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Cambridge Alumni Magazine

Lent Term 2020

Issue 89



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Steph Hughes

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Editor's Letter

Welcome to the Lent Term edition

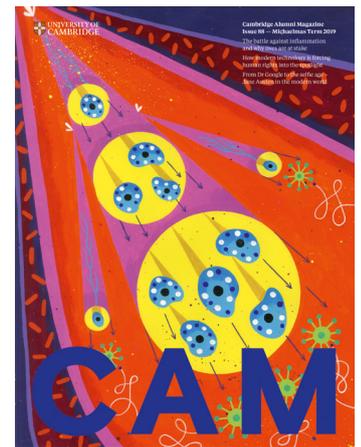
of CAM. Living through dark times can be challenging. It takes resilience, courage and, above all, hope. But what is hope exactly? And why is it (along with progress – but we can leave that for another day) contested territory? We report on the role of hope in the human psyche, where it comes from and how to get more of it, on page 34.

It takes optimism to launch a religious revolution – and steely determination to impose it upon an empire. But was King Amenhotep IV a high-minded social reformer or a megalomaniac bent on imposing his will? Welcome to reformation and counter-reformation, ancient Egyptian style, on page 28.

Elsewhere, on page 12, Dr Kristian Franze explains the mind-blowing science of brain mechanics and, on page 16, we investigate the buzz around Cambridge's electrochemists, who are working on grabbing electricity out of the air, from plastic eating bugs and from space ice.

On all these topics – along with all other things Cambridge related – we look forward to your contribution to the debate, online at our new website, magazine.alumni.cam.ac.uk, by post, email or on social media.

Mira Katbamna
(*Caius 1995*)



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Inbox

How to be modern

✉ I much enjoyed CAM 88 and found the article on ‘decolonising the curriculum’ particularly useful in explaining what this is about. I admit that my hackles had been raised by press and TV reports of statues being knocked down, names being changed, etc, in apparent attempt to obliterate past history. But part of my problem, and that of others with whom I have discussed the phenomena, has been the name. The widening and deepening of the curriculum and the understanding and possible adoption of alternative viewpoints are wholly admirable. And wholly within the academic tradition. So why the misleading name?

Brian Luker
(Sidney Sussex 1955)

✉ Few would dispute that cultural canons are not set in stone, and we are all better off for discovering and rediscovering new ways of thinking and writing. And looking to other countries, as well as to the past, is an eminently sensible way of doing so. If that is what ‘decolonisation’ stands for, surely we are all its apologists. Why then all the fanfare and manifestos?

On the other hand, those who merely wish to inject greater ethnic diversity in the curriculum rather than enrich our collective culture, are putting the cart before the horse.

Anton Moiseienko
(Hughes Hall 2013)

✉ On decolonising the curriculum: I appreciate that climate change, the rise of AI and other changes necessitate the constant reviewing of the curriculum, but not the downgrading of the study of western civilisation.

If Cambridge is not going to continue providing an education

in British and western civilisation, I shall be suggesting to my grandchildren that they apply elsewhere – perhaps Durham?

David Orton
(Churchill 1962)

My room, your room

🐦 The current issue of #CAM, the alumni magazine of @Cambridge_ Uni, contains a particularly intriguing piece for My room, your room: Lady Hale, President of the Supreme Court of the United Kingdom (@UKSupremeCourt) returns to her old room at Girton!

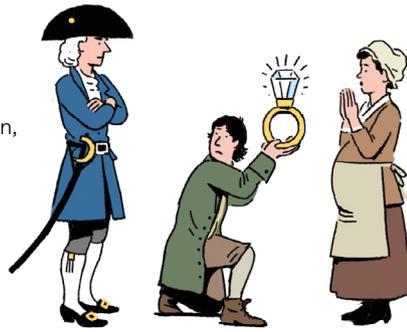
Anna Katharina Mangold
(Lucy Cavendish 2009)

Zero carbon

✉ It is good to hear about the Cambridge Zero initiative. As a scientist, I think that we already have the technologies to emit much less carbon dioxide. What we are lacking is the economic and political structures to drive the radical changes in expectations and behaviour that are needed to implement the science. These are the priority areas for new work.

John Heathcote
(Queens’ 1973)

✉ Dr Shuckburgh’s exhortation is correct, but it is hard to convince people of the need for the measures she underlines. There are already too many humans on Earth, and the long-term aim must be to initiate a steady decline in numbers until we reach a compromise at which a considerably reduced western standard of living becomes the accepted global norm. This is not a popular idea, and produces accusations of everything from racism, through sexism, to latent eugenic tendencies. So the change should start with the prosperous north and west, with impetus supplied by the UN. But the message needs to be sent to all



governments, perhaps through a refinement of the UNSDGs. As Dr Shuckburgh says, it will be more comfortable to manage them, than fight our way out of chaos.

John Moss
(Pembroke 1958)

✉ I’m glad to see CAM covering the climate emergency, saying [Cambridge] “will help to train up the next generation of leaders with the skillset to navigate through the coming decades” and the Vice-Chancellor stating: “When other institutions are perceived to be failing their societies, our University must step up” to support the transition to a zero-carbon future.

All laudable sentiments but the climate emergency requires urgent action now. It’s far too late for delaying tactics, more fine words and long-term aspirations – what we do in the next ten years is critical. And the University refuses to divest from its massive investment in fossil fuels and it continues to accept huge donations and research grants from fossil fuel companies. Actions speak louder than words.

Rebecca Lawson
(St Catharine’s 1986)

Bastardy books

✉ I was interested to read Dr Williams’ article about bastardy books. By chance, I had just finished reading *A Country Parson: James Woodforde’s Diary 1759-1802*. His entry for 25 January, 1787 reads: “Rode to Ringland this Morning and married one Robert Astick and Elizabeth Howlett by Licence... the Man being in custody and the Woman being with Child by him. The Man was a long time before he could be prevailed on to marry her when in the Church Yard; and at the Altar behaved very unbecoming. It is a cruel thing that any Person should be compelled by Law to marry... It is very disagreeable to me to marry such Persons.” A footnote explains that, by a clause

of the Bastardy Act of 1733, “the marriage of the woman caused the release of the man from penalty. Hence, in numerous cases, if the man could not indemnify the parish, he preferred wedlock to imprisonment.” I look forward to reading Dr Williams’ book.

Deirdre English (nee Mills)
(Homerton 1961)

King Arthur’s table

✉ I was very proud to appear in last term’s CAM magazine, a publication I have long read with admiration, and it was lovely to have my relationship with my supervisor Liba Taub recorded in such a beautiful photo.

However, I must point out that I was not responsible for recognising that the Equatorie was by the English Benedictine monk John Westwyk! In fact, it was Professor Kari Anne Rand, of the University of Oslo, who identified his handwriting. Professor Rand and I worked as part of a larger team on the project, led by Scott Mandelbrote of Peterhouse, to digitise the Equatorie manuscript for the Cambridge Digital Library. The results can be viewed here: cam.ac.uk/equatorieoftheplanetis – CAM readers might enjoy playing with the virtual equatorium they will find there.

Seb Falk
(Homerton 2011)

Human rights in a digital age

🐦 Latest edition of Cambridge Alumni Magazine provokes with an article on how are human rights changing in the digital age. Does freedom of speech trump intrusion of privacy? How can we work with ‘social platforms’ to negotiate the use of our behavioural data as a commodity which can shape wider outcomes whilst respecting the freedoms they give us?

Emma Sands
(New Hall 1992)

👤 I enjoyed the human rights article very much – great job!

Slaven Stekovic
(Homerton 2018)

Praise

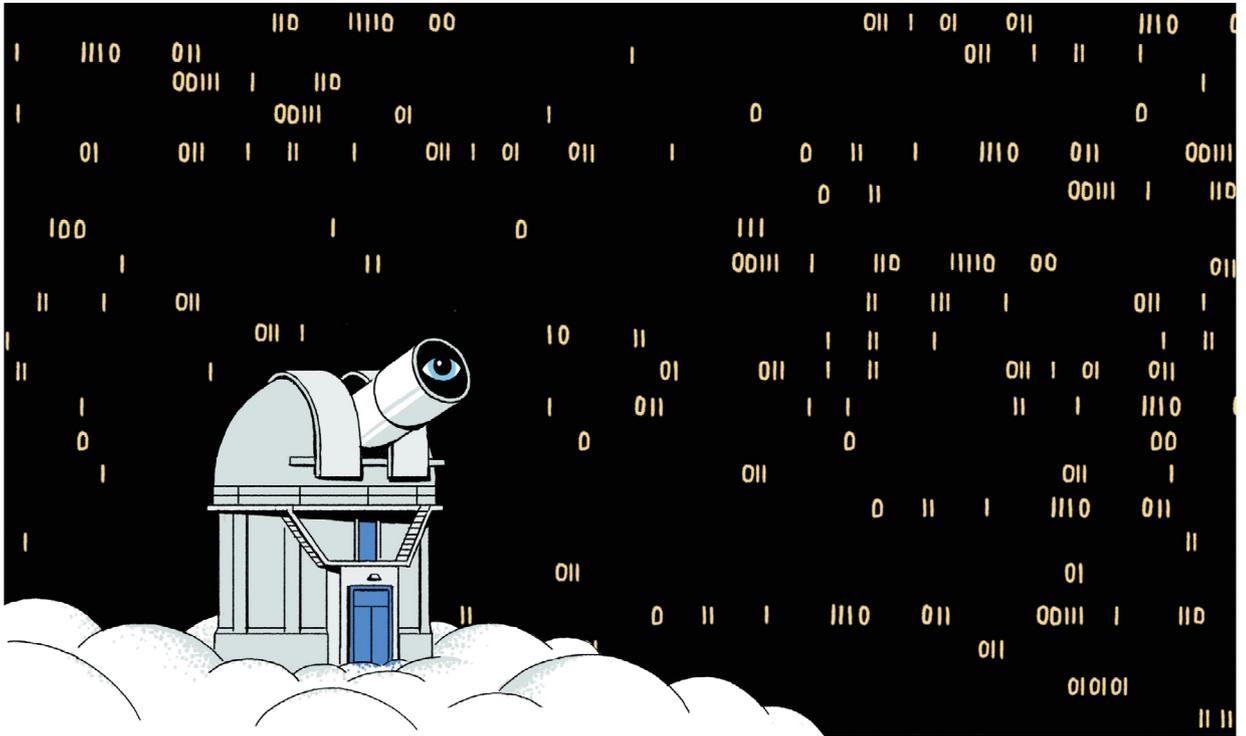
👤 Great articles, great issues, great read, every issue!

Edmond Salter
(Wolfson 2012)



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Research

New report recommends the creation of a ‘WTO for the internet’

The internet needs an international World Trade Organization (WTO)-style body to protect and grow it as one of the world’s unique shared resources: a communications infrastructure that is open, free, safe and reliable, concludes a new report published by the China-UK Global Issues Dialogue Centre at Jesus.

The global communications system – including the internet, smartphone access, and the Internet of Things – allows near-universal communication and supports almost every aspect of the modern economy. The report argues that just as the capabilities of communications infrastructures are being amplified by artificial intelligence and other technologies, we are becoming more aware of the risks of direct attacks and splintering, and the threat of distrust.

Professor Peter Williamson, Chair of the China-UK Global Issues Dialogue Centre, said: “The world faces a series of complex issues involving data and communications which go beyond national or bilateral deals. They potentially threaten free and open trade, easy and reliable communication, data flows and connectivity.”

The report authors’ argue that the world would benefit from better orchestrating knowledge about communications infrastructures, providing a shared picture of issues, threats and opportunities, based on deep technical expertise. One of their most

important recommendations is that the first step in creating a WTO-equivalent for data flows would be to set up a Global Communications Observatory. The Observatory could play an important role in uncovering potential risks of new data and communications technologies, such as loss of privacy or opportunities for data tampering, and proposing solutions.

“We need a global institution comparable to those in climate change, finance, health, development or refugees. At the moment, there is no obvious place for multilateral negotiations over issues such as data privacy or cybersecurity,” added Professor Williamson. “We propose using the Intergovernmental Panel on Climate Change (IPCC) as a model, as that has hugely influenced intergovernmental processes of negotiation and action around climate change.”

Designed to be as high profile and accountable as the IPCC, the Global Communications Observatory would draw on existing processes and use techniques pioneered by the IPCC for large-scale expert participation in analysis and assessments. It would deliver regular reports on key trends and emergent issues, and present accessible visualisations of the state of communications networks. In time, it could gain a formal status and a duty to report into the G20 and G7.

Cuttlefish resist lunch when shrimp is for dinner

Cuttlefish learn rapidly from experience and adapt their eating behaviour accordingly, a new study from the Department of Psychology has shown. When they know that shrimp – their favourite food – will be available in the evening, they eat fewer crabs during the day, revealing surprisingly complex cognitive abilities.



Deconstructed

New Kirk Global Challenge to reward student teams working in development

The launch of the new Kirk Global Challenge follows a £20,000 donation from Cambridge alumni Ewan Kirk and Patricia Turner (both Queens’) through the Turner-Kirk Charitable Trust.

Grants will be awarded to undergraduate teams developing inventive technology- and engineering-driven ideas which could boost economic growth in the developing world.



Ideas should solve a genuine, current need, work on the ground in the developing world at a reasonable cost, and have measurable, large-scale impact.

Applicants will present to an expert judging panel in November 2020. The six successful teams will receive grant funding over a year to develop, test and quantify the impact of their ideas.

Three-minute Tripos

SAND DUNES HAVE FEELINGS, TOO. DISCUSS.

Here’s a fascinating thought as you settle yourself onto a beach towel and open your still-pristine copy of Proust: sand dunes can communicate with each other. **Do they make themselves into castles and use little novelty flags on top to create a rudimentary semaphore system?** Actually, a study published by a Cambridge team in the journal *Physical Review Letters* found that, just like your fellow sunbathers, adjacent sand dunes both interact with, and repel, their neighbours.

How do they do that?

They cast disapproving glances when one of them shakes out a towel.

All right, all right: it’s forces. The dunes start out close together, but move further and further apart due to turbulent swirls from the upstream dune, which push the downstream dune away.

Scientists! Sipping pina colodas and looking at sand. Nice work if you can get it.

If only. The team, led by Dr Nathalie Vriend, looked at sand movement by constructing a circular flume. This enabled them to observe the dunes continuously (and for hours on end) as the flume rotated – high-speed cameras allowed them to track the flow of individual particles in the dunes.

Flumes! I knew some element of holiday fun would be involved. And I need to know this before I head off to Benidorm because...?

Because the study of how sand dunes move is key for the study of long-term dune migration. It threatens shipping channels, increases desertification, and can bury infrastructure such as highways. Don’t forget the old saying: it’s the foolish man who builds his house on sand.

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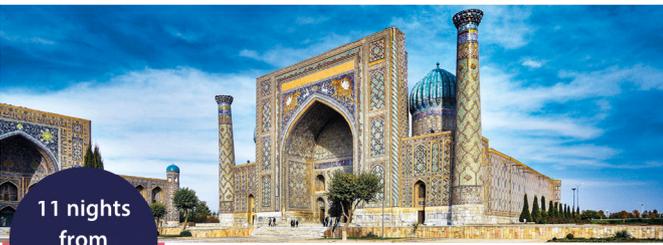
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Dr Leor Zmigrod is examining whether extremism is a question of brain, rather than belief.

Know you're right? New research suggests certainty could be a question of mind over matter

Dr Leor Zmigrod is a Junior Research Fellow at Churchill.

PHOTOGRAPHY CAMILLA GREENWELL

The philosopher Isaiah Berlin argued that human history was sculpted by two fundamental forces: the rise of science and technology and the “great ideological storms”, including the “totalitarian tyrannies of both right and left and the explosions of nationalism, racism and... religious bigotry”. Fast-forward to the present day and we still feel the whips and scorns of these ideologically tumultuous times.

So why are we, as societies and individuals, seduced by these ideologies? The answer may lie (at least in part) with our brains.

In a recent study, my colleagues and I considered the current US political climate, and hypothesised that rigidity and extremity might emerge from a psychological tendency to process information in rigid and inflexible ways.

An individual who is cognitively rigid tends to perceive objects and stimuli in black-and-white terms. This categorical way of evaluating information will make it difficult for them to switch between modes of thinking or to adapt to changing environments. Cognitive rigidity and flexibility are unconscious traits, meaning that we need to use specialised implicit neuropsychological tasks to quantify who tends towards rigidity and who towards flexibility.

We reasoned that individuals with a tendency towards cognitive

rigidity in how they perceive and react to the world generally might be more likely to be rigid about their political beliefs and identities as well.

We invited 750 US citizens to complete tests that allowed us to measure their individual levels of cognitive rigidity. We found that individuals who were extremely attached to a political party (whether Democrat or Republican) displayed greater mental rigidity relative to those who were only moderately or weakly attached. In fact, regardless of the content of their political beliefs (whether left- or right-wing), extreme partisans had a similar cognitive profile. This suggests that the intensity with which we attach ourselves to political doctrines may reflect and shape the way our mind works, even at the basic levels of perception and cognition.

Across a range of studies, we have found that perceptual and cognitive rigidity predicts UK citizens' attitudes towards Brexit, as well as individuals' levels of dogmatism, religiosity, and their willingness to endorse violence to protect their ideological groups. Mental rigidity may therefore make us more easily seduced by extreme ideologies across a multitude of domains, such as politics, nationalism and religion.

These results prompt many questions about the relationship

between our brains and our politics. The first is a question of causality: does engagement with an extreme ideology lead to mental rigidity? Or does cognitive inflexibility foster a proclivity towards ideological extremism? We might also consider whether these findings can help us counter some of the negative aspects of living in an era of polarisation, extremism and misinformation. One of the neat properties of cognitive flexibility is that it is, in itself, malleable. Studies have shown that training can improve our capacity to switch between different styles of thinking and adapt our behaviour in the face of change and uncertainty. Would heightening our flexibility help us to build more tolerant and less dogmatic societies?

The emergence of new fields such as political neuroscience and the cognitive science of ideology suggest that we can harness the power of the scientific method to study the nature of the intoxicating ideologies that have shaped our past and continue to structure our present. This endeavour reveals that, while our political beliefs may at times divide us, our capacity to think about the world flexibly and adaptively can unite us. Extremity in either direction can lead us to see the world in black and white and forget to appreciate those crucial shades of grey in between.

Room 8 4PT, Emmanuel

Vick Hope (Emmanuel 2007) and third-year geographer Robyn Topper, discuss the demands of work, play and flying under the porters' radar.

INTERVIEW LUCY JOLIN PHOTOGRAPHY MEGAN TAYLOR



Vick Hope's fourth year was not without its challenges. As a linguist, she had spent her third year in Argentina working for national newspapers and getting her first break as an MTV presenter. But back in Cambridge, she promptly broke her leg playing football – and had to make a temporary move out of Room 8 4PT (the twisty staircase was one challenge too many).

"I didn't like leaving it," she recalls. "This room was my haven and doing it up was really therapeutic. I put fabric all around the walls. I made curtains out of scarves I'd found in a Moroccan souk, plus pictures and posters I found in Argentina."

Third-year geographer and current occupant, Robyn Topper, shares Hope's love of decoration. Today, the walls of 8 4PT are lined with photos of friends, family and pets. "It's exactly as Vick

says: a haven. That's why I moved the desk away from the window. I felt like I needed a separation of where I work and where I relax."

Having the desk against the wall also frees up the window seat – with stunning view across Parker's Piece. Sadly, the window no longer opens sufficiently to allow students to climb out and sit on the roof. "I suspect that's our fault," Hope sighs. "It probably wasn't great for health and safety." Her 21st birthday party also fell foul of the rules: at one point, she says, she managed to cram 30 family and friends into her room. "And we put up a gazebo in the grounds! I rather hoped it would fly under the porters' radar, but no chance..."

Memories of parties and the exact positioning of beds sparks a discussion around getting enough sleep – a big issue for Hope, who currently has to get up at 4.30am every

day to be ready for Capital Radio's breakfast show at 6am. Topper's sleep aids include pillow spray and a speaker under her pillow playing calming music.

"I didn't value self-care at all at uni," says Hope. "I never ate well or exercised. It just didn't cross my mind. It was only in my fourth year that I started to place more importance on it. When you have loads to do, you almost feel guilty for looking after yourself. I still remember sitting in this room, crying on the phone to my boyfriend that I needed to revise and all I could do was play Tetris!"

Topper agrees that it can be hard balancing work and play. "You only get eight weeks, after all, and I love my subject. Geography has given me the opportunity to do so many different things. Learning about inequality and neoliberalism, for example, has made me realise

Sometimes you've got to say: this is a day off, this is a holiday. When I was here, my thing was *America's Next Top Model*. If I was at uni now, it would definitely be RuPaul!

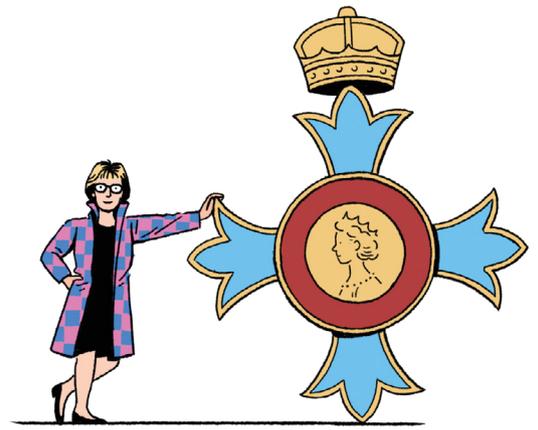


that I don't want to go into finance. I've got an interview for a job in transport planning and I'm really excited to see where that might go. But you can think it's the end of the world when you've watched loads of episodes of *RuPaul's Drag Race*. I'll binge-watch and then think: 'Oh no, is that a good use of my time?'"

"But you've spent that time doing something that you enjoyed," says Hope. "Sometimes you've got to say: this is a day off, this is a holiday. When I was here, my thing was *America's Next Top Model*. If I was at uni now, it would definitely be RuPaul!"

These days, Hope says she's a lot less hard on herself. "Coming back today was a little bit scary. But I've had time to process my Cambridge experience. It was very daunting when I arrived; I'd never seen a place that looked like this. I had to work hard to justify to myself that it wasn't a mistake and that I did deserve to be here – I think that's something you have throughout life."

Vick Hope is a radio and TV presenter, and currently co-hosts Capital FM's breakfast radio show. **Robyn Topper** is an unashamed fan of *RuPaul's Drag Race*. "Our LGBT officer has been doing weekly screenings in his room! So now I know that I'm not alone and actually everyone is watching it..."



Research

Democracy fails to satisfy majorities in countries across the world

Global dissatisfaction with democracy is higher than at any time since 1995, a report from the new Centre for the Future of Democracy has found.

Researchers found that the number of individuals who say they are dissatisfied has gone up from 47.9 per cent in the mid-1990s to 57.5 per cent today. They used the largest existing dataset on global attitudes to democracy ever created: four million people over 154 countries spanning the globe. Many large democracies – including the UK, Brazil, Australia and Mexico – are now at their highest-ever recorded level for democratic dissatisfaction. In the US, dissatisfaction has increased by a third since the 1990s.

But it's not all bad news: the study also found that Denmark, Switzerland, Norway and the Netherlands make up an 'island of contentment' at Europe's heart, where satisfaction with democracy is at an all-time high.

In Brief

Cambridge academics on New Year's Honours List

Trinity College Master, Dame Sally Davies, was among a number of Cambridge faculty members recognised in the New Year's Honours List.

She received the honour of Dame Grand Cross of the Order of the Bath (GCB) for services to public health and research.

Formerly Chief Medical Officer for England, Dame Davies led the UK Government's international campaign on antimicrobial resistance and advised it in health emergencies, including the spread of Ebola and the Zika virus.

Other honorees included Professor Lynn Gladden, Shell Professor of Chemical Engineering, who was made a dame. Distinguished Research Fellow Professor Anthony Cheetham and Clare Hall Fellow Dr Mene Pangalos were both knighted.





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Left to right: **Tim Yiu** is a third-year economist at Downing; **Dayna Cheah** is a second-year NatSci at Magdalene; and **William Xie** is a third-year NatSci at Fitzwilliam.

These are the breaks

The Cambridge University Breakdancing Club straddles both sport and dance with a culture that celebrates innovation.

WORDS LUCY JOLIN PHOTOGRAPHY ADAM LAWRENCE

Fancy learning how to do a windmill? Or maybe you just want to perfect your jackhammer? Then the Cambridge University Breakdancing Club (CUBiC) – where all you need to get started is an old-skool hip-hop beat, a shiny wooden floor and bags of enthusiasm – is for you. But don't worry – nobody will expect you to be spinning on your head on your first night.

"The basic moves are intuitive and easy to pick up," says president and third-year economist, Tim Yiu (Downing). "And in addition to our welcoming community, our classes are very structured and geared towards people with absolutely no dance experience."

Free-flowing and wildly innovative, breakdancing is rooted in hip-hop culture, with skateboarding, DJing and graffiti added to the mix. It borrows from gymnastics, tricking (a sport combining martial arts, gymnastics and dance), martial arts such as capoeira and even tap dance.

And, although it has much in common with both sport and dance,

there are no exams or defined standards – just a culture that encourages experimentation, sharing expertise, and getting out there and doing it.

"It's the culture that keeps me coming back," says Yiu, who started breakdancing in Hong Kong when he was 13. "It's a great mixture of passionate people from different backgrounds. We all teach each other and ask for advice. When you train with someone, you can talk to them afterwards – you go for a drink and end up hearing their life story. That kind of free, inclusive culture is very hard to find in a lot of sports and dance, so it's what we aim to offer here at CUBiC."

CUBiC's beginner sessions are open to anyone, and regulars include all ages, from 18 to 70. Experienced breakdancer Thomas Bignell runs the classes from 7pm to 8.30pm on Tuesdays, teaching new moves and concepts to build up members' dance vocabulary. There's no pressure to perform, but you can if you want to. A team including

Yiu danced at the Fitzwilliam May Ball, and the club also took part in the



student-run breakdancing competition, Break Central Vol 5, last year. "That was my first time in a UK competition," says Yiu. "We didn't advance to the top 16 but I'm glad I did it – it was a great experience."

Dancing can be nerve-racking, particularly if you've never done it before, but CUBiC is a great place to start. "Nobody's judging you," says Yiu. "Breakdancing is like carrying out a conversation: every time you do a move, it's like bantering or telling a joke between people that you're comfortable being around. We're all passionate about it, and we love to teach it and share it."

Follow CUBiC on Instagram @cubreaking for class recaps, breakdancing culture and more.



Axons. Neurons. And Bruno.

Blue-sky science is high risk. You might find something amazing – or you might not – as Dr Kristian Franze explains.

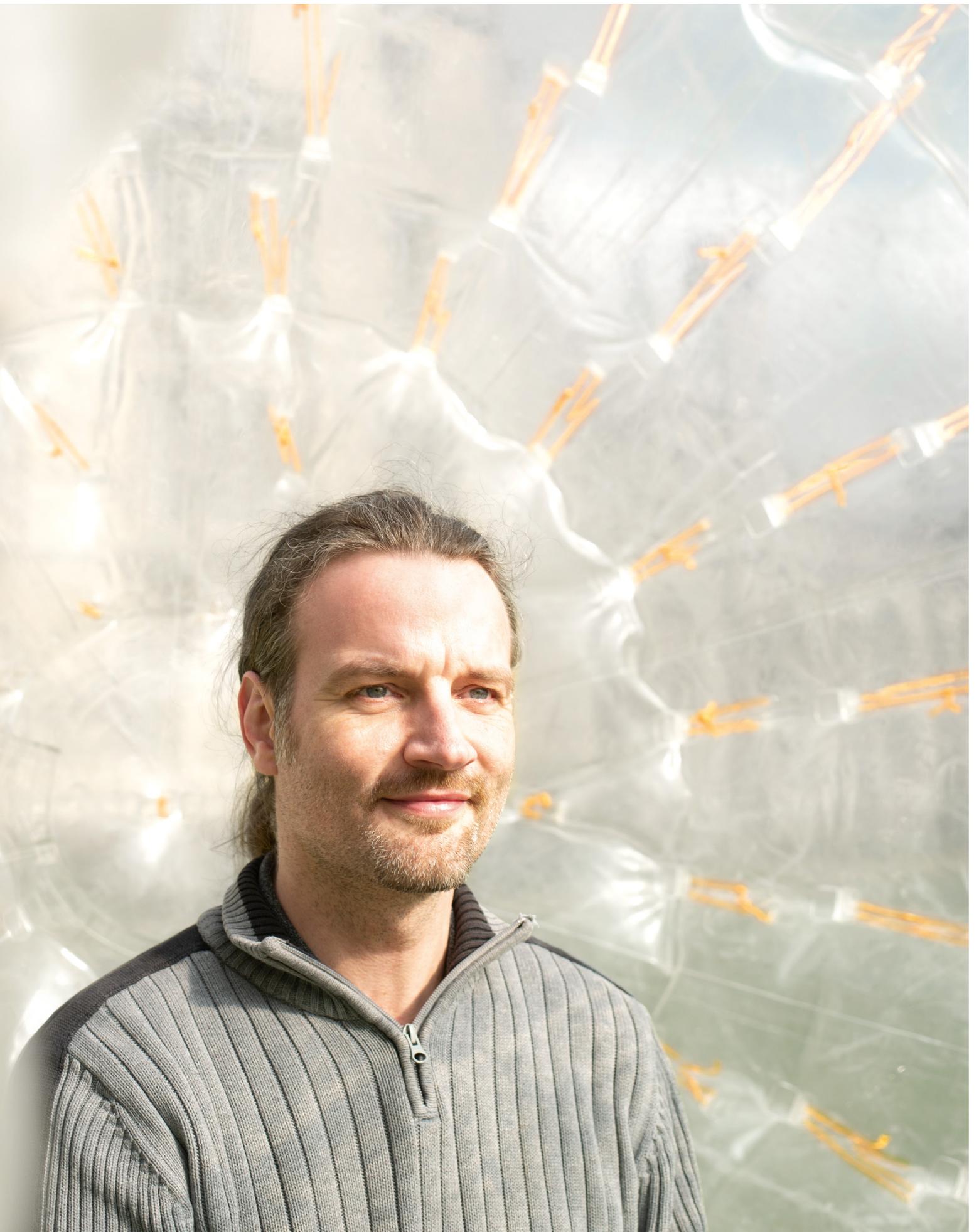
WORDS PAMELA EVANS PHOTOGRAPHY JULIAN ANDERSON

So far, it has been a rather unconventional career.

As a student, Dr Kristian Franze was torn between his love of physics and his love of animals. So when it came to deciding on a degree course, he flipped a coin – and veterinary medicine came up heads. Seven years on, Franze knew something was missing. Why did he still feel he wanted more of a challenge? Why did he hanker after something different? And why was he spending more time with the human owners of animals than with the animals themselves?

The result? A return to university for a PhD, initially in neuroscience and then in physics. But it wasn't until his supervisor, Andreas Reichenbach, mentioned what he called 'brain mechanics' that something clicked. "Andreas had been trying to find someone brave (and naive?) enough to take the subject on for years!" Franze says. "He was clear that it would be high risk but high gain. We might not find anything interesting – but if we did, it would probably be big. And he was right."

Today, Franze is a Reader in Neuronal Mechanics in the Department of Physiology, Development and Neuroscience, where visitors to his office in the Anatomy Building are greeted by Bruno, a bulldog skeleton. (Bruno is not the only sign that Franze has not entirely left animals behind: he has a little zoo at home and continues to teach veterinary students.) But what exactly is brain mechanics? Franze says that when he talks about 'mechanics', he means it literally – his work examines the role of forces, resistance, motion and fluids in the brain. ›



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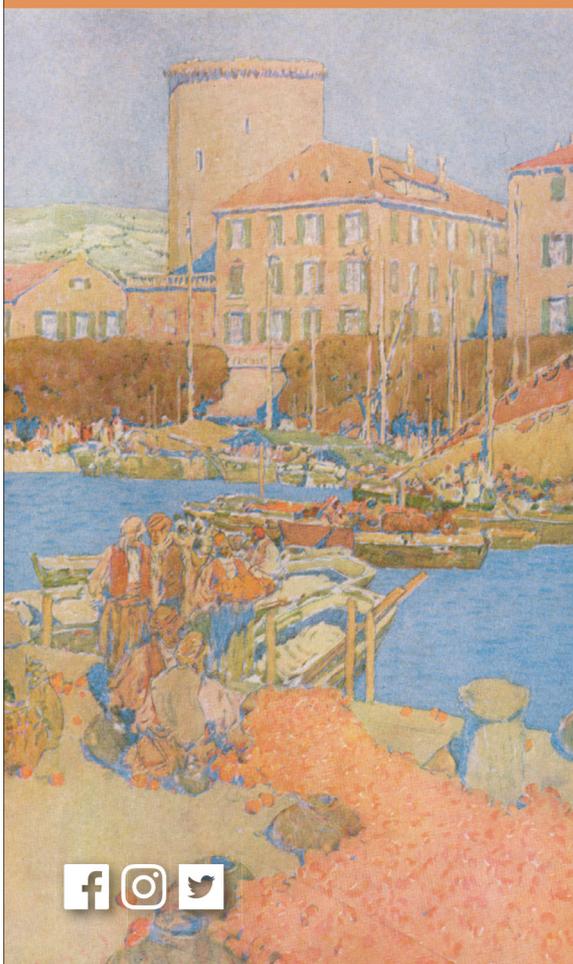
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This is not, as he points out, a new way of looking at the brain – indeed, papers discussing brain mechanics were being published as early as the late 19th century – but it is only recently that the technology has been available to investigate further. In 2020, neuroscientists are able to look beyond purely chemical signalling as a way of explaining how our brains work – and how we might repair them when they stop working.

Humans have billions of neurons (brain cells) and many more neuronal connections. If they don't grow correctly, then the brain doesn't work correctly, leading to neurodevelopmental disorders. So Franze's focus is on axons: the protrusions of neurons that can be many metres long. Axons are vital because neurons use them to connect up with and send information to other cells. But if axons stop growing, grow in a wrong direction or don't grow at all, there is no way to connect neurons properly. And if they are damaged – in a spinal cord injury, for example – nobody knows how to repair them. It's an exciting problem, says Franze, because of its complexity, as well as the fact that no one has yet solved it.

"Most of what we know about how neurons know where to grow, when to stop growing and where to connect to is based on chemical signalling," says Franze. "There are molecules in the tissue, so-called 'guidance cues', and neurons either grow towards them or away from them. That's what we currently know. But, in the end, growth is motion, right? The cells have to move through the tissue. And motion is driven by forces and not by a molecule. If you wake up in the morning to the lovely smell of coffee, it's attractive to you [and thus equivalent to a guidance cue]. But unless you get up and move your legs, exert force on your environment, you don't get to the coffee."

Similarly, he says, cells need to exert force in order to move – they need to interact mechanically with their environment. How effectively they move – and whether they move towards or away from that environment – depends both on the chemical and on the mechanical properties of the environment itself.

"We needed to develop a method that enabled us to measure brain tissue stiffness [the environment] in a living embryo," he says. "And we needed to combine this with fluorescence microscopy, so that we could also see where the axons grow while we measure brain stiffness. Previous studies had looked at how you can change the function of a cell in response to substrate stiffness in a Petri dish, but not in a living animal."

It took eight years but, in 2016, Franze and collaborators published the first paper to demonstrate *in vivo* in frogs how manipulating brain tissue mechanics alters axon growth. "The frog is pretty robust," he says. "And it's very regenerative. You can take a piece of tissue in its brain, put it elsewhere and see how this changes what cells do. It's also interesting to work with the frog because tadpoles regenerate their spinal cord: it regrows after you cut it. But after metamorphosis, that doesn't happen any longer." It's also a well-studied part of the brain in this field, enabling the team to use a system where the chemistry is already well understood. If you already know the chemistry, you can focus on the mechanics, Franze says.

The response was "pleasantly positive", he says. "If you introduce a new thought into a long-established field, you never know how it will go!" And this focus on mechanics has contributed to opening up a whole new field in neuroscience, one that is operating at the interface between physics, engineering, biology and medicine. Franze's lab collaborates with the MRC Cambridge Stem Cell Institute, the CRUK Cambridge Centre and the John van Geest Centre for Brain Repair, to name but a few.

Frogs and humans aren't so different. If we discover fundamental mechanisms in frogs, there is a good chance it can be applied to humans

He relishes this blurring of the lines between the sciences. "Nobody can be an expert in everything. You can be good at one or two things, but that's it. The key is to know your limitations and to find the right people to collaborate with. I have an amazing lab and all the success comes from my students, postdocs and technicians. My lab consists of biologists, physicists, engineers, a chemist, a vet – they come up with very different solutions and I learn from them all the time. We're interested in scientific questions. We use the technology that's available. And if nothing is available to address our questions or measure what we need, then we come up with a way to do it."

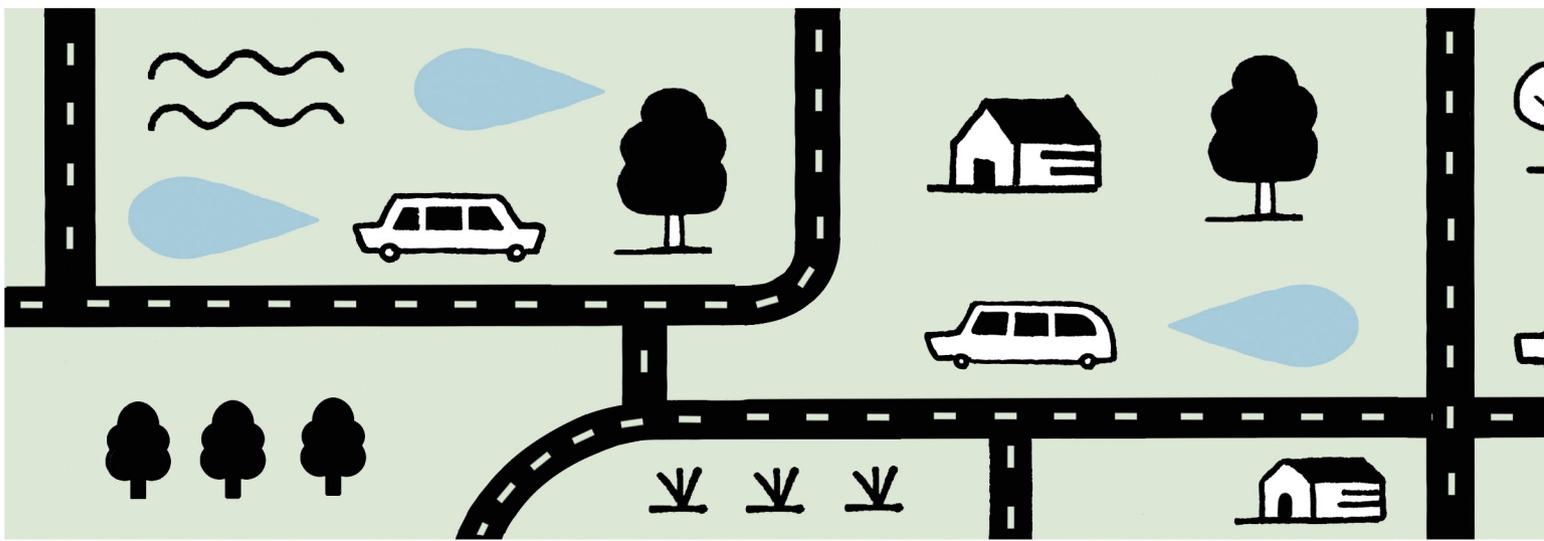
Having demonstrated that mechanics are crucial to how the brain works, the next step will be figuring out how they intersect with chemistry. (Franze has just secured a European Research Council grant to investigate that relationship.) His lab is also pushing technology forward, with a recent paper on time-lapse stiffness mapping of living brain tissue, showing how it changes during development, and another one introducing artificial-intelligence-based software to automatically quantify dynamical processes in neurons and other cells. "In this field, when there is a very important question that hasn't been solved for decades, there's a good chance it can't simply be answered just by chemistry or genetics, and that either appropriate technology is not available to address the question or people may have overlooked something," says Franze.

As for the future, Franze says he'd love to put together a mathematical model that accurately predicts neuron growth patterns in the brain. That such a model currently doesn't exist suggests something is missing, and that something could be the role of mechanics. And, of course, this blue-sky research could yet translate to humans: a life-changing possibility. But that's not what gets him up in the morning, he says. Rather, he's driven by curiosity.

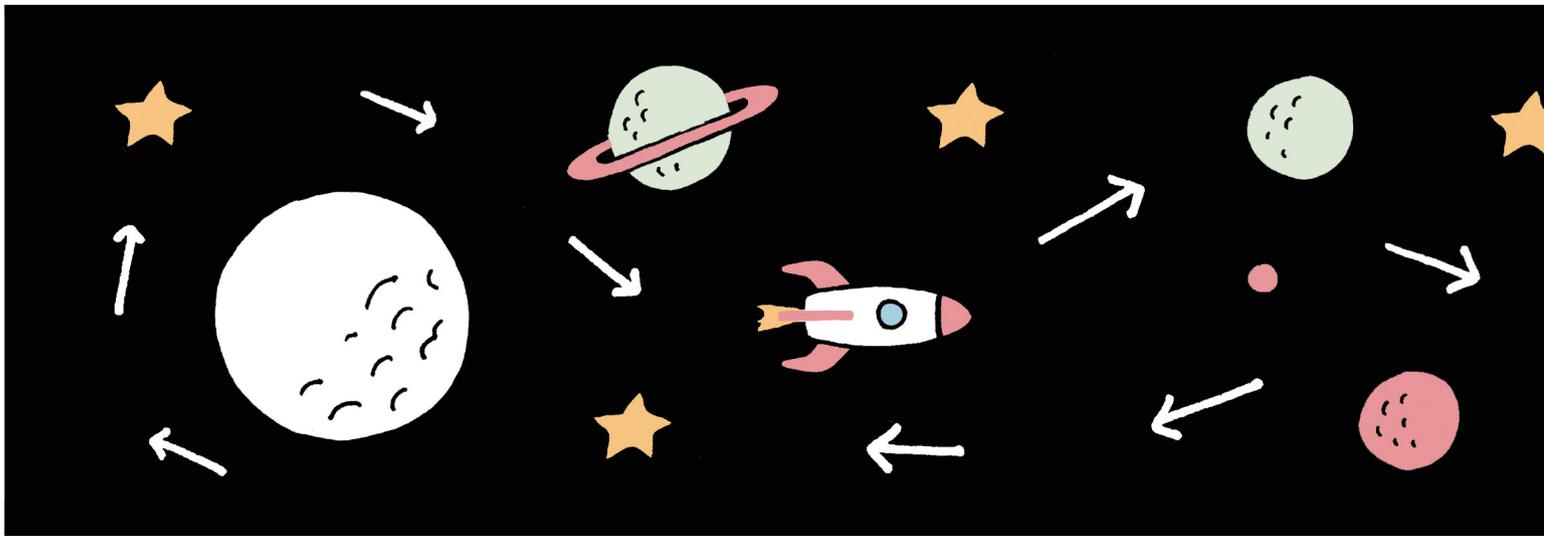
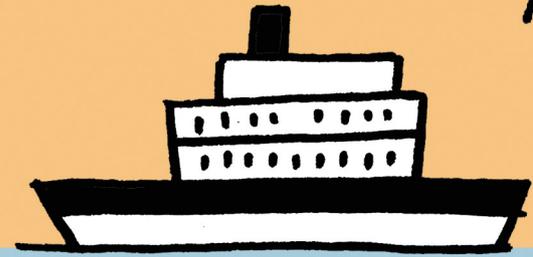
"I want to understand how this works just for the sake of it," he says. "Frogs and humans aren't so different in terms of the basic principles. If we discover any fundamental mechanisms in frogs, there's a very good chance it can be applied to humans. Of course, if we have a chance to help people and have an impact on society, then we will use it."

"I don't think you can always aim for a translational project from the beginning; your success is likely to be limited. If you want to change something on a big scale, my personal belief is that you have to understand fundamentally what's going on first. I suspect I am not going to fully understand how things work in my lifetime. Usually, when we find an answer, we come up with three new questions. But I want to see how far I can get!" ©

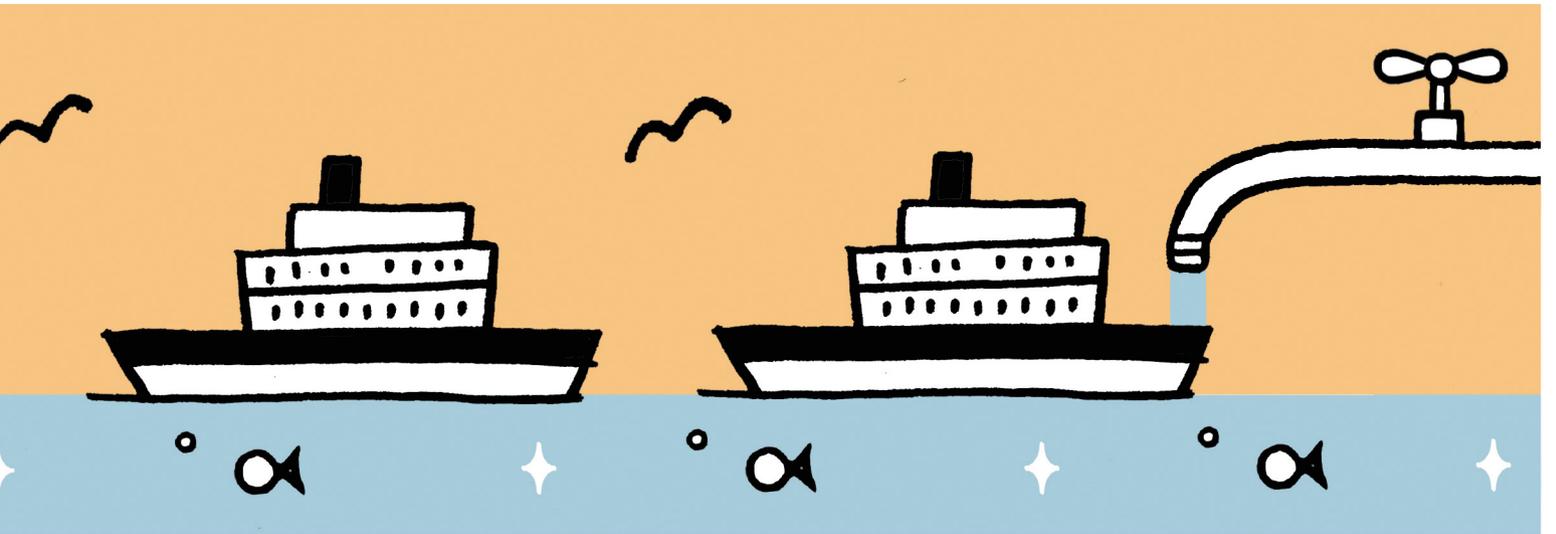
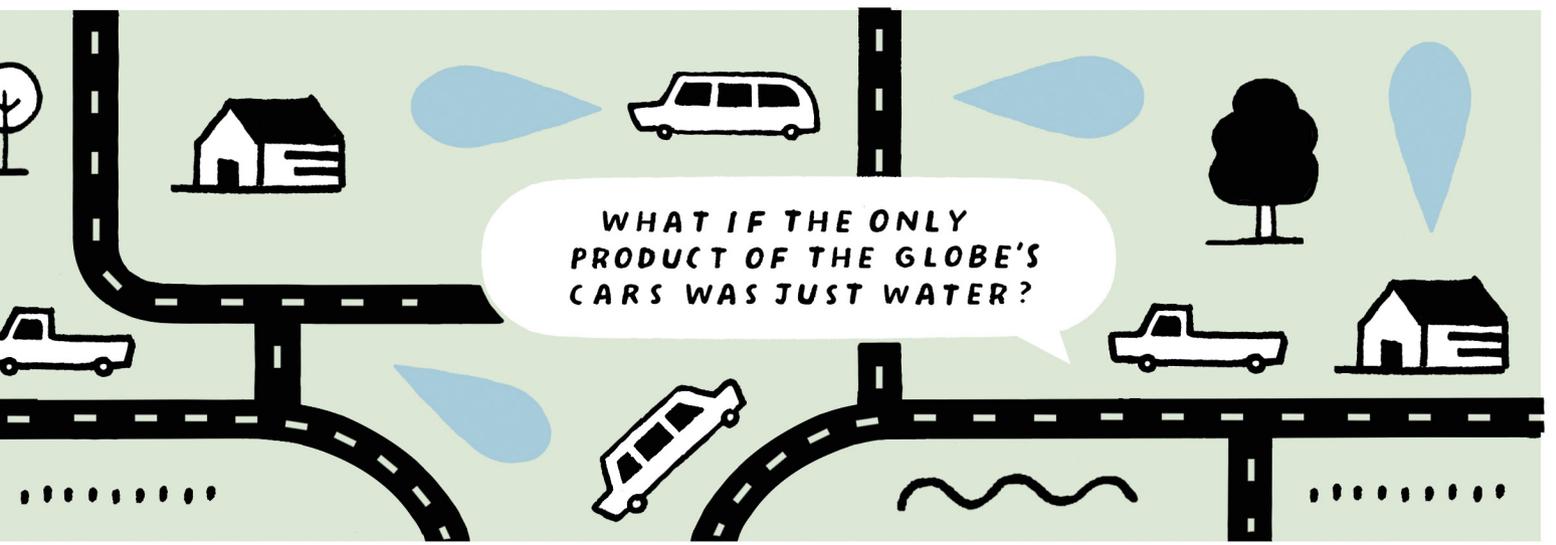
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Super power



It sounds like something straight out of a comic book: power you can grab out of thin air and use to fuel cars, ships and even rockets. That is, until you speak to the electrochemists making it a reality.

When hydrogen is burned in a fuel cell to generate electricity, the only waste product is water vapour

Orkney is suffering from an excess of electrons. Perched in the far north of Scotland, strong winds, fierce tides and waves generate more power than islanders can ever use – and it cannot easily be stored at scale. Nine thousand miles away in Singapore, Dr Adrian Fisher, Reader in Electrochemistry in the Department of Chemical Engineering and Biotechnology, says it is the perfect example of why electrochemistry’s time has come. “We need to find ways of using our surplus electrons,” he says.

Electrochemistry – using electricity to perform chemical reactions and create chemicals on demand – has been around since the 19th century, but the success of renewable energy has created a unique opportunity, because clean energy is erratic. Sometimes the wind blows, sometimes the sun shines – but if we don’t need that energy when it is produced, it can’t easily be stored. On Orkney, the solution is to use those extra electrons to liberate hydrogen from water (the electricity ‘splits’ the hydrogen from the oxygen). Pure hydrogen can then be stored and used in fuel cells.

This also has implications in space. It was just such a fuel cell that provided in-flight power to the 1969 Apollo 11 mission and, as Dr Fisher points out, the presence of ice on the far side of the moon could provide future missions with power, using electrochemistry. “Nasa is planning to go to the dark side of the moon by 2024. Where there is ice there is fuel – you can make hydrogen. And it means you are taking a localised resource to create something usable.”

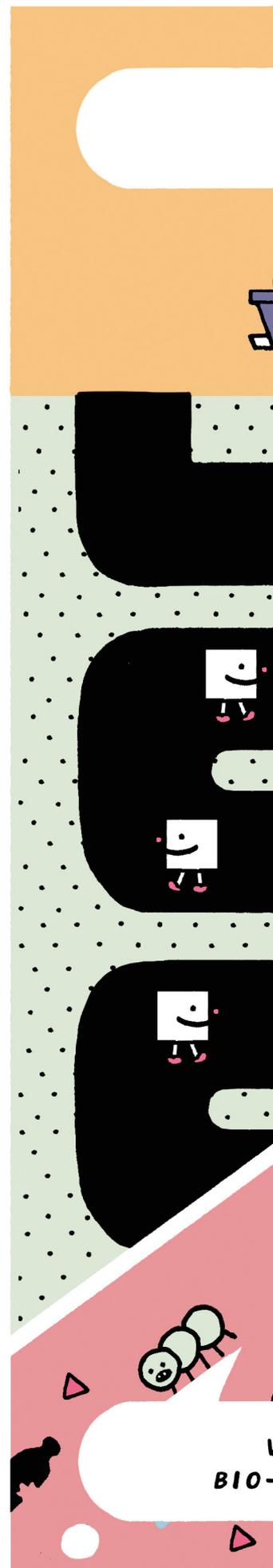
But if hydrogen is clean, cheap and available, why don’t we use more of it? When hydrogen is burned or used in a fuel cell to generate electricity, the only byproduct is water vapour – there are no particulates or pollution. But storing hydrogen is expensive and complex. As the costs of renewable energy fall, it becomes economically more viable to produce hydrogen – thereby making a hydrogen economy more possible.

In fact, hydrogen car prototypes have been around for decades – at 2019’s Frankfurt motorshow, BMW unveiled its latest model. However, switching is fraught with logistical headaches. “Infrastructure for hydrogen cells is not compatible with what is currently being rolled out for electric cars, but you can see prototypes on the market,” says Dr Minyu Zeng, a postdoctoral researcher who works alongside Dr Fisher. Germany now has a hydrogen train, San Francisco is welcoming a hydrogen ferry and there are thousands of hydrogen cars on California roads. “The supply chain of hydrogen is a huge project,” says Dr Zeng. “But it is time – the world is changing in how it produces energy.”

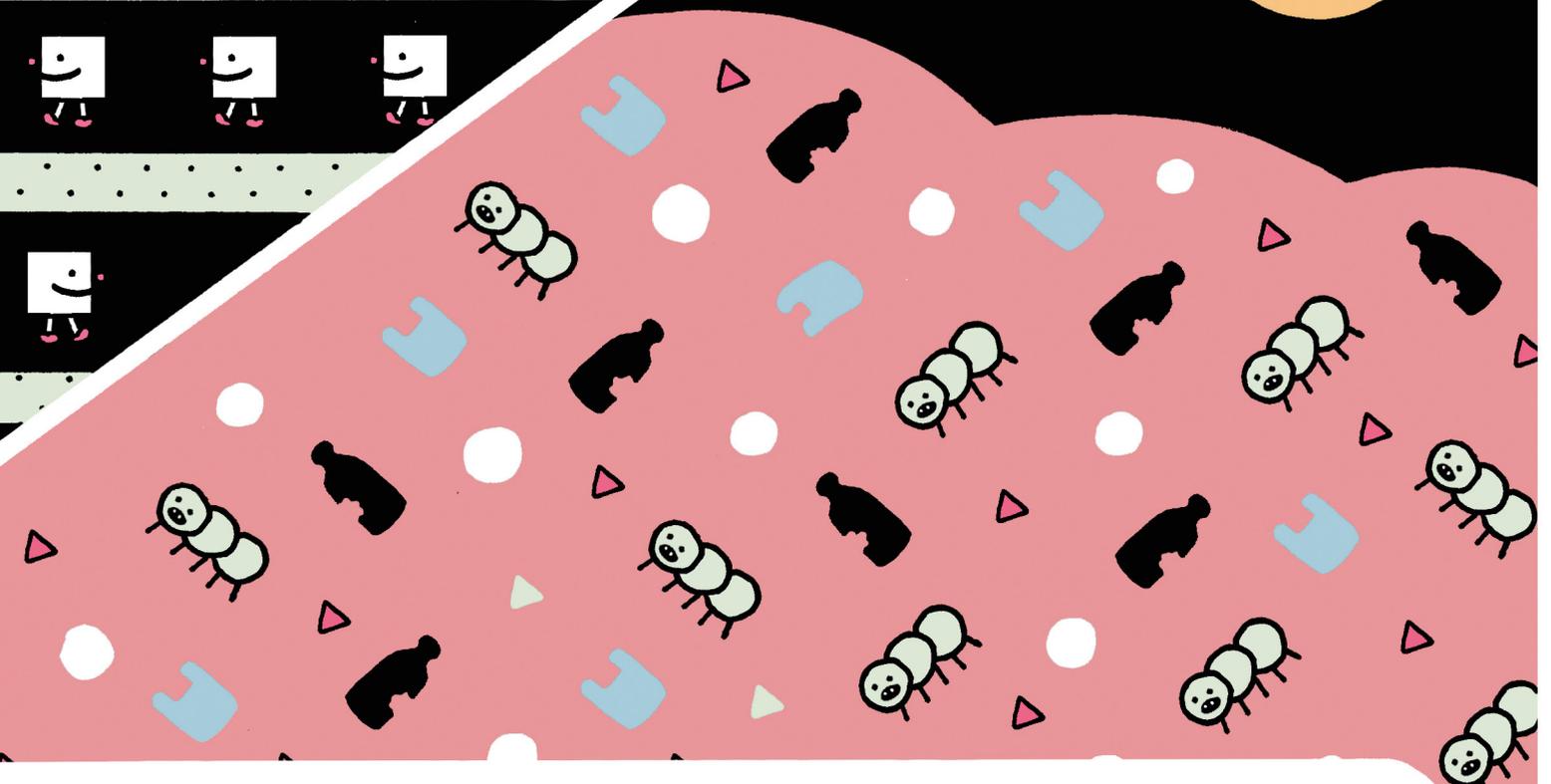
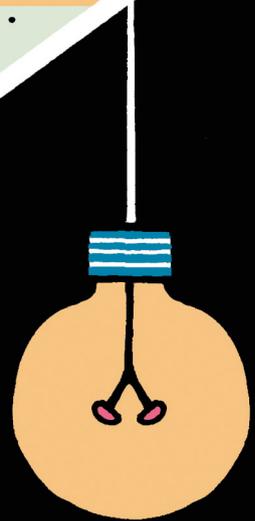
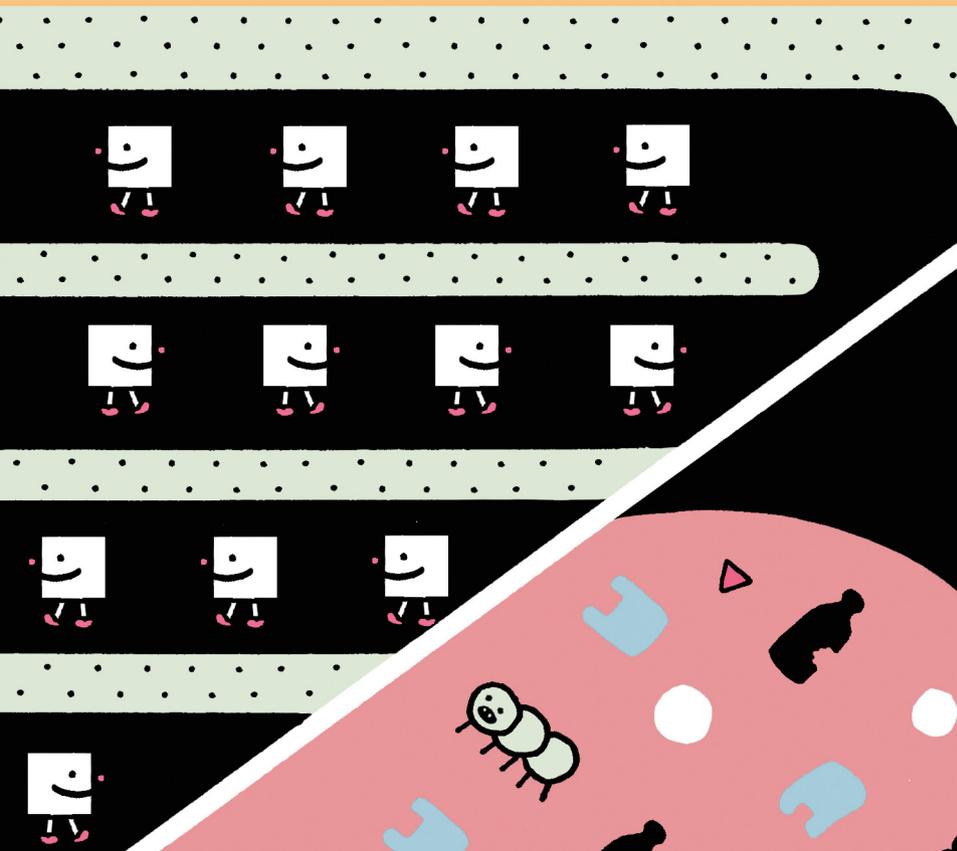
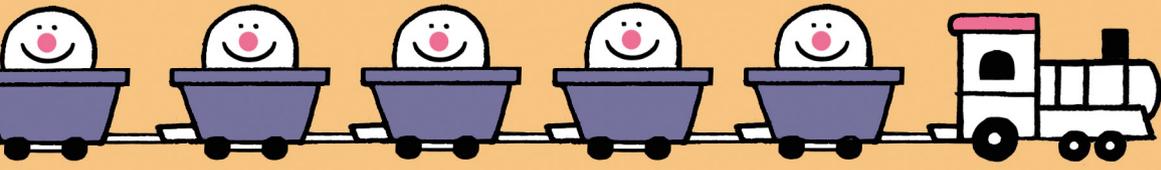
In fact, hydrogen is just one example of what you can do with electrochemistry. For the past six years, Dr Fisher and his team of chemists and engineers have been collaborating in Cambridge and at CREATE (Campus for Research Excellence and Technological Enterprise, the University’s research centre in Singapore) to find new, cleaner ways to make chemicals, helping the industry become more sustainable.

And that matters. More than 100,000 chemical products are currently sold worldwide in a market worth around \$3,500bn. Creating these products requires heat or the addition of another chemical to get going, whereas electrosynthesis works at low temperatures, and needs only a direct transfer of electrons, supplied by positive and negative electrodes dipped into the reaction mixture. No heat and no reagents mean lower costs, cleaner processes and greater precision. “Some chemicals are dangerous – it would be much better if we could make them locally,” says Dr Fisher. The ultimate vision is for chemicals produced on demand, on site, resulting in less waste and lower transport costs.

There are challenges, however. “Although most aluminium today is already made electrochemically, I wouldn’t want to say you could make everything this way,” says Dr Fisher. Logistics aren’t always straightforward. “Our catalyst is connected to an electrical supply, and that’s not quite as easy as just putting a chemical catalyst into a large reactor and



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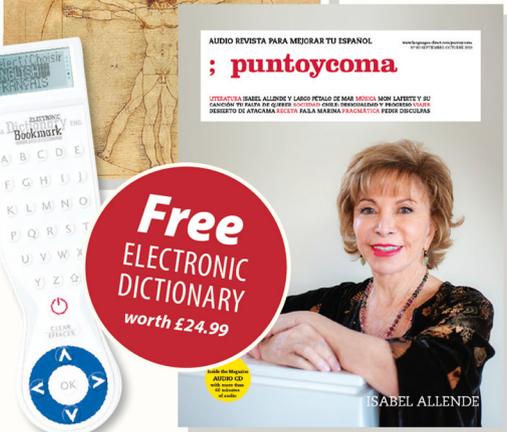
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When algae photosynthesise, they create a flow of electrons, some of which are transported outside the cell. The aim is to capture these electrons on a biophotovoltaic platform

allowing it to do its stuff,” he says. “In principle you can do a huge amount of chemistry electrochemically, but, historically, the cost of electrons has limited progress. And the technology is not yet as advanced as it needs to be to replace current large-scale manufacture.”

But ultimately, he says, all chemistry is really electrochemistry – moving electrons and making and breaking bonds. “This could be a completely different way of looking at the production of chemicals,” says Dr Fisher. “That’s our role in the Singapore centre. If you can take local feedstocks, and make chemicals locally and when you need them, you don’t have to ship them around the world or store them.”

And Dr Zeng is working on other potential applications. “Water is two hydrogen molecules plus one oxygen. But what if you have two molecules, each H_2O_2 ? That’s hydrogen peroxide – an important chemical that is used as a disinfectant and as a reagent in many chemical processes. If you can generate electricity *and* produce a useful product, it’s a win-win.” However, there have been problems with this process, including weak concentration of H_2O_2 , corroded electrodes and low levels of electricity. “But it still has potential in particular applications such as in the paper-making industry – or in cleaning products,” says Dr Zeng.

He is also working on technology that harnesses the power of data – such as looking for patterns in the supply of solar and wind energy, and demand for chemicals. “If you use artificial intelligence to process this data, you might find a pattern. You could feed this information to a chemical-generation platform, so we would know what chemicals to produce, when and in what amounts.” He aims to pilot this idea within the coming months. “Our goal is to make a platform that could help generate multiple chemicals.”

Back in Cambridge, Dr Fisher’s team is investigating whether electrochemistry can clean up waste supplies and create products that could be used to create energy. In 2016, Japanese scientists discovered tiny bugs found in landfill sites that could literally eat plastic, and chemical engineer, Dr Aazraa Oumayyah Pankan, is currently trying to recreate this process in the lab to see how it works. However, breaking down the plastic is not actually her ultimate aim. When microalgae photosynthesise, they create a flow of electrons, some of which are transported outside the cell. And so, as Dr Pankan explains, her true purpose is to “capture these [electrons] on a biophotovoltaic platform – a biological solar cell – to generate electricity”. Once the team has identified

the single molecules that are products of the broken-down plastic, Dr Pankan wants to harvest energy from them, by feeding them to low-cost and widely available microalgae (cyanobacteria). “We want to see if we can use these biodegradable products [monomers] to generate bioelectricity.”

And if you could harness these plastic composters to provide electricity in rural communities, it would solve two problems in one. It’s fundamental science: improving these cells’ ability to export more electrons rather than use them for photosynthesis. “We’re trying to make the whole process more effective and efficient,” she says.

Bioelectricity is also being generated from tropical microalgae in Malaysia. Working with scientists from the University of Malaya, the team has been putting microbes to work, using them to clean up waste water from the palm-oil industry – and providing power. “We showed that these microalgae fed on diluted palm-oil mill effluent, photosynthesised, and generated bioelectricity at the same time,” says Dr Pankan.

This, she explains, is potentially a cheap and sustainable system, and is currently being tested in a pilot project in Malaysia. “You just need microorganisms, which are basically the biocatalyst. Add some nutrients, some water and light energy. The bacteria use carbon dioxide to photosynthesise, and the only waste product of the whole system is water.”

Devising new ways of working is critical if nations are to meet pledges to cut carbon emissions and address the urgency of the crisis, says Dr Fisher. “There are sporadic examples emerging of new processes that do work and make sense – on Orkney, for instance.” Collaborating with scientists around the world, he likens his team to pieces of a jigsaw puzzle. “You need a broad range of groups with different expertise to be able to make progress. We are competing against processes that have existed for 100 years or more.”

He firmly believes innovation can lead to new technological solutions for manufacturing chemicals. “None of us really knows how to bring this new technology to market, but we do know that the industry won’t be operating in the same way in 30 years’ time.” As Dr Fisher sees it, opportunities offered by electrochemistry are vast. “This could be a completely different way of approaching the chemicals industry – and that’s urgently needed if we are to tackle CO_2 emissions and meet our climate targets.” ©

Find out more about the research being conducted by the University’s electrochemists at: cares.cam.ac.uk.

All the



Humans are social animals – so it makes sense that loneliness is bad for your health. But with so many of us affected, what can be done? CAM investigates.

WORDS VICTORIA JAMES PHOTOGRAPHY KATE PETERS

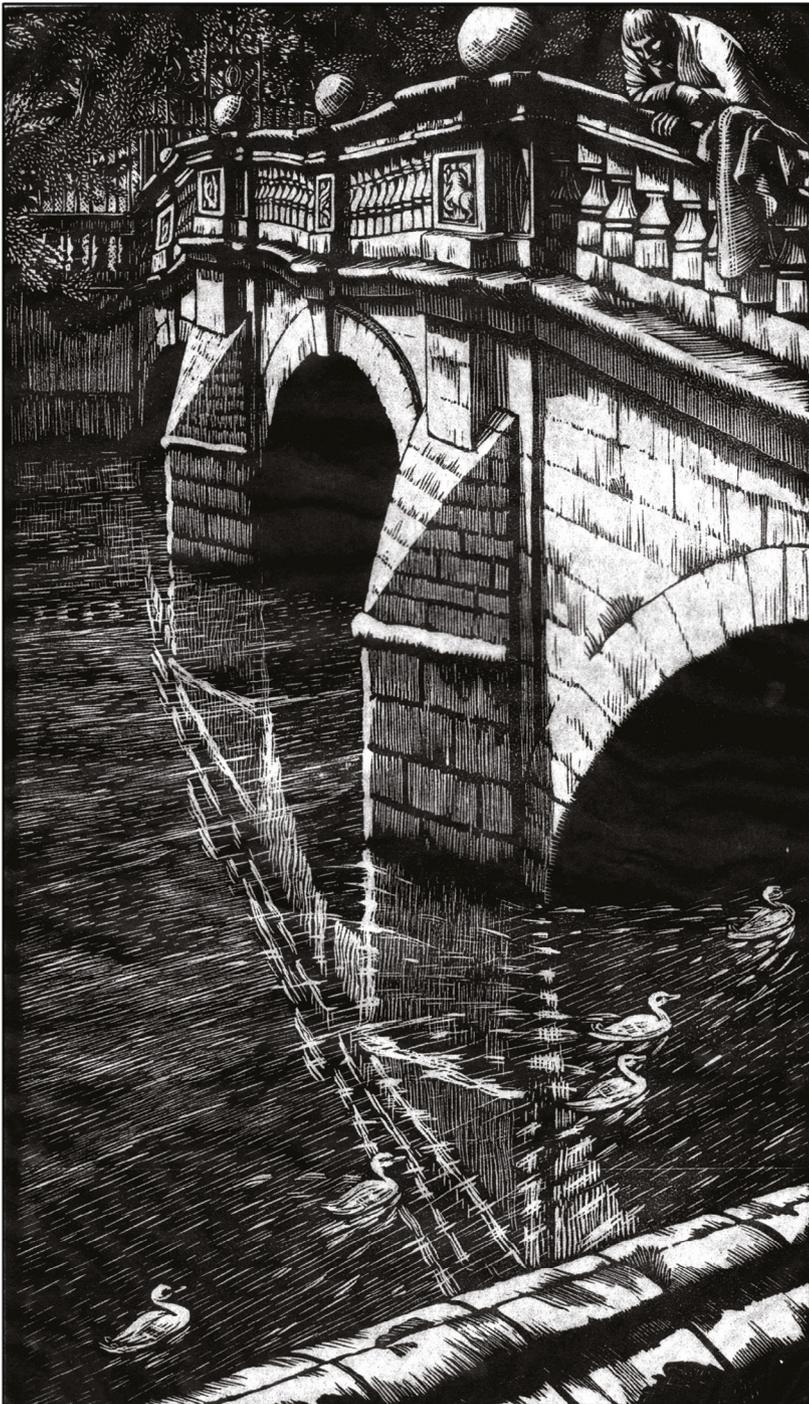
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There are entire geographic regions in which people's wellbeing is influenced by the history of where they live



It's as bad as smoking 15 cigarettes a day. Worse than obesity. It may affect as many as one in three of us during our lifetime – and its causes and potential remedies are complex. Loneliness is hard to define, difficult to tackle – and dramatically bad for you.

It can be bad for you in surprisingly practical ways. Nita Forouhi, Professor of Population Health and Nutrition at the MRC Epidemiology Unit, is interested in how social relationships can impact lifestyle behaviours. With colleagues, she has examined the link between self-reported loneliness and food intake among those aged over 50, and found an important interplay between the two. People who lived alone and saw friends only infrequently consumed fewer fruit and vegetables than the more socialised – a phenomenon that was particularly marked in men. “Infrequent friend contact interacted with living arrangements to amplify the negative associations of living alone on the quality of participants’ diet,” explains Forouhi. “This suggests that social interventions could have a role in promoting healthy eating, which in turn has benefits for health.”

And that's just one impact. Unpicking the many causes and effects of loneliness is a vast, multidisciplinary enterprise. One of the most striking discoveries also comes from the MRC Epidemiology Unit and was published in *Nature Communications* last year. “The negative impacts of social isolation and loneliness on health are well documented,” the paper states. “However, little is known about their possible biological determinants.” In other words, could a person's experience of loneliness have a genetic component?

“There are some patterns of behaviour, patterns of personality, that have quite a big impact on disease, which isn't often something you find geneticists talking about,” explains Senior Research Associate Dr Felix Day (the paper's co-author, with Professor Ken Ong and Dr John Perry). “We were interested to see if there was anything we could do regarding loneliness. There had been some work with twin studies, but not a large-scale look at it.”

The Cambridge team analysed responses from more than 450,000 participants in the UK Biobank study. “The study had asked people whether they considered themselves to be lonely,” Dr Day says. “We then examined sites in the DNA and how they corresponded with loneliness, which helped us to identify particular regions of the genome – 15 genomic loci – that appeared to show that if you had a variant at that site, you were more likely to report being lonely. And there was an association.”

Taking that forward, establishing linkages, let alone cause and effect, is a complex process. But the team was able to demonstrate a likely causal association between adiposity – excessive weight – and a susceptibility to loneliness and depression. “We find signals in the genome, but it can be incredibly difficult to relate what these might be doing at a cellular or a tissue level to loneliness,” says Dr Day. “However, we know there is a middle factor, high BMI, that correlates with loneliness. Now, there is social discrimination based on body size. There's evidence that people with higher BMI tend to do worse at school, and are earning less money during their lifetime [which could cause depression and loneliness]. So we have this apparent ability of genetics to show us something that usually seems like a purely sociological explanation.”

While Dr Day examines individual genes, psychologist Jason Rentfrow, Reader in Personality and Individual Differences, seeks clues to loneliness at the opposite end of the scale: in geography. The economic struggles of towns and regions that once drove the Industrial Revolution are well known. But Rentfrow's work explores the lingering psychological traumas of these places.

“For most of us, just a few generations ago, our immediate environment was our entire world. That was what shaped us,” Rentfrow explains. “And it has impact. Whole cities were formed on coal, then, when other energy sources were developed, those communities were left behind. Some people leave but others stick around, or are unable to leave. Kids are then raised in areas ›



Loneliness has a contagion effect, of sorts. Feelings and states can rub off on other people. The good news is that the same can be said for happiness

of high unemployment, which will shape their perceptions of the world. People internalise these experiences.” The results, to this day, he says, are entire “regions of loneliness, unhappiness” in which people’s psychological wellbeing is influenced by the history and geography of where they live.

Rentfrow is fascinated by the impact of surroundings more broadly, in the notion of ‘person-environment fit’. “People seek out particular types of environments that satisfy and reinforce their basic needs. In relationships, we might seek out partners and friends who validate our sense of who we are. In organisational contexts, we might seek jobs that play to our interests and strengths. In our living environment, do we have a garden? Do we have to commute long distances? We navigate the world to maximise the degree of ‘fit’ between ourselves and these environmental factors.”

A good fit will mean that we thrive. “But a failure to fit with our relationships, environment and employment,” says Rentfrow, “is correlated with lower life satisfaction. How might this apply to loneliness specifically? Evidence suggests that a poor social and environmental fit might make it difficult for us to form connections with others.”

These new insights are enriching our understanding of long-established societal and circumstantial risk factors for loneliness. “Not having enough social support, worsening finances and being in chronic poor physical health can all increase your risk,” says Olivia Remes, a postdoctoral researcher at the Cambridge Institute of Public Health. And she says there is one further, surprising, risk factor. “The more time you spend around lonely people, the more likely you are to become lonely yourself,” she says. “It’s a contagion effect, of sorts. Feelings and states can rub off on other people.” The good news, Remes adds, is that “the same can be said for happiness”. Positive states of mind can also rub off.

Loneliness is often thought of as something that particularly impacts older people, but university students, away from home for the first time, can also be vulnerable, something seen first-hand by staff at the University Counselling Service. In addition to students who feel lonely because they struggle to make friends, Géraldine Dufour, Head of Counselling, says others “have friends and a busy social life but still feel lonely”.

She adds: “Sometimes it’s because they feel disconnected and that people do not really know them, only the face they present to the world; other times because they felt lonely growing up and can’t shake that feeling. Some students miss friends from home, or spend every spare moment studying and do not make space to connect with people.”

But, young or old, vital to combating loneliness is the forging of meaningful connections with others. Shortly after becoming an MP, Jo Cox (Pembroke 1992) established a cross-party Loneliness Commission with the then MP for South Ribble, Seema Kennedy (Pembroke 1993). After her death, the Jo Cox Commission on Loneliness was set up in memory of the murdered parliamentarian to take forward her work. It highlighted the estimated £2.5bn annual costs to employers of loneliness and the £32bn impact on the UK of disconnected communities. The commission also made wide-ranging recommendations for government and the voluntary sector. But the heart of its message was the importance of individual connections – “Combating loneliness one conversation at a time” was the title of its final report and call to action.

Remes agrees. “Begin talking to as many people as possible, wherever you are. And before you chuckle, think about it. How many times do you strike up a conversation with the cashier at the grocery store? Or someone at the bus stop? It’s often the simple steps that we take, on a consistent basis, that can be the most impactful.” And you won’t only be happier in yourself. That positivity, we now know, is catching. ☺

Meet the guinea pigs of Lucy Cavendish

When Lucy Cavendish’s students – students like Bonnie Cheung and Taranpreet Bahra (pictured overleaf) – feel stressed out they can reach for the chamomile tea... or go visit the College guinea pigs. Emmeline Squeakhurst, Virguinea Woolf, Ruth Bader Guineasburg and Oreo (after the biscuit) arrived two years ago and are part of the College’s wellbeing strategy, as Dr Jane Greatorex, Senior Tutor (pictured left) explains. “We are dedicated to promoting mental wellbeing among our students. Numerous studies show the benefits of owning pets, including stress-relief, and our guinea pigs have been a huge success.” Nonetheless, Squeakhurst, Woolf, Guineasburg and Oreo are not the first guinea pigs to come up to Cambridge: in 1972, the College’s founding Fellow, Marion Clegg, used guinea pigs to help keep the lawns under control.

The University Counselling Service guide to overcoming loneliness can be read here: cam.ac.uk/selfhelp/loneliness. Olivia Remes’s TED talk on simple steps to tackle loneliness can be viewed at cam.ac.uk/oliviaremes/howtogetridofloneliness.

THE

What happens when an emperor decides to change the religion of an entire people? Forget the Tudors. This is reformation – and counter-reformation – ancient Egyptian style.

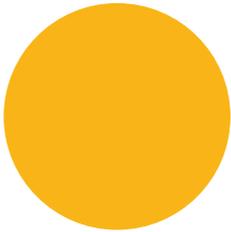
WORDS DR KATE SPENCE DESIGN ROB FLANAGAN



THE



NING



In the middle of the second millennium BC, a king called Amenhotep Neferkheperure-Waenre – Amenhotep IV – inherited the throne of Egypt from his father and decided things needed to change.

The Egyptian state and tradition of divine kingship was by now 1,500 years old. The country was enjoying a period of internal stability and great international prestige, with an empire that stretched from what is now central Sudan all the way to Lebanon. The preceding reign, of King Amenhotep III, had been marked by a focus on the celebration of royal power and the king's relationship with the gods, with a monumental building programme and massive output of luxury goods for the royal court, elite and international gift exchange.

Against this backdrop of stability and wealth, the new king, Amenhotep IV, set in motion a programme of unprecedented religious reformation focused on the Aten, the visible sun disk.

Egypt had always been polytheistic: there were multiple gods with varying forms and characteristics that could be syncretised or associated through familial relationships, hierarchies or regional affiliations. Now, Amenhotep IV chose to raise the Aten to pre-eminence, while simultaneously destroying the names and images of Egypt's other gods on existing monuments.

To understand what was going on, we first need to look at the available evidence. Finding ways to communicate a new direction or ideology is a perennial problem for rulers throughout history. What is particularly interesting in this case is the speed, extent and reach of the changes discernible in the textual and archaeological record. First, Amenhotep IV changed his given name to Akhenaten, reflecting the move away from the pre-eminence of the traditional state god Amun. Royal names in Egypt carried significant meaning and can be a useful indication of ideological trends, although some terms are not easy to translate. An *akh* is a transfigured spirit in Egyptian thought, and the term has strong associations with power and effectiveness, as well as with light and luminosity. The king's new name means something along the lines of 'Shining-transfigured-spirit-of-the-sun-disk': a clear indication of the new theological direction as well as the close relationship between the king and god within this.

Second, King Akhenaten – as he was now known – made significant changes to how the god was depicted. In contrast to earlier representations of Egyptian gods, the Aten was portrayed as a sun disk with solar rays descending from it; each ray had a tiny hand and these hands were often shown holding the *ankh* sign (a hieroglyph reading 'life'). Images show the king and royal family lifting up offerings to the sun disk, while the disk holds *ankh* signs to the faces of the offerants in a reciprocal gesture. Changes were also made to the proportions, postures and style of representations of the human body

as well as their contexts, while an exaggerated 'naturalism' is seen in depictions of plants and animals.

Temple architecture changed from the traditional provision of dark interiors within which the statues of the gods were housed to open-air temples full of sunlight, with platforms for solar worship and tables for the regular offerings of food and drink for the god. Temple decoration was different in style, content and method of carving relief; the size and regularity of building blocks and some construction methods were changed. The language of monumental inscriptions shifted from the classical language traditionally used in such settings towards contemporary vernacular, and content was radically revised. All these departures from traditional practice show the degree to which Akhenaten intended his new religious programme to be seen as radical, and that he was willing to shock the conservative Egyptian elite with the buildings, texts and art that he commissioned.

Finally, Akhenaten deliberately sought out a site that had not previously been dedicated to other gods to provide an uncontaminated setting for religious practice. He built a new settlement called Akhenaten, 'Horizon of the Aten', at a site in Middle Egypt now known as Amarna, outlining the reasons for his choice of location and his vision for the place in a series of monumental inscriptions cut into the bordering cliffs.

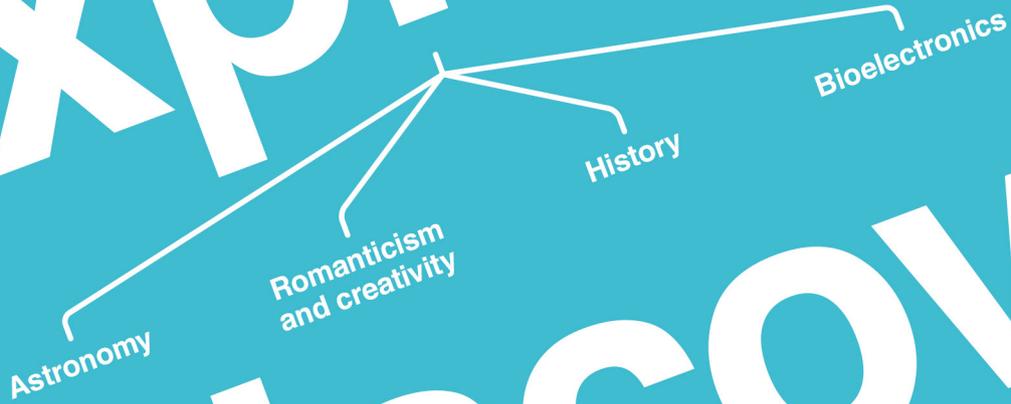
Yet these dramatic changes would be short-lived. King Akhenaten died after 17 years on the throne; following a number of short reigns, the throne passed to Tutankhamun, (thought to be Akhenaten's son or close relative), who swiftly re-established the old order. The city of Akhenaten was largely abandoned and, over the next few decades, the images and names of Akhenaten were destroyed or removed, and the temples and palaces of Amarna were dismantled.

King Akhenaten and his programme of religious reform has long fascinated writers, thinkers and creatives including Sigmund Freud, Thomas Mann, Naguib Mahfouz and Philip Glass – speculation on his intentions and motivation for change has raged for more than a century. He has been seen, among other interpretations, as a religious visionary, a utopian social reformer destroying the entrenched power of the Amun priesthood, and a megalomaniac narcissist.

From an archaeological perspective, however, interpreting these changes remains very difficult. Archaeology works well when investigating patterning and long-term change, but interpreting the motivation of an individual from the material record is hard at the best of times. When the individual concerned has the resources of a wealthy state at their disposal and an obvious desire to be very different, the underlying motivation is likely to remain elusive. Texts can be hugely valuable – but, of course, selective use of evidence and political spin are not inventions of the modern world. Texts of the Amarna period reference divine inspiration and allude obliquely to significant opposition, presumably within the royal ›

AKHENATEN AND HIS PROGRAMME OF RELIGIOUS REFORM HAS LONG FASCINATED WRITERS, THINKERS AND CREATIVES – SPECULATION ON HIS INTENTIONS AND MOTIVATION FOR CHANGE HAS RAGED FOR MORE THAN A CENTURY. HE HAS BEEN SEEN, AMONG OTHER INTERPRETATIONS, AS A RELIGIOUS VISIONARY, A UTOPIAN SOCIAL REFORMER DESTROYING THE ENTRENCHED POWER OF THE AMUN PRIESTHOOD, AND A MEGALOMANIAC.

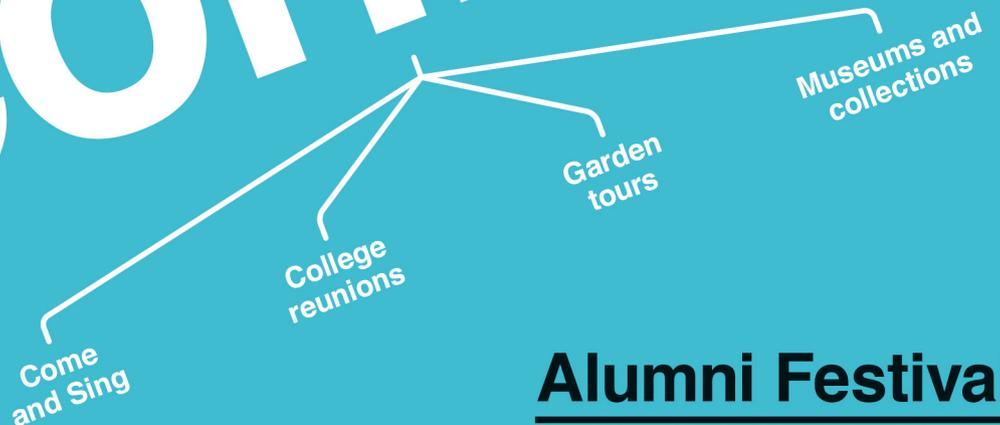
explore



discover



reconnect



Alumni Festival

25–27 September 2020

This dramatic change would be short-lived. Once the throne passed to Tutankhamun, the old order was swiftly re-established

court and among the elite. Autobiographies of successful officials of the period often reflect a sense of personal obligation to the king and sometimes suggest personal instruction by him, but do not speculate on his vision.

Most of the major changes outlined above were in place by the time construction started at Amarna, around the fifth year of King Akhenaten's reign. However, earlier activity at other sites can help to establish the timing, nature and progression of the changes made prior to the Amarna episode. Blocks, foundations and figures from a huge statue-lined courtyard structure were discovered outside the state temple of Amun at Karnak, in modern Luxor, while decorated blocks survive from other structures around the temple; these show a focus on solar deities from the beginning of the reign. But it is at the site of Sesebi in northern state, Sudan, that some of the most revealing evidence is found.

Sesebi is the modern name of an ancient Egyptian walled colonial town constructed right at the beginning of the reign of Akhenaten. The site was excavated in the 1930s by the Egypt Exploration Society but, other than brief preliminary reports, the findings were never published. Research at the site since 2008 by a team led by myself and Dr Pamela Rose of the Austrian Archaeological Institute in Cairo, in collaboration with Sudan's National Corporation for Antiquities and Museums, has shown that although the site had already been occupied for around 200 years prior to the construction of the walled town, earlier structures had been levelled before this work started.

And it is from the construction and decoration of the main temple at Sesebi that we start to glean information about the rapidly changing religious ideology of the early reign of Amenhotep IV. Work must have started very early in the new reign as foundation deposits beneath the corners of the temple give the young king's name as Amenhotep (rather than Akhenaten), and enough decoration survives to show that the new temple structure was initially dedicated to the god Amun.

Beneath the floor of the temple, a unique crypt preserves decoration that must be among the earliest surviving from the reign. Images of the king's deified father are shown, alongside other gods of Egypt. The crypt was carved into low-raised relief but seems never to have been painted – because before this stage of the decoration commenced, we find evidence of deliberate damage to the reliefs.

The initial damage seems to have involved the careful removal of images of a handful of gods, including Amun. The chiselling is delicate and the surface has been smoothed over in preparation for projected re-carving of the decoration in the area. Further images of gods were removed in a second phase – the chisel used is different and the blows are less careful, with no attempt to prepare the surface of the wall for further work. Two of the images

of the king were re-carved at some stage following the style of carving found later in Akhenaten's reign, and the figures of the king were later hacked out with force and determination, presumably in the post-Amarna period.

This one small room, therefore, bears evidence of the religious changes from the very beginning of his reign to their attempted destruction after his death. It shows that change during Akhenaten's early reign was incremental, and illustrates the destructive and iconoclastic nature of later years as images were hacked out even in temples he himself had constructed. Alongside this, we see at Sesebi and Karnak extraordinary creativity and experimentation in construction, decoration and in the production of royal images, as craftsmen worked to express the nature and depth of change required by the king.

Akhenaten's reign provides an early example of religious change, iconoclasm and the search for effective methods for materialising new ideas and of signalling changing directions. There remains much work to be done in terms of interpreting this extraordinary episode in the history of ideas – ensuring that the reign of King Akhenaten, the original Sun King, is likely to fascinate for many generations to come. ☺

Dr Kate Spence is a University Senior Lecturer in the Department of Archaeology and a Fellow of Emmanuel. This feature draws on extensive work at Amarna by Barry Kemp, Emeritus Professor of Egyptology, and his team, and that of Dr Anna Stevens, Honorary Research Associate of the University's McDonald Institute for Archaeological Research. arch.cam.ac.uk



The sites at Amarna and Sesebi are under threat from development. Working in partnership with the Egyptian Ministry of Tourism and Antiquities, Dr Spence, Dr Stevens and Dr Gemma Tully have developed a site management plan, guidebook, video and site signage for Amarna; and, in collaboration with children in Amarna, Cairo and Cambridge, the team has developed a children's book on life at Amarna to be published in Arabic and English, and a video for use in schools. This work was funded through the British Council and the Egyptian Science and Technology Development Fund through the Newton-Mosharafa scheme, and by a grant from the University of Cambridge Arts and Humanities Impact Fund.

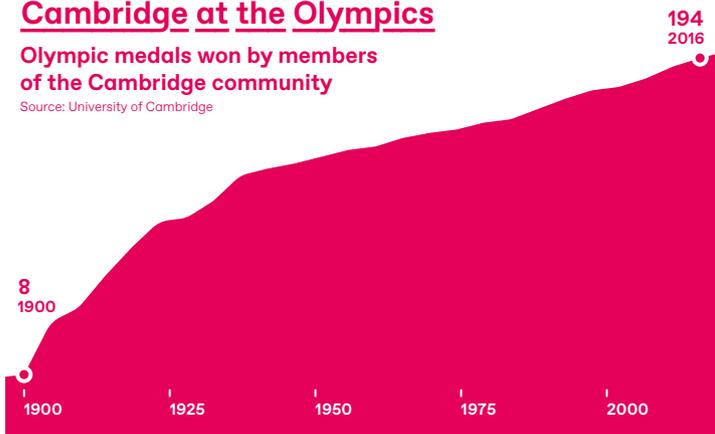


Reasons to

Cambridge at the Olympics

Olympic medals won by members of the Cambridge community

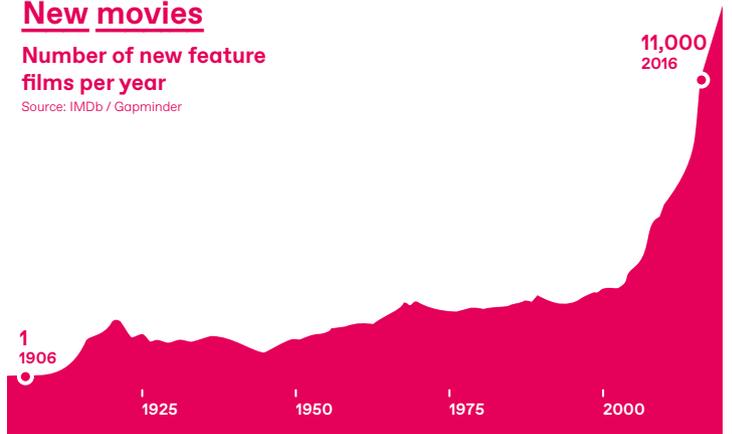
Source: University of Cambridge



New movies

Number of new feature films per year

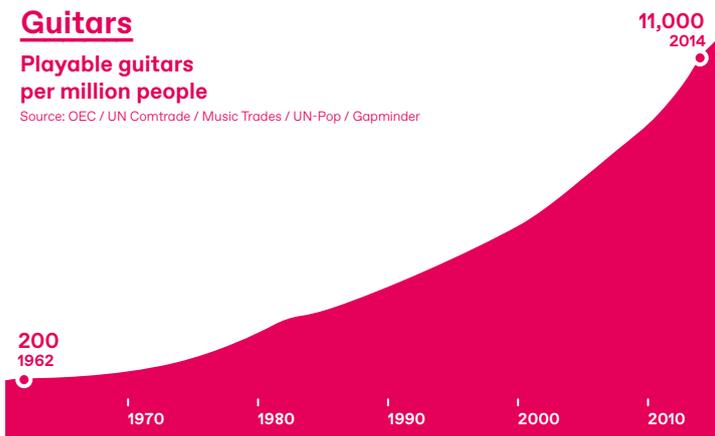
Source: IMDb / Gapminder



Guitars

Playable guitars per million people

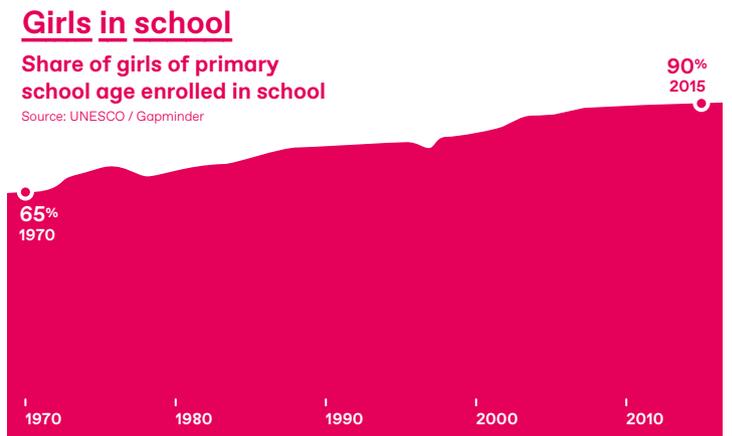
Source: OEC / UN Comtrade / Music Trades / UN-Pop / Gapminder



Girls in school

Share of girls of primary school age enrolled in school

Source: UNESCO / Gapminder





feel

hopeful

Done in by the climate emergency? Certain that civilisation is going backwards, not forwards? In dark times, it's vital we all try to recover our sense of hopefulness.

WORDS LUCY JOLIN DESIGN ROB FLANAGAN

Gapminder

The graphs on these pages have been created from data collated by Gapminder.org, an independent Swedish foundation established to promote a fact-based worldview. Gapminder's data is made available for use for free, by everyone, under a Creative Commons licence.

Hope, as Emily Dickinson famously wrote, is the thing with feathers. A thing, perhaps, like the bittern, an elegant, secretive brown heron known mostly for its eerie, booming mating cry, which used to echo across its native wetlands in Suffolk and Lancashire. Over the decades, the seas rose and the edgelands moved ever inland. The wetlands vanished and the bitterns did, too. By 1997, they were almost extinct in the UK: there were just 11 males left.

But now, thanks to the RSPB's wetlands at Lakenheath Fen (created on the site of former carrot fields in Suffolk), the bitterns are booming again. Eight to 10 breeding males live on just this one site. "It's like the Field of Dreams," says Andrew Balmford, Professor of Conservation Science and organiser of the #EarthOptimism summit. "If you build it, they will come."

If there is hope for the bitterns, then surely there is hope for us. This is not a fashionable point of view. Faced with doomsday headlines about the death of the planet, the rise of demagogues and the horrors of war, hope seems, well, a bit naive. Hope is the Disney princess mouthing platitudes. Hope is the mug festooned with an inspirational self-help slogan about living your best life or following your dreams no matter what.

This kind of hopelessness can be almost superstitious, says Olivia Remes, anxiety and depression specialist and postdoctoral researcher at the Cambridge Institute of Public Health. It is as if hoping for something might somehow prevent that good thing from actually happening in the future. "It's that feeling that it's better to keep your expectations low, because we don't want to wind up disappointed if it >

doesn't work out. But that thinking doesn't make us happy. It keeps us in that low state. We're neither happy nor sad," she says. "And wouldn't you rather have a life with ups and downs, like waves, so that you do actually experience great happiness – rather than just a flat line?"

So we can't abandon hope: it can change things. Think of a presidential campaign that has harnessed hope, and the viral image of then presidential candidate, Barack Obama, with the single word HOPE underneath may spring to mind. But Obama was by no means the first to harness the power of hope in a political campaign. In 1984, Ronald Reagan's famous campaign advertisement announced: "It's morning again in America." He talked of "a springtime of hope", recreating far older tropes and ideas of America as the place where huddled masses could be free. It chimed with voters weary of divisions. "In the 1960s and 70s, hope had ceased to be a unifying dream for Americans from all walks of life," says Gary Gerstle, Paul Mellon Professor of American History. "As Malcolm X famously said: 'I didn't land on Plymouth Rock, Plymouth Rock landed on me.' But hope is deep in the American psyche, because what matters about myths and politics is not necessarily whether they're true or false, but whether they have the capacity to move people and to compel people to believe them."

Obama's message of hope proved to be audacious – extraordinarily so. And it succeeded. "There were a lot of people in the United States, myself included, who never thought our lives would encompass an African-American president in this land where slavery existed for more than 200 years," says Gerstle. "Daring to hope is sometimes necessary to push aside the world-weary realism – 'Don't these people know how the world works?' – that can stymie bold thinking and action. Obama's combination of fierce intelligence and audacious hope stirred Americans to give him two terms in the White House. That resulted

in eight years where all the kids of colour in America were growing up in an environment where the highest office in the land was held by someone who looked like them. Think of the kind of inspiration that can generate."

As former Archbishop of Canterbury (and a seasoned campaigner), Dr Rowan Williams is very familiar with being told that he has no idea how the real world works. "I don't claim expertise, but I do think there's a role for ill-informed moralists from time to time!" he says. "Why should I take for granted how the international financial system works, for example? Why should I assume this is a law of nature? Perhaps it is a good idea to ask: do we want to be locked into this? And if we don't, what can we do about it? Just raising that question is a sign of hope."

Hope is, of course, one of the three theological virtues in Christianity – the other two being faith and love. Williams sees hope as "not regarding any situation as closed down. There's the sense that the triad of trust, hope and love is what our humanity ought to be growing into. And that means a certain amount of effort: not to be conquered by cynicism, despair or selfishness."

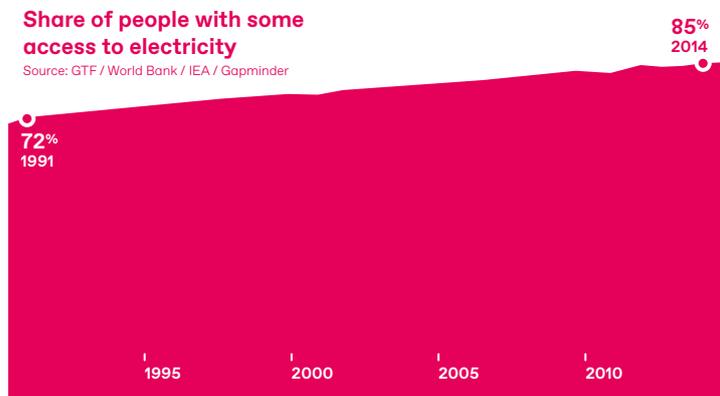
It's not about how things can only get better, he points out – indeed, bits of the New Testament suggest that things are probably going to get worse. "So what if things get worse? Do I then give way to despair? No, because even if things get worse, they can't close down the possibility of change. So that's why I think hope can survive a lot of practical disappointment. Because it has. Every generation has a reason for not being hopeful. But if you don't resist, nothing will happen."

So can hope help us when faced with monumental problems such as climate change? In the environmental context, hope isn't naive: it can be a direct challenge to authority, says Balmford. "There are an awful lot of vested interests that don't want things to change very

Electricity coverage

Share of people with some access to electricity

Source: GTF / World Bank / IEA / Gapminder



Science

Scholarly articles published per year

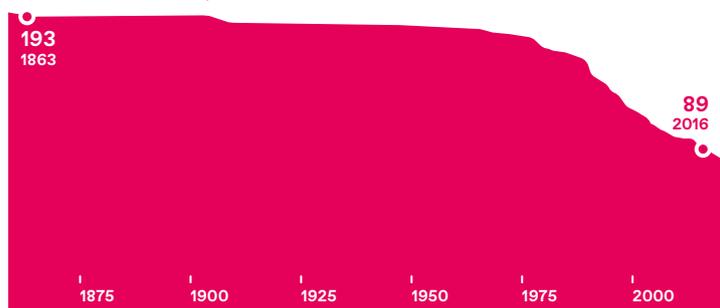
Source: Royal Society of London, Jinhua & Elsevier / Gapminder



Death penalty

Countries with the death penalty

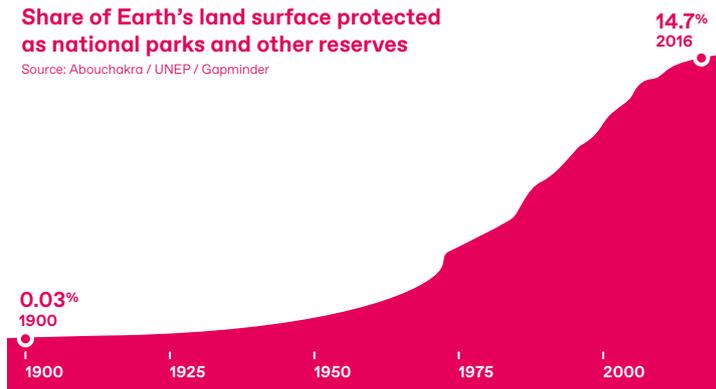
Source: Amnesty & Pinker / Gapminder



Protected nature

Share of Earth's land surface protected as national parks and other reserves

Source: Abouchakra / UNEP / Gapminder



There's a feeling that it's better to keep your expectations low. But that way of thinking doesn't make us happy. We're just neither happy nor sad

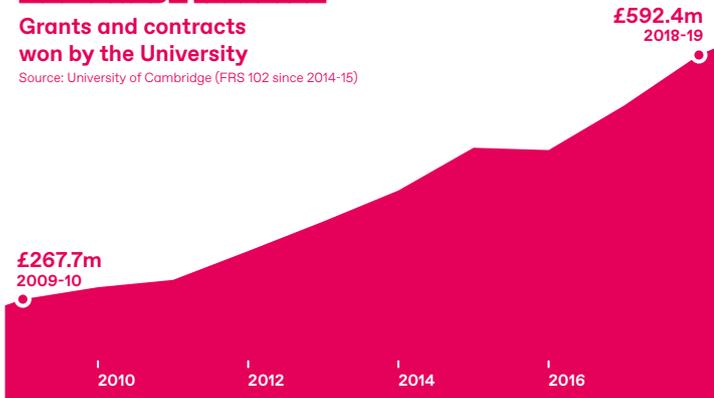
Cambridge research

Grants and contracts won by the University

Source: University of Cambridge (FRS 102 since 2014-15)

£592.4m
2018-19

£267.7m
2009-10



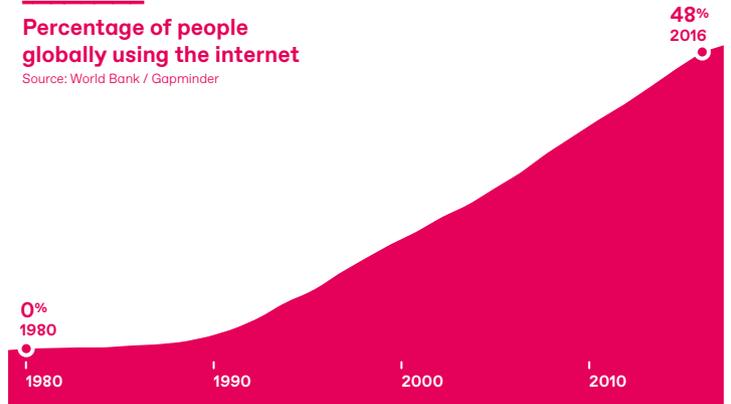
Internet

Percentage of people globally using the internet

Source: World Bank / Gapminder

48%
2016

0%
1980



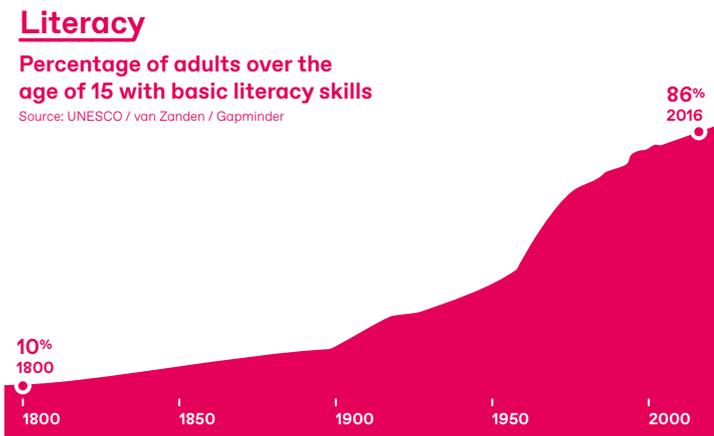
Literacy

Percentage of adults over the age of 15 with basic literacy skills

Source: UNESCO / van Zanden / Gapminder

86%
2016

10%
1800



New music

New music recordings per year

Source: Spotify / Wikipedia / Gapminder

6,210,002
2015

1
1860

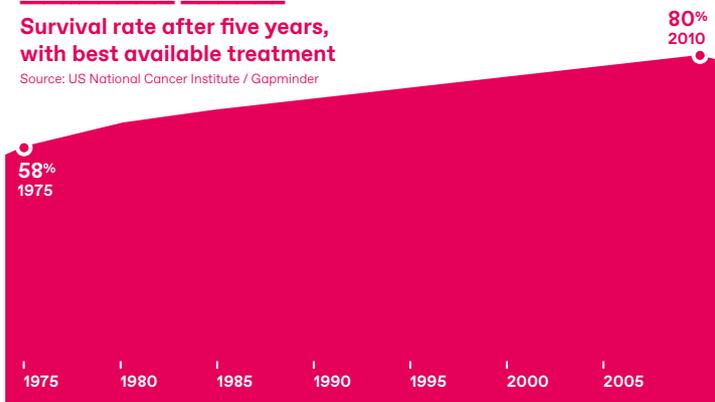


There is a techno-utopian idea that capitalism will solve the problem for us, without any need for fundamental social and economic transformation. That seems to me the kind of hope that we need to resist

Childhood cancer

Survival rate after five years, with best available treatment

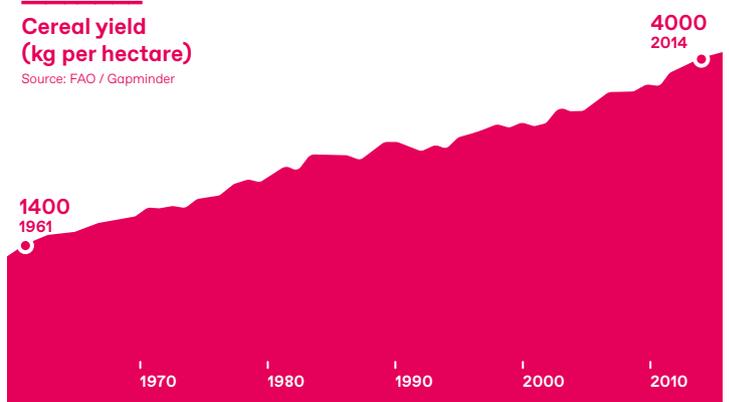
Source: US National Cancer Institute / Gapminder



Harvest

Cereal yield (kg per hectare)

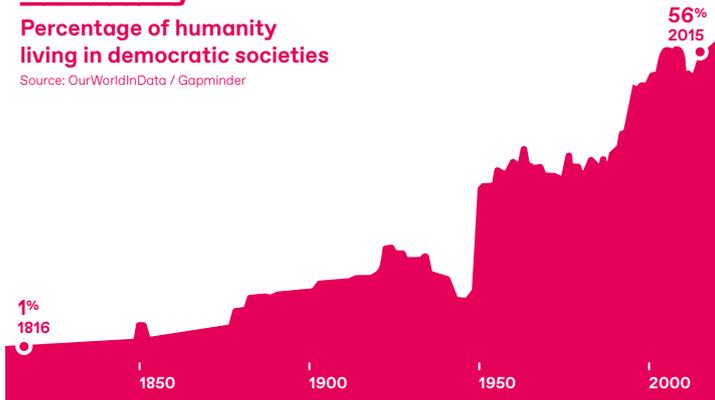
Source: FAO / Gapminder



Democracy

Percentage of humanity living in democratic societies

Source: OurWorldInData / Gapminder



Cambridge Nobel laureates

Nobel Prizes awarded to members of the Cambridge community

Source: University of Cambridge



much. Celebrating successes, through events like #EarthOptimism, and being far more ambitious about what we can achieve in addressing underlying environmental problems is really uncomfortable for some people.” And that means that the millions worldwide who joined the recent climate strike do count for something: it’s easy to forget that, in August 2018, that mass movement consisted of an unknown Swedish teenager sitting on a pavement with a cardboard sign.

When it comes to climate change, it suits a certain narrative, Balmford points out, to say that everything is hopeless because the Chinese are still building coal-fired power stations. “These things are, of course, important, but they don’t address the question: if I do something, will I make a difference? And the answer is: yes. It may be a modest difference. But it still counts.”

He sounds a note of caution, however: hope is good, as long as it’s the right sort of hope. “That small thing we do, that doesn’t mean we’ve done our bit. You can’t give up plastic drinking straws and think you’ve solved climate change. It’s a start. It makes you feel better. Now ask: what can I do next?”

Certain kinds of hope can certainly be dangerous, agrees Duncan Bell, Professor of Political Thought and International Relations, because they can lull us into a false sense of security. “Anthropogenic climate change is going to be the major political challenge facing humanity and, in that context, hope is vital, but the hope can’t be mindless,” he says. “I worry about the techno-utopian idea that capitalism will generate technologies that will solve the problem, without the need for fundamental social and economic transformation. That seems to me the kind of hope that we need to resist.”

But having high hopes can spark change. Bell points to the late 19th-century burst of utopian thinking, sparked in part by the publication of Edward Bellamy’s *Looking Backward: 2000-1887* in 1888. Many 19th-century literary utopias, including those that followed

Bellamy’s vision of a world with no private property, crime, money or lawyers, differed in one vital respect from those of earlier periods. “In the past, utopias were rarely thought of as realisable,” says Bell. “They were held up as mirrors to reflect on the existing society or models of ideal worlds. But many 19th-century utopian writers were convinced that their visions of Utopia on Earth were possible and could be brought about through collective action.”

In fact, Bell points out, many of the specific proposals of 19th-century utopians were achieved during the 20th century. “The NHS, for example. The modern welfare state. The beginnings of social and political equality between men and women. And these were all realised without recourse to any of the deeply unpleasant strands of this style of thinking, such as eugenics. The hope that we can mobilise sufficient social change to restructure the system? That kind of hope seems effective to me.”

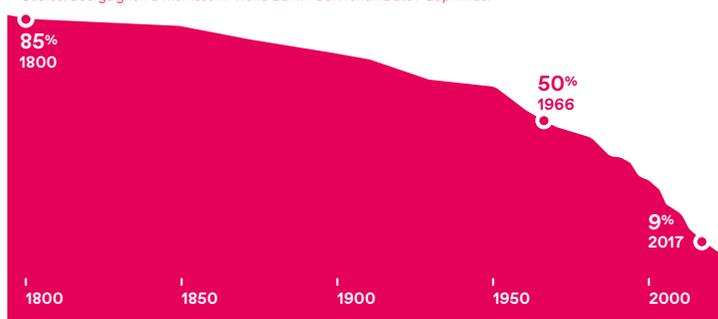
And if you feel that all hope is lost, take heart. It’s fine to cry and scream at the injustice of the world. But pick yourself up and move on, says Remes. Recognise the things you can control, and the things you can’t, and hope will return. “After the wave passes, after all of this passes, it allows you to become stronger and more resourceful. Setbacks and challenges in life can make us more resilient. They can strengthen bonds with those around you. You shift the way that you see the world and what is important to you – and unimportant things start to fall away. Your connections with others become more meaningful.”

Ten years ago, at Lakenheath, a lone pair of cranes joined the bitterns. There were no projects to attract them or funding to find them: they found their own way. Cranes haven’t bred in the Fens for four centuries. Now, around 40 cranes have made the wetlands their home: you can see flocks of them skimming across the sky at dusk. “I’ve heard it in the chilliest land / And on the strangest Sea,” Dickinson’s poem concludes. “Yet, never, in Extremity / It asked a crumb – of Me.”

Extreme poverty

Share of humanity living on less than \$2 a day

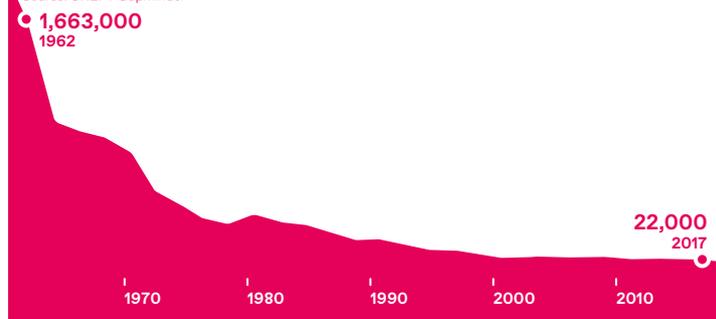
Source: Bourguignon & Morrisson / World Bank / OurWorldInData / Gapminder



Ozone depletion

Ozone-depleting substances used globally (in US tons)

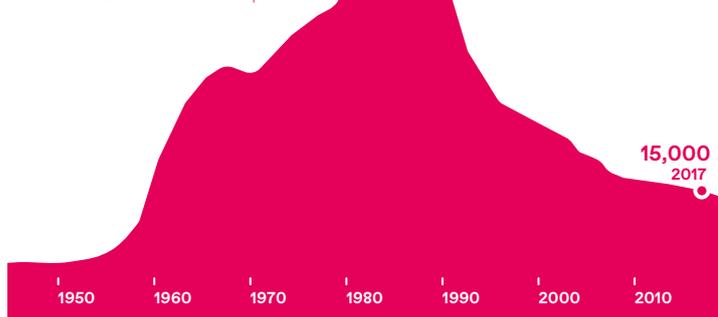
Source: UNEP / Gapminder



Nuclear arms

Number of nuclear warheads

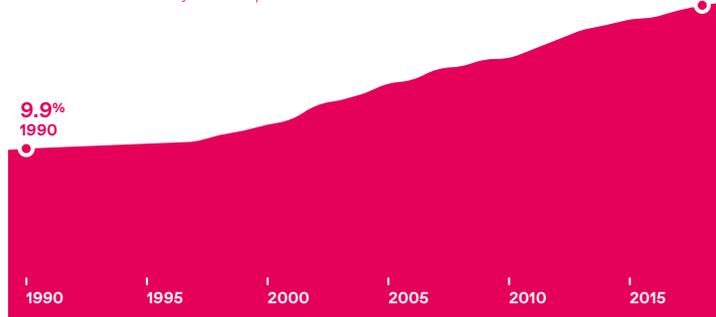
Source: Nuclear Notebook / SIPRI / Gapminder



Women in parliament

Proportion of seats held by women in national parliaments

Source: Inter-Parliamentary Union / Gapminder



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Certain things are just indelible

Dr Johnhenry Gonzalez is a lecturer in Caribbean and Atlantic History with a particular focus on the 1791 Haitian revolution.

INTERVIEW DIANE SHIPLEY PHOTOGRAPHY REEVE PHOTOGRAPHY

Sweetness and Power - The Place of Sugar in Modern History Sidney Mintz

Today, there are lots of single-commodity history books, about topics like salt and cod and even about particular diseases, but this was the first, and it was hugely influential. I first came to this via my father's book shelves as a teenager; I then returned to it more seriously later on. Mintz is an author I continue to read, and his final work *Three Ancient Colonies* – about Jamaica, Haiti and Puerto Rico – is underrated.

The Complete Stories Zora Neale Hurston

Hurston was a novelist rather than an academic, but she did also conduct ethnographic research, carrying out ground-breaking studies about Haitian culture of the 1930s. She was among people like US poet Langston Hughes who were drawn to that part of the Americas. The only two words in the Haitian language that people around the world are likely to know are 'zombie' and 'voodoo', and she was an early scholarly interpreter of both of them. In fact, her work, especially in the way she searched for history through

Vodou, continues to influence my work almost a century later.

Explosion in a Cathedral Alejo Carpentier

I first read this when I was in high school. Carpentier was probably the initial founder of magical realism and works such as Gabriel García Márquez's *Autumn of the Patriarch*, which gaze upon the archipelago, really borrow from this, a progenitor of the genre.

Carpentier was profoundly influenced by Haiti and by the French Antilles, and, because he was a political prisoner in the 1920s and a kind of elite ambassador under Fidel Castro, a member of the regime, it gives his work an obvious historical profile. He was the author-statesman of revolutionary Cuba.

The History of Mary Prince Mary Prince

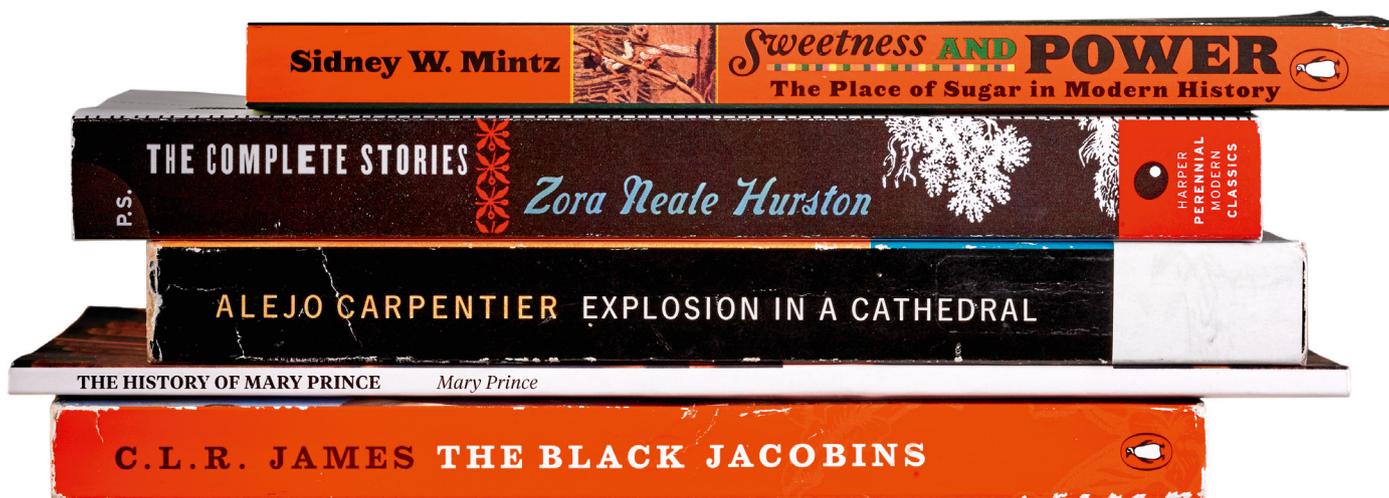
I'm surprised that I didn't discover this important slave narrative until graduate school. I wrote my first article on Turks and Caicos in part because of it. It's a first-hand account of the horrors of salt slavery, which wasn't as widespread as sugar slavery

but was equally terrible. Slave narratives by women are much rarer, so it's almost unique. Because she was born in Bermuda, enslaved in Turks and Caicos and Antigua, and then came to the UK, no country has claimed Mary Prince as their own, but I think Britain eventually will and that her story will become more prominent in future.

The Black Jacobins CLR James

I read this book in high school. It tells the story of the Haitian revolution and it's a classic of narrative history, dramatic and compelling. It's full of the rhetorical and polemical flourish of someone who was an expert propagandist of his time. As an introduction to the question of slavery alone, in some ways it can probably never be surpassed. In my arena there are not too many fundamental secondary texts that predate the second world war, but this was published in 1938 and written in the mid-1930s, and it's still relevant today. Certain things are just indelible.

Dr Gonzalez is the author of *Maroon Nation: A History of Revolutionary Haiti*, published by Yale University Press.



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Journeys of discovery for explorers and thinkers

Dr Owen Weller, University Lecturer, explains why he is passionate about the flora, fauna and peoples of the Arctic.

WORDS LUCY JOLIN PHOTOGRAPHY ERIN BROS



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"This is really the only way to see this part of the world – it's very difficult to access otherwise," explains Dr Owen Weller.

"I have spent three field seasons there on Baffin Island – the fifth largest island in the world that overlooks the eastern portion of the Passage – and I have become completely enchanted by the unique scenery, culture and wildlife of the Arctic."

Excursions will also be made throughout the expedition to visit sites of interest, during which travellers will have the opportunity to meet the Inuit people who live and work in the Arctic, and learn about their rich history.

And, as Dr Weller points out, "as well as the stunning geology of the region, which spans nearly all of Earth history, there is a vibrant art and cultural scene, which collectively makes for an unforgettable journey".

As well as stunning geology spanning nearly all of Earth history, there is a vibrant art and cultural scene – it makes for an unforgettable journey

For more information about this trip, please email travel@alumni.cam.ac.uk; for more about the Alumni Travel Programme, please visit alumni.cam.ac.uk/travel.

This idea must die: 'Gender roles are universal'

Dr Sheina Lew-Levy explains why the idea of universal gender roles just isn't supported by the evidence.

ILLUSTRATION GEORGE WYLESOL

We often hear people justifying gender roles as innate and stemming from our roles as hunters and gatherers in the past. However, gender roles among hunter-gatherer societies today are much more diverse than most would assume. Studying child development in these societies can help us understand the role of biology and culture in shaping children's gendered behaviours.

I study child development in hunter-gatherer societies. Hunter-gatherers are culturally and geographically diverse, speak different languages, and rely on different resources for subsistence. However, they share several foundational values, including very high gender and age egalitarianism, and high rates of inter-household sharing of food, space, knowledge and other goods.

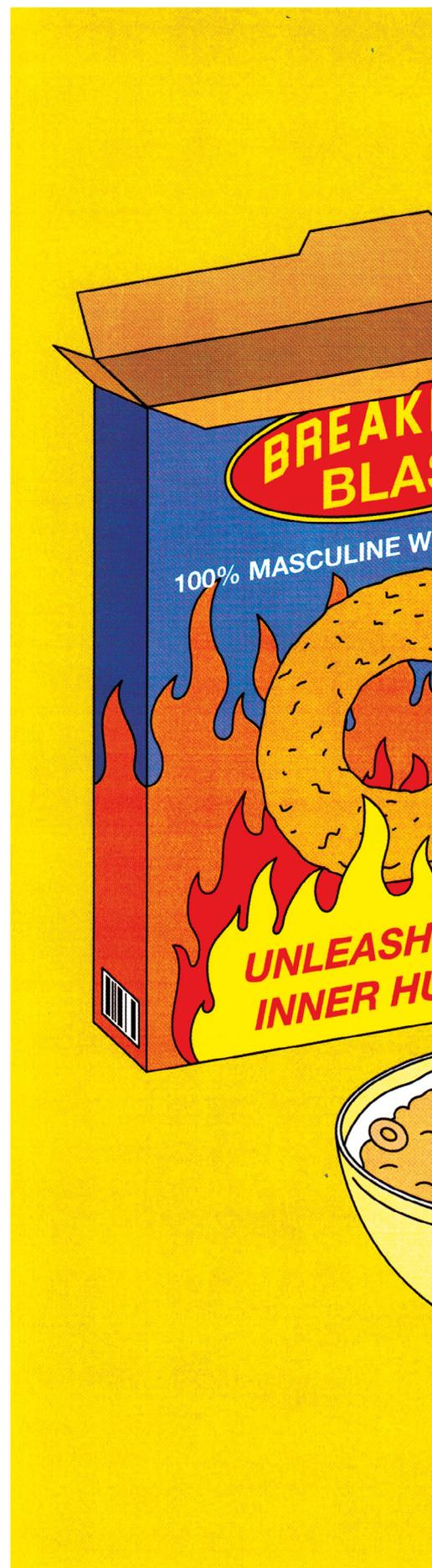
These cultural patterns translate to several shared childhood experiences. In particular, hunter-gatherer children are afforded extensive autonomy to learn and play as they see fit. In fact, much of children's time is spent in the playgroup, where they feed themselves and emulate aspects of adult culture in their play. For example, children will frequently play 'camp', building small huts and hearths, and cooking small portions of food to be shared with playmates.

A majority of my research has been conducted among the Hadza of Tanzania and the BaYaka of Congo. The Hadza rely on honey, baobab, tubers, berries and meat hunted

with bows and arrows. The BaYaka subsist on fishing; hunting with spears, guns and traps; tubers; insects; honey; and small gardens. In both societies, the majority of food comes from the forest or bush. For both, like other hunter-gatherers, there is a clear, gendered division of labour, but it's not the case that men necessarily do the hunting and women do the gathering. In fact, while Hadza men are solely responsible for hunting, and Hadza women do a majority of the gathering, BaYaka of both genders take part in both hunting and gathering, though to varying degrees.

Cross-cultural variation in adult gendered work may explain the differences we observed in children's gender-typed play. Take doll play. In the west, girls consistently play with dolls more than boys. Among the Hadza, we also found that girls participated in more doll play than boys. But among the BaYaka, boys participated in doll play just as much as girls. Why?

We know that mothers tend to be the primary caregivers in all societies. But, the second or third caregiver varies a lot. Sometimes it's sisters, grandmothers or fathers. BaYaka fathers are considered some of the most involved in the world. Thus, our findings suggest that children are watching and learning from potential models of their own gender. For the BaYaka, this involves boys emulating fathers in carrying out childcare. In other words, while *who* we pay attention to may be gender-specific, *what* we emulate is culturally specific.





It's not about innately performing activities but about children watching and learning from potential models of their own sex

Context also changes how gender-specific behaviours are expressed. Hunter-gatherers tend to live in camps of 25 to 75 people. In such small settlements, finding playmates of one's own age and gender is rare. As a result, children spend much of their time in multi-aged and mixed-gender groups. In fact, we found that children in larger camps were much more likely to segregate into same-sex groups than children in smaller camps.

While rough-and-tumble play is usually considered a predominantly male activity in most societies, our findings suggest that both boys and girls allocate similar amounts of play time to rough-and-tumble, at least until adolescence.

Since children play in mixed-gender groups, it's likely that children adjust their energetic play styles to those of playmates of the opposite gender, essentially meeting in the middle in terms of gender-typed play.

While many studies suggest that aspects of gender-typed play and gender-segregation during play are widespread, human development always occurs within a cultural context, and this context can mediate the degree to which gender-typed behaviour is expressed. While a majority of psychological studies are conducted in the west, opening up our field of research to include people from more diverse backgrounds, including hunter-gatherers, can give us a much better view of the diversity of human experiences.



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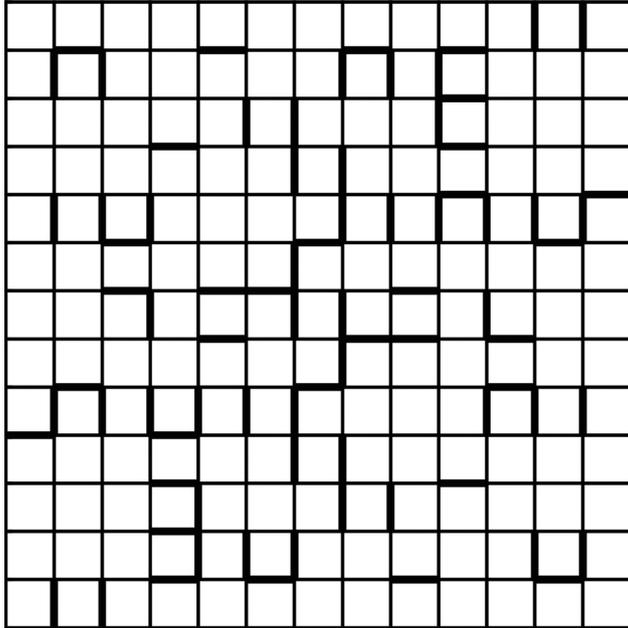
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Bits and Pieces by Nimrod



Instructions

Of the 53 grid entries, 31 are clued normally and are listed in alphabetical order of their solutions. Ten other (Thematic) clues, for two answers each and also systematically alphabetised, consist only of two sets of wordplay run together. Solvers must fit the bits and pieces together wherever they will go – and highlight the two unclued answers in the final grid.

Asterisked clues lead to answers of two words, including one of the answers in the ninth paired clue. Chambers Dictionary (2016) is recommended, but does not give one well-known foreign phrase. Two proper nouns and three other answers are supported by SOED and/or ODE.

All entries to be received by 15 May 2020. Send your entry

- **by post to:**
CAM 89 Prize Crossword,
University of Cambridge,
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- **online at:**
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Solutions and winners will be published in CAM 90 and online on 22 May 2020 at magazine.alumni.cam.ac.uk/crossword.

The first correct entry drawn will receive £75 of vouchers to spend on Cambridge University Press publications and a copy of *Feast & Fast: The Art of Food in Europe: 1500-1800* (Fitzwilliam Museum).

Two runners-up will also receive £50 to spend on CUP publications.



Thematic

- Beer-sozzled lover of old duke wanting to stay in seedy auberge
- Header from Chelsea centre back that's sweet finds right side of goal
- What's integral to author and his inside room? There's only one left
- Top manager almost returns a shilling donated by Pretender
- Coming across as genuine? A little deceitful at heart
- Jack facing up to odd scheme – the fifth?
- In churches in eg Kent, blue is not well liked, even at the outset
- Fly back over South Dakota, fixing man by Missouri?
- *Sons fool around as request is kicked about
- Farewell cheers serving girl, facetiously sheltering Resistance

Normal

- One dances naked, forgetting what's essential for dignity (3)
- Around Germany's Red Zone, one implements gas charges (7)
- *Typically offhand about compilers omitting first of clues (7)
- *Too fashionable to support America? (6)
- Heading for signboard after doing '@' signs (3)
- Scottish judge's new introduction to Nicene Creed (6)
- Rising French runner keeps me in the competition? (7)
- During lengthening evenings it's heard repeatedly – but seen only once (3)
- Wooden barrier protecting superior earthenware (7)

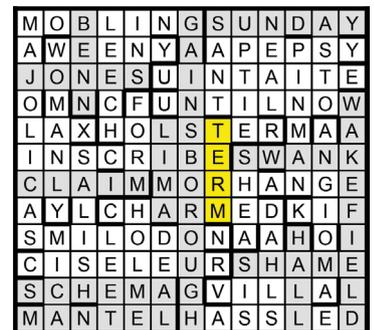
- Irish workhorse wanting to head north can set out from Reading? (6)
- Small hills seen when cycling out of SE European capital (6)
- One depressed about firing British X-ray pioneer (4)
- Old Master using English in writing notes (3)
- Indian barber being very slow trimming sides (3)
- Northern artist retiring to part of Galicia (5)
- Fine chopped raw seed pods (4)
- Listener's warning extremists ignored (4)
- Small part of old picture Stanhope lens reveals (3)
- *Criminal charge is what we got out of entering lift (7)
- Leaving east of town, resort screens a secluded spot (6)
- Partners holding hands excitedly learn about kiss of life? (7)
- God of the sun (chap's gathered) and moon (4)
- Eat mid-morning meal, avoiding black and white charlock (5)
- *Look after Oscar – "TT" – relapsing ... (5)
- ... council toper, cherishing life in Brittany (6)
- A couple of sessions drinking endless "fruit juice" in Ed's Bar (6)
- Fool reversing near back edge of mine shaft (4)
- Over the Pond, decoy might ring a bell (4)
- *Taking every second turn, speed up a bit round Montmartre (5)
- Poles cutting up Aberdeen on wings free team (6)
- Sex with Henry in sun angered deity (6)

Solution to CAM 88 Crossword Not Our Names by Nimrod

The three Themes are the names of University TERMS at Oxford (sorry). Theme A (MICHAELMAS): CLAIM/SHAME & SCHEMA/LIMA (rhyming anagrams). Theme B (HILARY): JONES/BENN & SWANK/MANTEL (famous male/female Hilarys). Theme C (TRINITY): GAINSBOROUGH/WAKEFIELD & SUNDAY/HALL (suffixes/prefixes).

Winner:
Linda Hutchinson (Churchill 1978)

Runners-up:
William Longley (Jesus 1956)
Tim Sheldon (Jesus 1974)



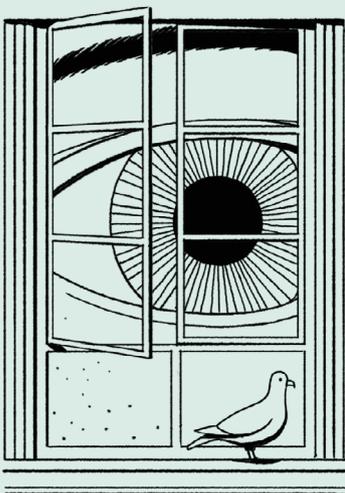
Clue notes
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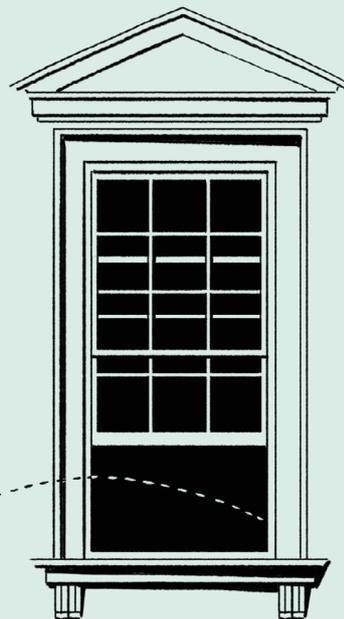
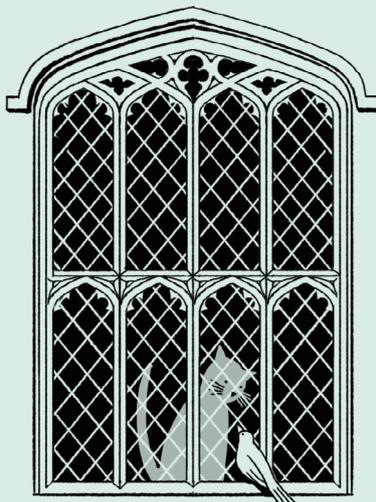
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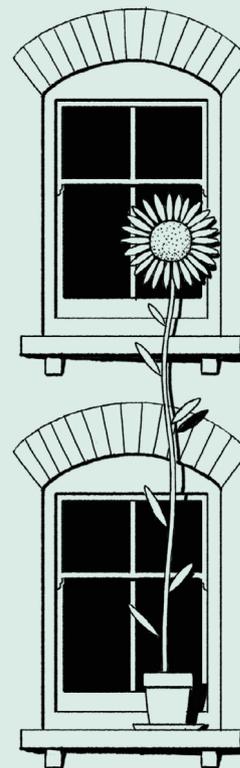
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