

#007

the long good read

#guardiancoffee

Articles algorithmically picked by readers, writers & robots



Introduction

Welcome to the Long Good Read. This is an experimental, almost entirely automated newspaper that uses an algorithm to pick the week's best long-form journalism from the Guardian. The idea was started by developer Dan Catt, print-your own newspaper service Newspaper Club, the design team at Mohawk and the technology editorial team at the Guardian. We've put this together for you to read with your coffee. Enjoy! And please do tell us what you think - what else should we include in our experimental, automatic newspaper?

**@thelonggoodread or
hello@thelonggoodread.com**

Spend time listening to anyone in the media industry, you might think newspapers are dead. In fact it's just pulse of the big media businesses around the newspapers that is growing weaker, with readership and advertising revenues falling and increased competition from new technology just a part of that.

But newspapers themselves are a delightful, tactile, luxurious technology in their own right. The success of Newspaper Club, which lets anyone cheaply print their own newspaper, shows that newspapers have been reclaimed in a way.

Its success is partly down to our curiosity about being able to professionally print in a format that used to be hard for an individual to access, but it is also part of a wider craving for tangible, physical products to compensate for our digital dependency. Our screen lives make much of our life feel overwhelming, yet at the same time we have nothing physical to show for it. And there's a real human pleasure in being able to make and hold something in your hands.

Editorially, we get enormous satisfaction in exploring and playing with new projects. It's not about finding a future for paper, but a future for the stories that deserve telling. Where shall we go next?

Jemima Kiss

Head of technology - editorial

The Guardian

theguardian.com/tech

This newspaper is in beta. It's an experiment in combining the Guardian's readers, writers and robots with Newspaper Club's short-run printing tools, to produce a newspaper that's completely unlike the daily Guardian.

We're only printing 500 copies, and it's just for #guardiancoffee, so it needed to be quick and easy to produce. 'One person, one hour' was the goal, and achieving that required automating as much as possible, while still retaining an editorial eye.

First, the team at the Guardian wrote a small tool to sift through the most popular and interesting long form content, as driven by website analytics, comments and social media.

A selection of these are then imported into Newspaper Club's browser based tool, ARTHR, and they're quickly laid out into templates designed just for this project.

Then, it's onto one of Newspaper Club's printing presses, where it's printed, packed, and delivered straight to #guardiancoffee and into your hands.

Of course, this isn't designed to replace the daily Guardian paper. It's an experiment to see what's possible at the other end of the spectrum, using new technology and techniques to produce a newspaper as quickly as a webpage.

And if you like it, wait a little while and maybe we'll be able to generate one tailored just for you.

Tom Taylor

Co-founder and head of engineering

Newspaper Club

newspaperclub.com/longgoodread

Woot, we got renewed for Season Two.

Back once again after a lovely break and sorry if the cover is messing with your eyes, I'll explain in a moment.

If you're reading The Long Good Read for the first time let me show you around a little. This is what we're calling a "Data Driven Newspaper" a weekly collection of stories and articles based on various numbers, such as comments, shares and view counts, which give articles an "interestingness score".

Over the last 7 days the Guardian has published 2,625 stories in 23 different sections and sub-sections. Each of those dots on the front cover is one of those stories and the colour is the section. All the pink/magenta dots are cultural stories; books, films, music and so on, the greens are sports and football, while the yellow is lifestyle and fashion.

The size of the dot is based on the number of words, from 1 (for videos) up to the longest article of 5,284 words.

This is useful to know, because the "robots" that pick the stories for this paper prefer the longer stories. I've also programmed them to favour cooking articles but alas this week it seems as though none made the final cut.

So in short, the robots aka the algorithms, sort through those 2,625 stories looking for the ones that scored highly on the Guardian's "interestingness" metric that are also over a certain word count, with a slight bonus if it involved simmering something over a slow temperature for 10-15 minutes. And it throws a bunch top performers into the "pool".

Then I come along and look at the pool of items selected for me, reject the ones I don't like the look of and throw the rest into Newspaper Club's ARTHR tool which handles the layout. A bit of tweaking and off it goes to the printer and then out to #guardiancoffee and you.

All while the robots are counting, collating and getting ready for the next issue.

Dan Catt

Developer

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NHS patient data to be made available for sale to drug and insurance firms

Privacy experts warn there will be no way for public to work out who has their medical records or how they are using it

By Randeep Ramesh, social affairs editor

Drug and insurance companies will from later this year be able to buy information on patients - including mental health conditions and diseases such as cancer, as well as smoking and drinking habits - once a single English database of medical data has been created.

Harvested from GP and hospital records, medical data covering the entire population will be uploaded to the repository controlled by a new arms-length NHS information centre, starting in March. Never before has the entire medical history of the nation been digitised and stored in one place.

Advocates say that sharing data will make medical advances easier and ultimately save lives because it will allow researchers to investigate drug side effects or the performance of hospital surgical units by tracking the impact on patients.

But privacy experts warn there will be no way for the public to work out who has their medical records or to what use their data will be put. The extracted information will contain NHS numbers, date of birth, postcode, ethnicity and gender.

Once live, organisations such as university research departments - but also insurers and drug companies - will be able to apply to the new Health and Social Care Information Centre (HSCIC) to gain access to the database, called care.data.

If an application is approved then firms will have to pay to extract this information, which will be scrubbed of some personal identifiers but not enough to make the information completely anonymous - a process known as "pseudonymisation".

However, Mark Davies, the centre's public assurance director, told the Guardian there was a "small risk" certain patients could be "re-identified" because insurers, pharmaceutical groups and other health sector companies had their own medical data that could be matched against the "pseudonymised" records. "You may be able to identify people if you had a lot of data. It depends on how people will use the data once they have it. But I think it is a small, theoretical risk," he said.

Once the scheme is formally approved by the HSCIC and patient data can be downloaded from this summer, Davies said that in the eyes of the law one could not distinguish between "a government

department, university researcher, pharmaceutical company or insurance company" in a request to access the database.

In an attempt to ease public concern, this month NHS England is sending a leaflet entitled Better Information Means Better Care to 26m households, to say parts of the care.data database will be shared with "researchers and organisations outside the NHS" - unless people choose to opt out via their family doctor.

However, a leading academic and government adviser on health privacy said pursuing a policy that opened up data to charities and companies without clearly spelling out privacy safeguards left serious unanswered questions about patient confidentiality.

Julia Hippisley-Cox, a professor of general practice at Nottingham University who sits on the NHS's confidentiality advisory group - the high-level body that advises the health secretary on accessing confidential patient data without consent - said that while there may be "benefits" from the scheme "if extraction [sale] of identifiable data is to go ahead, then patients must be able find out who has their identifiable data and for what purpose".

Hippisley-Cox added that "there should be a clear audit trail which the patient can access and there needs to be a simple method for recording data sharing preferences and for these to be respected".

Davies, who is a GP, defended the database, saying there was "an absolute commitment to transparency" and rejecting calls for an "independent review and scrutiny of requests for access to data". "I am tempted to say that we will have 50 million auditors [referring to England's population] looking over our shoulder."

He said it was necessary to open up medical data to commercial companies especially as private firms take over NHS services to "improve patient care". Davies said: "We have private hospitals and companies like Virgin who are purchasing NHS patient care now. This is a trend that will continue. As long as they can show patient care is benefiting then they can apply."

But Davies accepted there was now a "need to open a debate on this".

He pointed out that a number of private companies - such as Bupa - already had access to some sensitive hospital data, although none had been able to link to GP records until now. He added: "I am not sure how helpful in the NHS the distinction be-

tween public and private is these days. Look at Dr Foster [which] is a private company that used data to show significantly how things can be improved in the NHS and revealed what was going wrong at Mid Staffs. The key test is whether the data will be used to improve patient care."

Campaigners warned many members of the public would be uneasy about private companies benefiting from their health data - especially when the spread of data will not be routinely audited. Phil Booth, co-ordinator at patient pressure group med-Confidential, said: "One of people's commonest concerns about their medical records is that they'll be used for commercial purposes, or mean they are discriminated against by insurers or in the workplace."

"Rather than prevent this, the care.data scheme is deliberately designed so that 'pseudonymised' data - information that can be re-identified by anyone who already holds information about you - can be passed on to 'customers' of the information centre, with no independent scrutiny and without even notifying patients. It's a disaster just waiting to happen."

Booth said the five listed reasons data can be released for are exceptionally broad: health intelligence, health improvement, audit, health service research and service planning. He said: "Officials would have you believe they're doing this all for research or improving care but the number of non-medical, non-research uses is ballooning before even the first upload has taken place. And though you won't read it in their junk mail leaflet, the people in charge now admit the range of potential customers for this giant centralised database of all our medical records is effectively limitless."

NHS England said it would publish its own assessment of privacy risks this week and pointed out that one of the key aims of care.data was to "drive economic growth by making England the default location for world-class health services research".

A spokesperson said: "A phased rollout of care.data is being readied over a three month period with first extractions from March allowing time for the HSCIC to assess the quality of the data and the linkage before making the data available. We think it would be wrong to exclude private companies simply on ideological grounds; instead, the test should be how the company wants to use the data to improve NHS care."

Rosetta comet chaser set to wake up on Monday after three years' sleep

If it awakes, Rosetta will catch up with a comet and send down a lander to ride the dirty snowball as it rushes towards the sun

By Ian Sample, science correspondent

At 10am GMT on Monday morning an alarm clock will rouse a snoozing spacecraft that is hurtling through the darkest reaches of the solar system. Launched 10 years ago, and in hibernation for the last three, the time for action has come at last.

The European Space Agency's Rosetta probe aims for a spectacular first in space exploration. The billion-euro machine will catch up with a comet, circle it slowly, and throw down a lander to the surface. With gravity too weak to keep it there, the box of electronics and sensors on legs will cling to its ride with an explosive metal harpoon.

Together, the Rosetta probe and its lander, Philae, will scan and poke the comet as it tears towards the sun. As the comet draws near, it will warm and spew huge plumes of gas and dust in a tail more than one million kilometres long. The spectacle has never been captured up close before.

The comet, named 67P/Churyumov-Gerasimenko, formed from cosmic debris 4.6bn years ago, before material had coalesced to form the Earth and our nearest planets, and the sun was a newborn star. Even rocket scientists find the comet's name hard work. Some opt instead for "Chury".

By studying the comet - some of the most pristine and primordial material there is - scientists hope to learn more about the origins of the solar system. The presence of ice, and traces of organics, might hint at answers to other big questions: how Earth got its water and how life began. But first the spacecraft must wake up.

Rosetta was put into hibernation in June 2011 when its trajectory took it so far from the sun - beyond the orbit of Jupiter - that light reaching its solar panels was too feeble to provide power. Mission scientists deliberately built in the dormant stage of its voyage, but the silence is still nerve-wracking. No one has heard from the spacecraft since.

For mission controllers, Monday will be a day of finger-tapping and watching the clock. If all goes to plan, at 10am on the dot, an electronic circuit will

stir into life on the spacecraft, which is more than 700m kilometres from Earth and almost as far out in the solar system as the orbit of Jupiter. First to switch on will be heaters hooked up to Rosetta's star trackers. Once they have warmed up, they will stare into space and, from the positions of the stars, work out which way the probe is facing.

When Rosetta has gained its bearings, thrusters will fire to stop the spacecraft from spinning. Next, they will turn the probe so its antenna points to Earth. Only then, perhaps eight hours after the alarm clock sounds, can Rosetta send a message home. "There's apprehension and excitement. Some people have put their lives into this," said Matt Taylor, project scientist on Rosetta at the European Space Agency in the Netherlands. "But it's a bit like a teenager waking up. It takes some time to get out of bed."

Mission controllers will spend the next three months checking that the systems and scientific instruments onboard Rosetta and its lander are in working order. The spacecraft is bearing down on the comet at more than 3,500km per hour, so in May the spacecraft must pull a major braking manoeuvre to slow its approach to walking speed.

Once Rosetta has moved alongside the comet, it will steer itself into an orbit that takes it within 20km of the surface. From here, its cameras can begin to map the surface and search for a landing spot for Philae. The comet is 4km wide, roughly the size of Mont Blanc, and the surface is unlikely to be smooth.

Placing a lander on a speeding comet has never been achieved for a reason: it is extraordinarily difficult. After scouring the surface for hazards, mission controllers will send details of their chosen landing site and flight instructions to Rosetta, but from then on the process will be automatic. The communications delay makes it impossible to control the spacecraft directly from Earth.

Rosetta will perform a series of manoeuvres in November to bring it within three kilometres of the comet's surface. From here, the spacecraft can lob Philae straight down to its landing site. Rosetta must compensate for movement of the comet, so

the lander does not slide or tumble when it makes contact. When Philae touches down, an explosive harpoon will fire into the ground, with luck holding the lander steady.

For Hermann Boehnhardt, an astronomer at the Max Planck Institute for Solar System Research in Lindau and lead scientist on the Philae lander, this will be the moment of truth. He says so little is known about comets, they cannot be sure what they will land on. "Philae was designed to land on a surface as hard as a table or as soft as powder snow. Our hope is that the comet is somewhere between the two," Boehnhardt told the Guardian.

The lander has a crucial role to play in the Rosetta mission. Once it has latched on to the comet, Philae will take pictures and sense gases and particles that come off as the comet nears the sun. These can then be compared with similar measurements from the orbiting Rosetta mothership. In one experiment, called Consert, Rosetta will send radiowaves to Philae from the other side of the comet, to create an x-ray like image of the comet's interior.

The lander could survive the comet's trip around the sun, but the electronics are expected to pack up sooner, not from the sun's heat, but an inability to cool the circuits. Even when dead, the lander could cling to the comet for several laps around the sun, each taking more than six years. With each lap, more material from the comet will vapourise into space. "Eventually, we will lose our grip. The ground beneath us will just disappear," said Boehnhardt.

Astronomers regard comets as dirty snowballs, huge lumps of ice laced with dust and other substances, including organic material. Through flurries of ancient collisions, they may have helped to shape the early Earth by delivering water for the oceans and atmosphere, and even amino acids needed for life to emerge.

"Comets are time capsules from the origin of the solar system. It is still a big mystery exactly how the planets formed, but when you start looking at comets, you start to get an idea how it all happened," said Taylor. "This is difficult, but I am confident. It is going to be amazing."

Rosetta the comet-chasing spacecraft wakes up

Cheers and hugs as Rosetta ends almost three years of hurtling through space in state of hibernation

By Stuart Clark and Ian Sample

There was a moment of silence, and then the room erupted. Two hundred scientists, engineers and journalists threw their arms in the air, cheered, and bear-hugged their nearest neighbours, whether they knew them or not.

Many had waited a decade for this. In 2004, the European Space Agency launched the Rosetta probe on an audacious mission to chase down a comet and place a robot on its surface. For nearly three years Rosetta had been hurtling through space in a state of hibernation. On Monday, it awoke.

The radio signal from Rosetta came from 800m kilometres away, a distance made hardly more conceivable by its proximity to Jupiter. The signal appeared on a computer screen as a tremulous green spike, but it meant the world - perhaps the solar system - to the scientists and engineers gathered at European Space Operations Centre in Darmstadt.

In a time when every spacecraft worth its salt has a Twitter account, the inevitable message followed from @Esa_Rosetta. It was brief and joyful: "Hello, world!"

Speaking to the assembled crowd at Darmstadt, Matt Taylor, project scientist on the Rosetta mission, said: "Now it's up to us to do the work we've promised to do."

Just 10 minutes before he'd been facing an uncertain future career. If the spacecraft had not woken up, there would be no science to do and the role of project scientist would have been redundant.

The comet hunter had been woken by an internal alarm clock at 10am UK time but only after several hours of warming up its instruments and orientating towards Earth could it send a message home.

In the event, the missive was late. Taylor had been hiding his nerves well, even joking about the wait on Twitter but when the clock passed 19:00CET, making the signal at least 15 minutes late, the mood changed. ESA scientists and engineers started rocking on their heels, clutching their arms around themselves, and stopping the banter than had helped pass the time. Taylor himself sat down, and seemed to withdraw.

Then the flood of relief when the blip on the graph appeared. "I told you it would work," said Taylor with a grin.

The successful rousing of the distant probe marks a crucial milestone in a mission that is more spectacular and ambitious than any the European Space Agency has conceived. The €1bn, car-sized spacecraft will now close in on a comet, orbit around it, and send down a lander, called Philae, the first time such a feat has been attempted.

The comet, 67P/Churyumov-Gerasimenko, is 4km wide, or roughly the size of Mont Blanc. That is big enough to study, but too measly to have a gravitational field strong enough to hold the lander in place. Instead, the box of sensors on legs will latch on to the comet by firing an explosive harpoon the moment it lands, and twisting ice screws into its surface.

Rosetta and Philae will work together to photograph, prod and poke the comet as it hairs towards the sun and loops back out to the deepest reaches of the solar system. The comet is quiet now, but as it nears the sun it will start to erupt with plumes of gas and dust and develop a tail that could stretch for more than 1m kilometres.

"With Rosetta, we will track the evolution of a comet on a daily basis and for over a year, giving us a unique insight into a comet's behaviour and ultimately helping us to decipher their role in the formation of the solar system," said Taylor.

The Rosetta spacecraft has taken the long way round to reach the comet, circling Earth and Mars in the inner solar system before looping out towards Jupiter to bring it on course. On its travels through deep space, Rosetta has already snapped pictures of asteroid Steins in 2008, and asteroid Lutetia in 2010. Now that Rosetta has woken up, mission controllers can beam the probe a series of commands to ensure that subsystems and 21 scientific instruments aboard the spacecraft and Philae are in working order. Once they are happy that Rosetta has emerged from hibernation in good health, they can fire the spacecraft's thrusters to close the gap of 9m kilometres that separate machine and comet.

The mission ahead promises a spectacular demonstration of relative motion that could only be improved by the accompaniment of The Blue Danube. The comet is travelling at 60,000 kilometres per hour relative to the sun, but Rosetta will close up from behind at walking pace. Alas, in space, no one can hear your Strauss. "It's like driving on the M25 when the traffic is moving," said Taylor. "You are shooting along, but the car overtaking will come

past you ever so slowly."

Rosetta is expected to send back its first images of the comet in May when it still 2m kilometres behind. At the end of May, mission controllers will send up commands for a major manoeuvre that will line Rosetta up for rendezvous with the comet in August.

Once Rosetta has reached the comet, the probe will begin to scan the surface for a suitable place to drop its lander. Sensors on board will measure the comet's gravitational field, its size and mass, and study the layer of gas and dust that cloaks the comet like an atmosphere.

Information gleaned by Rosetta will be pored over by ESA scientists, both to understand to comet, and to identify the best spot to land on. On 11 November, mission controllers aim to give the spacecraft the all clear to drop off the 100kg lander.

The lander is expected to take one or two hours to reach the comet, another move that will play out at walking pace as the comet, Rosetta and Philae all hurtle towards the sun at around 16 kilometres per second. Rosetta must get into an orbit that minimises any sideways movement for the lander relative to the comet, so it does not tumble or slide when it lands.

If Philae touches down safely, it will beam back a panorama of its extraordinary environment, along with high resolution images of the face of the comet. Using onboard equipment, the lander can analyse the chemical composition of the ice, dust and organic material that makes up the comet. The lander even wields a drill to pierce beneath the surface.

As the comet nears the sun, ice on its surface will transform into gas. With time, this erodes the surface of the comet. Though Philae is expected to die when its electronics overheat from use, the lander may hold fast to the comet and ride it around the sun for three laps before enough material breaks off to dislodge its harpoon.

"We will face many challenges this year as we explore the unknown territory of comet 67P/Churyumov-Gerasimenko and I'm sure there will be plenty of surprises, but today we are just extremely happy to be back on speaking terms with our spacecraft," said Taylor.

Police to ask home secretary to approve use of water cannon across country

Police chiefs say water cannon are needed because 'austerity measures are likely to lead to continued protest'.

By Alan Travis, home affairs editor

Police deploy a water cannon in Belfast The Police Service of Northern Ireland already has six water cannon but has told Acpo it is unable to lend them for use in England and Wales. Photograph: Barcroft Media

Chief constables are shortly to press the home secretary, Theresa May, to authorise the use of water cannon by any police force across England and Wales to deal with anticipated street protests.

The Association of Chief Police Officers says that the need to control continued protests "from ongoing and potential future austerity measures" justifies the introduction of water cannon across Britain for the first time.

The London mayor, Boris Johnson, has already announced a consultation on the introduction of water cannon onto the streets of London ready for use by this summer.

A new Acpo/College of Policing briefing paper makes clear that chief constables across England and Wales have also been asked to discuss water cannon with their police and crime commissioners and "it is anticipated that the home secretary will be approached in early 2014 in respect of water cannon authorisation".

The Acpo briefing paper is written by David Shaw, the West Mercia chief constable, who has been leading a national Acpo/Home Office project that was set up after the 2011 riots and has been re-examining whether to introduce water cannon for the first time in England, Wales and Scotland.

He cites three occasions in the last 10 years that police commanders would have considered using water cannon on the streets of London had they been available.

He names them as the Countryside Alliance

demonstration in Parliament Square in 2010, the Gaza demonstrations against the Israeli embassy in 2008/09 and "potentially" the student protests of 2010, when specific locations were targeted.

They would also have been considered during the August riots of 2011 but he concedes they would have had only limited impact on the "fast, agile disorder" seen then.

The report says there is no intelligence to suggest there is an increased likelihood of serious riots within England and Wales, but states "it would be fair to assume that the ongoing and potential future austerity measures are likely to lead to continued protest."

It adds that although the debate on water cannon was sparked by the riots in London in 2011, there was also serious disorder in many major cities and towns "of an intensity and scale where water cannon potentially could have offered an operational advantage to public order commanders".

The Acpo report reveals that the model of water cannon most likely to be used, the Ziegler Wasserwerfer 9000, can get through its 9,000 litres in just five minutes if it is running at full pressure although it adds that operating for this length of time would be difficult to justify in terms of use of force.

It also discloses that the water in within the water cannon tank will have to be kept at 5C to "prevent the onset of medical conditions associated with the shock of being exposed to cold water".

The report adds that it would then take 10 to 20 minutes to refill from a hydrant depending on the pressure of the hydrant.

A new water cannon costs between £600,000 and £1m depending on its specification and lasts for 25 to 30 years.

The Police Service of Northern Ireland has six water cannon but has told Acpo it is unable to lend them for use in England and Wales.

As delivery on a new bespoke water cannon can

take 18 - 24 months, Acpo has been working since early last year on buying secondhand water cannon from Germany to ensure they are available from this summer.

Acpo says it anticipates that any water cannon bought by a force will be regarded as a national asset. Discussions are underway over where in England and Wales they should be based but as they can be driven at speeds similar to an HGV lorry they can be sent to tackle any prolonged spontaneous disorder or to support planned police activity.

The police envisage using their water cannon to "exert control from a distance and critically to provide a graduated and flexible application of force ranging from spray to forceful water jets. The mere presence of water cannon can have a deterrent effect and experience from Northern Ireland demonstrates that water cannon are often deployed without being employed."

They say that the alternative tactics to the use of water cannon to disperse a crowd or protect vulnerable premises are the use of baton rounds, batons, mounted officers, vehicle tactics, police dogs or even firearms.

Their use will have to be authorised by at least an assistant chief constable. The national guidance will say that they can be used when conventional methods of policing have been tried and failed, or are unlikely to succeed if tried.

They can also be used in situations of serious public disorder where there is potential for loss of life, serious injury or widespread destruction.

However, the report acknowledges that the very presence of water cannon could be inflammatory in a volatile situation. The police also accept they would have had only limited use in halting the "fast, agile disorder" and "dynamic looting" that took place during the August 2011 riots.

"However, it is extremely effective at supporting police lines and creating distance between rival fac-



The Police Service of Northern Ireland already has six water cannon but has told Acpo it is unable to lend them for use in England and Wales. Photograph: Barcroft Media

tions (for example between police and protestors or supporting police cordons designed to keep rival factions apart). In such circumstances, water cannon is known to reduce both subject and officer injuries.”

The Acpo report is open about the fact that the full-pressure jet from a water cannon is capable of causing serious injury or even death and says there are also possible injuries from the impact on the body of street furniture or other debris.

But it says their deployment would be using similar tactics to those in Northern Ireland, where there have been no recorded injuries. The police claim there is also less potential for injury compared with using police dogs, baton strikes or protective shield

tactics to do the same job. A Home Office independent expert scientific committee has already assessed the risk of injuries and made recommendations regarding their use.

Joanne McCartney, Labour’s police and crime spokesperson on the London assembly, said that Boris Johnson’s proposal to buy water cannon for the Met police will be discussed next Wednesday.

”The mayor’s plans to quickly roll out water cannon on to our streets is deeply worrying. This is being rushed through and Londoners are being given virtually no chance to express their views. Such a monumental shift in policing needs a proper public debate,” she said.

It's the year of the bush - time to rediscover all female body hair

Cameron Diaz is leading a movement rejecting the shame heaped on women's privates by the removal industry. Now time for underarms and legs

By Emer O'Toole

On John Ruskin's wedding night, legend has it, the critic fainted on finding that - unlike the Elysian statues of his fantasies - women had body hair. Monday is the 114th anniversary of Ruskin's death. Who would've predicted that instead of laughing at Victorian prudery, many men still expect their sexual encounters to entail pudenda, pins and pits as marble smooth as those of young Ruskin's imagination?

But there's a change in the wind, a turn in the worm: oh yes, something's in the hair. Though I'm no astrologer, I think 2014 might just be the year of the bush.

In an unlikely about-face, Cameron Diaz has proclaimed that pubic hair is there for a reason, and to remove it is tantamount to saying, "I don't need my nose". This is odd, as just under a year ago she cheerfully told Graham Norton a cute story about pinning an ungroomed friend into the shower and forcibly de-fuzzing her. (I hope the poor woman's nose is still intact.)

While Diaz was making her new hairy allegiances public, clothing label American Apparel filled its New York shop windows with be-merkined mannequins in sheer undies. A spokeswoman says they're trying to spark up conversations about the kinds of femininity deemed beautiful and sexy.

To add to these media events, a UK Medix poll recently found that 50% of UK women did not groom down there at all. It must be admitted: 2014 is looking voluminously rosy for those of us who love our lady gardens.

But what's behind the last decade of wax in western culture in the first place?

Many are quick to blame porn; and porn undoubtedly has a role to play, but I know plenty of women

who never need to clear their browser history, yet still denude their bottoms. (Of course, this doesn't preclude pressure from their partners.) And when you apply the age-old journalistic trick of following the money, what does the porn industry have to gain from regular real-life girlfriends looking like shiny cyber girlfriends? Not a whole lot. It's the "beauty" industry that profits, and which is driving the trend.

Before the first world war, virtually no American woman shaved her legs. By 1964, 98% of women under the age of 44 did so. Before that war, underarm hair was not a cosmetic consideration. Fashions up to that point, while often clingy and form revealing, covered up most of a woman's skin. But female fashions became ostensibly freer, and Gillette's first razor for women came out in 1915, triggering aggressive advertising campaigns on behalf of more than a dozen "beauty" companies. Female body hair was suddenly deemed unsightly.

The capitalist drive to convince us that female body hair is unnatural and unclean has been alarmingly successful. The removal industry is worth millions, and uncountable women are ashamed of and distressed by their post-pubescent hair. But the industry is greedy. It must now convince the world that female pubic hair is dirty too. It must now convince people that male body hair is equally unacceptable.

So why, if women were so easily duped in the 20th century, are they seemingly wilier now, seemingly more willing to reject the shame heaped on their hairy privates? I think one answer is that privates usually are quite private, and - give or take a few spanners - our partners tend to love us as we are, in a way that wider society does not. I think another answer is the discomfort and the invasiveness of pubic waxing. I had my first (and last) Hollywood in August as research for the book I'm writing, and I could not believe how painful it was. Or the rash

and itch that set in as it grew out. It's too much. It's too far. We resent the pressure, and we resent being made to feel ashamed.

The comedian Kate Smurthwaite has a skit where she describes being in the showers after swimming, when two little girls run into the changing room, point at her fluffy bits, start giggling, and run out again. Kate, of a generation confident of the normalcy of bush, shrugs and thinks to herself, "they'll grow the same thing soon". But then she thinks about how they'll also grow leg and armpit hair. So she stops shaving.

Hollywood mania was a similar jolt for me. How could I try to claim that my pubic hair was feminine and acceptable when I was so ashamed of the hair on my legs or under my arms? I realised that I was Ruskin: unable to deal with the reality of the female body, squirmy about my own sexual maturity. So, as others are doing in this, the year of the bush, I decided it was time to stop swooning, and wake up.

Featured Comment

By **Liz ADNITT**

Speaking as someone who was bullied through school for my inability to shave (couldnt stand the itchy feeling as it grew back) I would love to see a more accepting attitude to female body hair. We say its down to personal choice but the overwhelming message certainly in the media and among teenage girls is if you don't shave your legs and/or pits then you're some sort of freak.

Eight years of bullying and snide comments aside, the wider community is generally just unaccepting of the natural look. When was the last time you saw an unwaxed leg on TV? Even in, say, a post-apocalyptic or historic setting when access to hot wax or razors would be negligible, we see male characters sporting full beards or rugged stubble in a nod to their situation and yet the women among them walk around as if fresh from the salon. Even actual advertisements for depilatory products themselves do not deign to show an unshaven female limb, and instead choose to demonstrate their product's effectiveness on skin which doesn't have any hair on it in the first place.

If body hair DOES feature on television, or receive a mention, it is nearly always in mockery. It's a steady trickle of jabs that tell us as young women, "If you don't conform, we're going to laugh at you." How can something be a "choice" if this is the consequence? Even the charity drive of Armpits for August was met with a discussion of whether it was "acceptable" for women to go out without shaving their underarms! Talk about legitimising the bullies!

So basically I DO have the "choice" of not shaving, but I can't wear skirts, shorts or vests even in the height of summer. I can't go swimming. I can't use communal changing rooms, saunas, etc. I can't sunbathe. I can't get a massage, acupuncture, anything that involves showing skin. I've even had people tell me I shouldn't expect to be able to have sex unless I shave my genitals as its "only polite" - how that par-

ticular practise went from porn inspired kink to "basic sexual etiquette" shall never know.

I'd dearly love a more tolerant attitude in society. I have grown to hate my body over the years and all down to this seemingly endless pressure to be hairless. Every time I am faced with the prospect of sex I have to brace myself for the defuzzing and ten days of applying creams and exfoliants and waiting for the itching to subside. Romantic spontaneity is out of the question. Summers are spent sweating under trousers wishing I could don a pair of shorts.

Sorry to go on like this but this is an issue very close to my heart and I wish people would wake up. And to anyone complaining about feeling "shamed"

for shaving by any article which dares to suggest an alternative to the daily depilation or points out this vast social pressure, remember that while YOU may feel comfortable in your choice to do what you wish with your body, the point is that there are many who are not granted the same acceptance and reassurance.



2014 is looking voluminously rosy for those of us who love our lady gardens.' Illustration by Andrzej Krauze



Student, athlete and model Jo-Jo Cranfield, 20, one of Sophie De Oliveira Barata's clients: 'It's not like a limb; it's like an accessory.' Photograph: Nadav Kander

Meet the woman who turns artificial limbs into works of art

From arms that resemble snakes to legs studded with diamonds, Sophie de Oliveira Barata designs bespoke prosthetics. Andrew Anthony meets her in her London workshop

By Andrew Anthony

Sophie de Oliveira Barata's studio is located in an undistinguished building near Harlesden in north London, but inside it looks like a workshop from the futuristic classic *Blade Runner*, only with good lighting. Spread around its artistically white space is a plethora of extraordinary artificial limbs.

Some of them are uncannily lifelike, such near perfect simulacra of the human leg that you wonder how they came to be separated from their owners. Others, however, are outlandishly robotic, a metallic riot of hardware decorated with everything from rhinestones to laser lights.

In the corner is what looks like a pasta-making machine. As if rolling out ultra-thin layers of lasagna, De Oliveira Barata tears about foot-square

translucent strips of silicon and applies them to a cast. "These are the beginning stages," she explains. "I'm just piecing together the different skin tones. Then I will vacuum to take out the air bubbles and then start sculpting. When I'm finished, I'll put it in the oven and peel it off."

This is the conventional means of making bespoke artificial limbs, a careful, time-consuming process that takes around three weeks. De Oliveira Barata has been making realistic prosthetics for the past decade but two years ago she started the Alternative Limb Project, which caters for clients who are looking for less realism and a good deal more fantasy.

She had the idea after one of her regular clients, a young girl called Pollyanna, began requesting a few frills. "I'd been making her leg every year because she was growing," De Oliveira Barata recalls, "and every year she wanted something different. It started off with little Peppas at the top of her leg, and they were all eating ice-cream. And the next year she wanted a whole Christmas scene at the top of her leg. She was getting bored coming in every year; it was a chore for her but when she had something to look forward to, it completely changed her experience. And her friends and family were asking her what she was going to have. And it became quite an exciting event for her, so I could see the rehabilitation effect in that way."

Because De Oliveira Barata had an artistic background - she studied special-effects prosthetics for film at the University of the Arts London - she found herself wondering what sort of limb she would want. She thought of the cartoon character Inspector Gadget and decided to look for amputees "who might want something different".

She Googled "amputee model" and found Viktoria Modesta, who ended up wearing one of De Oliveira Barata's legs at the London 2012 Paralympic closing ceremony. It's a striking piece, at once powerful and delicate, full of rhinestones, shards of mirrored plastic and studded with Swarovski diamonds - sort of country and western goes sci-fi at a society ball.

There have been two big influences on the profile and self-image of amputees in recent years. One is the Paralympics, which De Oliveira Barata agrees has transformed the public perception of people who've lost their limbs and given the amputees themselves much greater confidence about expressing their condition in positive ways - as something that is not defined by absence but, rather, transformation.

The other big change has been wrought by the

number of military amputees produced by the wars in Iraq and Afghanistan. "They're quite proud of their limbs," says De Oliveira Barata. "They tend to have a different mode of thinking in general, perhaps because they've been prepped up about what might happen. They're quite impressive. They have this attitude as if it's almost a badge of honour and I think that has a knock-on effect. The metal work and the componentry is becoming more and more slick and robotic, and they love all that."

One leg she did for the soldier Ryan Seary is a stunning mixture of the realistic and the robotic. He wanted his toes back, says De Oliveira Barata, so she created a lifelike foot, complete with micro toe hairs from the back of Seary's neck. But emerging from the centre of the foot is a part-metallic, part-bone cyborg structure that its owner describes as "awesome".

The limbs cost between £3,000 and £8,000 a piece, depending on how much work is involved. Some take up to three months to complete. There are companies in the US that offer basic limb shells that can be customised, but Sophie prefers to keep her business to a small scale - a tailor of artificial limbs, instead of a producer of off-the-peg legs. "I'm more interested in pushing your imagination to the limits," she says.

Yet she still likes making realistic limbs, and feels that many amputees would prefer to be able to swap between different types of limbs, depending on the occasion. "The truth is people say they want a realistic leg but as soon as you give them a few chances to make improvements, they ask you to ease down on the veins and take the bunion off."

But with the mechanics of intelligent artificial limbs costing up to £50,000 a piece, it's perhaps not surprising that amputees have started to think about exactly how they want to display and encase the hardware. Some of De Oliveira Barata's clients put an enormous amount of thought into every detail. Which she appreciates.

Warm and creative, she seems to combine an artistic sensibility with innate people skills. And one of the aspects she most enjoys about her job is meeting her clients.

"You get to form a relationship," she says. "I met this one guy recently and I thought he was joking. He said: 'I know exactly what I want. I want a leg shell that's the shape of my leg with cut-outs so that you can see through and you can see the componentry inside but it would be covered by what looks like a bone. Then there would be an alien around it and

a predator and they would be having a war inside my leg.' And I was like, Really?"

She's now busy making it.



A woman sleeps on the floor in the new Terminal 5 building at Heathrow Airport

Getting enough sleep is a forgotten art

The desire to 'lean in' at work must, occasionally, be superseded by the need to keel over. A nap isn't always bad.

By Emma Brockes

Some years ago, I worked in an office where the second floor bathroom had a shower room attached, with just enough floor space to accommodate a body. If the door was locked in the middle of the day, you knew someone had taken the filthy towels off the back of the door and laid them on the ground for a nap. It was warm in there, like an airing cupboard, perfect for soothing a hangover, and after an hour on the floor you might emerge fighting fit, the sheen and consistency of a freshly steamed pork bun.

It was a liberal sort of office (alright, it was the Guardian), but still, such things are, we know, widely frowned upon as forms of degeneracy, laziness or the term favoured by more brutal management systems, "time-theft".

Last week, a new word for the activity entered the lexicon, care of a front page story in the New York Times about police officers on duty doing things that they shouldn't.

The list, seemingly compiled by an auto-generator of police cliches, included frequenting donut stores that gave them a discount and going to Irish bars. Worse than both, said police bosses - in fact, floating at the top of the Orwellian sounding "integrity

monitoring list" - was something called "cooping": parking the patrol car in a secluded area and stealing a crafty nap.

It's not ideal, obviously, in that line of work, and hard to spin an upside to chasing a robber down the street while in the grip of sleep inertia, the period of disorientation experienced after you wake. But unlike eating sugary snacks, napping is, more generally, the subject of a vast and noble literature and can be justified by advocates as uniquely brain boosting.

Where you draw the line on napping probably has to do with the era you were raised in, book-ended at one extreme by Margaret Thatcher's '80s ethos and by Winston Churchill at the other. (There's probably a class thing at work here, too; the hard graft and insecurity of the grocer's daughter versus the more leisurely approach of the grandson of a duke).

Thatcher, famously, operated on as little as four hours sleep a night with, as far as we know, no mid-afternoon catch-up, while Churchill, just as famously, enjoyed a civilized 8am breakfast, lay down for a few hours in the late afternoon and held the nation together again until midnight.

As he said in the sort of expansive statement available to the well-rested:

"Nature has not intended mankind to work from eight in the morning until midnight without that refreshment of blessed oblivion which, even if it only lasts 20 minutes, is sufficient to renew all the vital forces."

Napoleon apparently slept before battle. Thomas Edison has some rather stern views about oversleeping, but kept a cot in his office. JFK napped; George W Bush did, too but let's not get into that. LBJ's habit was to divide the day into two "shifts", napping in the middle and effectively squeezing two work days out of one: from 8am-2pm, and then post-nap, from 4pm-2am. Napping in this way can be said to wipe the day clean.

Many of these people, of course, were frequently required to stay up all night, so that, as new mothers know better than the keenest world leader, catching up the next day was less a self-indulgence than a mechanical necessity. The desire to lean in must, occasionally, be superseded by the need to keel over.

And there are plenty of studies that point to the advantages, the most recent published this week by the University of Surrey, which shows that irregular sleep patterns cause a "profound disruption" at the genetic level, and explain why shift workers are of-

ten in poor health.

According to the US Center for Disease Control, 30% of Americans report "short sleep duration" of less than six hours a night, much of it accounted for by increasingly peripatetic work habits and linked, among other things, to a possibly heightened susceptibility to Alzheimers.

As with most things, those at the top have vastly more opportunity to dictate their own schedules than those at the bottom, while telling themselves they work harder than anyone. If you have the luxury of working at home, in the White House for example, you have more pockets of leisure in your day than, say, someone working on the cash register at Starbucks. (Or Amazon, where a worker's every move is monitored by management).

Cops on the beat, meanwhile, have to be creative. According to those interviewed by the New York Times, members of the NYPD have been known to crash out in movie theatres, "on piers" and parked outside cemeteries, but the best tactic, they say, is to stay on the move and nap in the passenger seat while your partner is driving.

It's a question of degree; the successful nap is the quick re-energizer, or "caffeine nap", which can be controlled by drinking a cup of coffee before lying down, so that roughly a quarter of an hour later, the caffeine hits your system like a biological alarm clock.

The unsuccessful nap is the one that rolls on for three hours, leaving you dazed, dribbling and incapable of thought. That said, I'd rather see a cop napping on duty than engaged in something that didn't make the list, has no benefit whatsoever and makes my blood run cold every time I see it: the officer, head down, oblivious, wholly absorbed in his cell-phone.

The 30 greatest video games that time forgot

From lost adventures to forgotten puzzlers, here are the classic titles that games history has cruelly overlooked

By Keith Stuart

History is not always kind to great games. Titles once heralded as masterworks are often lost as console cycles turn. Alternatively, there are the offbeat outliers completely shunned during their own lifetimes, only to be quietly ransacked by later generations of designers.

Here, we remember 30 brilliant, idiosyncratic, challenging or just plain weird titles that have been erased from the gaming annals, or at least criminally overlooked. Each one of these did something interesting with gaming, just not interesting enough to be endlessly recalled in misty-eyed retro articles or on otherwise pretty good Charlie Brooker documentaries.

3D Deathchase (Micromega, ZX Spectrum, 1983)

Written by lone coder Mervyn Estcourt (who also produced a PC remake almost 20 years later), this remarkably progressive 3D chase game gets the player to ride a futuristic motorbike through dense woodland, attempting to track down and shoot enemy riders. The first-person view and smooth sensation of movement were astonishing at the time (especially considering it ran on the older 16k Spectrum), and it no doubt prepared the way for future variations on the free-roaming driving game.

Aliens: The Computer Game (Software Studios/Electric Dreams Software, C64/Spectrum, 1986)

Activision developed a higher profile tie-in with the movie, but this version is far superior and has lasting significance in game design terms. It's essentially a prototype first-person shooter, complete with moveable targeting reticule. Players have to guide six of the film's characters through the colony base, toward the queen's lair. Although movement is essentially limited to left and right (firing at doors lets you pass through them), the action is tense, and the importance of quick accurate aiming hints at the FPS genre to come. There's also a brilliantly unsettling take on the movie's motion tracker sound effect that ramps up the scare factor considerably. And when the face huggers leap at you it is terrifying.

Alter Ego (Activision, C64/PC/Apple II, 1986)

Designed by psychologist Peter Favaro and released by Activision, this fascinating life simulation gave players control over either a male or female character as they progressed from childhood to grave. Designed around a series of key decision points, the mostly text-led experience was based on hundreds of interviews conducted by Favaro, and was hugely critically acclaimed at the time. Alongside David Crane's Little Computer People it laid the groundwork for modern era "virtual soap opera" The Sims. Alas, the sparse presentation and offbeat concept meant that the sim sold poorly and a proposed sequel, based around rearing a child, was scrapped.

You can play the original game online.

Astal (Sega, Sega Saturn, 1995)

Golden Axe, Streets of Rage, Altered Beast... Plenty of Sega's classic side-scrolling beat-'em-ups have gone on to become legends of the genre. But somehow this beautiful early Saturn release has been overlooked, perhaps thanks to the console's untimely demise. Banished from Earth by an angry goddess, the eponymous hero must return to rescue the girl he loves. Okay, forget the horribly trite story and revel in the gorgeous hand-drawn artwork and interesting attacks, which allow Astal to blow his enemies over or wrench trees out of the ground to chuck at them. There's also an innovative but tricky co-op mode which puts player two into the role of Astal's bird sidekick. Watch this playthrough for a taste of the wonderful character and landscape designs.

Bioforge (EA/Origin, PC, 1995)

The "interactive movie" genre of the mid-90s brought us plenty of nightmarishly unplayable dross as game developers fell in love with the idea of using full-motion-video to create, ugh, "cinematic" experiences. But there were some fascinating examples, too, like this cyberpunk adventure, set on a moon base governed by religious maniacs who believe man must evolve toward a machine-hybrid state. The player awakens as a cyborg and must escape the lab, piecing together the plot from PDA diary entries and using security and computer equipment to hack defenses. Elements of Deus Ex, Bioshock and Dead Space all combined to create a tense and interesting adventure. It was so expensive to produce, however, that low sales ensured a planned sequel never arrived. Edge later published an excellent 'Making of' feature.

Bust A Groove (Enix/Metro Graphics, PlayStation, 1998)

This formative rhythm action game cordially invites players to bust ridiculous disco moves by following onscreen direction prompts, in a similar manner to Sony's revered PaRappa The Rapper. The difference here is the head-to-head competitive dance fighting element, allowing dancers to knock each other off the beat with special disco fight moves. Featuring an excellent electronica soundtrack, bizarre characters and super-smooth animation, the title helped build the "post-pub gaming" credentials of the PlayStation, and spawned a sequel. But then Konami's all-conquering Dance Dance Revolution strutted in and kicked it from the dance floor.

ChuChu Rocket (Sega/Sonic Team, Dreamcast, 1999)

How this frenetic combination of Pac Man, Bomberman, Lemmings and Hungry Hippos failed to become a continually updated gaming staple is beyond us. Designed by Sonic co-creator Yuji Naka it's

a fast-paced maze puzzler in which players have to place arrows on the floor to direct a line of mice into rockets so they can escape the giant cats. In the four-player mode, participants can also use arrows to direct the feline enemies toward competitors, making for fraught, hugely tense encounters. Given away free to European Dreamcast owners, the game would later surface on GameBoy Advance and iPhone but should - if there were a whiff of justice in the universe - be on every single console released from 1999 to the end of time.

Devil Dice (Sony/Shift, PlayStation, 1998)

A modest success on its release and followed by two sequels, this ingenious puzzler was briefly revered, but has somehow slipped from wider memory. Players must navigate a grid by stepping on and turning dice cubes - when the numbers match between two adjacent cubes, they disappear. It's sort of a numerical match-three puzzle, bringing in some of the deeper mathematical reasoning of Area/Code's masterful iPhone title Drop 7. Originally created using Sony's home programmable console, the Net Yaroze, it was one of the few 'homebrew' titles to see release on the PlayStation.

Eternal Darkness: Sanity's Requiem (Nintendo/Silicon Knights, GameCube, 2002)

Resident Evil 4 wasn't the only standout survival horror experience on Nintendo's under-rated GameCube system. Developed by Canadian studio Silicon Knights and originally meant for the N64, Eternal Darkness is a fascinating Lovecraftian romp following student Alexandria Roivas as she investigates a book known as the Tome of Eternal Darkness. The powerful artifact provides a portal to a selection of previous lives, all of which must be experienced by the player in order to prevent an ancient evil from re-surfacing. The narrative and locations are creepy and unsettling, but the best part is the sanity meter which drops when you encounter enemies, causing visual disturbances and even tricking you into believing your TV has broken. Critically acclaimed, but with its mature rating, Nintendo fans weren't quite sure what to make of it. A proposed sequel never materialised, despite Nintendo renewing the trademark as recently as 2012. Meanwhile, many of the original development team went on to form Precursor Games and planned a spiritual successor named Shadow of the Eternals which sadly failed to hit its crowdfunding target last year.

Freedom Fighters (EA/IO Interactive, GameCube/PS2/Xbox, 2003)

On a break from the highly successful Hitman series, Danish studio IO Interactive launched this innovative third-person squad-based shooter, getting to the whole America-invaded-by-Communists plotline years before Call of Duty. You play as a regular Joe running round New York taking on Russian troops - and the more you kill, the more your "Charisma rating" goes up allowing you to recruit followers. That's right, it's Homefront meets

Twitter. Great controls and smooth squad commands ensured a thrilling yet surprisingly tactical experience. Maddeningly, it seems a proposed sequel was put on indefinite hold so that the studio could work on... Kane & Lynch. Wha... why?!! Anyway, Eurogamer has a nice retrospective on the game right here.

FreQuency (Sony, PS2, 2001)

The first title from music game innovator Harmonix was a compelling cross between *Tempest* and *Rez*. Your avatar, *FreQ*, zooms down an octagonal tunnel, swapping walls to hit the correct musical chunks and keep the soundtrack pumping. Fans of the musical game genre recall this trailblazer fondly, but it doesn't get enough credit for its crucial interface innovations. Famously, then VP of Xbox, Ed Fries, turned the game down, but suggested the team work on a similar idea with a dedicated controller. They went away and made *Guitar Hero*.

Gitaroo Man (Koei/Inis, PS2/PSP, 2001)

Of the many rhythm action games involving talking dogs and heroes that transform from lonely schoolboys into guitar-wielding galactic saviours, *Gitaroo Man* is definitely in the top three. Developed by music game specialist Inis (which would go on to create the Xbox karaoke title, *Lips*) it's a deranged mash up of teen manga, weird future rock and beat-'em-up complexity. *PaRappa* got there first and is the more approachable of the two, but *Gitaroo Man* is a joyous celebration of music, fashion and surreality. A later PSP version added new modes and was well-received, but the title has never escaped its 'cult' label.

Hellfire (Toaplan, arcade/Mega Drive/PC Engine, 1989)

Okay so the late eighties and early nineties saw no shortage of beautiful scrolling shooters, but when the subject comes up, it's the works of Irem, SNK and Treasure that tend to get eulogised. The now sadly defunct developer Toaplan was a master of the genre though, and *Hellfire* is a scorching space blaster with a wonderfully balanced and satisfying weapon system that lets you quickly swap between four different laser types to take on the various attack waves. The Mega Drive conversion is arguably better than the arcade original, adding a super cannon and new difficulty levels, and it remains one of the console's finest moments. Incidentally, Toaplan followed *Hellfire* with another side-scroller, *Zero Wing*, which, in its European Mega Drive conversion, contains the immortal line, "All your base are belong to us".

Herzog Zwei (Sega/Technosoft, Mega Drive, 1989)

When gamers talk about the origins of the real-time strategy genre they often pick out *Dune II* as a starting point, forgetting the whole host of foundational

games that preceded it. One of them was *Herzog Zwei*, an early Mega Drive title in which the player pilots a transforming mech over a series of eight warzones, dropping units off to engage enemy craft, then issuing an array of orders. Although the AI isn't amazing, the array of available vehicles, including both air and ground options, made this a surprisingly sophisticated tactical challenge on a machine better known at the time for brawlers and shooters. The head-to-head mode was a fantastic inclusion, too - but even this wasn't enough to impress contemporary critics, many of whom were bemused by the comparatively glacial pace of battle.

Interstate 76 (Activision, PC, 1997)

Released in the midst of a major seventies revival, Activision's stylish driving adventure was a spot-on pastiche of that era's cop shows, road movies and paranoid thrillers. Set in an alternative America where the 1973 oil crisis has never been resolved, it follows unlikely heroes *Groove Champion* and *Taurus* as they go up against a Mad Max-style army of muscle car psychos. The brash flat-shaded visuals and funk jam soundtrack accentuate the exploitation feel, and there is some brilliantly dark humour hiding behind more conventional period references. There was a sequel, *Interstate 82*, and a spin-off series of car combat games, *Vigilante 8*, on consoles, but, come on Activision, a proper remake would go down amazingly well on Steam.

Little Big Adventure (EA, PC/PlayStation, 1994)

The early-to-mid-nineties saw a burst of creativity in the French development scene with titles like *Alone in the Dark*, *Flashback* and *Rayman* attracting worldwide acclaim. Among these idiosyncratic gems was *Little Big Adventure*, a colourful science fiction epic developed by Adeline Software, and overseen by Frédéric Raynal, the co-creator of the *Alone in the Dark* series. The surreal narrative follows unwilling prophet *Twinsen* as he journeys across his world to defeat evil overlord, *Dr. Funfrock*. The appeal is in the disarmingly neat isometric visuals and strange puzzles and side-stories, and the game sold well enough to spawn a decent sequel. There has been talk of a remake, but the title's quirky charms are unknown to many younger adventure fans.

Meridian 59 (The 3DO Company, PC, 1995)

While the ill-fated 3DO company is best known for its failed 32bit games console, it was also the publisher for this seminal massively multiplayer online RPG. Originally coded by brothers Andrew and Chris Kirmse in their parent's basement, the game arrived before *Everquest* and *Ultima Online*, bringing 3D visuals to the online adventure genre and introducing a large fanbase to many of the key conventions that would follow. After 3DO abandoned the title in 2000, the game was taken on by *Near Death Studios*, which itself closed in 2010. But somehow it has survived and is now run as a free-

to-play open source project by the Kirmse brothers. A living piece of MMORPG history.

Mischief Makers (Nintendo/Treasure, N64, 1997)

Named *Yuke Yuke!! Trouble Makers* in Japan, this delightfully colourful and energetic puzzle scroller from Treasure pits ultra intergalactic cybot *Marina* against the evil *Clancer* empire as she fights to rescue her imprisoned employer. Created by many of the team behind the legendary *Gunstar Heroes*, it has a gorgeous kawaii styling and an interesting attack mechanic that allows *Marina* to grab and shake enemies. With its offbeat level design (*Marina* has to compete in an athletics event in one mission) and decent boss battles, *Mischief Makers* achieved cult appeal at the time, but because it could be finished reasonably quickly, reviews were muted. Some kind of Wii U/3DS update or at least a Virtual Console port would be extremely welcome.

Nato Commander (Microprose, Apple II/Atari/C64, 1983)

The first military strategy sim designed by Civilization creator *Sid Meier* is recalled by fans of the genre, of course, but often overlooked in retrospectives of the famed game designer. Set during the Cold War, the player is tasked with moving allied forces against Russia and its Warsaw Pact brethren as nuclear war threatens in the background. Like the later, and incredibly chilling *Theater Europe*, it captures the paranoia of the era, but *Nato Commander* also brings in political elements such as strikes in munitions factories or friendly nations inconveniently surrendering mid-offensive.

The Neverhood (Neverhood, Inc/Dreamworks, PC/PlayStation, 1996)

Designed by Earthworm Jim artist *Doug TenNapel*, this unusual claymation-based point-and-click adventure stars an amnesiac figure, *Klaymen*, who wakes up on a deserted world and must discover what the heck has happened. The animation is beautiful, the slowly unfolding narrative intriguing, and there's a great soundtrack by cult American songwriter *Terry Scott Taylor*. It was admired at the time, but nostalgic recollections of nineties adventures are now largely dominated by the great *LucasArts* titles, leaving *The Neverhood* skulking in their immense shadows. There was a sequel, *Skullmonkeys*, and last year *TenNapel* ran a successful Kickstarter to fund a spiritual successor, *Armikrog* - although the right-wing views he has espoused on Republican opinion site, *Brietbart*, have caused controversy.

Oids (FTL Games, Atari ST/Mac, 1987)

Over-shadowed in its day by the mighty *Commodore Amiga*, the Atari ST computer had few of its own original titles to shout about. One of them, however, was this inertia-based shooter, which bor-

rowed elements from sub-genre heavyweights Gravitar and Choplifter as well as Defender to tense and exciting effect. The aim is to navigate a series of minimalist caverns in your dart-like craft, taking out enemies and rescuing robotic hostages - the eponymous Oids. A key appeal of the game is its taut fuel system: you need the stuff both to fly and to recharge your shields, so there's a constant balance going on as it slowly runs down. FTL, of course, would later become much better known for its hugely innovative and influential first-person RPG, Dungeon Master.

Oni (Rockstar/Bungie, Mac/PC/PS3, 2001)

In between revolutionising the first-person shooter genre with Marathon (1994) and Halo (2001), Bungie took some time out to update the third-person beat-em-up with this cyberpunk action romp. Heroine Konoko stands alongside D'arci Stern from Urban Chaos as one of the great lost female protagonists of video gaming - a renegade cop with a devastating range of combat moves, an interesting back story and clothes that... well, she basically wore actual clothes (a situation that artist Lorraine McLees claims had to be continually fought for). Although criticised at the time for its sparse visuals and lack of multiplayer, this combination shooter/brawler has such pace and energy, paving the way for modern melee adventures like Batman: Arkham Asylum.

Pyjamarama (Mikrogen, Amstrad/C64/Sectrum, 1984)

Everyone of a certain age recalls Britsoft favourites like Jet Set Willy, Skool Daze and Attack of the Mutant Camels, but many of the more nuanced classics are slipping from collective memory. Created by lone coder Chris Hinsley, Pyjamarama is a platforming adventure, starring loveable everyman Wally Week who has forgotten to set his alarm clock, and must now wander the house in a somnambulist state, looking for the key to wind it up. Like Jet Set Willy, it is filled with surreal puzzles and weird enemies, but in its detailed depiction of Wally's modest terrace home, it reveals one of the charms of early-eighties British games: they weren't always about space heroes or ludicrous anthropomorphised critters; they were sometimes about normal people worrying about everyday things. Wally is so distraught about the possibility of losing his job at the car factory, he sleep walks his way to a solution. Like the Monty Mole series, which made satirical references to the miners' strike, it says things about the country at that time. A social history in blocky sprites.

Return Fire (Silent Software/Prolific, 3DO/PC/PlayStation, 1995)

True, the 3DO console was not a great success when it was launched as a hugely over-priced multimedia machine in 1993. And while its software library was let's say modestly populated, it boasted a few minor masterpieces. One was this excellent two-player

military sim, in which participants use their tanks, helicopters and jeeps to invade the opponent's base and capture their flag. It's sort of a cross between Advance Wars and Counter Strike, a mix of fraught action and sneaky thinking, and if it had been originally released on PC and PlayStation rather than ported over later, we'd probably still be playing sequels.

Runabout (ASCII/Climax Entertainment, PlayStation, 1997)

Western developers don't *entirely* own the open-world adventure genre. Although Grand Theft Auto and Saints Row are dominant, Japanese studios have pitched in: Sega with its brilliant Crazy Taxi and Emergency Call Ambulance titles, and Climax Entertainment with its chaotic Runabout series. Designed by Climax director Kan Naito (also responsible for the classic Shining and Landstalker RPGs), it's a mission-based driving quest, in which points are earned by smashing up as much scenery and as many other road users as possible. Renamed Felony 11-79 in the West and followed by a series of inferior sequels, it is as daft, hilarious and anarchic as you'd expect from a game that rewards you for driving a bus through a cafe.

Sacrifice (Shiny/Avalon, PC, 2000)

Visually stunning and filled with interesting stylistic flourishes, Shiny Entertainment's real-time strategy sim pitches warring wizards against each other in an exotic fantasy landscape. With an emphasis on close combat rather than resource macro-management, the title was at odds with genre big-hitters like Command and Conquer and Total Annihilation. But it brought in its own packed menagerie of beasts, spells and weapons and the third-person action made the warring more immediate and exciting. Although critically revered, it sold poorly and is barely credited for its technical innovations - as Kieron Gillen later lamented in his retrospective essay on the game.

Tenchu: Stealth Assassins (Acquire/Activision, PlayStation, 1998)

Although the PlayStation One era of fighting games was dominated by the showy Tekken series, there were a few more sophisticated outliers. Acquire's ninja stealth adventure, for example, is just about the most unforgiving combat game of the era. Players are slung into the bloody world of Feudal Japan with just a blade and a series of mission objectives. As with the Thief series, quietly sneaking about in the shadows and surprising enemies is the only way, because face-to-face fights can be ended with just one swipe of your opponent's sword. Dark, complex and dripping in atmosphere, Tenchu was a sophisticated cult classic. A series of sequels followed but we haven't seen a new one in five years. It would come into its own on the PS4 or Xbox One.

Vib-Ribbon (Sony/NanaOn-Sha, PlayStation, 1999)

More of an audio/visual experiment than a game, this monochrome rhythm action folly from the makers of PaRappa the Rappa involves guiding Vibri the rabbit along an ever-pulsating ribbon, avoiding pits and carefully managing looped sections. Naturally, the landscape changes in time to the music, but the key feature is that players are able to play their own CDs with the onscreen world reacting accordingly. Much fun could be had attempting the game with musical extremes, either speed metal or ambient house, and the concept was clever enough to get the game into Moma's design collection. Vib-Ribbon's eccentric creator, Masaya Matsuura, has often spoken about a modern update - with Sony now actively pursuing offbeat PS4 projects like Hohokum, it could be his time.

The Warriors (Rockstar, PS2/Xbox, 2005)

No one in the games industry does sleazy urban grit like Rockstar and this tie-in with the cult 1979 movie is one of the company's most under-rated titles. Following the events of the movie, players control the eponymous street gang as it makes its way through New York City to its Coney Island home base. Unlike the Grand Theft Auto titles, there's little in the way of open-world freedom, but this is more of a straightforward brawler, with a complex fighting mechanic and rollicking two-player co-op mode. Typically for Rockstar there is also an amazing licensed soundtrack slinging in '70s disco hits to contrast the relentless violence; the company even brought back original cast members to voice their virtual representations. According to Kotaku, a spiritual success was planned, based around the mods vs rockers battles of '60s Britain, but sadly nothing emerged.

Zillion (Sega/Tatsunoko Production, Master System, 1987)

Though successful in Europe, Sega's 8bit Master System console nose-dived in Japan and the US so this tough, multi-directional platformer has faded from memory. Which is criminal because it is a tense, sprawling combination of Metroid and Impossible Mission, pitching the player into a maze-like enemy base looking for crucial diskettes filled with valuable information. Interestingly, every door in this place is locked so you have to explore each room, looking for code combinations to make progress. There are cool little RPG elements too. As you rush through you can power-up the character's health, jump and laser gun, and if you discover his two team mates, Apple and Champ, you can switch between them, making use of their differing capabilities. It's an unforgiving adventure, but totally worth revisiting if you can track down a working Master System and a copy of the game on eBay. And in the unlikely event you beat it, there's a sequel out there too.

Superheroes a 'cultural catastrophe', says comics guru Alan Moore

Watchmen author tells interviewer that they have become a dangerous distraction, and that he plans to withdraw from public life

By Alison Flood

Comics god Alan Moore has issued a comprehensive sign-off from public life after shooting down accusations that his stories feature racist characters and an excessive amount of sexual violence towards women.

The Watchmen author also used a lengthy recent interview with Pádraig Ó Méalóid at Slovobooks entitled "Last Alan Moore interview?" - to expand upon his belief that today's adults' interest in superheroes is potentially "culturally catastrophic", a view originally aired in the Guardian last year.

"To my mind, this embracing of what were unambiguously children's characters at their mid-20th century inception seems to indicate a retreat from the admittedly overwhelming complexities of modern existence," he wrote to Ó Méalóid. "It looks to me very much like a significant section of the public, having given up on attempting to understand the reality they are actually living in, have instead reasoned that they might at least be able to comprehend the sprawling, meaningless, but at least-still-finite 'universes' presented by DC or Marvel Comics. I would also observe that it is, potentially, culturally catastrophic to have the ephemera of a previous century squatting possessively on the cultural stage and refusing to allow this surely unprecedented era to develop a culture of its own, relevant and sufficient to its times."

The award-winning Moore used the interview to address criticism over his inclusion of the Galley-Wag character - based on Florence Upton's 1895 Golliwogg creation - in his League of Extraordinary Gentlemen comics, saying that "it was our belief that the character could be handled in such a way as to return to him the sterling qualities of Upton's creation, while stripping him of the racial connotations that had been grafted onto the Golliwogg figure by those who had misappropriated and wilfully misinterpreted her work".

And he rebutted the suggestion that it was "not the place of two white men to try to 'reclaim' a character like the golliwogg", telling Ó Méalóid that this idea "would appear to be predicated upon an assumption that no author or artist should presume to use characters who are of a different race to themselves".

"Since I can think of no obvious reason why this principle should only relate to the issue of race - and specifically to black people and white people - then I assume it must be extended to characters of different ethnicities, genders, sexualities, religions, political persuasions and, possibly most uncomfortably of all for many people considering these issues, social classes ... If this restriction were universally adopted, we would have had no authors from middle-class backgrounds who were able to write about the situation of the lower classes, which would have effectively ruled out almost all authors since William Shakespeare."

Moore also defended himself against the claim that his work was characterised by "the prevalence of sexual violence towards women, with a number of instances of rape or attempted rape in [his] stories", saying that "there is a far greater prevalence

of consensual and relatively joyous sexual relationships in my work than there are instances of sexual violence", and that "there is clearly a lot more non-sexual violence in my work than there is violence of the sexual variety".

His thinking, he said, was that "sexual violence, including rape and domestic abuse, should also feature in my work where necessary or appropriate to a given narrative, the alternative being to imply that these things did not exist, or weren't happening. This, given the scale upon which such events occur, would have seemed tantamount to the denial of a sexual holocaust, happening annually."

In the real world there are, Moore tells his interviewer, "relatively few murders in relation to the staggering number of rapes and other crimes of sexual or gender-related violence", but this is "almost a complete reversal of the way that the world is represented in its movies, television shows, literature or comic-book material".

"Why should murder be so over-represented in our popular fiction, and crimes of a sexual nature so under-represented?" he asks. "Surely it cannot be because rape is worse than murder, and is thus deserving of a special unmentionable status. Surely, the last people to suggest that rape was worse than murder were the sensitively reared classes of the Victorian era ... And yet, while it is perfectly acceptable (not to say almost mandatory) to depict violent and lethal incidents in lurid and gloating high-definition detail, this is somehow regarded as healthy and perfectly normal, and it is the considered depiction of sexual crimes that will inevitably attract uproars of the current variety."

Moore ended by telling Ó Méalóid that his lengthy

responses to questions, written over Christmas, should indicate to fans that he has no intention of "doing this or anything remotely like it ever again".

"While many of you have been justifiably relaxing with your families or loved ones, I have been answering allegations about my obsession with rape, and re-answering several-year-old questions with regard to my perceived racism," he said. "If my comments or opinions are going to provoke such storms of upset, then considering that I myself am looking to severely constrain the amount of time I spend with interviews and my already very occasional appearances, it would logically be better for everyone concerned, not least myself, if I were to stop issuing those comments and opinions. Better that I let my work speak for me, which is all I've truthfully ever wanted or expected, both as a writer and as a reader of other authors' work."

After completing his current commitments, Moore said he will "more or less curtail speaking engagements and non-performance appearances".

"I suppose what I'm saying here is that as I enter the seventh decade of my life, I no longer wish that life to be a public one to the same extent that it has been," he said. "I myself will be able to get on with my work without interruption, which I think is something that I'm entitled to do after all these years, and indeed part of the length of this response might be likened to someone taking their time about unwrapping a long-postponed and very special birthday present to themselves. The truth may or may not set us free, but I'm hoping that blanket excommunication and utter indifference will go some considerable way to doing the trick."



Alan Moore: plans to quit engagements and 'let my work speak for me'. Photograph: Phil Fisk for the Observer

Scientists tell us their favourite jokes: 'An electron and a positron walked into a bar...'

Science is a very serious business, so what tickles a rational mind? In a not very scientific experiment, we asked a sample of great minds for their favourite jokes

Physics

■ Two theoretical physicists are lost at the top of a mountain. Theoretical physicist No 1 pulls out a map and peruses it for a while. Then he turns to the other theoretical physicist No 2 and says: "Hey, I've figured it out. I know where we are."

"Where are we then?"

"Do you see that mountain over there?"

"Yes."

"Well... THAT'S where we are."

I heard this joke at a physics conference in Les Arcs (I was at the top of a mountain skiing at the time, so it was quite apt). It was explained to me that it was first told by a Nobel prize-winning experimental physicist by way of indicating how out-of-touch with the real world theoretical physicists can sometimes be.

Jeff Forshaw, professor of physics and astronomy, University of Manchester

■ An electron and a positron go into a bar.

Positron: "You're round."

Electron: "Are you sure?"

Positron: "I'm positive."

I think I heard this on Radio 4 after the publication of a record (small) measurement of the electron electric dipole moment - often explained as the roundness of the electron - by Jony Hudson et al in Nature 2011.

Joanna Haigh, professor of atmospheric physics, Imperial College, London

■ A group of wealthy investors wanted to be able to predict the outcome of a horse race. So they hired a group of biologists, a group of statisticians, and a group of physicists. Each group was given a year to research the issue. After one year, the groups all reported to the investors. The biologists said that they could genetically engineer an unbeatable racehorse, but it would take 200 years and \$100bn. The statisticians reported next. They said that they could predict the outcome of any race, at a cost of \$100m per race, and they would only be right 10% of the time. Finally, the physicists reported that they could also predict the outcome of any race, and that their process was cheap and simple. The investors listened eagerly to this proposal. The head physicist reported, "We have made several simplifying

assumptions: first, let each horse be a perfect rolling sphere..."

This is really the joke form of "all models are wrong, some models are useful" and also sums up the sort of physics confidence that they can solve problems (ie, by making the model solvable).

Ewan Birney, associate director, European Bioinformatics Institute

■ What is a physicist's favourite food? Fission chips.

Callum Roberts, professor in marine conservation, University of York

■ Why did Erwin Schrödinger, Paul Dirac and Wolfgang Pauli work in very small garages? Because they were quantum mechanics.

Lloyd Peck, professor, British Antarctic Survey

■ A friend who's in liquor production,

Has a still of astounding construction,

The alcohol boils,

Through old magnet coils,

He says that it's proof by induction.

I knew this limerick when I was at school. I've always loved comic poetry and I like the pun in it.

And it is pretty geeky ...

Helen Czerski, Institute of Sound and Vibration Research, Southampton

Biology

■ What does DNA stand for? National Dyslexia Association.

I first read this joke when I was an undergraduate as a mature student in 1990. I'd just come to terms with my own severe reading difficulties and neurophysiology was full of acronyms, which I always got mixed up. For example, the first time I heard about Adenosine Triphosphate it was abbreviated by the lecturer to ATP, which I heard as 80p. I had no clue what she was talking about every time she mentioned 80p. And another thing, how does Adenosine Triphosphate reduce to ATP? Where's the P?

Peter Lovatt, lecturer in psychology of dance, University of Hertfordshire

■ A new monk shows up at a monastery where the monks spend their time making copies of ancient books. The new monk goes to the basement of the monastery saying he wants to make copies of the originals rather than of others' copies so as to avoid duplicating errors they might have made. Several hours later the monks, wondering where their new friend is, find him crying in the basement. They ask him what is wrong and he says "the word is CELE-

BRATE, not CELIBATE!"

I first heard this maybe more than 10 years ago in conjunction with the general theme of "copying errors" or mutations in biology.

Mark Pagel, professor of biological sciences, University of Reading

■ A blowfly goes into a bar and asks: "Is that stool taken?"

No idea where I got this from!

Amoret Whitaker, entomologist, Natural History Museum

■ They have just found the gene for shyness. They would have found it earlier, but it was hiding behind two other genes.

Stuart Peirson, senior research scientist, Nuffield Laboratory of Ophthalmology

Maths

■ What does the 'B' in Benoit B Mandelbrot stand for? Benoit B Mandelbrot.

Mathematician Mandelbrot coined the word fractal - a form of geometric repetition.

Adam Rutherford, science writer and broadcaster

■ Why did the chicken cross the Möbius strip? To get to the other... eh? Hang on...

The most recent time I saw this joke was in Simon Singh's lovely book on maths in The Simpsons. I've heard it before though. I guess its origins are lost in the mists of time.

David Colquhoun, professor of pharmacology, University College London

■ A statistician is someone who tells you, when you've got your head in the fridge and your feet in the oven, that you're - on average - very comfortable.

This is a joke I was told a long time ago, probably as a high school student in India, trying to come to terms with the baffling ways of statistics. What I like about it is how it alerts you to the limitations of reductionist thinking but also makes you aware that we are unlikely to fall into such traps, even if we are not experts in the field.

Sunetra Gupta, professor of theoretical epidemiology, Oxford

■ At a party for functions, ex is at the bar looking despondent. The barman says: "Why don't you go and integrate?" To which ex replies: "It would not make any difference."

Heard by my daughter in a student bar in Oxford.
Jean-Paul Vincent, head of developmental biology, National Institute for Medical Research

- There are 10 kinds of people in this world, those who understand binary, and those who don't.

I think this is just part of the cultural soup, so to speak. I don't remember hearing it myself until the mid-90s, when computers started getting in the way of everyone's lives!

Max Little, mathematician, Aston University

- The floods had subsided, and Noah had safely landed his ark on Mount Sinai. "Go forth and multiply!" he told the animals, and so off they went two by two, and within a few weeks Noah heard the chatter of tiny monkeys, the snarl of tiny tigers and the stomp of baby elephants. Then he heard something he didn't recognise... a loud, revving buzz coming from the woods. He went in to find out what strange animal's offspring was making this noise, and discovered a pair of snakes wielding a chainsaw. "What on earth are you doing?" he cried. "You're destroying the trees!" "Well Noah," the snakes replied, "we tried to multiply as you bade us, but we're adders... so we have to use logs."

Alan Turnbull, National Physical Laboratory

- A statistician gave birth to twins, but only had one of them baptised. She kept the other as a control.

David Spiegelhalter, professor of statistics, University of Cambridge

Chemistry

- A chemistry teacher is recruited as a radio operator in the first world war. He soon becomes familiar with the military habit of abbreviating everything. As his unit comes under sustained attack, he is asked to urgently inform his HQ. "NaCl over NaOH! NaCl over NaOH!" he says. "NaCl over NaOH?" shouts his officer. "What do you mean?" "The base is under a salt!" came the reply.

I think I heard this when I was a student in the early 1980s.

Hugh Montgomery, professor of intensive care medicine, University College London

- Sodium sodium sodium sodium sodium sodium sodium sodium Batman!

This is my current favourite. It comes from my daughter, who is a 17-year-old A-level science student.

Tony Ryan, professor of physical chemistry, University of Sheffield

- A weed scientist goes into a shop. He asks: "Hey, you got any of that inhibitor of 3-phosphoshikimate-carboxyvinyl transferase? Shop-

keeper: "You mean Roundup?" Scientist: "Yeah, that's it. I can never remember that dang name."

Made up by and first told by me.

John A Pickett, scientific leader of chemical ecology, Rothamsted Research

- A mosquito was heard to complain That chemists had poisoned her brain. The cause of her sorrow Was para-dichloro-diphenyl-trichloroethane.

I first read this limerick in a science magazine when I was at school. I taught it to my baby sister, then to my children, and to my students. It's the only poem in their degree course.

Martyn Poliakoff, research professor of chemistry, University of Nottingham

Psychology

- A psychoanalyst shows a patient an inkblot, and asks him what he sees. The patient says: "A man and woman making love." The psychoanalyst shows him a second inkblot, and the patient says: "That's also a man and woman making love." The psychoanalyst says: "You are obsessed with sex." The patient says: "What do you mean I am obsessed? You are the one with all the dirty pictures."

I have no idea where I first heard this joke. I suspect when I was an undergraduate and was first taught about Freudian psychology.

Richard Wiseman, professor of public understanding of psychology, University of Hertfordshire

- Psychiatrist to patient: "Don't worry. You're not deluded. You only think you are."

I heard this joke from my husband, my source of all good jokes. It is a variation of the type of joke I particularly like: a paradoxical twist of meaning. Here the surprising paradox is that you can at once be deluded and not deluded. This links to an aspect of my work that goes under the label "mentalising" and involves attributing thoughts to oneself and others. It's a mechanism that works beautifully, but the joke reveals how it can go wrong.

Uta Frith, professor in cognitive neuroscience, University College London

- After sex, one behaviourist turned to another behaviourist and said, "That was great for you, but how was it for me?"

It's an oldie. I came across it in the late 1980s in a book by cognitive science legend Philip Johnson-Laird. Behaviourism was a movement in psychology that put the scientific observation of behaviour

above theorising about unobservables like thoughts, feelings and beliefs. Johnson-Laird was one of my teachers at Cambridge, and he was using the joke to comment on the "cognitive revolution" that had overthrown behaviourism and shown that we can indeed have a rigorous science of cognitive states. **Charles Fernyhough, professor of psychology at the University of Durham**

Multidisciplinary

- An interviewer approaches a variety of scientists, and asks them: "Is it true that all odd numbers are prime?" The mathematician rejects the conjecture. "One is prime, three is prime, five is prime, seven is prime, but nine is not. The conjecture is false." The physicist is less certain. "One is prime, three is prime, five is prime, seven is prime, but nine is not. Then again 11 is and so is 13. Up to the limits of measurement error, the conjecture appears to be true." The psychologist says: "One is prime, three is prime, five is prime, seven is prime, nine is not. Eleven is and so is 13. The result is statistically significant." The artist says: "One is prime, three is prime, five is prime, seven is prime, nine is prime. It's true, all odd numbers are prime!"

Gary Marcus, professor of psychology, New York University

- What do scientists say when they go to the bar? Climate change scientists say: "Where's the ice?" Seismologists might ask for their drinks to be "shaken and not stirred". Microbiologists request just a small one. Neuroscientists ask for their drinks "to be spiked". Scientists studying the defective gubernaculum say: "Put mine in a highball", and finally, social scientists say: "I'd like something soft." When paying at the bar, geneticists say: "I think I have some change in my jeans." And at the end of the evening a shy benzene biochemist might say to his companion: "Please give me a ring."

Professor Ron Douglas of City University and I made these feeble jokes up after pondering the question: "What do scientists say at a cocktail party". Of course this idea can be developed - and may even stimulate your readers to come up with additional contributions.

Russell Foster, professor of circadian neuroscience, University of Oxford

Teddy bears lost and found: searching for Strawberry

When a beloved toy goes missing, families can despair. But now there's an online caped crusader helping to reunite children with their furry friends
By Anna Moore

The search is on for a cuddly lamb. On 7 January, a five-year-old girl called Rosie dropped Lamby at Victoria station, somewhere near platform 15. Having tried Lost Property and other obvious avenues, there was only one place left for her parents to turn - the TeddyBearLostAndFound(TBL&F) Facebook page with its Twitter feed, online database and army of followers who never rest.

But Lamby isn't the only toy in trouble. There's a girl in Croydon looking for her dog Lady; a family in Colorado missing the bear they left in Walmart; plus an ever-expanding supply of unclaimed toys found, listed, lined up and waiting for their rightful owners. A giraffe in Sheffield; a St Bernard in Stockholm; a wistful bear in Dingle marina, on the west coast of Ireland, looking out to sea.

TBL&F was started as a simple Facebook page in September 2012 by someone who was trying to help a friend find her lost teddy. Then someone else asked to list theirs. Then came another ... and another. There are now more than 500 lost and found toys on the database - stretching from Bahrain to Brooklyn, Cornwall to Colorado. Planes, trains and shopping centres seem to feature heavily. Around 60 have been claimed by their owners and made their way home. The person behind the site wishes to remain anonymous - a kind of caped crusader for kids, a lone ranger for lost toys - but has the support of thousands. Many online comments are of the warm and cuddly variety ("A beacon and beam of hope in a busy world!"; "This should be shown to anyone who has lost faith in humanity"). But there are also a few detractors. ("Why not buy her another one?"; "I'm not the one creating an account for a teddy, when there's actual missing people.")

Except I've experienced the desolation of a lost

toy. While most are replaceable - a quick cuddle or a few jelly beans is all it takes to stop the tears - some simply aren't. My daughter Ruby's "Strawberry" was one of them.

Just how we came to possess this cheap piece of fleece was a favourite family story. Ruby liked to hear it over and over, and repeated it to anyone who would listen. When she was about four months old, I was pushing her in her pram and she began to grizzle. Passing a charity shop piled with junk outside, I saw a red, cuddly object with two eyes and a large smile and waved it in front of her face. Ruby smiled back. It was the best 20p I ever spent.

Psychologists call them "transitional objects" that help infants move from attachment to their mums to increasing independence. Ruby called hers "Dud". In fact, Dud was her third word, not long after Mama and Dada, and it took a while for us to work out that she was referring to Strawberry (which he later became when she learned to speak).

That toy was her friend, protector, comforter and companion. Ruby was always scarily self-contained, independent, a good sleeper (unlike my other two daughters, Ruby always slept on her own, in her room in the pitch black). The reason was simple - and she'd say it herself, as she got older. "I'm not on my own. I have Strawberry Boy."

She liked his smell (smell seems critical with comfort toys) but temperature seemed to be his USP. "When I'm hot, he cools me down and when I'm cold, he warms me up," she'd say. From time to time, if he'd been left too near a radiator or in the sun, Ruby would pop him in the fridge until he felt about right. He featured in her games, her stories, her pictures and crops up in countless family photos. No one else would do at nap time, tea time, sad times, bed time. After being left (and found) in the local park, he was grounded - except for holidays, where he ranked above tickets and passports in terms of importance. (He was the kind of toy

you'd have to miss a plane for.)

For her fourth birthday, Ruby requested a "Strawberry Boy cake" - I'm glad I don't have a photograph to show you my effort - but several months later, he vanished. We looked everywhere. We never stopped searching. For weeks, I'd be cooking, reading, watching TV, then find myself wandering around, picking up random items, clearing corners. My husband and I couldn't enter a room without scanning it.

Lost toys have been the inspiration for so many classic children's stories. Who can read Shirley Hughes's Dogger to their child without welling up? Add to that Helen Cooper's Tatty Ratty or Mo Willems's Knuffle Bunny: A Cautionary Tale, which describes the time his daughter's toy was left in a New York laundromat. It's ridiculous but not so hard to understand. Strawberry made Ruby feel happy and safe. She loved him. So we loved him too. His absence was heartbreaking. My husband - a bloke's bloke, not big on emotion - likened it to losing a pet.

Ruby talked about him last thing at night and first thing in the morning. She drew pictures of him and plastered them everywhere. At first, we told her he was lying somewhere close, waiting to be found. Sometimes, she'd talk happily about him, "When Strawberry comes back ..." Other times, out of the blue, we'd find her crying and she'd say, "I don't think we'll ever find Strawberry." He was never, ever far from her mind. I remember once telling her I had a surprise for her and her instant response was, "Have you found Strawberry Boy?"

My mum made a substitute - it was a case of nearly but not quite. We couldn't give it to her. Our only hope was to get an identical one and pass it off as Strawberry. (Note to new parents, if your child forms a deep attachment to something, go straight out and buy another. Switch them regularly so they are interchangeable, smell the same and fall apart at



Strawberry was second-hand and had no obvious identity, which made complicated the search. Was there a happy ending? Photograph: Linda Nylind for the Guardian

an equal rate.) The trouble was, Strawberry was second-hand and had no obvious identity. There was no Twitter back then but I registered with Mumsnet to see if anyone had an identical piece of tat knocking around their home.

The response was overwhelming. (I printed it up as a memento and it runs to over 80 pages.) There was practical help. Was it Sally Strawberry from the Munch Bunch? What about the Garden Gang? Someone suggested Mumsnetters send postcards to Ruby supposedly from Strawberry, safe and well and having adventures (but wouldn't that make her feel more abandoned?).

Hopes were raised when someone did indeed have the same toy and my husband drove off to collect it. On the evening of the handover, the thread had so many followers, it took half an hour to log on and someone started another in case it crashed. "I can't bear this much longer," was one comment. "I'm not moving from here until he arrives." Another said, "I put my daughter to bed early so I can get all the news as it happens."

"Can I just say the time difference is really frustrating," added someone in Sydney. "It's late Monday our time and I'm STILL waiting to hear about Strawberry."

As it turned out, the substitute was a few sizes bigger than the original. (A Mumsnetter suggested hiding him in the kitchen cupboard, covering him with crumbs and saying he'd put on weight - but Ruby was now too old to fall for that!) Most helpful, though, was the emotional support from mums who got it. It was Mumsnet at its best. ("I just rang my mum 15,000 miles away bawling about the poor child and the lost strawberry!"; "I woke up in the night thinking about this"; "I tried to tell my husband and after 10 seconds he started shaking his head ... he has no idea! Just wait til our son loses danda the panda!!")

But there is a happy ending. After five months or

so, we bought a new washing machine and behind the old one, propped up on a pipe, was a soft red toy, slightly damp but still smiling. (It was a small space where Ruby sometimes hid.) The reunion was like something from *Lassie*. (There are parents who film such reunions and post them on YouTube. The story of Ah-ah the monkey is particularly bonkers.)

They have never been parted since - Strawberry stays safely on Ruby's pillow, while still accompanying her on holidays and sleepovers. Ruby is 14 now, far too self-conscious to be photographed with her main man for a national newspaper. Her 500 followers on her feminist Tumblr account may be surprised to know about this attachment but he's there, a flash of red holding out against the teenage chaos, the piles of socks, dirty pyjamas, and stray GCSE essays. Still loved.

The rest of us don't have much to do with him these days but writing this story prompted me to ask Ruby what she likes about him. Her answer: "His temperature, of course ... and his smell ..." It's just like old times. "Does he have a character?" I ask. Ruby nods and thinks for a minute, then slowly replies: "He's like one of those people who's really quiet at parties but when you get to know him, you realise he's smarter and funnier than anyone else ... He knows a lot." And, mad as it must sound, when I look at that toy ... a tiny part of me believes she's right.

Oxfam: 85 richest people as wealthy as poorest half of the world

As World Economic Forum starts in Davos, development charity claims growing inequality has been driven by 'power grab'

By Graeme Wearden

The world's wealthiest people aren't known for travelling by bus, but if they fancied a change of scene then the richest 85 people on the globe - who between them control as much wealth as the poorest half of the global population put together - could squeeze onto a single double-decker.

The extent to which so much global wealth has become corralled by a virtual handful of the so-called 'global elite' is exposed in a new report from Oxfam on Monday. It warned that those richest 85 people across the globe share a combined wealth of £1tn, as much as the poorest 3.5 billion of the world's population.

The wealth of the 1% richest people in the world amounts to \$110tn (£60.88tn), or 65 times as much as the poorest half of the world, added the development charity, which fears this concentration of economic resources is threatening political stability and driving up social tensions.

It's a chilling reminder of the depths of wealth inequality as political leaders and top business people head to the snowy peaks of Davos for this week's World Economic Forum. Few, if any, will be arriving on anything as common as a bus, with private jets and helicopters pressed into service as many of the world's most powerful people convene to discuss the state of the global economy over four hectic days of meetings, seminars and parties in the exclusive ski resort.

Winnie Byanyima, the Oxfam executive director who will attend the Davos meetings, said: "It is staggering that in the 21st Century, half of the world's population - that's three and a half billion people - own no more than a tiny elite whose numbers could all fit comfortably on a double-decker bus."

Oxfam also argues that this is no accident either, saying growing inequality has been driven by a "power grab" by wealthy elites, who have co-opted the political process to rig the rules of the economic system in their favour.

In the report, entitled Working For The Few (summary here), Oxfam warned that the fight against poverty cannot be won until wealth inequality has been tackled.

"Widening inequality is creating a vicious circle

where wealth and power are increasingly concentrated in the hands of a few, leaving the rest of us to fight over crumbs from the top table," Byanyima said.

Oxfam called on attendees at this week's World Economic Forum to take a personal pledge to tackle the problem by refraining from dodging taxes or using their wealth to seek political favours.

As well as being morally dubious, economic inequality can also exacerbate other social problems such as gender inequality, Oxfam warned. Davos itself is also struggling in this area, with the number of female delegates actually dropping from 17% in 2013 to 15% this year.

Polling for Oxfam's report found people in countries around the world - including two-thirds of those questioned in Britain - believe that the rich have too much influence over the direction their country is heading.

Byanyima explained:

"In developed and developing countries alike we are increasingly living in a world where the lowest tax rates, the best health and education and the opportunity to influence are being given not just to the rich but also to their children.

"Without a concerted effort to tackle inequality, the cascade of privilege and of disadvantage will continue down the generations. We will soon live in a world where equality of opportunity is just a dream. In too many countries economic growth already amounts to little more than a 'winner takes all' windfall for the richest."

The Oxfam report found that over the past few decades, the rich have successfully wielded political influence to skew policies in their favour on issues ranging from financial deregulation, tax havens, anti-competitive business practices to lower tax rates on high incomes and cuts in public services for the majority. Since the late 1970s, tax rates for the richest have fallen in 29 out of 30 countries for which data are available, said the report.

This "capture of opportunities" by the rich at the expense of the poor and middle classes has led to a situation where 70% of the world's population live in countries where inequality has increased since the 1980s and 1% of families own 46% of global wealth - almost £70tn.

Opinion polls in Spain, Brazil, India, South Africa, the US, UK and Netherlands found that a majority in each country believe that wealthy people exert too

much influence. Concern was strongest in Spain, followed by Brazil and India and least marked in the Netherlands.

In the UK, some 67% agreed that "the rich have too much influence over where this country is headed" - 37% saying that they agreed "strongly" with the statement - against just 10% who disagreed, 2% of them strongly.

The WEF's own Global Risks report recently identified widening income disparities as one of the biggest threats to the world community.

Oxfam is calling on those gathered at WEF to pledge: to support progressive taxation and not dodge their own taxes; refrain from using their wealth to seek political favours that undermine the democratic will of their fellow citizens; make public all investments in companies and trusts for which they are the ultimate beneficial owners; challenge governments to use tax revenue to provide universal healthcare, education and social protection; demand a living wage in all companies they own or control; and challenge other members of the economic elite to join them in these pledges.

● Research Now questioned 1,166 adults in the UK for Oxfam between October 1 and 14 2013.

The British amateur who debunked the mathematics of happiness

The astonishing story of Nick Brown, the British man who began a part-time psychology course in his 50s - and ended up taking on America's academic establishment

By Andrew Anthony

Nick Brown does not look like your average student. He's 53 for a start and at 6ft 4in with a bushy moustache and an expression that jackknifes between sceptical and alarmed, he is reminiscent of a mid-period John Cleese. He can even sound a bit like the great comedian when he embarks on an extended sardonic riff, which he is prone to do if the subject rouses his intellectual suspicion.

A couple of years ago that suspicion began to grow while he sat in a lecture at the University of East London, where he was taking a postgraduate course in applied positive psychology. There was a slide showing a butterfly graph - the branch of mathematical modelling most often associated with chaos theory. On the graph was a tipping point that claimed to identify the precise emotional co-ordinates that divide those people who "flourish" from those who "languish".

According to the graph, it all came down to a specific ratio of positive emotions to negative emotions. If your ratio was greater than 2.9013 positive emotions to 1 negative emotion you were flourishing in life. If your ratio was less than that number you were languishing.

It was as simple as that. The mysteries of love, happiness, fulfilment, success, disappointment, heartache, failure, experience, random luck, environment, culture, gender, genes, and all the other myriad ingredients that make up a human life could be reduced to the figure of 2.9013.

It seemed incredible to Brown, as though it had been made up. But the number was no invention. Instead it was the product of research that had been published, after peer review, in no less authoritative a journal than *American Psychologist* - the pre-eminent publication in the world of psychology that is delivered to every member of the American Psychological Association. Co-authored by Barbara Fredrickson and Marcial Losada and entitled *Positive Affect and the Complex Dynamics of Human Flourishing*, the paper was subsequently cited more than 350 times in other academic journals. And aside from one partially critical paper, no one had seriously questioned its validity.

Fredrickson is a distinguished psychologist, a pro-

fessor at the University of North Carolina, a winner of several notable psychology awards and best-selling author of a number of psychology books, including *Positivity*, which took her and Losada's academic research and recast it for a mass audience - the subtitle ran "Top-Notch Research Reveals the 3-to-1 Ratio That Will Change Your Life".

"Just as zero degrees celsius is a special number in thermodynamics," wrote Fredrickson in *Positivity*, "the 3-to-1 positivity ratio may well be a magic number in human psychology."

Fredrickson is the object of widespread admiration in the field of psychology. Martin Seligman, former president of the American Psychological Association and a bestselling author in his own right, went so far as to call her "the genius of the positive psychology movement". On top of which she is also an associate editor at *American Psychologist*.

By contrast, Brown was a first-term, first-year, part-time masters student who was about to take early retirement from what he calls a "large international organisation" in Strasbourg, where he had been head of IT network operations. Who was he to doubt the work of a leading professional which had been accepted by the psychological elite? What gave him the right to suggest that the emperor had gone naturist?

"The answer," says Brown when I meet him in a north London cafe, "is because that's how it always happens. Look at whistleblower culture. If you want to be a whistleblower you have to be prepared to lose your job. I'm able to do what I'm doing here because I'm nobody. I don't have to keep any academics happy. I don't have to think about the possible consequences of my actions for people I might admire personally who may have based their work on this and they end up looking silly. There are 160,000 psychologists in America and they've got mortgages. I've got the necessary degree of total independence."

Armed with that independence, he went away and looked at the maths that underpinned Fredrickson and Losada's ratio. Complex or non-linear dynamics are not easy for an untrained mathematician to understand, much less work out. Losada, who claimed expertise in non-linear dynamics, was working as a business consultant and making mathematical models of business team behaviour when he first met Fredrickson.

In *Positivity*, Fredrickson describes the moment

when Losada explained how he could apply complex dynamics to her theories of positive psychology. "Hours into our lively discussion, he made a bold claim: based on his mathematical work, he could locate the exact positivity ratio that would distinguish those who flourished from those who didn't."

So impressed was she by this boast that Fredrickson arranged a sabbatical from her teaching duties "so I could immerse myself in the science of dynamic systems that Marcial had introduced me to".

There were several psychologists, versed in non-linear dynamics, who smelt something fishy about the maths in the published paper. Stephen Guastello, from Marquette University, wrote a note of mild complaint to *American Psychologist*, which it chose not to publish because "there wasn't enough interest in the article". Guastello feels now that he should have been more forceful in his opinions. "In retrospect," he says, "I see how I could have been more clearly negative and less supportive of what looked like an article that could move the field forward if someone would follow up with some strong empirical work."

John Gottman, a leading authority in the psychology of successful relationships, wrote to Losada because he couldn't follow the equations. "I thought it was something I didn't know about, because he's a smart guy, Losada. He never answered my email," he says. Gottman also wrote to Fredrickson. "She said she didn't understand the math either."

"Not many psychologists are very good at maths," says Brown. "Not many psychologists are even good at the maths and statistics you have to do as a psychologist. Typically you'll have a couple of people in the department who understand it. Most psychologists are not capable of organising a quantitative study. A lot of people can get a PhD in psychology without having those things at their fingertips. And that's the stuff you're meant to know. Losada's maths were of the kind you're not meant to encounter in psychology. The maths you need to understand the Losada system is hard but the maths you need to understand that this cannot possibly be true is relatively straightforward."

Brown had studied maths to A-level and then took a degree in engineering and computer science at Cambridge. "But I actually gave up the engineering because the maths was too hard," he says, laughing at the irony. "So I'm really not that good at maths. I



Illustration by Chris Gash.

can read simple calculus but I can't solve differential equations. But then neither could Losada!"

He went back over Losada's equations and he noticed that if he put in the numbers Fredrickson and Losada had then you could arrive at the appropriate figures. But he realised that it only worked on its own terms. "When you look at the equation, it doesn't contain any data. It's completely self-referential."

Unfortunately, while his grasp of maths was strong enough to see the problem, it wasn't sufficiently firm to be able to mount an academic take-down of Fredrickson's and Losada's work. Yet that was what he wanted to do. Once he knew to his own satisfaction that their research was fundamentally flawed, he was not going to be content to let things pass. So he decided to seek the help of an academic mathematician. Not just any academic mathematician either, but one who had made a name for himself by puncturing the bogus use of maths and science in another discipline.

Back in 1996, Alan Sokal wrote a paper called *Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity* and submitted it to an academic cultural studies journal called *Social Text*, which promptly published the article. As the title suggested, the paper was dense with impenetrable theory. Among other things, it disparaged the scientific method and western intellectual hegemony and claimed that quantum gravity could only be understood through its political context.

The paper, as Sokal quickly admitted, was a hoax, a deliberate pastiche of the sorts of nonsensical postmodern appropriations of maths and physics at which French critical theorists particularly excelled - among them Jacques Derrida, Jacques Lacan, Gilles Deleuze and Julia Kristeva. A major intellectual controversy ensued in which postmodernists stood accused of pseudo-science, absurd cultural relativism and the concealing of ignorance and innumeracy behind obscurantist prose. In response Sokal was derided as a pedant, a literalist and a cultural imperialist.

Despite the counterattacks, Sokal gained a reputation as a formidable enemy of bad science. As such he was regularly approached by people who believed they had uncovered an intellectual imposture, be it in architecture, history or musicology.

"I don't think I'm a crank," Brown had said in his email to Sokal. "I am just this grad student with no qualifications or credentials, starting out in the field. I don't know how to express this kind of idea especially coherently in academic written form, and I suspect that even if I did, it would be unlikely to be published."

But like many such requests, it began to disappear beneath a pile of other emails. It was only several weeks later that Sokal came across it again and realised that on this occasion he could help because it was in a field he knew something about: mathematics and physics.

Losada had derived his mathematical model from a system of differential equations known as the Lorenz equations, after Edward Lorenz, a pioneer of chaos theory.

"The Lorenz equation Losada used was from fluid dynamics," says Sokal, "which is not the field that I'm specialised in, but it's elementary enough that any mathematician or physicist knows enough. In 10 seconds I could see it was total bullshit. Nick had written a very long critique and basically it was absolutely right. There were some points where he didn't quite get the math right but essentially Nick had seen everything that was wrong with the Losada and Fredrickson paper."

Sokal did a little research and was amazed at the standing the Fredrickson and Losada paper enjoyed. "I don't know what the figures are in psychology but I know that in physics having 350 citations is a big deal," he says. "Look on Google you get something like 27,000 hits. This theory is not just big in academia, there's a whole industry of coaching and it intersects with business and business schools. There's a lot of money in it."

The concept of positive thinking dates back at least as far as the ancient Greeks. Throughout written history, metaphysicians have grappled with questions of happiness and free will. The second-century Stoic sage Epictetus argued that "Your will needn't be affected by an incident unless you let it". In other words, we can be masters and not victims of fate because what we believe our capability to be determines the strength of that capability.

In one way or another, positive thinking has always been concerned with optimising human potential, which is a key component of psychology. But in the 20th century, confronting the great traumas of two annihilating wars, the psychology pro-

fession became increasingly focused on the dysfunctional and pathological aspects of the human mind. The emphasis was on healing the ill rather than improving the well.

So it was left to popular or amateur psychology, and in particular that sector specialising in business success, to accentuate the positive. Books such as Norman Vincent Peale's *The Power of Positive Thinking*, published in 1952, became huge bestsellers. By the 1970s and 1980s, self-help had mushroomed into a vast literary genre that encompassed everything from the secrets of material achievement to the new age promises of chakras, reiki and self-realisation.

On becoming president of the American Psychological Association in 1998, Martin Seligman set out to bring scientific rigour to the issue of self-improvement. In his inaugural speech, he announced a shift in psychology towards a "new science of human strengths".

"It's my belief," said Seligman, "that since the end of the second world war, psychology has moved too far away from its original roots, which were to make the lives of all people more fulfilling and productive, and too much toward the important, but not all-important, area of curing mental illness."

He called for "a reoriented science that emphasises the understanding and building of the most positive qualities of an individual". It was an optimistic period in American history. The economy was buoyant, US geopolitical power was unchallenged and no major conflicts were raging. As a result, there was almost a messianic note of global ambition in Seligman's address. "We can show the world what actions lead to wellbeing, to positive individuals, to flourishing communities, and to a just society," he declared.

Suddenly a plethora of positive psychology books began to appear, written by eminent psychologists. There was *Flow: The Psychology of Happiness* by Mihaly Csikszentmihalyi, who with Seligman is seen as the co-founder of the modern positive psychology movement; *Authentic Happiness: Using the New Positive Psychology to Realise Your Potential for Lasting Fulfilment* by Seligman himself. And of course Fredrickson's *Positivity*, approved by both Seligman and Csikszentmihalyi. Each of them appeared to quote and promote one another, creating a virtuous circle of recommendation.

And these books were not only marketed like a

previous generation of self-help manuals, they often shared the same style of cod-sagacious prose. "Positivity opens your mind naturally, like the water lily that opens with sunlight," writes Fredrickson in *Positivity*.

Then there was the lucrative lecture circuit. Both Seligman and Fredrickson are hired speakers. One website lists Seligman's booking fee at between \$30,000 and \$50,000 an engagement. In this new science of happiness, it seemed that all the leading proponents were happy.

But then Nick Brown started to ask questions.

Around the time Brown first came across Fredrickson's work, a case came to light in Holland in which a psychologist called Diederik Stapel, who was dean of faculty at Tilburg University, was caught by his graduate students making up data. It turned out he'd been falsifying his research for the previous 15 years. Brown, who is currently translating Stapel's autobiography, got in touch with him and asked him why he did it.

"The way he describes it," says Brown, "is that the environment was conducive to it. He said, 'I could either do the hard work or put my hand in the jar and take out a biscuit'." It does a massive amount of harm to science when this sort of thing happens. Nobody's accusing Fredrickson of making anything up. She just basically invented her own method. Is that worse than inventing your own data?"

After he had established contact with Sokal, Brown sent him a 15,000-word draft, which was much too long for publication. At first the professor agreed to give Brown advice on cleaning up the draft. He also told him that he should go to *American Psychologist*, and he contributed a pedagogic section, explaining the maths.

"I still wasn't thinking that I was going to be a co-author but Nick sent me drafts and I just liked his writing style," recalls Sokal. "It made me laugh. He had this gift for English understatement."

Getting their critique of Fredrickson into the publication of which she was an associate editor was a tall order. To help him get across the line, Brown had already recruited Harris Friedman, a sympathetic psychologist who had doubts about Fredrickson's claims but was not sufficiently versed in maths to make a case on his own.

Sending revised versions back and forth among themselves, the three men gradually composed

what they considered to be a watertight argument. The initial title they submitted to *American Psychologist* was *The Complex Dynamics of an Intellectual Imposture* - an ironic play on Fredrickson and Losada's original piece. That was rejected by the editor because he argued that the word "imposture" implied a deliberate fraud on the part of Fredrickson and Losada.

Sokal insists that this was never their intention. As Brown puts it in characteristic manner. "This particular paper wasn't an act of fraud and it wasn't about statistics. It's that someone had a brain-fart one day."

Following much negotiation, Brown, Sokal and Friedman had their paper accepted by *American Psychologist* and it was published online last July under the only slightly less provocative title of *The Complex Dynamics of Wishful Thinking*. Referring to the bizarrely precise tipping point ratio of 2.9013 that Fredrickson and Losada trumpeted applied to all humans regardless of age, gender, race or culture, the authors - in fact Brown, in this sentence - wrote: "The idea that any aspect of human behaviour or experience should be universally and reproducibly constant to five significant digits would, if proven, constitute a unique moment in the history of the social sciences."

The paper mounted a devastating case against the maths employed by Fredrickson and Losada, who were offered the chance to respond in the same online issue of *American Psychologist*. Losada declined and has thus far failed to defend his input in any public forum. But Fredrickson did write a reply, which, putting a positive spin on things, she titled *Updated Thinking on Positivity Ratios*.

She effectively accepted that Losada's maths was wrong and admitted that she never really understood it anyway. But she refused to accept that the rest of the research was flawed. Indeed she claimed that, if anything, the empirical evidence was even stronger in support of her case. Fredrickson subsequently removed the critical chapter that outlines Losada's input from further editions of *Positivity*. She has avoided speaking to much of the press but in an email exchange with me, she maintained that "on empirical grounds, yes, tipping points are highly probable" in relation to positive emotions and flourishing.

"She's kind of hoping the Cheshire cat has disappeared but the grin is still there," says Brown, who

is dismissive of Fredrickson's efforts at damage limitation. "She's trying to throw Losada over the side without admitting that she got conned. All she can really show is that higher numbers are better than lower ones. What you do in science is you make a statement of what you think will happen and then run the experiment and see if it matches it. What you don't do is pick up a bunch of data and start reading tea leaves. Because you can always find something. If you don't have much data you shouldn't go round theorising. Something orange is going to happen to you today, says the astrology chart. Sure enough, you'll notice if an orange bicycle goes by you."

But social psychology is full of theorising and much of it goes unquestioned. This is particularly the case when the research involves, as it does with Fredrickson, self-report, where the subjects assess themselves.

As John Gottman says: "Self-report data is easier to obtain, so a lot of social psychologists have formed an implicit society where they won't challenge one another. It's a collusion that makes it easier to publish research and not look at observational data or more objective data."

In general, says Gottman, the results of self-report have been quite reliable in the area of wellbeing. The problem is that when it comes down to distinguishing, say, those who "languish" from those who "flourish", there may be all manner of cultural and personal reasons why an individual or group might wish to deny negative feelings or even downplay positive ones.

"It's a lot more complicated than Fredrickson is suggesting," says Gottman.

After initially being turned down, Brown, Sokal and Friedman went through *American Psychologist's* lengthy appeals procedure and won the right to reply to Fredrickson's reply. They are currently working on what is certain to be a very carefully considered response. But it doesn't take a psychologist to work out that, given the nature of human behaviour, it's unlikely to be the last word.

Juliette Lewis: 'I faced my fears'

At 18, Juliette Lewis was a Hollywood star. But fame brought drug addiction and panic attacks. As she returns to the big screen, she talks revolt, rehab and rock'n'roll with Ryan Gilbey

By Ryan Gilbey

Juliette Lewis has been drug-free for - how long is it now? Give her a minute. She's working it out. "I was 22. I'm 40 now. So that's ..." And yet one of the pleasures of being in her company is that she acts like someone trying to conceal a certain chemical wooziness. She totters and wobbles when she crosses the room like a human Slinky, in her low-cut cream top and black leather smudge of a skirt. Her speech patterns have the same jerkiness: when she declares that she has finished doing TV appearances for the day and so can now "be as idiosyncratic as I want", she pronounces that adjective gingerly, with the trepidation of someone walking a tightrope in heels. Her conversation accelerates and decelerates without warning; the voice is cheerfully musical, skating up and down the register. In every sentence, it's anyone's guess where the stresses will fall.

This is a special time for Lewis. You might say that her part in *August: Osage County*, a starry film of Tracy Letts's Pulitzer-winning play, represents a comeback, though neither of us uses that word. She blazed into film in the early 1990s with a spate of disarming work: she was Oscar-nominated at the age of 18 for playing the bashful thumb-sucker (it was Robert De Niro's thumb she sucked, not her own) in Martin Scorsese's *Cape Fear*. She was a self-possessed literary whiz-kid in Woody Allen's masterpiece *Husbands and Wives*. And controversy was guaranteed after she went hell-for-leather playing psychopaths in *Natural Born Killers*, and alongside her then-boyfriend Brad Pitt in *Kalifornia*. No one else looked or sounded like her; whether playing vulnerable or volatile, she had a playful, uninhibited spontaneity. I see it for myself when she interrupts our conversation to wander over to the window of the hotel room where we're talking and peer across the street: "That's Tilda Swinton!" she trills excitedly. In fact, it isn't. "Oh. It's a guy. But the hair. The cheekbones ..."

In recent times Lewis has concentrated on her music career, first in her band Juliette and the Licks, and then as a solo performer. There have been guest spots here and there (she was in the Jennifer Aniston comedy *The Switch* and even turned up hosting *Never Mind the Buzzcocks*) but nothing meaty since the legal thriller *Conviction* in 2010. *August: Osage County*, in which the fraught and scattered Weston clan convene after the head of the family disappears, may be a listless adaptation, but it is redeemed by three highly energised performers: Meryl Streep as the batty, dying matriarch and Julia Roberts and Lewis as her frazzled daughters, gamely enduring a reunion full of historical gripes and grudges. While Roberts is the fighter of the family, Lewis plays the happy clappy optimist, Karen. "If someone tells you over and over that everything's great, you immediately think, 'OK, what's the rest of the story?'" Lewis says. "But at the same time, I was wondering whether she really does have it all figured out." She tilts her head to one side, narrowing her tiny, vivid grey eyes, as though she is still puzzling over this.

The actor was uniquely placed to respond to the script when it arrived, having recently joined her

two sisters in nursing their father (the character actor Geoffrey Lewis, best known as a fixture of Clint Eastwood films in the 1970s) through illness. "Six months prior I had almost lost my father. My sisters and I had come together in this intense way. What I was bringing to the movie is having gone through facing your parents' mortality, thinking about things you don't consider in your 20s."

She praises the atmosphere on set. "There were no egos or entourages. No one was retreating to their trailers because we all lived in this small town and really hunkered down. It was like a theatre troupe vibe." Or a band on the road. When I ask how music has affected her approach to acting, she says that the influence travelled largely in the opposite direction: it was all her years of film-making that enabled her to cope with life on tour. "I had musicians come and go who couldn't hang, you know what I'm saying?" she laughs. "But I grew up never taking a sick day because I knew that would cost the studio money. In six years, I only cancelled two shows and that was because I had bronchitis. So I'm really into the work ethic. Musically, I wear many hats. I'm the social media director, I conceptualise the videos, write the songs, do the press. I'm not a major label act. It's all fucking hustle and doing it for the love of it, and it made me appreciate the slowness of movie-making, where I'm just this little worker bee."

She formed Juliette and the Licks at the age of 30, which wasn't the plan at all. "I was meant to make music in my soul way younger than I did. I was just scared because I knew it would take more of me than anything else. But I was all into facing my fears. Now I got fears again and I gotta face 'em. Just to do with life. Leaving your home can be a fear at times. You gotta make yourself get out. Before making music I used to have a fear of crowds because I got famous young and it was quite overwhelming. I used to get heart palpitations and panic attacks. My rock'n'roll band became this animal, this vehicle to confront things. Musically I can express myself in really liberating ways on stage." I suggest that there is something prickly in her rock persona but she disagrees. "I just try to turn everyone into a 10-year-old. It's confrontational but in the best sense. Like if a kid was gonna smash a pie into your face. It's still just a pie, right? It's sugar. It might have an edge of violence but it'll taste sweet."

Lewis grew up in Los Angeles and started acting at 14; she was one of those child performers, like Michelle Williams and Drew Barrymore, who secured legal emancipation from her parents at a young age, not because of any rift, she insists, but to enable her to work without child labour restrictions. Early experiences were not always encouraging. "At 16, I was ready to quit," she recalls. "I'm always trying to quit acting. I'm always, like, 'This is the last one.' I was doing a really bad sitcom and they hired an acting teacher for me to get me to conform to that broad sitcom-style acting." She started to think that the problem was her - that she wasn't cut out for acting. Though what she actually says to me is: "Maybe this wasn't cut out for me" - a slip that seems to reflect her skew-whiff perspective. Around that time, she auditioned for Scorsese. "On the sitcom they were trying to make me into this machine, this robot. When you have a Scorsese validating your naturalistic instincts, you think: 'Maybe I'm



Actress and musician Juliette Lewis. Commissioned for G2
Photo by Linda Nyland. 15/9/2008 Photograph: Linda Nyland for the Guardian

doing something right after all ..."

In *Cape Fear* she gives one of the truest and most troubling of all teen performances: this is a girl with no protective layers, no grasp of much beyond her own fringe. "It was all about natural teenage movement. Hunched shoulders, shyness. I based her on a girl I'd met in the park who wore bangs and always looked like she had a secret." It was a choice time for her. Or, as she puts it now, "a nice little run." Then came rehab. "I didn't go to rehab as a place," she points out. "I did rehab." Although she needed to overcome her drug addiction, the prolonged break she took from acting at the height of her fame seems consistent with a taste for self-sabotage that she freely owns.

"I would revolt in any way I could. When I turned up to photo shoots and realised they were going to put makeup and clothes on me that I would never usually wear, I said 'no'. I think I'm still the same non-conformist spirit." She took several years off work in her early 20s and has never quite equalled her initial success since returning. She finds acting hard, but can't say why. "Most artistic mediums are masochistic but with acting there's such an internal struggle." She sighs. "It drives me crazy. It's a horrifying industry but I can't tell which is worse: music, fashion or film. They're all horrifying but they're all better than accounting or road-sweeping."

August: Osage County is out in the UK on 24 January.