of us from listening? Did it cause us to stop and say to ourselves: hold on - there might be something of value in what she's grumbling about? Well, not really.

As a young lad, I would instead wonder what having 'square eyes' actually meant. Surely it simply implied that one might, through careful and selective viewing of the correct types of TV programmes, acquire some kind of robot vision. So what? Robots were cool and anyway no-one would ever mess with one, right?

Oh how wrong we were. Our mothers had spoken the truth - particularly as the supposedly harmless TV viewing later developed into full-fledged microcomputer madness. (And yes, I am referring to that obsession for home computers). You know - you'd get into school and all you'd chat about (apart from *Dungeons & Dragons*) was which computer console or game was best. And then, at home, all that seemed to matter was how to master BASIC programming and how you could become a world-famous games writer.

"If you don't have any friends... go and make some"

These days, as I look around my office, all I see are techno-types with square lenses balanced upon their noses. And not only that, but there appears to be such a lost look on their faces - a sadness that suggests that they are only what they are, and can only be what they can be with the aid of their desktop PC and monitor. I often ponder at whether they too belong to that generation - the 'computer youth' of the late 1970s and early 1980s - the boys and girls who were indeed once warned by their mothers to sit back from the TV. They should have taken heed. But I fear that it's far too late for some of these poor 'robots' to make amends.

Researching the computer youth lifestyle

Our department correspondent, Lipton Limburger set out to observe the working practices of persons known to be the computer youth generation (specifically those born within the period 1968-1975). Posing as a visitor at the offices of several IT-related organisations within the Bristol and Cardiff areas, Lipton made detailed notes regarding the communication habits of the workforce. We present an extract from Lipton's diary:

I was surprised to note that the majority of the office workers hardly speak to each other throughout the day. Plans for meetings and projects are all undertaken through e-mail. It would seem that even people sitting next to each other correspond in this manner.

Except for the occasional beep of a mobile phone there is complete silence. I attempted to start a conversation with one of the staff, but was just handed a card containing the address for a personal website. This person then adjusted their spectacles and continued to type at their keyboard.

Increasing social disorder?

Lipton's report shows without doubt, the severity of this problem. This is what the world has come to: communication without the incentive for verbal reasoning.

So what can we conclude? The message is simple: if you feel that you might be one of the lost computer youth, then think back to what your mother once told you. Change now and don't allow the next generation to become inhuman.

Get yourself out of this frame of mind - just turn to the person next to you and have a brief conversation. When you go home, don't sit at the PC, try something different. Take a walk, go and watch a movie, visit a friend. If you don't have any friends then join a community group and try to make some.

Furthermore, ensure that your offspring take note of your warnings. Explain that excessive use of the TV or the PC can only result in them becoming a walking electronic brain. Encourage them to take up book-reading, perhaps cycling, cooking or even stamp-collecting.

Persuade them with the incentive that they might meet some interesting people at a youth club or through an activity that gets them out of doors. Do it today. It's your duty as a parent. It's your duty as a human.

Written by Jonah Newton (with assistance from Lipton Limburger). Dept. Home Truths, Morwena Glyntaff Memorial College, Tre-Mynach, South Wales, UK.

What else should be on this list? If you have any thoughts, email us - and we'll print your ideas. Send your comments to **letters@null-hypothesis.co.uk**

From little mobiles, trees grow

How many of us find ourselves staring in the window of the local 'Phones 'R' Us' superstore, eyeing up the latest offerings from the big phone companies? But what would you do if you got up to the counter brandishing your old mobile hoping they would take it off your hands in return for the latest videophone, and the sales assistant refused - instead handing you a terracotta pot and a bag of compost. That may sound ridiculous, but with a new invention from scientists at Warwick University, it could well be happening on a high street near you.

Researchers in the School of Engineering's Warwick Manufacturing Group, in conjunction with *PVAXX Research & Development Ltd*, have devised a novel way to recycle mobile telephones. The idea is to bury your phone and watch it transform into the flower of your choice. Are they trying to turn us into a nation of horticulturists? Not quite, but it may be a side effect.

What else can you see at the 'Dead Ringers' Exhibition?

- The first UK display of *NEC's* phone with a biodegradable cover, currently only available in Japan.

- Other prototypes on show are the only lasagne-based circuit board in the world, and an exploded phone showing how new smart metals will help phones take themselves apart for recycling.

- Further inventive design ideas covered in the exhibition include new and biodegradable battery designs and design innovations from *Nokia* which may reduce the need for toxic flame retardants, aiding easier recycling of mobile-derived plastics.

DEAD RINGERS is on at the Science Museum in London as part of the Antenna Exhibition. For more information, visit the website: www.sciencemuseum.org.uk

CHICKEN BIO-PHONE

Richard Wool from Delaware University, along with his team, has created a circuit board entirely made of soya bean oils and chicken feathers! His bio-plastic uses the fibres of chicken feathers as a glass-fibre substitute, as they are a hollow, lightweight but incredibly strong material.

They have high hopes of using the world's chicken feather waste for many more innovations in the future - would you believe, America's waste chicken feathers weigh more than the QE2!

It is still at the prototype stage, but mobile giant *Motorola* has already spotted the potential this product has and was quick to get involved during the development stage. *PVAXX* has come up with a new polyvinylalcohol polymer. It is a non-toxic plastic, with the high-quality finish you would expect, that can be rigid or flexible in shape. The key difference to standard plastic is that it is totally biodegradable in compost.

Then engineers at the University of Warwick created a small transparent window, designed to be inserted in the case or cover of a mobile phone, in which they embedded a seed. The seed is visible to the environmentally aware mobile phone user but will not germinate until the phone cover or case is recycled. The seed feeds on the nitrates that are formed when the polymer cover turns to waste.

The researchers have drawn on the specialised seed expertise of researchers in the University of Warwick's horticultural research arm - Warwick HRI - to identify which types of seeds would perform best in this situation. For the first prototype telephones they have used dwarf sunflower seeds.

Dr Kerry Kirwan, who led the team at Warwick, said "The seed is released and germinates in the pot so you don't have to collect, segregate and dispose of the phones which has huge amounts of cost and energy associated with it."

Please leave a message

A bit of female logic - trust us, we're chemists.

What do chemists know about mobile technology? More than you'd think given the cocktail of metals, chemicals and circuitry in an every-day mobile telephone. Rebecca and Sarah take a closer look.

R - I'm so excited Sarah. I have finally traded in the brick! I now have the most amazing, all-singing, all-dancing mobile ever. Who would have thought there was more to mobiles than games?

S - Ha, ha. You only held onto that phone for so long because nobody could beat your top score at *Snake*! Surely it's time you progressed to *Snake II*?

R - Oi, cheeky minx! What's so great about your phone then?

S - Admittedly my phone is not as flash as yours, I've had it a while. Did you know that on average people only keep their phones for 18 months? That means about 1712 people in the UK upgrade their phone every hour!

R - That's astronomical. But aren't they designed to last about 10 years? Except the battery that is, I always end up with one that dies in the first week!

S - You can often get some great trade-in deals with phone companies, so I guess they make it pretty enticing to upgrade. Funny then that over 23 million of us just abandon them at the bottom of a draw.

R - Well I've got four of them lurking in a draw somewhere, amongst other things! But apart from when you're forced to trade them in for a new deal, there aren't many ways to get rid of them. I suppose I could just throw them away.

S - No you can't! We have enough landfill problems in the UK without you putting your mobiles in there too! In your lifetime you will get through approximately three tonnes of electrical products. Imagine if you threw all that lot in the bin!

Get in line

New legislation will shortly force us all to tackle the issue of electrical products and waste. The *Restriction of Hazardous Substances Directive* (RoHS), set for implementation this summer, will cut down on the use of six chemical nasties in favour of safer alternatives.

The *Waste Electronic and Electrical Equipment Directive* (WEEE) may still be in consultation, but will force retailers, manufacturers and consumers to think 'green', by restricting landfill and disposal of all electrical products. Otherwise, the Industry estimates a cost in excess of £83m a year to treat and recycle domestic electrical equipment!

Did you know?

By putting your phone in a mobile recycling bin rather than your bottom draw, you could be helping business to boom in Africa. Most discarded phones are only 12 to 18 months old so it is more cost-effective to re-use rather than melt them down. Phones are sent to developing countries where landlines are scarce.

For example, fishermen in Tanzania can phone from their boat to find out which market will give them the best fish prices - and all with your unwanted mobile!

R - Thinking about it, mobiles consist of a lot of heavy metals - copper, iron, lead, mercury, cadmium and even some silver and gold. Add the battery to the equation and that is a fairly toxic mix for the environment. Is there any way of recycling or reusing the parts? Circuit boards could be inserted into a new phone surely?

S - I've never really thought about what's inside - I usually have enough trouble just inserting the SIM card! I reckon it would be quite fiddly extracting metals from inside a phone - it probably wouldn't be very cost-effective. Wouldn't it be great if someone invented a mobile that lasted forever?

R - Well, you're in luck, because somebody already did! It is a beautiful mobile, with a beautiful five-figure price tag too! This baby has a white gold handset, with a titanium back cover and a hard sapphire crystal screen designed to be scratch resistant. To top it all off, it has an upgradeable circuit board, so never again will you be left behind by technology.

S - Blimey. Five figures eh? Not sure a chemist's salary will stretch to that! Maybe that will become the romantic gift of the future. Forget diamonds, I want an engagement *ring*-tone!

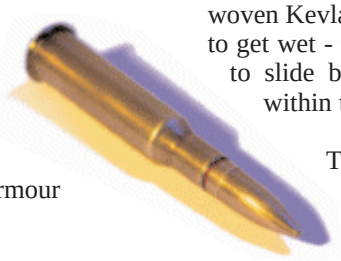
R&S - Chuckle, chuckle.

To learn more about mobile phones, go to the new '**Dead Ringers**' exhibition at the Science Museum in London (as supported by the SITA Trust and DEFRA). See **www.sciencemuseum.org.uk/antenna/deadringers** for more details.

How does that work?

Bullet-proofing

They save lives and are standard issue for police, armed forces and security guards all over the world. Body armour aims to minimise injury from projectiles fired from handguns and rifles. But how do they stop bullets that are travelling at speeds of more than 1000 kph?



It was the development of canons and guns that inspired the advance in armour technology. Traditional body armour could not get any thicker without making the wearer immobile, so the engineers turned to a new form of body armour to protect ourselves.

This falls into two categories - soft and hard body armour. The hard type consists of ceramic plates, which deflect the bullet. The ceramic used in body armour is not the same as is found in brittle ceramic bathroom tiles, but is a formula called alumina, Al_2O_3, which is very strong.

For soft body armour, interwoven pieces of clothing stop the bullets piercing the body. This might sound pretty strange, but it's similar to a football striking the back of a net at pace - the net threads pull on each other then on the goal posts, and the ball is stopped immediately. This absorbs the bullet, spreading its force over a larger area, causing it to buckle and stopping it before it can penetrate through to the body.

The future?

Although Kevlar is the most commonly used fibre in body armour at the moment, there are alternatives being made all the time to stay ahead of the bullets. One such product is called Vectran, which is up to ten times stronger than steel, and twice as strong as Kevlar.

Spider's silk is also being investigated, the chemical equivalent is called biosteel and is 20 times stronger than steel. Another future material is carbon nanotubes, which are even stronger than biosteel, although their expense will prevent their widespread use for the moment.

The wearer still receives bruising or internal injuries from the force of the bullet's impact, but not as serious as a full on hit!

Most Kevlar vests consist of between 16 and 30 layers of woven Kevlar. These, however, should never be allowed to get wet - water acts as a lubricant allowing the bullet to slide between the fibres, although sealed panels within the vest can help improve the proofing.

The level of protection depends on the type of bullet and the type of armour. Vests can use various materials as the bullet stopper - steel, titanium, ceramic and polyethylene - usually between layers of Kevlar. Additional glass-fibre sheets can be added to protect against knife attacks as well; being able to protect against both high and low-velocity implements is something that not many fibres can do without providing a bulky, heavy armoured coat.

Bullet proof glass

To the casual observer, bullet-resistant glass looks the same as normal glass. However, normal glass shatters when hit whilst toughened bullet-resistant glass is able to withstand several rounds without buckling.

Bullet-resistant glass is made by sandwiching a polycarbonate material between two pieces of normal glass; the glass can be anything from 7 to 75 millimetres thick. When a bullet hits the glass, it smashes through the first piece of glass, but is stopped by the middle polycarbonate layer, which absorbs the bullet's energy before it can pass out of the second piece of glass.

Bullet-resistant glass needs to be a lot thicker for a rifle than for a handgun. You can also get one-way bullet-resistant glass - in this case a brittle sheet of material is attached to a flexible piece of material. A person shooting at the glass hits the brittle side causing it to shatter but the flexible side then absorbs the energy. Meanwhile, on the other side of the glass, the bullet passes easily through the flexible material, onto the brittle one, which shatters allowing the bullet to escape.

Do you want to know how something works? Ask us at:

letters@null-hypothesis.co.uk

May/June birthdays

Not a household name initially but, thanks to a certain tomb, Mr Carter soon became one of the most famous explorers ever.

Carter with his mummy

Howard Carter, *9th May 1874.*

Howard was born in Kensington, London and was the youngest in a family of eight children. Having no formal education, his father tutored him in the art of drawing and painting. By the age of 17, he was already copying paintings and inscriptions of Egyptian works. He worked on different posts in various sites in Egypt, on his way discovering the remains of Queen Hatshepsut's tomb. After several years with little or no proper work, he was introduced to Lord Carnarvon, a rich amateur who was prepared to risk some money on Carter's claims. Soon, he was supervising the Lord's digs all over the region.

It was Carnarvon who financed the search for the tomb of a previously unknown Pharaoh, Tutankhamen. After several searches, he got annoyed with Carters lack of success, giving him one final season to come up trumps.

On the 4th November 1922, Carter found the steps to his tomb, called tomb KV62. It was by far the best preserved and most complete tomb found in the Valley of the Kings. Twenty-two days later, Carter and Carnarvon broke through sealed inner doorway and looked for the first time at the golden treasures within. All the artefacts in the antechamber were catalogued and taken away. Then, on the 16th of February 1923, Carter opened the burial chamber - where he saw the sarcophagus of Tutankhamen at the centre of the room.

After cataloguing the contents of the burial chamber, Carter retired from archaeology and turned his attentions to collecting artefacts and trinkets and giving lectures. Howard Carter died in 1939 at the age of 64, from natural causes - refuting the idea of a "curse of the Pharaohs", which seemed to plague the other member of the party who first entered Tutankhamen's tomb. Carter's tomb, less elaborate than the Egyptian boy King's, is in Putney Vale cemetery in London.

Other birthdays include:

15th May - Pierre Curie, French scientist famous for his work on radioactivity with his wife Marie. Born 1859.

17th - Edward Jenner. English physician who pioneered work on vaccinations. Born 1749.

27th - John Cockcroft, English physicist and winner of Nobel Prize for his atom-splitting work. Born in 1897.

6th June - Captain Robert Falcon Scott. Born 1868, but sadly pipped to the post by Norwegian Roald Amundsen. Antarctica became the death of him - in 1912 to be exact.

9th June - Elizabeth Garrett Anderson. English physician who pioneered women in medicine. Born in 1836.

26th June - William Thomson, Lord Kelvin. Irish physicist born in 1824, developed the temperature scale that bears his name.

Famous quotes

The future, according to some scientists, will be exactly like the past, only far more expensive.
~ John Sladek, American science-fiction author.

Sometimes I've believed as many as six impossible things before breakfast.
~ Lewis Carroll, British author.

The fewer the facts, the stronger the opinion.
~ Arnold H. Glasow, author.

If all else fails, immortality can always be assured by spectacular error.
~ John Kenneth Galbraith, twentieth-century American economist and author.

I was born not knowing and have had only a little time to change that here and there.
~ Richard Feynman, American quantum physicist, inspiring lecturer and bongo player!

Discovery corner

Eyes in the back of my head

By Maarten Ubermaans
Institute of Ocular Surgery
Lippenhuizen, Netherlands

I used to have trouble seeing anything in front of me, now I can see just about anything anywhere around me with my new eyes, which I'm hailing as a medical miracle.

Eye, eye - what are you staring at?

As a football referee, it is not easy to keep an eye on all parts of the game, but having had an extra pair of eyes surgically implanted into the back of my skull - I can now see all.

Off-sides are now much easier to call, as I can see those offenders in front and behind me as well as keeping an eye on my assistant on the touchline. I have recommended this to the Koninklijke Nederlandse Voetbal Bond, the Dutch football league. Bookings for dissent have increased, whilst offensive backchat has decreased on the pitch.

I still have a bit of work to do on the eyebrows admittedly, but that will come with time. I have also had some (nasty and unfair) comments about my ponytail, which draws crowds, but at least now I can see them laughing behind my back.

Share your discoveries with us...
E-mail us at: **letters@null-hypothesis.co.uk**

Coming up in the next issue:

It looks good on paper.
The world's most expensive coffee.
John Gould talks to the *Null*.
More unlikely science and nuggets of the bizarre...

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Prof's page

Prof. H.O.Null,
DAS, D.Litt., FIMS, FRS

Reader's letters

Dear Sirs,

With the release of *Ice Age 2 - The Meltdown* last month I must write to vent my frustration on the growing culture of inaccurate kids movies that are appearing on our big screens. This film wrongly puts a sabre-toothed cat and a mammoth together with several dinosaurs, animals that would never be together in the prehistoric wilds.

Another ecologically immoral film is *Madagascar*, where a bunch of wild animals from a zoo are introduced to what is one of the most biologically rich islands in the world. Introduced animals have caused hundreds of bird, reptile and invertebrate species to go extinct over the last thousand years, and they certainly don't need to be celebrated in summer Hollywood blockbusters. Let's think more about what goes out to tomorrow's politicians and ecologists.

Kind regards,
Anthony Mercier,
Kensington and Chelsea, London

Dear Sirs,

For years, everyone at my dance class has been telling me I have two left feet. Now, with the help of last month's *Null* (discovery corner, vol. 2, issue 7), I have something to show them to prove that it's not just me! I am not alone.

Thanks,

Mary Ross, *by email.*

Sirs,

Do two left feet make a right?

Ian M,
Southampton, UK.

What's on?
Science near you.

MarsQuest
Manchester Museum of Science and Industry, Throughout May.
Explore the red planet yourself in this new and exciting exhibition. With more than 20 interactive exhibits, you can manoeuvre a rover over a Martian landscape, feel Martian soil and experience a Martian volcanic eruption.
See: **www.msim.org.uk**

Pixar: 20 years of Animation
Science Museum, London, throughout May.
Come and see hundreds of pieces of artwork, models and digital paintings from the studios of Pixar, the effects wizards who brought you *Toy Story* and *The Incredibles*. Booking fee required.
See: **www.sciencemuseum.org.uk**

Monster Creepy Crawlies
Royal Museum of Scotland, Edinburgh, until 28th May.
From scorpions to stag beetles, spiders to snails: come and explore the fascinating lives of these creatures we love to hate.
See: **www.nms.ac.uk/creepycrawlies**

RAW Conservation Exhibition
London Zoo, Regent's Park until 23rd May.
A unique exhibition featuring images taken by field researchers working on London Zoo's pioneering conservation projects around the world.
See: **www.zsl.org**

The Science of Aliens
Thinktank, Birmingham, from 8th April.
Fully interactive exhibition with cutting edge hands-on displays. Come and explore all possible kinds of alien worlds and creatures.
See: **www.thinktank.ac**

Bodies: The Exhibition
Earl's Court, London until July.
The famous body exhibition is here. Don't miss it.
See: **www.bodiestickets.com**

Something on your mind? Have your say - send your letters and comments to us by e-mailing us at: **letters@null-hypothesis.co.uk**

Puzzles

Brain Teasers:

1. I recently gave a new watch to my friend for their birthday. However, as usual with my presents, it was quite useless as it gains 6 minutes every hour. I set it using my own accurate clock at midnight and the watch now shows 8.26am. I know that it stopped 30 minutes ago, so what is the correct time now?

2. There are two planets in our solar system that have anagrams. Which are they, and what are the anagrams that can be made?

3. My first three and last three are the same - and many people stay with me when they die. What am I?

Last month's brain teaser answers:

1. Albert has one child. It depends on the number of vowels in their name: A=0, E=1, I=2, O=3, U=4.
2. The year reads the same upside down
3. BANALITIES

Sudoku:

Simply enter a number from 1 to 9 in each cell of the grid. Each row, column and 9x9 box must contain only one of each number.

	2					7		1
					5			
		9	1	3		6		2
		7		4				9
			5		7			
8				2		1		
2		4		6	1	8		
			7					
5		1					4	

Level: medium Answers next month

last month's Sudoku solution:

5	1	2	7	4	6	3	9	8
9	6	7	2	3	8	5	1	4
8	3	4	9	5	1	7	2	6
7	9	6	5	8	2	4	3	1
4	5	3	1	6	9	8	7	2
1	2	8	4	7	3	6	5	9
2	8	5	3	1	4	9	6	7
6	7	1	8	9	5	2	4	3
3	4	9	6	2	7	1	8	5

Caption competition:

Think of something appropriate for the picture below, then tell us what it is. Send your answers to: **puzzles@null-hypothesis.co.uk**


Kadri Poldma


Hagit Berkovich

Last month's winner:

"Average rainfall... 152.4 mm. "

Vince Melia, Kent, UK.

A full colour version and our 'best of the rest' entries for last month's picture can be seen on the website: **www.null-hypothesis.co.uk/puzzles**

Instructions for authors:

We welcome papers, with or without photographs, illustrations and figures, from all fields of science, technology, mathematics, medicine, humanities, psychology and sociology. Papers should take the form of popular science or scientific research, typically consisting of an introduction, methods, results and discussion. Abstract, conclusions and references are optional. They can be up to 2000 words in length and please include the names and addresses of all authors. Send your finished papers to: **articles@null-hypothesis.co.uk**

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