The Economist

China sues for peace in the trade war

The failure of Britain's chumocracy

Mexico's surprisingly sober budget

Our country of the year

DECEMBER 22ND 2018–JANUARY 4TH 2019

Christmas double issue

Wild swimming ★ Perfecting porcelain ★ Polyphony ★ The Texas emu boom
Origami for engineers ★ The boy with no cerebellum ★ Zipping up the world
Inside Putin's Russia ★ Bright economists ★ Norwegian heroes ★ Cleaning
An essay on identity ★ Lady Murasaki ★ Quiz ★ and much more...

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The world this year

Print edition | The world this week Dec 22nd 2018

America and China started a **trade war**, the world's worst such dispute in decades. America imposed tariffs on $250bn-worth of Chinese products; China responded with tariffs of its own. America also slapped duties on steel imports from Europe, Canada, Mexico and elsewhere, infuriating its allies. Donald Trump intervened on national-security grounds to scupper a $117bn bid from Broadcom, a chipmaker with ties to South-East Asia, for Qualcomm. It would have been the biggest-ever tech merger. There was one de-escalation: America, Canada and Mexico struck a deal to update NAFTA. See article .

"Fire and Fury"

In another dysfunctional year at the White House, **Rex Tillerson** was sacked as secretary of state, as was **Jeff Sessions** as attorney-general, both after the president had publicly undermined them. The investigation by **Robert Mueller**, the special counsel, into Russian influence in American elections rumbled on, laying charges against some of Mr Trump's former aides. A voter backlash against Mr Trump propelled the Democrats to win the House of Representatives in the **mid-terms**, though the Republicans increased their majority in the Senate.

The messy spectacle of **Brett Kavanaugh's** confirmation hearings to the Supreme Court polarised American politics even further. With the **#MeToo** movement fully behind them, Democrats wheeled out sexual- assault allegations from the early 1980s to try to block his path. Mr Kavanaugh survived the media circus and was eventually confirmed in the Senate by 50-48, the narrowest such margin since 1881. He appointed a team of all-female clerks, a first for the court.

Bother Brexit

After a year of tortuous **Brexit** negotiations, Theresa May and the European Commission agreed a deal for Britain's withdrawal from the European Union, but Britain's Parliament has not approved the agreement. Britain's prime minister clung to power after hard Brexiteers in her party tried to bring her down. Two-and-a-half years after the referendum, the opposition Labour Party still had no coherent Brexit policy. Britain is due to leave the EU on March 29th. See article .

Tensions increased between Britain and Russia after two Russian intelligence officers poisoned Sergei Skripal, a dissident, and his daughter with a **nerve agent** in Salisbury, an otherwise quiet cathedral town. They both survived. Russia paraded the attackers on television, claiming they were innocent tourists with an interest in church spires.

Facebook had a terrible year. The social network came under intense pressure to rein in **fake news** and protect user data. The revelation that **Cambridge Analytica**, a political consultancy that had worked on Donald Trump's campaign in 2016, had obtained information on 87m Facebook users through a third-party app shook the company to its core.

A large number of prominent **chief executives** left their jobs or announced their departures. The list includes Vittorio Colao at Vodafone, Indra Nooyi at PepsiCo, Paul Polman at Unilever, Martin Sorrell at WPP and Dieter Zetsche at Daimler. John Flannery was ousted at General Electric, as was John Cryan at Deutsche Bank. Carlos Ghosn was dismissed from Nissan for alleged misdeeds. The carmaking industry lost another giant with the death of Sergio Marchionne, Fiat Chrysler's boss.

Elon Musk stood down as **Tesla's** chairman, but remains chief executive, after tweeting that he intended to take the company private, a move that fell foul of regulators. The electric-car maker at last hit its production targets, and actually made a quarterly profit.

The world watched and waited as 12 boys and their football coach trapped in a **flooded cave in Thailand** were rescued in a complex operation involving thousands of people. A navy diver died in the attempt. Mr Musk tweeted unfounded claims that one of the rescuers was a paedophile. The rescuer had provoked Mr Musk by deriding his offer of a kid-sized submarine to help the boys escape as a PR stunt.

Carmakers ramped up their development of electric and **self-driving vehicles**. A woman was run down in Arizona by one of Uber's autonomous cars, the world's first fatal accident involving a **pedestrian** and a driverless vehicle.

In **Syria** the regime of Bashar al-Assad used chemical weapons again, killing scores of people in Douma, the last rebel stronghold in Eastern Ghouta. America responded by firing missiles at military targets. Later in the year a Russian military jet was shot down by Syria. Instead of blaming its ally, Russia said Israel was responsible because it had provided misleading information about a missile attack it had launched.

Xi Jinping confirmed his grip on power in **China** by promoting more of his allies to senior positions. Wang Qishan, who led a crackdown on corruption, was made vice-president. His new role includes helping to manage ties with America. The priority for the government was limiting the damage from the trade conflict with America; GDP in the third quarter grew at the slowest pace since the financial crisis. **China's stockmarkets** will finish the year well down.

Donald Trump hailed his summit with Kim Jong Un, **North Korea's** dictator, as a breakthrough, even going so far as to say "we fell in love" during the ongoing detente. But there has been little progress implementing the deal they signed. The North

has been sending out mixed signals about whether it intends to denuclearise. The North's PR offensive included sending a team to the **Winter Olympics** that marched with the South Korean side under a reunification flag.

Mr Trump's attempt to replicate his tough-guy approach with **Iran** did not produce a similar rapprochement. He pulled out of the deal to roll back Iran's nuclear-weapons programme, describing it as "rotten". The reimposition of American sanctions, especially on its oil and gas industry, crippled Iran's economy.

Popular populists

Brazil and Mexico both elected populist leaders. **Jair Bolsonaro**, a fan of former military regimes, won Brazil's presidency after being stabbed during the campaign and losing 40% of his blood. **Mexico** elected Andrés Manuel López Obrador, a leftist with a penchant for dodgy referendums. AMLO, as he is called, slashed wages for top officials, including himself, and vowed to halt reforms of education and the oil sector.

In the year's other big elections, **Colombia** took a conservative turn when it elected Iván Duque as president. With the main opposition candidate barred from running, Vladimir Putin was easily re-elected as **Russia's** president. **Pakistan** got a new prime minister in Imran Khan, though the former cricket star had unsporting help from the army. **Italy** got a new populist coalition, which did little to tackle the country's mounting debt problem.

Malaysians ousted the increasingly corrupt party that had ruled their country since independence in 1957, even though it had tried to rig the ballot. And **Zimbabwe's** election was won by ZANU-PF, sans Robert Mugabe. The opposition claimed the vote had been rigged, but the electoral commission insisted there had been no skulduggery.

Cyril Ramaphosa took over as **South Africa's** president when Jacob Zuma at last resigned after years of corruption scandals. The moribund economy emerged from recession. **Australia** also got a new leader when Malcolm Turnbull was ousted as prime minister by his party colleagues and replaced with Scott Morrison. The office has changed hands six times since 2007. Amid an impeachment vote, Pedro Pablo Kuczynski resigned as **Peru's** president.

The crisis of socialist mismanagement in **Venezuela** deepened, speeding up a mass exodus of its hungry and disenfranchised people. The military officers in charge of toilet-paper distribution failed to deliver. Inflation hit 1,000,000%. Nicolás Maduro, the president, gained another term in a sham election. He blamed Colombia for what he said was an assassination attempt on himself by drones. The event, captured on TV, showed troops fleeing rather than defending their leader.

I don't believe it

Global warming was said to be partly responsible for **wildfires** that killed some 100 people near Athens and at least 85 in California. A report by the Intergovernmental Panel on Climate Change warned that such calamities will become more common if the world warms even by another 0.5°C. A White House report forecast grim effects for the American economy: Donald Trump said he didn't believe it. An international deal was struck on how to implement the Paris agreement on climate change. See article .

Indonesia suffered two devastating **earthquakes**. The first struck the island of Lombok, killing over 560 people. The second triggered a tsunami in Sulawesi, killing more than 2,250 people.

Women got wheels

Saudi Arabia lifted a ban on female drivers. It also allowed cinemas to open for the first time in decades (the first film to be shown publicly was "Black Panther"). But these small liberalising steps were overshadowed by the arbitrary locking up of feminists, plutocrats and many others. The kingdom froze its links with Canada after Canada's foreign minister mildly criticised such abuses. Jamal Khashoggi, a journalist, was murdered and dismembered by Saudi operatives in a consulate in Istanbul. See article .

The war in **Yemen** ground on. An air strike on a school bus that killed scores of children was just one incident in which civilians were caught up. The UN warned that the country was on the brink of a famine, with up to 14m people at risk of starvation.

Gun violence in America hit the headlines again. A former pupil went on a rampage at his high school in Florida on St Valentine's Day, murdering 17 people. Eleven Jews were murdered by a gunman at a synagogue in Pittsburgh, America's worst-ever anti-Semitic attack. Over one weekend in Chicago 75 people were shot in separate incidents, 13 of them fatally.

Trump grump

Jerome Powell continued gradually raising interest rates in his first year as chairman of the **Federal Reserve**. Mr Trump said he wasn't "even a little bit happy" with him. The political pressure Mr Powell endured was nothing compared with **Turkey's** central bank. Recep Tayyip Erdogan, Turkey's president, described high interest rates as "the mother of all evil" and claimed that they cause inflation. Most economists think they curb it. After a run on the lira, the central bank eventually raised rates regardless.

After a run on the peso, **Argentina** had to call in the IMF (again). Mauricio Macri, the president, introduced an austerity plan and new taxes on exports.

Stockmarkets appeared to be heading for their worst year since the financial crisis. Many leading indices, including the S&P 500, the Dow Jones Industrial Average and the FTSE 100 are set to end the year below the level at which they started. There was a broad sell-off in technology stocks. **Apple**, which had earlier become the first company worth $1trn, tumbled. **Google** was slapped with a record €4.3bn ($5bn) fine by the European Commission. The **bitcoin** bubble burst.

The consolidation of media and telecommunications companies produced some of the year's blockbuster mergers, including a deal between **T-Mobile** and **Sprint** that valued the combined entity at $146bn. **Rupert Murdoch's** association with Sky, a

British subscription-TV broadcaster that Mr Murdoch's company founded in 1989, ended after it was bought by Comcast.

Germany's government lost two state elections in which the far right gained. Angela Merkel, chancellor since 2005 and a stabilising force in Europe, said she would step down in 2021. Germany's consternation was compounded by its football team being knocked out in the early stage of the **World Cup** for the first time since 1938. France won the tournament.

One of the most bizarre stories of 2018 was the faked assassination of Arkady Babchenko, a **Russian journalist** and critic of the Kremlin, by Ukraine's intelligence services. Mr Babchenko's body was smeared with pig's blood and taken to a morgue while his "murder" was deplored by the world's media. His sudden appearance, alive, at a press conference dumbfounded his grieving friends and colleagues. Wisely, he had kept his wife in the loop, but he still apologised to her publicly.

Looking back
The uses of nostalgia

Looking back

The world is fixated on the past

How to get the best from an outbreak of nostalgia

Print edition | Leaders Dec 22nd 2018

POLITICIANS HAVE always exploited the past. But just now, rich countries and emerging economies are experiencing an outbreak of nostalgia. Right and left, democracies and autocracies, all are harking back to the glories of yesteryear. Even as President Donald Trump vows to "Make America great again", President Xi Jinping is using his "Chinese dream" to banish a century of humiliation and return China to its golden age. Mexico's new president, Andrés Manuel López Obrador, has a mission to withstand global capitalism and restore his country's economic sovereignty. Jaroslaw Kaczynski, the most powerful politician in Poland, wants to purge the last traces of Soviet communism to bring about a renaissance of old-fashioned Polish values.

This orgy of reminiscence has different causes in different countries. In emerging markets past glories are often a foretaste of future triumphs. China, which has enjoyed 40 years of transformative growth, senses that it is on the threshold of something great. Under Narendra Modi, India has been celebrating its growing geopolitical heft with a Hindu-nationalist revival.

In the rich world, by contrast, nostalgia usually stems from what Sophia Gaston, of the Henry Jackson Society, calls "an omnipresent, menacing feeling of decline". Almost two-thirds of Britons think that life used to be better. A similar share of the French do not feel at home in the present. This year's UN World Happiness Report found that Americans are becoming less content. Large majorities in rich and developing countries believe that robots and automation will increase inequality and harm employment. A poll of 28 countries in 2017 found that over half of respondents expected their living conditions to stagnate or worsen. Only 15% of Japanese think their children will be richer than their parents.

Vaults full of research attest to how emerging-market optimism is more soundly based than rich-country pessimism. People around the world are living longer, healthier lives; fewer fall victim to war and famine; as education spreads, discrimination and prejudice are waning. Similarly, the summers were rarely as idyllic or the nation as glorious as sentiment would have it.

But to reject pessimism and nostalgia as simply inaccurate misses the point. They are powerful forces that are shaping politics. To harness them, you must first understand them.

Nostalgia serves optimists and pessimists alike as an anchor in a world being transformed. New technologies, including artificial intelligence, threaten to disrupt entire industries and to alter the relationship between the state and the citizen. After two centuries power is shifting from the West back to China. The planet is ageing faster than at any time in history. Its climate is changing. It is ever more racially and culturally mixed.

At such moments, people are drawn to nostalgia as a source of reassurance and self-esteem. Many Brexiteers hope that leaving the European Union means they will once again belong to a dynamic "global Britain". Catalans evoke an idealised past in pursuit of a distinctive identity. Alarmed by corruption and recession, Brazilians have elected a president who harks back to the certainties of a military dictatorship they rid themselves of three decades ago. When Mr Trump boosts coal and steel, men who feared that they had been marginalised in dirty, dying industries suddenly feel as if they are worth something again.

In the rich world, nostalgia also offers a way to rebel against someone else's idea of progress—to "take back control". The far-right Alternative for Germany has its strongest support in the former East, where voters regret their loss of community and security. In France the *gilets jaunes* smash shop windows on the Champs-Elysées because they cannot make ends meet. They reject the trade-off offered by their president, Emmanuel Macron, between national prosperity and individual economic security.

This makes nostalgia dangerous. Protesters do not necessarily expect to put back the clock—they may just be seeking to slow it down. And yet such sclerosis may only aggravate the sense of decline. In addition, the self-esteem that nostalgists crave often seems to feed xenophobia. India's Hindu-nationalist revival has seen an increase in reported hate crimes towards Muslims. In the West people on the right remember a whiter past, with fewer cultures, even as the hard left condemns the machinations of global business. It is no accident that there has been a resurgence of anti-Semitism, not least in Britain's Labour Party under the backward-looking Jeremy Corbyn.

Because of the taint of xenophobia, progressives are quick to treat all nostalgia as prejudice, leading them to dismiss the fears of whole sections of society. That sweeping judgment is one more reason why populists have been able to exploit nostalgia so successfully.

They are having it too easy. Nostalgia can be harnessed for good. At the start of the 20th century, Europe and America were nostalgic, too, buffeted by a similar confluence of technological, geopolitical and cultural change. Then a period of conflict and social upheaval led to universal suffrage and education for all. Today's politicians can learn from that time. They must avoid war, obviously, by preserving and enhancing the institutions that enable countries to work together. But they should also find bold ways to deal with insecurity and alienation. That will involve the state working harder for the citizen by making education available throughout people's lives, by overhauling taxation, devolving power to cities and regions, averting climate catastrophe, and wise management of immigration.

If the past is a foreign country, let me emigrate

The nostalgists are on to something. When one way of running the world seems to be exhausted, but the next has yet to come into being, the past holds important lessons. When nothing seems to make sense, history becomes the supreme discipline. Knowing who you are and where you came from matters.

The best way to harness the past demolishes prejudice and opens horizons. A proper sense of history helps you grasp that progress depends on facing up to hard choices. Sometimes it can inspire, too. Fifty years ago *Apollo 8* took off from Cape Canaveral in Florida. On December 24th it captured a photograph of Earth, a half-shrouded blue-white planet, seemingly united.

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Military misunderstandings

More worrying than a US-China trade war is the risk of a hot one

Better communication between their armed forces would help avoid one

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IT IS A sobering thought that official military communication between America and China is still conducted by fax machine. The use of this obsolete technology symbolises a worrying lack of effective dialogue between the two countries' armed forces. The giants jostle for space in the western Pacific; their ships and jets manoeuvre close to each other every day. Neither side wants war, but China is intent on keeping America at bay. It is easy to imagine how a collision in the air or at sea could escalate. Casualties could fan nationalist flames on either side and cause twitchy officers, or political leaders, to respond in ways that lead rapidly to disaster. So could a misunderstanding by either side of the other's military movements. Relations between China and America are already strained over trade and a host of other matters. So it is only common sense to try to reduce the risk that their cold-war style sparring might turn hot.

American and Chinese officers are getting to know each other better. Exchanges between their military academies, port calls and high-level visits to each other's countries have multiplied over the years (see article). But there is still a huge gulf. Much of the interaction is superficial. American officers often describe the Chinese who talk to them as "barbarian handlers": polished, English-speaking political appointees, usually intelligence officers, whose uniforms have never been crumpled or muddied. The Americans are sometimes led around empty Potemkin bases and entertained with kung fu shows rather than genuine drills. They wonder why they should waste their time on such junkets, which offer little insight into Chinese intentions or how the two sides might defuse a crisis. When senior officers of the two sides meet, the Chinese tend to spend much of the time lambasting American foreign policy rather than discussing how to build trust.

In recent years China has forged ever-closer military ties with Russia. In September China sent thousands of troops to join Russia's largest manoeuvres since the cold war. But when invited to take part in American exercises, China has behaved boorishly. In 2014 America, to its credit, allowed the Chinese navy to join RIMPAC, the world's largest multinational war games at sea. Instead of responding with camaraderie, China demanded plum roles, sent spy ships to snoop on the manoeuvres and barred Japanese officers from the traditional shipboard cocktail party. America excluded China from RIMPAC this year in protest against China's deployment of missiles on artificial islands it has built in the South China Sea. That upset the Chinese navy, but the Americans rightly felt no loss. Even when given an opportunity to build bridges, Chinese officers have chosen to ignore it.

The two armed forces do not just use faxes to communicate. A channel called the Defence Telephone Link was set up a decade ago. A whizzier video link between the chairman of America's joint chiefs of staff and his Chinese counterpart was established more recently. The problem is not a lack of channels. It is how they are used. American officials have made clear that if China were to call during a crisis, they would pick up the phone. They are not sure whether China would do the same.

Part of the problem is the way that China's armed forces work. The Communist Party is present throughout the military hierarchy. Its political commissars often wield as much power as commanders who are genuine soldiers. Especially at higher levels, Chinese officers can move only at the speed of a committee. But that is no excuse for China's habit of unplugging the phone. Swift communication may not end a crisis, but it can certainly reduce the danger of tensions flaring up over a misunderstanding.

Going ballistic

Mercifully, when Barack Obama was president, the two countries managed to establish some rules for managing close encounters between their ships and planes. That has led to fewer near collisions in the air and at sea. But that still falls short. China's relentless beefing up of its military forces has created an urgent need for wider-ranging agreements. Pentagon officials say China is arming its air force with nuclear weapons. That would give China a complete "triad" of nuclear weaponry, launchable from the air, land and sea. Yet the two armed forces have not held nuclear talks in over ten years. Even the Soviet Union agreed to give warnings about ballistic-missile tests. The Chinese refuse to consider such a confidence-building measure, despite the growing importance of missiles to both countries.

On a visit to Washington, DC, in November China's defence minister, Wei Fenghe, said that communication must be strengthened. It is good that China recognises this. But all too often the country lets pique over unconnected business disrupt military contacts. In 2018 it cancelled multiple high-level talks, including an embryonic dialogue between senior military officers. Not since the cold war has it been so crucial for global peace for two defence establishments to talk.

This article appeared in the Leaders section of the print edition under the headline "Military misunderstandings"

Big mistake

Politicians in Europe are wrong to embrace mega-mergers

Europe needs more competition, not less

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NO COMPANY FOUNDED in Europe in the past four decades has gone on to be worth over $100bn today. Entrepreneurs in America have managed the feat a dozen times, including the founders of Amazon, Cisco and Home Depot. China will soon have more such corporate leviathans than the European Union does. Angela Merkel of Germany and Emmanuel Macron of France are among those who think they have found a solution to this relative impotence: let European companies merge their way into the top leagues.

Only the most hidebound politicians still yearn for the state-owned "national champions" of yore. But an increasing number see a need for "European champions" able to compete globally. Mrs Merkel has called for EU competition guidelines to be "modernised" so that European titans can emerge. Mr Macron says he wants the issue to feature prominently in the upcoming European election campaign. From eyeglasses to steelmaking, from stockmarkets to railways, proposed cross-border mergers are being backed by politicians as the only way to take on Chinese and American rivals (see article). That should set alarm bells ringing, for two reasons.

The first is that Europe already has a competition problem. A forthcoming study by Chiara Criscuolo and colleagues at the OECD, a club of mainly rich countries, shows that the average market share of the top four firms in Europe in each industry has risen by three percentage points since 2000. The free cashflow of non-financial firms as a share of GDP is well above its 20-year average. When concentration is rising and profits are high and persistent, the answer is not to make big firms even bigger.

Industrialists argue that added size will make them more efficient, and so likelier to thrive globally. Sometimes sheer size pays off: Airbus, an aerospace giant, is a cross-border success story. But big deals often throttle competition. Take the mammoth proposed merger between the operations of Germany's Siemens and France's Alstom that make rolling stock and train-track signals. In some rail markets the combined firm would be three times bigger than its largest rival. Margrethe Vestager, the EU's independent-minded competition commissioner, seems sceptical that a Siemens-Alstom tie-up will be good for consumers. She is right to be wary.

The second reason to worry is political. As Mrs Merkel and Mr Macron become keener on the logic of big mergers, pro-competitive voices in Europe risk being drowned out. Britain, historically a stalwart defender of free markets, is consumed by the Brexit mess. The European Commission has a strong record of standing up to governments on issues such as state aid, but Ms Vestager's term ends next year. Suspicion of Chinese investment, though often warranted, can be exploited to hinder any foreign company taking over an EU firm.

If competition-sapping mergers are not the way to create world-beating companies, what is? Above all, European firms struggle compared with their American and Chinese rivals because the continent's markets are so fragmented. Making it so that an Irish firm can serve a Portuguese client as easily as a Texan one can serve a New Yorker would be good for businesses of all sizes. The EU's "single market" is designed for goods. It works less well for services—which make up over 70% of the European economy. Talk of greater integration of capital markets and digital services urgently needs to be turned into action. More funding for basic research is also needed to help foster innovation.

European bosses complain that China and America tilt the playing field in favour of their own companies, whether through "America first" trade policies or Chinese soft loans. That is no reason to follow suit. Mercantilism benefits favoured companies but not economies and consumers. The answer to other countries giving their citizens and taxpayers a raw deal is not to emulate them. It is to foster competition.

This article appeared in the Leaders section of the print edition under the headline "Big mistake"

Les stats, c'est moi

How to think about data in 2019

It is tangible human beings, not abstract "data", that power the online economy

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"DATA", RUNS a common refrain, "is the new oil." Like the sticky black stuff that comes out of the ground, all those 1s and 0s are of little use until they are processed into something more valuable. That something is you.

Seven of the world's ten most valuable companies by market capitalisation are technology firms. Excluding Apple, which makes money by selling pricey gadgets, and Microsoft, which charges businesses for its software and services, all are built on a foundation of tying data to human beings. Google and Facebook want to find out as much as it is possible to know about their users' interests, activities, friends and family. Amazon has a detailed history of consumer behaviour. Tencent and Alibaba are the digital wallets for hundreds of millions of Chinese; both know enough about consumers to provide widely used credit scores.

Where tech companies have blazed a trail, others have followed. Consumer brands in every industry collect data on their customers to improve design and advertise products and services. Governments have looked at these firms and instituted their own systems to gather information on their citizens. Narendra Modi, India's prime minister, cites Facebook as an inspiration. That is apparent in the ever-expanding reach of Aadhaar, an ID system for India's 1.3bn residents that is required for nearly every government service imaginable.

That data are valuable is increasingly well-understood by individuals, too, not least because personal information is so often hacked, leaked or stolen. India's database has been shown to be vulnerable to scammers and state abuse. Facebook has spent most of 2018 dealing with the reputational damage of multiple breaches, most notably via Cambridge Analytica, a consulting firm. The list of other companies that have suffered some sort of data breach in 2018 alone reads like a roll call of household names: Google, Marriott, Delta, British Airways, Cathay Pacific, Best Buy, Sears, Saks 5th Avenue, even Panera Bread. Such events have caused a tectonic shift in the public understanding of data collection. People have started to take notice of all the data they are giving away.

Yet few have changed their online behaviour, boycotted snooping tech firms or exercised what few digital rights they possess. Partly this is because managing your own data is time-consuming and complex, even for those who understand how to do it. But it is also because of a misunderstanding of what is at stake. "Data" is an abstract concept, technical and intangible. Far more solid is the idea of identity (see Essay). It is only when "data" is understood to mean "people" that individuals will demand accountability from those who seek to know them.

Such accountability stretches far beyond an obligation to secure someone's credit-card details. In the information age, data are used to decide what sort of access people have to services. Uber ratings determine who gets a taxi; Airbnb reviews decide what sort of property you can stay in; dating-app algorithms choose your potential life partners. Firms use location data and payment history to sell you products. Your online searches may establish the price you pay for things. Those with a good Zhima credit score, administered by an Alibaba subsidiary, enjoy discounts and waived deposits. Those without receive few offers.

When they are used by states, such techniques pose a still greater threat. Algorithms that are able to recognise patterns in data can pinpoint dissidents or even those with unconventional opinions. In 2012 Facebook experimented with using data to manipulate emotions. In 2016 Russia used data to influence the American presidential election. The question is not whether someone is doing something wrong. It is whether others can do wrong to them.

We, the data

The fossils of past actions fuel future economic and social outcomes. Privacy rules, data-protection regulation and new laws surrounding the use of algorithms are crucial in protecting the rights of individuals. But the first step towards ensuring the fairness of the new information age is to understand that it is not data that are valuable. It is you.

This article appeared in the Leaders section of the print edition under the headline "Les stats, c'est moi"

Ovation nation

The Economist's country of the year 2018

Which country improved the most in the past year?

Print edition | Leaders Dec 22nd 2018

OUR ANNUAL "country of the year" award goes not to the most influential nation, nor to the richest, nor to the one with the tastiest food (sorry, Japan). It celebrates progress. Which country has improved the most in the past 12 months?

It is a tricky choice. A stellar performance in one year is no guarantee of future success. Last year's pick, France, is now racked by riots. Myanmar, our winner in 2015, has regressed bloodily. Nonetheless, we must choose. For 2018, some of our staff facetiously suggested **Britain**, for giving the world a useful warning: that even a rich, peaceful and apparently stable country can absent-mindedly set fire to its constitutional arrangements without any serious plan for replacing them. Others suggested **Ireland**, for resisting a form of Brexit that would undermine Irish peace; and also for settling its vexed abortion debate democratically. Two Latin American states merit a mention. Whereas Brazil and Mexico are plunging into populism, **Ecuador** and **Peru** are strengthening institutions, such as the judiciary, that can curb a headstrong leader. **South Africa** has ditched a president, Jacob Zuma, who presided over the plunder of the state. His replacement, Cyril Ramaphosa, has appointed honest, competent folk to stop the looting.

In the end, the choice came down to three countries. In **Malaysia** voters fired a prime minister who could not adequately explain why there was $700m in his bank account. Despite Najib Razak's glaring imperfections, his sacking was a surprise. Malaysia's ruling party had dominated politics since the 1950s and gerrymandered furiously to keep it that way. Yet the opposition triumphed at an election, and Malaysians enjoyed the delicious spectacle of police removing big boxes of cash, jewellery and designer handbags from their former leader's home. Malaysia might have made a worthy winner, except that the new prime minister, the nonagenarian Mahathir Mohamad, seems reluctant either to relax the country's divisive racial preferences or to hand over power as agreed to his more liberal partner, Anwar Ibrahim, a former political prisoner.

Ethiopia had an extraordinary year. It is a huge place, with 105m people and a long history of tyranny and woe. A cold-war Marxist regime slaughtered and starved multitudes. The guerrillas who overthrew it looked to China for inspiration and loans. They had some success in rebuilding a desolate economy, but also shot protesters and virtually criminalised dissent. After tempers exploded following a rigged election in 2015, the ruling party this year picked a reformist leader, Abiy Ahmed, who has released political prisoners, largely unmuzzled the media and promised to hold real elections in 2020. He has made peace with Eritrea, opening a long-closed border and restoring access to the sea. He is even trying to liberalise Ethiopia's debt-burdened, state-directed economy, where a phone connection is harder to get than in anarchic Somalia next door. If this were a contest for person of the year, Abiy might have won. But we did not choose Ethiopia because it is far from clear that the new prime minister will be able to curb ethnic violence. Separatists no longer fear being shot by the security services; some are now trying to create ethnically pure enclaves by driving minorities from their homes. Perhaps 1.4m people have been displaced so far. Autocracies, alas, seldom die quietly.

Yet in **Armenia** that is exactly what seems to have happened. The president, Serzh Sargsyan, tried to dodge term limits by making himself into an executive prime minister. The streets erupted in protest. Nikol Pashinyan, a charismatic and bearded former journalist and MP, was swept into power, legally and properly, on a wave of revulsion against corruption and incompetence. His new party alliance won 70% of the vote in a subsequent election. A Putinesque potentate was ejected, and no one was killed. Russia was given no excuse to interfere. A note of caution: Armenia's nasty territorial dispute with Azerbaijan has not been resolved and could ignite again. However, an ancient and often misruled nation in a turbulent region has a chance of democracy and renewal. For that reason, Armenia is our country of the year. *Shnorhavorum yem*!

This article appeared in the Leaders section of the print edition under the headline "Ovation nation"

Letters
Letters to the editor

Letters

Letters to the editor

On Brexit, Singapore, Ayn Rand, the lingerie market, novelty socks

Print edition | Letters Dec 22nd 2018

Letters are welcome and should be addressed to the Editor at letters@economist.com

March 29th 2019 and all that

Get our daily newsletter Upgrade your inbox and get our Daily Dispatch and Editor's Picks.

In searching for a parallel crisis to Brexit in Britain, Bagehot (November 24th) glossed over some of the instructive detail of ditching the gold standard in 1931. That crisis broke under a minority Labour government sustained by the Liberals. The pound came under pressure as a result of a banking collapse in Germany and Austria, where British banks were heavily exposed. The City and the Bank of England pressed the government to make cuts in public-sector pay and unemployment benefits to restore confidence.

Ramsay MacDonald decided that he couldn't continue as prime minister once half his cabinet refused to back the proposed cuts. The Conservatives, however, were not prepared to form a minority government to deliver this unpalatable medicine and the Liberals did not want to help them gain the necessary majority in Parliament. In these circumstances MacDonald agreed to form a government of co-operation with the other parties in order "to deal with the national emergency that now exists". It promised that afterwards "the political parties will resume their respective positions."

This government duly went ahead with the cuts, which provoked the Invergordon mutiny by sailors, which in turn provoked the run on the pound the cuts had been intended to prevent. At that point the government suspended the gold standard. As A.J.P. Taylor concluded, "The mutiny provoked a common-sense solution which the politicians and economists had been incapable of discovering for themselves."

MICHAEL WILLIAMS
Letchworth Garden City, Hertfordshire

The parallel Bagehot should have considered is the repeal of the Corn Laws in 1846. Then, as now, a divided Tory party had to choose between vested interests and cheaper food.

ADRIAN WADDELOVE
Malpas, Cheshire

If a second referendum is to have three questions, there is an obvious way to organise it. The problem with the first referendum was that no one knew what "leave" entailed. Hence, next time we need two rounds. The first asks, "If we leave the EU would you prefer 'no deal' or 'Mrs May's deal'?" Then, when the answer to this is known (say a week later), round two asks "Now you know how we would leave, would you prefer leaving or staying?"

The decision is sequential. Economists solve such problems by backward induction, starting with the last step of the actual process (how you leave) and working backwards to determine the best first step (whether to leave).

L. ALAN WINTERS
Director
UK Trade Policy Observatory
Brighton

Boris Johnson was a good choice to win your alternative awards for political prize idiots (Bagehot , December 8th). But my God it must have been like shooting fish in a barrel.

JAMES PERRY
Paris

Singapore responds

Given *The Economist*'s belief in free speech and robust debate, I found it surprising that Banyan (December 1st) took issue with my letters to *The Economist*. Apart from quoting anonymous readers, Banyan selectively failed to mention that I had also argued that in our consistently contestable elections, the People's Action Party could well lose power, and would deserve to do so if it ever became incompetent and corrupt. I write not to defend any political party, but to set the record straight and provide your readers with the facts to judge for themselves.

This time, Banyan made patronising backhanded innuendos about Singapore's ongoing political succession. The ruling party has indeed settled on Heng Swee Keat as its next leader. But the prime minister in Singapore must command the confidence of the majority of members of parliament, no different from British prime ministers. Provided the party wins the people's support in the next general election, due by April 2021, Mr Heng will take over from Lee Hsien Loong as prime minister.

Banyan equated democracy with freewheeling, rambunctious politics, divisive national debates, inter- and intra-party politicking, and quick changes of prime ministers and cabinet ministers. He dismissed Singapore's political culture which strives for continuity and consensus in seeking the mandate of the people.

So far our system has produced accountable and stable governments, and progress and security for Singaporeans. And that surely is the ultimate test of any political system.

FOO CHI HSIA
High commissioner for Singapore
London

Randian philosophy

James Lennox turned to Ayn Rand for his analysis of capitalism, which Rand idealised as the economic system best suited to her conception of human beings, whose noble purpose is personal happiness and productive achievement (Letters , November 24th). Though somewhat different from Friedrich Nietzsche or Max Stirner, her rejection of religious and socialist ethics lay in the total repudiation of the morality of altruism. Rand's ideological skyscraper rested narrowly on premises that led her, for example, to rate Mickey Spillane above William Shakespeare.

Murray Rothbard's satirical playlet, "Mozart was a Red" (available on YouTube), did less than justice, however, to her demonstration of the vital connection between individual freedom and scientific discovery and innovation (although she did praise America's mission to the moon).

Rand's imaginative environment belonged to the 1940s and 1950s. I doubt she would accept global finance, with its cyber-run fractional reserve and hedge-fund speculation, or open-door mass-immigration of refugees and culturally incompatible communities.

DAVID ASHTON
Sheringham, Norfolk

Carry on writing

I was not aware that Sid James and Charles Hawtrey were employed by your business desk. However, your piece on the lingerie market (" Going for bust ", December 8th) had sufficient *double entendres* to make a matron blush. From the article's title, to keeping "abreast" of market dynamics, to shares in Victoria's Secret having their "knockers", all it lacked was a comment on insider dealing featuring a bishop and an actress.

Thankfully you also managed to avoid stating that stocks, like underwear, can go down as well as up.

SIMON ARBUTHNOT
London

Christmas stockings

The subscription offer I received with my issue (December 1st) included the tag line "Nobody changed the world with novelty socks". That was in the same week as the funeral of President George H.W. Bush, a fairly influential man who was famously fond of novelty socks.

Looks like the shoe is on the other foot.

GEOFFREY CHAPMAN
Honolulu

I am disappointed that *The Economist* has never tried to change the world with novelty socks. A few comfortable pairs with snappy quotes from the Espresso app would be a step in the right direction. Please dip your toe into this.

ERIK GULOIEN
St Catharines, Canada

Municipal limits
Less than the sum of their parts

Less than the sum of their parts

Why American cities are so weirdly shaped

How strange municipal boundaries came about, and how they hold cities back

Print edition | United States Dec 22nd 2018

BIRMINGHAM, ENGLAND, is shaped like a kidney, taller than it is wide, curving eastwards slightly on its longer sides. It is contiguous, blob-like, sensible. Birmingham, Alabama, founded in 1871 and named after its English ancestor, looks as if it was imagined by a deranged computer, straight lines and sharp angles and missing bits in the middle (see illustration above). One pseudopodium extends to the west, long and thin, until it widens out a bit and ends in a box. To the east is a tumorous outgrowth, thin, then wide, then thin again, doubling back on itself several times.

From San Jose in the west to Savannah in the east, and from tiny Minot in North Dakota to sprawling Fort Worth in Texas, odd city maps can be found all across America. With some exceptions, these boundaries are administrative confections that make few allowances for geography, population density or common sense.

Los Angeles is a striking example. The county is home to 88 incorporated cities, ranging in population from 76 (Vernon) to 3.9m (Los Angeles itself). Beverly Hills (population 34,506) is its own city, with its own police force, fire department and school district. So is Santa Monica (92,495). Even Vernon has a police department, with some 50-odd staff. All told, the county has about 30 fire departments, more than 40 police departments and 80 school districts.

Los Angeles is extreme but not unusual. Alabama's Jefferson County, which is one of seven counties in the Birmingham area, is home to 35 municipalities, including Cardiff, population 45. A map of the incorporated areas of Jefferson County (see map) clarifies matters somewhat: dozens of independent cities slot neatly into the gaps around Birmingham like a tricky jigsaw puzzle. From the air, it may appear that Birmingham sprawls but, in an administrative sense, the city is constrained. This is a problem. Cities that are unable easily to expand their boundaries are poorer, more segregated, have higher concentrations of poverty, lower growth, worse municipal bond ratings and less well-educated workforces.

America's constitution goes to great lengths to demarcate state and federal powers. The Tenth Amendment explicitly reaffirms that "powers not delegated to the United States by the constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people." Cities derive their power from state governments, says David Rusk, a former mayor of Albuquerque whose book on annexation, "Cities Without Suburbs", is in its fourth edition. All but 11 states follow "Dillon's Rule", named after a 19th-century judge, which holds that municipalities only possess powers specifically granted to them by state law.

The joy of annex

For municipal officials, one way around this is to annex commercial territory, such as shopping malls, ports (as in LA) or airports (Chicago), where there are few resident voters to irk and the tax returns are substantial. In the 1980s Birmingham annexed Overton. A shopping centre there, called the Summit, contributes about 15% of the city's total revenues, says Darrell O'Quinn, a Birmingham city councillor. Some states, including Alabama, require cities to be contiguous, explaining the skinny tentacles that reach out to capture territory. The result is the higgledy-piggledy mess of urban boundaries.

Most states make it difficult for a city to force its neighbours to join it. Only eight states allow municipalities to annex territory unilaterally. Eight require the state legislature to change municipal boundaries. The overwhelming majority, 29 states, require a referendum in the areas to be annexed, according to an analysis by Greg Lindsey of the University of Minnesota.

These votes often fail. Residents of unincorporated areas resist annexation, fearing a greater tax burden. Those in already rich suburbs fret about sharing their taxes with the poorer core city and merging of school districts. Municipalities avoid annexing poor neighbourhoods because they cost more to service than they provide in revenue. In places like Birmingham, blacks worry that rich, white suburbanites will usurp their hard-won power.

Divided and bonkers

The result is duplication and waste as municipalities each pay councillors, police and fire departments, waste-collection agencies and school administrators to perform the same services. Cities are reluctant to co-operate even on menial things like waste collection, fearing an erosion of their independence. Fragmentation is one of the main reasons that many cities are poor at providing public transport.

Businesses use fragmentation to their advantage, making known their interest in moving to a metropolitan area and playing its constituent cities off against each other. “We get into a bidding war trying to attract companies, and the only one who wins is these companies,” says Mr O’Quinn. Firms win tax breaks and other enticements; employees’ use of infrastructure puts a further burden on the whole conglomeration.

The jigsaws also deepen inequality. Small, wealthy cities can afford better schools. No matter how much young white couples enjoy living in restored downtown lofts and strolling to artisan coffee shops full of reclaimed wood, they eventually move to suburban houses in superior school districts when they have children, taking their taxes with them. Struggling cities get poorer; comfortable ones get richer. It is, for families, a sensible decision: four of the five best school districts in Alabama are in the suburbs of Birmingham, according to Niche, a website. Mountain Brook, a Birmingham suburb, is home to the highest-ranked school system in the state. Its median household income is four times that of the mother city. Its poverty rate is one-seventh.

Overcoming restrictive state laws requires creativity. In the 1960s Minneapolis, St Paul and their surrounding suburbs lost revenue as they competed to attract business. In 1971 Minnesota legislated that all municipalities in the region had to put part of their commercial taxes into one kitty. Today the Twin Cities area is one of America’s most successful, with a rare mix of well-off residents and affordable homes.

A more recent example is Charlotte, North Carolina, another southern city that shares some characteristics with Birmingham. North Carolina had some of the most liberal annexation laws in the country; until recently it allowed cities to annex contiguous land more or less unilaterally. Between 1950 and 2010, Charlotte’s area grew by 892%. Today it is the economic powerhouse of North Carolina. Its median income is higher by two-thirds, the unemployment rate is lower by a third and the poverty rate is almost half that of its Alabaman counterpart, according to a report by the Public Affairs Research Council of Alabama (PARCA), a non-partisan think-tank. Charlotte has a viable public-transport system and the corporate headquarters of Bank of America. It attracts young workers in droves.

There are other templates for cities hobbled by fragmentation. Pittsburgh is only one of Allegheny County’s 130 municipalities. But it spent decades working with the county and its many neighbours to foster regional co-operation, which is bearing fruit as it emerges as a tech hub. Louisville merged with Jefferson County in Kentucky, uniting its 92 neighbouring municipalities as “Greater Louisville”.

Such examples are less common than they ought to be. Yet change is not impossible. Americans have long trusted local government over the state or federal sort. Local governments are also largely non-partisan. As PARCA said in its report, “Governmental forms are not handed down from on high. They are created by citizens banding together in enlightened self-interest.” For Birmingham, as for many ailing cities, the imperative is to overcome decades of narrow self-interest in pursuit of a more expansive sort.

This article appeared in the United States section of the print edition under the headline ”Less than the sum of their parts”

Bruised, not broken

A federal judge in Texas rules that Obamacare is unconstitutional

The law will stay in force until all appeals are exhausted

Print edition | United States Dec 22nd 2018

LIKE WEEDS and superheroes, the Affordable Care Act (ACA) is hard to kill. Since storming Congress in 2010, Republicans have tried their darndest to take down the ACA, better known as Obamacare, only to find themselves stymied by internal divisions over what would replace it. On December 14th a federal judge in Texas dealt the law what many in the party hope will be a fatal blow. But as green-fingered hobbyists and the Green Goblin know in equal measure, it is unlikely to be so simple.

The issue is over a legal technicality known as severability: what happens to a law if part of it is found to be unconstitutional or unenforceable. As originally passed, the ACA included a requirement for all Americans to obtain health insurance or pay a penalty, known as the individual mandate. When the Supreme Court was asked to weigh in on the law's constitutionality in 2012, it held that this was a legitimate exercise of Congress's power to tax. But as part of their tax-cut bill in 2017, Republicans reduced this penalty to zero, killing the individual mandate. Republican officials from 20 states then sued the federal government, arguing that without the mandate, the entire law, based as it was on Congress's taxing powers, should be struck down as unconstitutional.

For many constitutional-law experts—including libertarian ones who do not much like Obamacare—this argument was frivolous. Reed O'Connor, a federal judge appointed by George W. Bush, took it seriously. He wrote that "because rewriting the ACA without its 'essential' feature is beyond the power" of his court, the individual mandate was inseparable from the rest of the law—all of which would need to be dismantled. The Department of Justice declined to defend the law, leaving the task to Democratic state attorneys-general. They are sure to appeal; until these efforts are exhausted the law will remain in force.

If the ruling were to stand, the consequences would be disastrous. When the Supreme Court considered the law, Obamacare was not yet fully in effect. Today, it is embedded in American society. Compulsory coverage of people with pre-existing conditions would disappear. Young adults counting on remaining on their parents' insurance until the age of 26 would suddenly find themselves without health care. Expansion of Medicaid, the government health-insurance programme for the poor, would be undone overnight. At least 15m who gained coverage would lose it.

States like Ohio and Kentucky that are heavily reliant on Medicaid dollars to pay for counselling and treatment for those addicted to opioids would also be dealt a blow. Since Obamacare went into effect, the share of Americans without health insurance has dropped from 16.8% to 10.2%; the decline was even steeper in states that chose to expand their Medicaid programmes. Without the ACA—and with a sensible replacement unlikely to pass through a divided Congress—this progress would reverse.

An appeals court is likely to overturn Judge O'Connor's ruling. Even for Republicans, that would probably be the best outcome. In the recent mid-term elections the party was pummelled by voters nervous about health-care costs and the possible evaporation of protections for people with pre-existing conditions. Having just demolished those protections, Republicans would struggle to run as the party defending people with such conditions.

Americans have a conflicted relationship with facts at the moment. But even the most partisan voters might recoil at such up-is-downism.

This article appeared in the United States section of the print edition under the headline "Bruised, not broken"

Shaw thing

A historic church in the capital closes its doors to worshippers

A century and a half after it was founded, Lincoln Temple falls to gentrification

Print edition | United States Dec 22nd 2018

WHEN LINCOLN TEMPLE, a church in the Shaw neighbourhood of Washington, DC, closed this year, it signalled the end of an important chapter in African-American history. Founded in 1869 by a group that included many newly freed slaves, it became a hub of the civil-rights movement. In the 1950s one of its earliest members, Mary Church Terrell, led successful sit-in protests against Washington's segregated restaurants. In the next decade the church was used as a marshalling ground for marchers. It attracted famous preachers. Roberta Flack sang there. More than a thousand people once attended Lincoln Temple's Sunday services.

By 2018, after decades of steady decline, that number had dwindled to a dozen—if the pastor was lucky. In September the redbrick Romanesque Revival church, erected in 1928 to replace an older building, held its last service. Lincoln Temple, part of the United Church of Christ, is not unique. According to Sacred Spaces Conservancy, a Christian non-profit that uses city data to count church closures, Shaw has lost around 30% of its churches—most of them with predominantly black congregations—since 2008. In Capitol Hill it reckons over 40% of religious properties have closed.

One of the reasons behind the disappearance of Washington's churches is familiar across the West: fewer people are going to church. But as in other big cities, that change has been exacerbated by the departure of African-Americans to the suburbs. What began in part as a search for more space and a better life has been accelerated by gentrification.

In 2015 the proportion of black residents in Washington dropped below 50% of the population for the first time in decades. Many of those who left took their religion with them, as the mushrooming of churches in some Maryland suburbs shows. Some tried not to. Jeanne Cooper, who attended Lincoln Temple for five decades, says many congregants would drive in from the suburbs on Sunday; she did so herself until the church's last service. But as parking spaces were swallowed up by development, or claimed by new residents who had lobbied the city for parking restrictions, the journey became too much for many of its ageing members.

Elsewhere in Washington, old churches have been flattened or developed to make apartment blocks. Shaw, where Victorian row houses sit alongside renovated industrial lofts, has become one of the city's trendiest neighbourhoods. Demand for land is high. But Mrs Cooper says the church's management team, which she leads, hopes to continue renting out the building to groups that serve the area's poor. "That way, it almost feels as if the church is returning to its original purpose," she says.

This article appeared in the United States section of the print edition under the headline "Shaw thing"

Lexington

Joe Biden is not the best person to take on Donald Trump

Democrats need someone who can offer a fresh face and new ideas

Print edition | United States Dec 22nd 2018

JOE BIDEN was first off a flight from Burlington to Philadelphia the other day. Lexington was second, which afforded him a rare moment to observe the former vice-president in the solitude of an empty jetway. Perhaps Mr Biden knew he was being spied on. Perhaps he always expects to be, after half a century in frontline politics. Even so, to watch the stiff-legged 76-year-old stoop to pick up someone's empty soda bottle and transport it, softly tutting to himself, to the nearest rubbish bin was to glimpse a modesty and diligence not obvious in American government these days.

His reputation for being a good guy has helped make "Uncle Joe" a hugely popular figure on the left. Recent polls make him the favourite for the next Democratic presidential ticket. The latest for CNN gives him 30% of the Democratic vote, with his closest rival, Senator Bernie Sanders, trailing on 14%. Mr Biden, who had been speaking in Burlington on a book he published last year, "Promise Me, Dad", says he will decide whether to embark on his third run for president over Christmas. Having visited 31 states this year, he is clearly tempted to. It would be a mistake if he did.

That is not to underestimate his strengths, which go beyond amiability. As he demonstrated in Burlington, Mr Biden is a polished turn, with moderate instincts and an impressive history of courage in adversity. Newly elected to the Senate by Delaware, aged 29, he suffered the death of his wife and baby daughter in a car crash, leaving him with two young sons to care for. The eldest, Beau, a former attorney-general of Delaware with his father's features and easy charm, died of brain cancer in 2015 aged 46. That deterred Mr Biden, in the depths of his grief, from running in 2016—as he explains movingly in his book, which is part-memoir for a beloved son, part-campaign tome.

He was also dissuaded by Barack Obama, who believed his deputy could not beat Hillary Clinton in the primary. He might have been wrong, especially if Mr Biden had entered the race before Mr Sanders began kicking up a storm. And he could certainly have beaten Donald Trump. Trading on his working-class roots and strong ties to labour unions, Mr Biden performs best in the post-industrial states, such as his native Pennsylvania, that swung the election for Mr Trump. He would also have presented a less easy target for the hard-right media than Mrs Clinton was.

But that was then, and now Mr Biden seems too old. His supporters say his faculties are as sharp as ever. But his audiences would be as likely to remember him as the Democrat vying to be the oldest man ever elected president. "He's much older than I thought he'd be," murmured the woman seated behind your columnist in Burlington, as the final applause faded away. Mr Trump and Mr Sanders, the standout performers of 2016, were also old. Yet the fact that they were politically unknown to most people mitigated the effect of that. Mr Sanders's largely unproductive Senate career also meant he had few political skeletons to hurt him in the primary; unlike Mr Biden, who voted for many things during his decades in Congress that he would be forced to account for. The lesson of the past two presidential elections is that voters want the most novel candidate available to them. This suggests that Mr Biden's current strength, his superior name recognition, would be a weakness.

Even in the flush of youth, in all truth, he was a lousy presidential candidate. His first run, in 1988 (the year before the Democrats' youngest incoming House member, Alexandria Ocasio-Cortez, was born) started weakly and fizzled quickly after he was caught plagiarising a speech by Neil Kinnock, a British politician. His second, in 2008, went the same way, after several gaffes, including his description of Mr Obama, his then rival, as unusually "bright and clean" for a black candidate. There is a post-Trump view that Mr Biden's foot-in-mouth propensity would come over as authentic and engaging. Yet his infelicities too often revive racial and gender stereotypes that no Democrat could get away with, let alone an old white male one. Mr Biden's tactility could be a similar problem. After a welcoming hug from the vice-president, the elderly mother of one of his then colleagues told him: "No man has touched me like that apart from your father!" Though he has never been accused of anything untoward, Mr Biden's notion of personal space does not accord with contemporary standards.

His top billing today probably says less about him than the Democrats' backward-looking frame of mind. Mr Biden represents a lifeline to the golden days of the Obama administration; the biggest cheers in Burlington came when he mentioned Mr Obama. It is even possible to read his book, of real-life grief and recovery, as a political allegory for the erasing of the Trump blot that Democrats dream of. The fact that Mr Biden's strengths, his conviviality and appeal to blue-collar voters, map Mrs Clinton's big weaknesses reinforces the sense that his prominence is about the past, not the future. And elections are the other way round.

There is more than Mr Biden's dignity at stake in this. The tremendous moral courage he has shown, in circumstances that every parent dreads, should resonate far beyond politics. It would be a shame to see it reduced to a footnote in a fiercely contested primary battle that he seems unlikely to win. That would also be a waste of Mr Biden's potential to act as a Democratic elder statesman, unifying the party's diverse candidates and parts.

Back to the future

Meanwhile, his prominence in the primary speculation is a barrier to progress. That is most obviously because the left has fresher, potentially better, working-class champions, who would be likelier to run if Mr Biden does not. Senator Sherrod Brown of Ohio is one. More broadly, it is unwise to think that Mr Biden's long-ago working-class roots are a substitute for the serious reappraisal of economic policy that the Trump insurgency makes urgent. Democrats need new blood. They also need new ideas. The admirable Mr Biden offers neither.

This article appeared in the United States section of the print edition under the headline "Biden his time"

Placating the masters of the universe

Mexico's new president presents a sober budget

But the calm in the markets may not last

Print edition | The Americas Dec 18th 2018

ANDRéS MANUEL LóPEZ OBRADOR, who became Mexico's president on December 1st, knows how to put the romance into a honeymoon. On December 13th thousands of people attended a free moonlit screening of "Roma", a Mexican film tipped for an Oscar, next to the heliport of Los Pinos, the residence of Mexico's presidents until Mr López Obrador took over. The culture ministry supplied popcorn and punch. Mr López Obrador, or AMLO, as he is known, has swapped Los Pinos for more modest digs and opened it up to the public.

Rocio Bonilla, a retired civil servant, watched with her 86-year-old mother, who remembers the first presidential occupant of Los Pinos, Lázaro Cárdenas, who took office in 1934. "I never thought I'd be allowed to come here," says Ms Bonilla.

While Mexicans huddled under blankets at the heliport, AMLO was making the sort of decisions that can eventually spoil a honeymoon. The veteran left-wing populist has begun to undo reforms of energy and education, the two landmark achievements of his predecessor, Enrique Peña Nieto. Before the inauguration he spooked the financial markets by saying that he would stop Mexico's biggest infrastructure project, a new airport for Mexico City. At the same time he is travelling about the country launching others, including a tourist train in southern Mexico and a refinery in his home state of Tabasco.

On December 15th AMLO presented a budget for 2019, giving Mexicans their first idea of the trade-offs he is prepared to make in pursuit of his "fourth transformation" of Mexico, which is supposed to uplift the poor, make the economy more self-sufficient and reduce corruption and crime. The budget shows that AMLO remains a populist, but that he hopes to be a fiscally responsible one.

After the fright he gave the markets by cancelling the airport (in response to a spurious vote badged as a "consultation" of the people that he held before taking office), AMLO sought to reassure investors. The finance minister, Carlos Manuel Urzúa, set a target for a primary surplus (ie, before interest payments) of 1% of GDP after an expected 0.8% this year. Although AMLO had suggested that preventing corruption would result in massive savings, the budget does not rely on that unrealistic promise. Instead, he had to make some hard choices. He has scaled back his plans for higher social spending, although these remain ambitious. He is speeding ahead with high-profile infrastructure projects, which cost less money. And he is bringing back the idea that the state should provide energy that is abundant and cheap.

He had planned to spend 125bn pesos ($6.2bn), about 0.5% of GDP, on scholarships for the young. That programme will get a little more than a third of that. The budget allocates 60bn pesos of new money for a universal pension for old people, 20bn pesos less than originally proposed. To help pay for these still-large programmes the government will slash elsewhere, in some departments by more than 20%.

An overhaul of migration policy will get little money. Marcelo Ebrard, the foreign minister, announced spending of $5bn a year to discourage migration from Central America to the United States—partly to please President Donald Trump. This seems to be a repackaging of other promises to spend money in southern Mexico.

The austerity will not affect AMLO's favourite infrastructure projects. On December 16th he attended an indigenous ceremony (pictured) in which he asked "Mother Earth" for permission to build the "Maya" tourist train. (Mother Earth's advocates in government have yet to be consulted. No environmental impact report on the project has been published; the budget cuts funding for the environment ministry by a third.) AMLO is eager to start work on the refinery. The budget includes 73bn pesos in extra funding for Pemex, the state-owned oil company, largely to pay for it.

This is part of his expensive scheme to make Mexico self-sufficient in energy. AMLO's government has not torn up contracts already agreed with international oil companies, an important part of Mr Peña's energy reform. But it plans to freeze auctions of rights to prospect for oil and gas for three years. AMLO hopes to cut fuel prices once the new refinery is built. Pemex, which has a history of inefficiency and corruption, is supposed to raise oil production by 50% during his six-year term.

Congress, which is dominated by AMLO's Morena party and its allies, is debating measures to scrap Mr Peña's education reform, which sought to enforce higher standards of teaching in Mexico's terrible schools. AMLO wants to make education free at all levels.

The costs of reversing Mr Peña's reforms will become visible only gradually. The government risks wasting billions in AMLO's attempt to restore to Pemex some of the glory it lost when Mr Peña ended its monopoly of oil extraction. Cuts to fuel prices will eventually burden the budget. Weaker accountability for teachers will lead to poorer performance by pupils.

The attempt to end the $13bn airport is causing immediate problems. Work on the doomed project continues, because the state-owned airport trust will have to repay $6bn of bonds when it is cancelled. It does not have the money, and AMLO does not want to pay out of the budget. Bondholders rejected an offer by the government to buy back a third of the bonds at a discount, and are unenthusiastic about a more generous offer. Until a solution is found, the cranes must continue to operate.

Continued construction of the airport and AMLO's conservative budget have soothed investors for now. But the calm may not last long. The budget assumes that the economy will grow by 2% next year, but some private-sector economists expect the increase to be smaller. A sharp drop in oil prices would upset the calculations on which the budget is based.

Mexico's supreme court has suspended a law that cuts the salaries of senior officials (including judges) and will rule in January on whether it violates public employees' rights. That pay cut would not save the government much money, but it was a popular promise. The court could inflict the first big defeat on AMLO'S young government. If that happens, grab the popcorn.

This article appeared in the The Americas section of the print edition under the headline "Placating the masters of the universe"

Killing the chicken

In a row between China and America, Canada gets trampled

Now Canada's relations with the world's second-biggest economy are in trouble

Print edition | The Americas Dec 22nd 2018

JUST HOURS before opening a flagship store in Beijing in December, Canada Goose, a maker of expensive parkas, cancelled the event. The proudly Canadian firm, based in Toronto, blamed delays in construction. More likely, it wanted to avoid protests against the arrest in Vancouver on December 1st of Meng Wanzhou, the chief financial officer of Huawei, a Chinese maker of telecoms equipment. She is also the daughter of the firm's founder, Ren Zhengfei. Shares in Canada Goose have fallen by more than 20% since news of Ms Meng's arrest.

Like the company, Canada itself is caught in a fight between the United States and China. Canadian police arrested Ms Meng on her way to Mexico under the terms of an extradition treaty between Canada and the United States. An American judge sought her arrest, alleging that Ms Meng committed fraud in order to violate American sanctions against Iran. China (and Ms Meng) claim the charges themselves are fraudulent. The United States fears Huawei, a hugely successful supplier of the equipment needed to build "fifth-generation" mobile-telecoms networks. It is suspicious of its ties with China's government. (No Chinese company as big as Huawei is free of Communist Party influence.) China contends that Ms Meng's arrest is meant to undermine the company.

Rather than retaliate against the United States, which is waging a trade war against it, China is punishing Canada. Citing national security, it has detained two Canadians, Michael Kovrig, a diplomat on leave who is advising the International Crisis Group, an NGO that tries to prevent conflict, and Michael Spavor, a businessman. According to a person familiar with the situation, Mr Kovrig is being questioned "morning, afternoon and evening" and is not allowed to turn the lights off when he sleeps. David Mulroney, a former Canadian ambassador to China, said in a television interview that China is using an established tactic of "kill the chicken [Canada], scare the monkey [United States]".

The row comes at a bad time. Donald Trump bludgeoned Canada (and Mexico) into renegotiating the North American Free Trade Agreement. The new United States-Mexico-Canada Agreement was signed in November. Mr Trump has yet to lift heavy tariffs on Canadian (and other countries') aluminium and steel. Justin Trudeau, Canada's prime minister, had hoped to reduce the country's dependence on the United States, which buys three-quarters of Canadian goods exports and supplies half of Canada's imports. China had looked the most promising alternative partner. The Huawei dust-up has put that relationship in jeopardy. Talks about a possible free-trade agreement, which began in 2016, face "new obstacles", said Lu Shaye, China's ambassador in Ottawa, on December 14th.

Seeking to cool China's ire, Canada points out that Ms Meng's arrest was not political. An independent court issued the order (and released her on bail of C$10m, or $7.5m). But Mr Trump undermined that argument by saying he would intervene if that would help secure a good trade deal with China. Chrystia Freeland, Canada's foreign minister, begged Mr Trump not to politicise the extradition process.

More perils lie ahead. One is a final decision on whether to extradite Ms Meng, which will be made by the attorney-general, a member of Mr Trudeau's cabinet (and thus a politician). That will come after the United States files a formal extradition request. Canada's government has been debating whether to ban the use of equipment from Huawei to build Canada's 5G networks, as the United States, Australia and New Zealand have already done. That would provoke China even more. Canadian executives in China now fear joining Mr Kovrig and Mr Spavor in detention.

In happier times the two governments designated 2018 the year of tourism; Canada had hoped to double the number of Chinese visitors to 1.2m by 2021. Its tourism minister cancelled a trip to China for the closing ceremony. If the spat continues, it will not just disrupt holidays.

This article appeared in the The Americas section of the print edition under the headline "Killing the chicken"

Politics in Sri Lanka
Restoration drama

Restoration drama

Sri Lanka's prime minister regains office, humiliating the president

But there may be more theatrics to come

Print edition | Asia Dec 22nd 2018

ALL'S WELL that ends well, or so Shakespeare would have it, when a seeming tragedy turns into a heart-warming story of persistence and redemption. Such was the relief that Sri Lanka felt on December 16th, as seven weeks of political turbulence ended like a summer squall. After a period when the country had first two bickering governments and then no government at all, Ranil Wickremesinghe returned to office as prime minister just as suddenly as he had been tossed out in October.

It was reassuring to see democracy prevail. After much suspense, the legislative and judicial branches joined forces to contain a dangerous lunge by President Maithripala Sirisena to expand executive power. It was also, for many, satisfying to watch the lushly mustachioed former strongman, Mahinda Rajapaksa, exit the stage with a scowl, having failed to usurp the premiership that Mr Sirisena had tried to seize for him. Yet as every Sri Lankan knows, the events of the past few weeks represent only one act in a much longer play. The island of 22m remains riven with bitter divisions, economically precarious and dangerously prone to high-pitched populism. With presidential, legislative and provincial elections all due within the next two years, the current intermission will not last long.

The curtain rose on the just-concluded act on October 26th, when Mr Sirisena, chafing after three years of "cohabitation" with Mr Wickremesinghe, abruptly fired his prime minister. The two were ostensibly allies. In 2015 the liberal-leaning Mr Wickremesinghe (pictured) had given crucial backing to Mr Sirisena's bid for the presidency. Together they formed a broad coalition that successfully ended the ten-year rule of Mr Rajapaksa, under whom the army brutally crushed a quarter-century rebellion by minority Tamils, but whose government also leant towards nepotism, repression and cronyism, and towards China rather than such traditional partners as India and the West.

At the start of his term Mr Sirisena spewed venom against Mr Rajapaksa, from whose party he had only recently split. He also enthusiastically embraced a constitutional amendment designed to trim executive powers, and so to prevent the return of a strongman president. As time passed Mr Sirisena was known to feel growing discomfort with Mr Wickremesinghe. Not only was the prime minister a more urbane and annoyingly aloof man. His liberal United National Party (UNP) pursued a range of policies, from post-war justice and reconciliation to fiscal reforms, that angered Mr Sirisena's prickly, nationalist followers.

Yet it still came as a shock when the president followed the sacking of Mr Wickremesinghe by swearing in Mr Rajapaksa to succeed him. More shocking still were Mr Sirisena's antics in subsequent weeks, as it became increasingly clear that he had breached the limits that he himself had helped set to presidential power. The president first sent parliament on a holiday, reckoning that during their furlough Mr Rajapaksa would be able to win over enough UNP members to gain a majority. When it became clear that Mr Wickremesinghe still controlled parliament, the president disbanded it, calling for a snap election, so breaking a rule that such action can only be taken four and a half years into a parliamentary term.

Even as Mr Rajapaksa's men took over ministries and issued decrees, things began to unravel. Mr Wickremesinghe, for one, refused to quit his official residence. The country's Supreme Court first put a hold on the dissolution of parliament, allowing it to prove repeatedly that Mr Wickremesinghe retained a majority. Then, by seven judges to none, the court ruled the president's act unconstitutional. Another court, meanwhile, had suspended Mr Rajapaksa's government, and looked set to declare it invalid. Mr Sirisena, who only a week before had sworn he would never appoint Mr Wickremesinghe, even if all 225 MPs insisted on him, gave in.

There is much to cheer in this outcome. Sri Lanka's governing institutions and civil society proved strong enough—just—to withstand an assault not just by a rogue president but by a charismatic populist skilled at stoking majoritarian Sinhalese Buddhist sentiment, and backed by big money and powerful interests, particularly in the security establishment. Mr Rajapaksa's return had looked increasingly likely; now he stands disgraced in the eyes of many. The crisis may also empower Mr Wickremesinghe's government, so far lacklustre in its achievements, to push through parts of its agenda that the president has sabotaged.

But judging from backstage whispers, the next acts of the play could still be ugly. Mr Sirisena, who is now supposed to work with Mr Wickremesinghe, has accused him of wanting to "punish the servicemen who saved Sri Lanka and protect the Tamil fighters who tried to destroy it". Mr Rajapaksa in his resignation speech rapped his rivals as "anti-national" traitors. Henchmen blame outside meddling for their ouster, telling supporters that "certain foreign nations" siphoned millions of dollars to NGOs

that interfered with national security. Sri Lankans are used to loud, nasty politics, but this kind of talk does not fit a plot with a happy ending.

This article appeared in the Asia section of the print edition under the headline "Restoration drama"

Hybrid heaven

Everyone in Mongolia drives a Prius

The cars are cheap, fuel-efficient and easy to start in the cold

Print edition | Asia Dec 22nd 2018

THE MELLOW thrum of the Toyota Prius is to the streets of Ulaanbaatar what the screech of brakes and honk of horns is to New York: omnipresent. Beloved of eco-warriors worldwide, the Japanese car dominates the streets of Mongolia's capital. If you stand on the corner of Sukhbaatar Square in the city centre, a good half of the passenger vehicles you see sailing past are Priuses. Dozens of garages cater exclusively to them. According to UN trade data and *The Economist*'s estimates, some 60% of Mongolia's car imports last year were hybrids.

They are popular in Mongolia, as elsewhere, because hybrid engines are efficient and fuel costs low. The cars themselves are also cheap: according to the UB *Post*, a local newspaper, you can pick up a used Prius for as little as $2,000. That is partly because most Mongolian ones are second-hand imports from Japan, where passenger vehicles more than three years old must undergo expensive safety tests. Rather than shell out for those, many Japanese drivers buy a new car. (That is the point of the tests, some say: to boost domestic carmakers.) In 2017 Japan exported 30,000 hybrid vehicles to Mongolia.

In addition, the government has exempted hybrids from various taxes, in an attempt to clear the air in Ulaanbaatar. The city is one of the most polluted in the world in winter because of the widespread use of coal for heating and power generation. Hybrid vehicles enter the country duty-free and, unlike most cars, are exempt from an air-pollution tax.

But the clincher is the Prius's reliability. Ulaanbaatar may be the chilliest capital in the world. On a winter morning drivers must sometimes start their cars in temperatures below -30°C. Cars that run on petrol and diesel tend to sputter and die at such temperatures. The Prius can use its battery to power its electrical engine until the car warms up enough for the petrol engine to run smoothly—saving many a Mongolian from freezing frustration.

This article appeared in the Asia section of the print edition under the headline "Hybrid heaven"

Shackles of the past

Japanese firms resist compensating forced wartime labourers from Korea

The Japanese government argues that South Korea has waived such claims

Print edition | Asia Dec 22nd 2018

JAPAN'S ACTIONS during the second world war cast a long shadow, especially in South Korea. Only in 1965, twenty years after Japan's colonisation of the Korean peninsula ended, did the two countries agree to re-establish relations. They have been thorny ever since. A serious spat started in the autumn when the Supreme Court in Seoul upheld judgments in the lower courts against two Japanese firms, Mitsubishi Heavy Industries and Nippon Steel & Sumitomo Metal Corp, obliging the pair to pay compensation to South Koreans forced to work for them during the war. More such cases are coming through the courts.

On at least one occasion Japanese companies have settled privately with former forced labourers from China, says Seita Yamamoto, a Japanese lawyer. The sums awarded in the South Korean rulings look affordable, at between 80m and 150m won ($71,000-133,000) per plaintiff. But Japan's government, which deems the rulings "unacceptable", is pressing the companies to refuse to pay. It asked the South Korean government to intervene. South Korea's president, Moon Jae-in, says he will not interfere in the judicial system.

Japan contends that the treaty re-establishing relations with South Korea voids the plaintiffs' claims. It says the economic aid it gave South Korea at the time was intended as compensation for wartime abuses. Japanese courts have rejected similar demands for compensation on that basis. If the money did not reach the victims, a senior Japanese official says, that is the fault of the South Korean government.

South Korea's courts and government dispute that reading. They point out that in 1992 and for several years afterwards Japanese officials accepted the idea that individual victims of their country's wartime regime could seek compensation. Japanese officials have also argued that victims of the atom bombs dropped on Hiroshima and Nagasaki can sue the American government, despite Japan's renunciation of such claims in the treaty ending the war between Japan and America.

But the problem runs deeper than these legal arguments. "The court rulings are not only a cause but also an effect of our bad bilateral relations," says Junya Nishino of Keio University in Tokyo. South Koreans feel that Japan has not taken full responsibility for its past. West Germany, for instance, tried German war criminals itself, in addition to the trials conducted by the occupiers in the aftermath of the war. And in 2000 the German government and companies such as thyssenkrupp that had used forced labourers under the Nazis set up a joint fund to compensate them. By the time it shut in 2007 it had paid out €4.4bn ($5.8bn at the time) to 1.7m people. Japan has done nothing of the sort.

In 1995 the Japanese government acknowledged its wartime aggression and apologised to Asian victims. But under Shinzo Abe, the current prime minister, it has back-pedalled, at least in tone. Mr Abe's grandfather, Nobusuke Kishi, helped to administer Manchuria when it was a puppet state hived off from China and advocated using slave labour to increase Japan's wartime output. In the 1950s he became prime minister. "There have been a lot of apologies but deep within, I don't think the Japanese are sorry for what they did," says Hideki Yano, who heads an NGO in Tokyo that lobbies for victims of forced labour.

It does not help that the South Korean regime that made peace with Japan was an authoritarian one, which cared more about economic development than history or justice. "Nobody here listened to the victims before South Korea became democratic," says Lim Jae-sung, the lawyer for the plaintiffs against Nippon Steel. The collapse, in part due to the South Korean government's fickleness, of an agreement between the two countries on compensation for Korean women forced into sexual slavery during the war has added to the rancour. South Korean lawyers say they will move to freeze assets of Nippon Steel if it does not start implementing the ruling by December 24th. That would lead to a harsh response, says the Japanese official.

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Banyan

Pakistan's army is behind an unprecedented clampdown on the media

Publishers and producers receive detailed dos and don'ts from men in uniform

Print edition | Asia Dec 22nd 2018

UPON SUPERFICIAL inspection, Pakistan's market for expression is enjoying a golden age. This is a still a land of broadsheet newspapers, in both Urdu and English. Television channels only multiply. The country hardly lacks for people with a point of view, with regiments of columnists and teeming opinion-formers on social media.

This picture of a thriving, vibrant press is one that many in authority would love the world to believe. It fits with the narrative that Pakistan's democracy is alive and healthy, and no longer plagued by military meddling. After all, at elections in July one lot of civilians, the Pakistan Tehreek-e-Insaf, led by Imran Khan, turfed out another lot, the Pakistan Muslim League-Nawaz.

All is not what it seems, however. For a start a fiscal crisis has walloped the media, which rely on advertising from government agencies and state-owned companies. Owners talk of the pain of having to fire journalists and cut operations. "We are all paring ourselves to the bone just to survive," says one. "Every day the challenge is just to put out the paper."

Worse, the army is using the crisis to reinforce an even more disturbing trend: its tendency to strong-arm journalists and bloggers, behind the scenes, to suppress all criticism, not just of the armed forces directly, but also of the policies they hold dear. The army, for example, clearly feels that it should be the sole judge of threats to national security. It decided that Nawaz Sharif, Mr Khan's predecessor as prime minister, was one such. Two years ago at a national-security meeting, Mr Sharif and his government seem to have confronted the generals over their support for violent extremism. The army considers various militant groups useful, either because they extend Pakistan's influence into Afghanistan (the Haqqani network) or because they discomfit India (Lashkar-e-Taiba). But supporting these outfits undermines Pakistan's relations with America and India, among others—a situation Mr Sharif was keen to reverse.

The meeting was the beginning of the end for Mr Sharif, whose downfall and defeat in the subsequent election the army helped engineer. It also marked the start of the persecution of *Dawn*, Pakistan's best-known newspaper, whose star columnist, Cyril Almeida, broke the story. Just before the election *Dawn* suddenly found itself denied distribution in several cities. Meanwhile, Mr Almeida may face treason charges for an interview with the former prime minister in which Mr Sharif made the shocking point that Pakistan should get along better with India.

Media types say they cannot report on the army's constant interference in public life. Instead, they are under immense pressure to support Mr Khan and demonise Mr Sharif. Other out-of-bounds topics include the disappearance of advocates of self-rule in the province of Balochistan or in tribal areas in the north of the country. And though it is fine—indeed, expected—to rail against graft among politicians, don't dare ask why the army is allotted so much land to dole out to officers (including the previous army chief, Raheel Sharif, who received 90 acres outside Lahore on retirement).

Bloggers who cross the line vanish into army custody, only to reappear chastened and docile. Publishers and producers say that orders about what to cover and how come in meetings with army officers, or warning calls from anonymous numbers. Threats of closure are not taken lightly. In March Geo, Pakistan's biggest television station, found itself off the air in much of the country for a month—supposedly the spontaneous decision of hundreds of cable-providers. Private lawsuits are used to harass journalists deemed to be enemies of the state. In this environment, self-censorship flourishes. As one veteran journalist puts it, "I have never in my life experienced anything as tough as this."

The question is, why now? One theory is that a younger generation of army officers, drawn from the lower middle classes and bloodied in the fight against home-grown militants who turned on the army, have a more Messianic impulse than older, whisky-swilling generals. After the extent of the army's intervention in civilian affairs and foreign policy was revealed by Mr Sharif, this cohort's reaction was not to retreat, embarrassed, from the political sphere. Rather it sought to co-opt Mr Khan and sculpt an administration more to its liking. If so, there are lessons for Mr Khan, whose government is struggling to find a sense of direction. Once upon a time the army helped Mr Sharif into power, too.

This article appeared in the Asia section of the print edition under the headline "Stop the presses!"

Parleying with the PLA

The US and Chinese armies struggle to learn how to talk to each other

A big problem is China's unwillingness to open up

Print edition | China Dec 18th 2018

"YOU ARE on dangerous course," barked a Chinese sailor aboard the *Lanzhou*, a destroyer, over the ship's radio on September 30th. "If you don't change course you will suffer consequences." The vessel picked up speed and overtook the USS *Decatur*, an American destroyer, which was conducting a "freedom of navigation operation" (FONOP, in Pentagon jargon) near reefs in the South China Sea that are claimed by China, the Philippines and Vietnam. "We are conducting innocent passage," insisted the *Decatur*. She sounded five short blasts with her whistle as the *Lanzhou* closed in, passing within a hair-raising 41 metres. "They were trying to push us out of the way," notes an American sailor, narrating a video of the incident. Had the *Lanzhou* misjudged and smashed into the *Decatur*, lives might have been lost.

If the ships had collided, how would the two countries have responded? There have been several such nail-biting encounters between Chinese and American ships and aircraft. The record has not always been reassuring. James Fanell has not forgotten a moment in 2009 when he was director of intelligence for the Seventh Fleet. He was told that Chinese vessels had surrounded the USNS Impeccable, an unarmed American survey ship, in international waters near China's Hainan island.

The Americans feared a repeat of what happened to the *USS Pueblo*, a vessel that was seized in 1968 by North Korean forces. In 2001 an American aircrew had been detained for 11 days on Hainan after their EP-3 spy plane had collided in mid-air with a Chinese fighter jet and made an emergency landing on the island. "Are we prepared for the Chinese to board?" asked an American admiral as he worked to manoeuvre other ships close to the *Impeccable*. The standoff was ended, says Mr Fanell, by an American diplomat in Beijing who was alerted while cycling through the city on a Sunday. He dashed back to the embassy and managed to raise his Chinese contacts who, luckily, proved to be useful ones.

Ten years after the *Impeccable* incident, American and Chinese ships and aircraft are at even greater risk of closer encounters in and over Asian waters. China has been building islands on contested rocks in the South China Sea and turning them into military outposts. America has stepped up its FONOPs. The two countries' armed forces remain woefully ill-prepared to defuse any unexpected crises or to avoid misunderstandings that might arise from military movements.

Relations between the Chinese and American defence establishments are not as rocky as they once were. It used to be that communications were routinely broken off just when they were needed most—during crises such as those over Taiwan in 1996, America's bombing of China's embassy in Belgrade in 1999 and the EP-3 incident in 2001. Since then there have been fewer disruptions. This is partly because there have been fewer flare-ups on such a scale. But the two armed forces have also been trying harder to keep their relations steady. After Xi Jinping became China's leader in 2012 he stepped up the country's push into the South China Sea. But Mr Xi also ordered officers to strengthen ties with their American counterparts.

That led to some important agreements. In 2014 the two countries endorsed a Code for Unplanned Encounters at Sea (CUES) which China had previously rejected. Memos exchanged in 2014 and 2015 laid down clearer rules for aircraft and ships operating close to those of the other country. Among other things, these discouraged pilots from making "unfriendly physical gestures" from their cockpits. Dangerous intercepts of American aircraft by Chinese ones, common between 2011 and 2013, became rarer by 2014. "Encounters between our forces at sea and in the air are generally safe," said Admiral Harry Harris, then America's military chief in Asia, last year. But the *Decatur*'s close call showed that perils persist.

One mechanism for reducing them is the Military Maritime Consultative Agreement, reached two decades ago. It has provided a forum at which mid-ranking officers can explain their version of incidents that have occurred. Some American officials complain that China uses these occasions to recite political talking points. But most of them say that the agreement plays a valuable role.

Please leave a message

For more urgent problems there is the Defence Telephone Link, established in 2008. This is not a hotline, says Roy Kamphausen of the National Bureau of Asian Research, a think-tank, who previously served as an American military attaché in Beijing. Rather, it is an "I'll get back to you as quick as I can" line. The protocol for using it was streamlined in 2015, but American and Chinese officials still fax each other requests and pre-arrange calls, a process that can take days.

The two military systems face more fundamental obstacles in their efforts to communicate. America's approach, says Mr Kamphausen, is to build trust from the bottom up, whereas for China "trust is earned at the top and conveyed downward." And

even if the head of America's Pacific Fleet could parley instantaneously with his Chinese counterpart, other steps would be required to defuse a crisis since a Chinese navy chief cannot proceed without the approval of a political commissar, who in turn may have to consult others.

Getting to know each other better may be even trickier in these times of tension over trade and other matters. Last year General Joseph Dunford, chairman of America's Joint Chiefs of Staff, travelled to Beijing (see picture) and launched what was intended to be a regular gathering of senior generals, the Joint Staff Dialogue Mechanism. But it did not reach its second birthday. China called off this year's meeting in a huff after a row over American sanctions on a Chinese military unit involved in importing arms from Russia.

Drew Thompson of the Lee Kuan Yew School in Singapore, a former head of the Pentagon's Asia desk, recalls being told that military-to-military talks with China were like watching paint dry. "I discovered that it's more like Chinese lacquer, putting layer upon layer. Eventually it'll be something beautiful. But the process can be slow and painful," he says. Another crisis may erupt long before it is complete.

This article appeared in the China section of the print edition under the headline "Parleying with the PLA"

Wise qiouice

China picks the most popular terms of the year

The public may not agree with the Communist Party's preferences

Print edition | China Dec 22nd 2018

EVERY DECEMBER millions of Chinese netizens vote for a word and phrase that best capture the spirit of the preceding year in China. The Communist Party's hand is highly visible. The competition is jointly organised by the website of the *People's Daily*, the party's mouthpiece; Commercial Press, a state-backed publisher; Tencent, an internet giant; and a think-tank under the education ministry. Internet users are invited to propose candidates. But the shortlists presented to voters comprise terms that the party itself endlessly repeats or that it deems sufficiently anodyne.

In 2017 the winning Chinese character was *xiang*, which means either to enjoy or to share (the fruits of China's prosperity, naturally). In 2016 it was *gui*, meaning rules (the party uses them to strengthen its control). Repeat winners include *zhang*, meaning grow, which romped to victory in both 2007 and 2010. The separate category for the most popular phrase has resulted in similar triumphs for party-speak. Last year's victor was "original intention", referring to the party's founding goals.

This year's finalists are true to form. As *The Economist* went to press the leading candidate for character of the year was *fen*, meaning to strive, one of President Xi Jinping's favourite words (the results will be announced on December 20th). By contrast, Japanese voters recently picked *sai*, meaning disaster, as the *kanji*, or Chinese character as used in Japanese, that best represented the year 2018. Winning *kanji* from previous years have also tended to be more downbeat than their equivalents in China.

This is hardly surprising. China's shortlists are prepared by a panel of "experts" who would hardly dare pick words that clash with the party's relentlessly upbeat line. But it is possible to find clues as to which characters or phrases would be truer reflections of public sentiment. Baidu, China's leading search engine, recently revealed its site's most searched-for terms in 2018 relating to domestic events. Among the hottest was "vaccine incident". It refers to a scandal involving the injection of defective doses into possibly hundreds of thousands of children. It is conspicuously absent from this year's official shortlist of phrases-of-the-year. Among those that did make the cut are such yawn-inducing terms as "private enterprise", for which Mr Xi pledged his "unwavering" support in October, and "import expo", referring to a big trade show that he attended in Shanghai in the following month.

The biggest official snub, however, goes to *qiou*, a made-up character that is an amalgamation of three others: *tu*, *qiong* and *chou*. It is used to mean dirt-poor and ugly. *Qiou* is hard to write using Chinese-language software, which tends to struggle with characters not found in dictionaries—the face in our illustration incorporates the *qiou* character. (Even its romanisation is an invention, reflecting the word's portmanteau origins: *qiu* is the conventional form for a character pronounced this way.) In early December the hashtag for *qiou* on Weibo, a Chinese version of Twitter, surged to 16th place on the top-50 trending list. One Chinese news site declared *qiou* the unofficial Chinese character of 2018. Even the website of the *People's Daily*, in a recent Weibo post, acknowledged the cultish following of *qiou*.

The word is used self-deprecatingly, not as a form of abuse. But that does not make it any more acceptable to the party, which likes to think of young Chinese as brimming with confidence in their ability to lead a prosperous life. *Qiou* is used to describe the angst of many young Chinese who feel excluded from a society that obsesses over physical appearance and wealth. The mainstream view is that desirable men are *gao-fu-shuai*—tall, rich and handsome. And the ideal woman is *bai-fu-mei*—pale-skinned, rich and beautiful. As one bitter commentator quipped, "Once *qiou*, always *qiou*."

This article appeared in the China section of the print edition under the headline "Wise qiouice"

A prince fails to charm

Saudi Arabia's economic reforms are not attracting investors

Or creating jobs

Print edition | Middle East and Africa Dec 22nd 2018

DRIVE AROUND Riyadh and Saudi Arabia's economy looks vibrant. Malls in the capital are crowded with shoppers and staff. Young people are eager to spend money on entertainment now that the once-feared religious police are off the streets. The city feels like a building site, with workers breaking ground on new hotels and shopping centres. The Saudi stockmarket is up by more than 9% this year. GDP is projected to grow by 1.9% and the non-oil sector by 2.3% next year.

This suggests "Vision 2030", the kingdom's ambitious plan to diversify its economy, is working. It aims to create jobs, attract investment and develop industries, such as tourism (see article). For decades oil-rich Gulf states have made similar promises, only to backtrack when the price of oil rises. Muhammad bin Salman, Saudi Arabia's powerful crown prince, has kept his country on course better than his predecessors. But the progress is illusory. Dig past the headline numbers and, so far, the results of Prince Muhammad's reforms are disappointing.

Take the stockmarket. It looks healthy in part because the government is secretly propping it up by placing huge buy orders to counter sell-offs following recent political crises, according to the *Wall Street Journal*. The GDP figures are also misleading. The economy remains yoked to oil. Higher prices for the black stuff, notwithstanding a sharp fall in recent months, are boosting all sectors. But for an economy with rapid population growth coming out of recession, the performance is hardly stellar. Three years ago GDP growth stood at 4%.

Prince Muhammad wants foreign investors to think that Saudi Arabia is a safe bet. But his capricious policies, from the locking-up of wealthy Saudis in 2017 to pointless diplomatic feuds with Canada and Germany, are scaring them off. Foreign direct investment fell to $1.4bn (0.2% of GDP) in 2017, from $7.5bn the year before. An investment conference in Riyadh in October was overshadowed by the grisly murder of Jamal Khashoggi, an exiled Saudi journalist, in a Saudi consulate in Turkey. Rich Saudis are trying to move their money abroad: $80bn left the country last year.

There have been steps to improve the investment climate, including a new law to bring order to Saudi bankruptcy procedures. Projects once dominated by the state are now planned as public-private partnerships. The housing ministry, for example, wants private firms to stump up most of the estimated $100bn required to build 1m affordable homes. More than 1.5m Saudis are on a waiting list for subsidised housing.

When he courts investors, though, Prince Muhammad focuses on state-directed mega-projects like Neom, a futuristic $500bn city staffed by robots on the north-western coast. Little has been built. On December 10th he broke ground on Spark, a $1.6bn "energy city" in the east that is meant to create 100,000 jobs. Such schemes rarely work. The King Abdullah Financial District, a $10bn project in Riyadh, still has more buildings than banks.

Rising oil revenues and austerity measures, such as cuts to subsidies and a new 5% value-added tax, have helped drastically reduce the budget deficit. The government has duly increased public spending, the lifeblood of the economy. Saudis are buying more than they did during the recession. But many still feel pinched. Retail sales are sluggish, especially for big-ticket items. The number of retail jobs has fallen by 177,000 since 2017, negating the government's efforts to create opportunities for Saudis by banning foreigners from many sales jobs.

Jobs are Saudi Arabia's most immediate headache. It needs to create 1.2m of them by 2022 to meet its target of 9% unemployment for Saudi citizens. To free up work for them, it is discouraging the hiring of foreigners. Since January 2018 firms have been charged 400 rials ($107) per month for each foreign worker, with a discount if they employ more Saudi nationals than expatriates. The levy will double by 2020. Migrants pay another fee for each of their dependents. At first glance these charges seem to be working. Almost 1m foreign workers have left the kingdom since the start of 2017.

But Saudis are not replacing many of them. Construction has been disproportionately affected. It employs 45% of the expats and accounts for 60% of the exodus. The number of Saudis working in construction, though, has also fallen. Overall, since January 2017, the number of Saudis in work has grown by less than 100,000; the unemployment rate has increased by 0.2 percentage points, to 12.9%. Jobs once held by migrants are not being filled because they no longer exist. "You have these expats with low skills, low wages, and you can easily not renew their contracts," says Abdullah al-Hassan, a government economist.

Young Saudis are reluctant to work with their hands—and anyway firms cannot afford them. A low-skilled foreign worker takes home around 1,500 rials each month. The de facto minimum wage for Saudi citizens is 3,000 rials. The pay gap is much

narrower for skilled jobs and there is a pool of talent eager to do such work: 56% of Saudi jobseekers hold at least a bachelor's degree. Officials have therefore discussed putting the migrant fees on a progressive scale, linked to income.

Though many of them are unemployed, young Saudis, who make up a majority of the population, still speak enthusiastically about Prince Muhammad. Having alienated the kingdom's clerics and other princes, he relies more on their support than past Saudi rulers did. His bold (some say rash) style is popular with them, but it worries investors. Without foreign money the prince will find it difficult to keep all of those young Saudis happy.

This article appeared in the Middle East and Africa section of the print edition under the headline "A prince fails to charm"

Justice, eventually

Unlike other Arab regimes, Tunisia's remembers old crimes

A truth commission captivates the nation where the Arab Spring began

Print edition | Middle East and Africa Dec 22nd 2018

AN ARABIC PROVERB holds that "what is past is dead." Eight years after the Arab spring most Arab regimes treat these words as policy. Though Egypt prosecuted a few ministers from Hosni Mubarak's era, the ex-dictator is enjoying a placid retirement. The abuses of the current regime, which massacred hundreds of its own citizens in 2013, are not discussed. Rebels in Libya and Yemen killed their strongmen only to commit new atrocities. Bashar al-Assad wants the world to forget how he stoked a civil war and laid waste to Syria.

Tunisia is different. On December 14th its Truth and Dignity Commission (known by its French acronym, IVD) held its final public meeting. Modelled on South Africa's post-apartheid Truth and Reconciliation Commission, the IVD's mandate goes back to 1955, a year before Tunisia gained independence from France. Most of its work has focused on the dictatorship of Zine el-Abidine Ben Ali, who ruled the country from 1987 until 2011. By the end of 2018 it will hand the government its final report, a compendium of the *ancien régime*'s crimes based on interviews with nearly 50,000 witnesses, about one Tunisian in 230.

Many brought tales of torture in dark dungeons, family members who disappeared and corruption by policemen and civil servants. Few had evidence of crimes that occurred decades ago. "The victims have the right to forget," says Sihem Bensedrine, the head of the commission. "The obligation is on us to establish the truth." The government made that task difficult. Both the interior ministry and military courts refused to give the IVD access to their files. Earnest critics accused Ms Bensedrine of mismanagement; mendacious ones called her corrupt.

About 20 cases have already gone to trial in special courts. Faysal Baraket's family never believed that he died in a car crash in 1991. They thought the university student was tortured to death by police for joining a then-banned Islamist group. A judge eventually ordered his body to be exhumed in 2013, and 21 officers are now on trial for his murder. Another 16 defendants have been charged with crushing a riot in 2008 by miners in Gafsa, an impoverished city in the west.

The president, Beji Caid Essebsi, is not eager to prosecute thousands of other cases. A member of the old regime, he has spoken about letting go of the past. In March his government voted not to extend the IVD's mandate, originally due to end in May (a court later overruled the decision). He is also mired in a political crisis. His party, Nidaa Tounes (NT), is an unwieldy coalition of wealthy businessmen, labour leaders and old-regime figures that is run by his son, Hafedh. About half of its MPs have defected since the election in 2014. Some support Youssef Chahed, the technocratic prime minister, who had jostled for power with Hafedh. NT suspended Mr Chahed in September. His "war on corruption" has targeted people close to the party.

There is much still to do in Tunisia's nascent democracy. The security forces are far from reformed. Too many corrupt officials still wield power. The IVD's report may yet be forgotten.

For all its flaws, though, the IVD was unprecedented in the Arab world. Millions of Tunisians were transfixed by its televised sessions, where victims gave stark testimony to a live audience. Activists in other Arab countries tuned in as well for a glimpse of what their own leaders deny them. There was a certain symmetry to the commission's final session, held almost eight years to the day after Muhammad Bouazizi, a poor fruit vendor, set himself ablaze after being robbed by police, igniting the Arab spring. Two groups of protesters gathered outside. One held portraits of the victims. The other waved signs denouncing "the justice of revenge". Police simply stood between them. No one was beaten with truncheons or whisked away to oubliettes.

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The Lord of the Isles

Intrigue in the world's most coup-prone island paradise

President Azali Assoumani wants to rule the Comoros by decree

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RUNNING A MINORITY government is rarely easy. When your party has just one seat in parliament, it should be impossible. Yet Azali Assoumani, the president of the Comoros (pictured), has largely been given a free hand by MPs. They did not demur when he dissolved the anti-corruption authority after returning to office in 2016, nor when he suspended the constitutional court in April. "Whenever there is a key vote, the government wins," says Ibrahim Soulé, an MP for Juwa, an opposition party.

The Comoros is corrupt, so bribery may explain the parliamentary acquiescence. Since independence from France in 1975, there have been at least 21 coup attempts (not all have been successful). Mr Azali himself led one in 1999. A power-sharing deal restored some stability in 2001. But in July the president forced through a referendum that ruined the agreement. The presidency will no longer rotate among the country's three querulous islands. Mr Azali, previously allowed a single five-year term, can stand for another two.

Many of the islanders are seething. Intrigue abounds in the twisting alleys of Mutsamudu, the regional capital of Anjouan, the second-largest of the three main islands. In October masked gunmen seized control of its old town. Two people were killed in a week-long army counter-offensive. Who was behind the raid, or what the attackers wanted, is unknown. The government arrested Anjouan's Juwa governor, accusing him of insurrection. But it cannot explain how the fighters slipped through a tight army cordon and sailed away.

Anjouan and Moheli, the smallest island, have long feared subjugation by Grande Comore, the biggest. In 1997 both tried to secede, asking to be recolonised. France refused. Mr Azali is from Grande Comore, so suspicions are mounting again. "Anjouan is a volcano that could erupt at any moment," says a local journalist.

Yet opposition to Mr Azali is growing even on Grande Comore. Allies have scarpered, including his party chairman. Juwa says 100 of its members have been arrested, including its leader. Private radio stations have been closed. Having called an early election in March, the president is removing potential rivals, critics say.

Mr Azali has his defenders. With just 800,000 people, the Comoros can ill afford to run both central and regional administrations, they say. Snarl-ups have prevented the country from exploiting its oil and gas reserves. The new system should be more stable and allow the president to pursue development, says the government.

Western governments are still worried. Comorians fleeing poverty and repression often end up on Mayotte, a nearby French-owned island. The far right in France claims that immigration to this overcrowded territory could be a back way into the motherland.

The African Union has tried to mediate. But Mr Azali was intractable and the opposition walked out. Isolated at home and in the West, he is buttering up new allies. Last month he won Russian backing after withdrawing Comorian recognition of Kosovo. And he has aligned with Saudi Arabia, severing ties with Qatar.

Yet the Comorian parliament has finally found some backbone. In November MPs declined to debate a bill to let Mr Azali rule by decree and to stop the electoral commission from overseeing next year's poll. Furious, the president sacked the opposition's representative on the commission. At the end of a 90-minute speech denouncing MPs and promising to rule without them, he tumbled to the ground, pulling the podium down on top of himself. Some Comorians hope that their president, impervious to all else, may be stopped by ill health.

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General panic

Why did Nigeria ban UNICEF?

The army has absurd ideas about what the baby-vaccinators are up to

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EVEN AT THE best of times Nigeria is awash with speculation. Ask otherwise sensible people who is really behind Boko Haram, a jihadist group, and conspiracy theories come pouring out. National politicians have stoked the fighting, some say. No, others retort: it was American and British spies who started it. Not a shred of evidence supports these theories. Nor is there any plausible reason why any of them might be true. But none is as bonkers as the latest one from Nigeria's army.

On December 14th Nigeria suspended the operations of UNICEF, the UN children's fund, accusing it of spying for Boko Haram. The two groups do not obviously share a common interest. One saves children's lives. The other uses them as human bombs. Nonetheless, commanders insisted that UNICEF was "training selected persons for clandestine activities". They added that there was "credible information" that foreign aid agencies and NGOs were training and deploying spies for Boko Haram.

This was so absurd that, within hours, the army was forced to lift the ban on UNICEF. Still, damage has been done. By obstructing (and implicitly threatening) aid workers, the army has put lives at risk. After almost a decade of conflict with Boko Haram in the north-east of the country, some 1.8m people are unable to return to their homes. Many rely on the UN for food and other essentials. More than 1.1m get clean water through UNICEF projects.

The Nigerian army has long viewed aid workers in the north-east with suspicion. In 2017 it expressed concerns to the governor of Borno state, who agreed to set up a panel to investigate NGOs "to determine whether they are exploiting security challenges for profit".

However, some suspect that the army's real reason for harassing aid workers is to stem the flow of embarrassing information. The army often commits atrocities and loses battles. Aid workers notice these things. Indeed, they are often the only witnesses who dare to contradict the government's story that it is winning the war. National elections are due in February. President Muhammadu Buhari, who is standing for re-election, won office in 2015 after promising to restore security to the north-east. On December 17th an army spokesman threatened Amnesty International, a human-rights group, with closure for seeking to "destabilise" Nigeria.

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Building trusts

The EU's industrial-policy fans want to go back to the '70s

Competition rules are out, mergers and "European champions" are in

Print edition | Europe Dec 22nd 2018

ANGST OVER petrol prices, confusion over Britain's relationship with the EU, bemusement at the American president's legal tangles: it feels like the 1970s in Europe again. In policy circles, too, talk of corporate "champions" and "industrial policy" is now heard nearly as freely as it was in the era of bell-bottoms and dodgy sideburns. Only the joyless technocrats at the European Commission are standing in the way of a full return to disco-era dirigisme.

There is no talk of large-scale nationalisations (yet). But there is a new tension in EU policymaking. On one side are fans of competition rules as old as the European project itself, which forbid member states from mollycoddling "national champions" and aim to give consumers a fair shake. On the other are those who argue that these very rules are hindering the emergence of "European champions" capable of taking on rivals from China and America.

Large industrialists have long been sceptical of the European Commission and its competition-enforcement arm. This is run by Margrethe Vestager, an industrious Dane with political aspirations (she is a contender to run the commission after the European Parliament elections in May). Martin Bouygues, a French construction-to-telecoms magnate, spoke for many a boss in March when he decried "ayatollahs of competition" in Brussels, allegedly hellbent on hobbling European firms.

Such opinions are heard frequently these days. Why should European governments play by the rules—not subsidising domestic firms, for example—if their rivals are flouting them? Shouldn't Europe respond in kind to Chinese industrial meddling and American protectionism?

The competition sceptics have made some inroads. On November 20th the EU agreed to allow governments to block foreign investment in sensitive industries from infrastructure to media and defence. The move is largely a response to concerns over Chinese takeovers of European firms. Though protectionist, it is no worse than a similar mechanism America frequently uses. Emmanuel Macron, the French president, has suggested Brussels bar non-EU firms from public tenders if their home countries do not reciprocate.

New ways are being found of funnelling state funding to industry, for example with research-and-development grants. This breaches the spirit of European state-aid rules. Ms Vestager has given ground with a package to "modernise" how the EU evaluates such largesse.

The most vocal lobbying has been on mergers. European politicians have revelled in Ms Vestager's bashing of large American businesses, such as whopping fines for Google and demands that Apple pay back Ireland for undue tax breaks. But they would like her to indulge the locals, easing rules to allow the creation of "European champions".

Take mobile telecoms. Europe often blocks mergers which would give an operator a dominant position in a single member state. By contrast, American trustbusters tend to look at the effects of a merger across all 50 states. As a result, Europe has around 100 operators, including dozens of tiddlers, whereas America is shifting from four networks to three. How can European companies achieve critical scale, which might aid their profit margins and their overseas ambitions?

Unions agree with their bosses about the need for bigger firms, which they hope will result in fatter profits and higher wages. They have sizeable political allies. In June Angela Merkel, the German chancellor, said European competition law "does not help us sufficiently to build" such champions. Mr Macron, who worked on mergers in his years as an investment banker, is pushing in the same direction. He has nudged French firms into deals with other European groups, dubbing them "European champions" to soften the blow of losing national icons.

A test case is the merger of the rail arms of Germany's Siemens and France's Alstom. The aim is to create a "Railbus" able to compete globally much as Airbus does in aircraft. Backers say Europe needs a titan to compete with China's rail giant, CRRC. Yet Ms Vestager seems to be resisting the deal. She appears to think the combination would wield too much power in Europe, where it would have three times its biggest rival's share in some markets, unless it disposed of many of its businesses.

So far, the commission has satisfied neither competition purists nor sceptics. A merger of two stockmarkets, Deutsche Börse and the London Stock Exchange, was blocked in 2017. A steelmaking combination of ArcelorMittal and Ilva, a struggling Italian firm, was approved in May but only after some disposals. Essilor and Luxottica, two big eyewear companies, merged in a €48bn ($54bn) deal, with EU assent in March. A military shipbuilding alliance between Italy and France is being mulled.

Pro-consumer types like Ms Vestager are losing influence. Britain, which has often helped block Franco-German protectionism, is on its way out. Populists who clamour for the good old days of European industry happily blame Brussels for getting

in the way. They could be more powerful after the European elections. Oddly, their priorities might sometimes chime with those of Mr Macron and Mrs Merkel.

One factor driving the mergers is Europe's declining significance as a home of big global companies. A decade ago, 28 of the world's 100 most valuable firms were based in the EU. That figure is down to 17, and will shrink to 12 when Britain leaves the bloc. The youngest company worth over $100bn that was founded in an EU country is SAP, a German software giant launched in 1972. Mergers may be the only way for Europe to bulk up.

European policymakers know—even if they will not admit it publicly—that much of the corporate lethargy is down to archaic labour rules, anaemic capital markets and a balkanised single market. But reforming these is as hard as ever. Blaming Brussels and its supposedly dogmatic Anglo-Saxon worldview for the woes of European industry is much easier.

This article appeared in the Europe section of the print edition under the headline "Merger track"

All together now

A wave of protests is uniting Hungary's divided opposition

For the first time, Viktor Orban may have something to worry about

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THE PROTESTERS who marched through downtown Budapest on December 16th dubbed their demonstration "Merry Xmas, Mr Prime Minister". They were only 10,000 strong, and fewer made it to the headquarters of the state broadcaster. But for Viktor Orban, Hungary's populist leader, it was an unsettling start to the holiday season. In a rare display of unity, the demonstrators waved both the red flag of the Socialist Party and the tricolour banner of Jobbik, a far-right party that is trying to move towards the centre. Other left-wing and liberal groups also put aside their squabbles to present a united front.

The demonstrators were protesting against two new laws passed last week. The first allows companies to request that employees work up to 400 hours of overtime a year, while giving firms three years to pay the added salary. (Some speculate that the aim is to help foreign-owned factories, especially German carmakers, which complain of a labour shortage.) The second establishes a parallel system of administrative courts, overseen by the minister of justice, to deal with matters related to the state. The worry is that this would shield the government from all kinds of legal challenges.

Compared with other elements of Mr Orban's self-declared plan to turn Hungary into an "illiberal" democracy, these may seem like small beans. Over the course of Mr Orban's three terms in office since 2010, political and economic power has been centralised to a degree unprecedented since the collapse of communism. The European Parliament voted in September to move towards suspending some or all of Hungary's rights, under article seven of the treaty of the European Union, though few expect real consequences.

By the evening of December 17th, the protesters had braved sub-zero temperatures for five nights in a row. Some opposition MPs forced their way into the state television studio to demand that they be allowed to read their manifesto. Two were forcibly removed by security guards.

Despite the modest numbers, the protests are significant because of the unity of the opposition, says Tamas Boros of Policy Solutions, a think-tank. The demonstrators come from two distinct sections of Hungarian society. One group, Mr Boros says, consists of veteran protesters "with ideological grievances against the regime. The other is people affected by the labour law, concerned about their everyday lives." That could form a potent mixture.

Yet for now Mr Orban looks secure. In polls over 50% of Hungarians support the ruling party, Fidesz. Opposition groups trail far behind. Officials dismissed the protests as the work of dissidents guided by George Soros, a Hungarian-born billionaire and philanthropist whom the government blames for everything. (Mr Soros's organisation wearily denies it.)

Zoltan Kovacs, the government's spokesman, called gripes about the new laws "fake news". He said the labour law was in line with EU norms. Administrative courts, he noted, were part of the Hungarian system before communism. Mr Orban's government has argued before that its illiberal reforms conform to European principles. The EU disagrees. So, it appears, do an increasing number of Hungarians.

This article appeared in the Europe section of the print edition under the headline "All together now"

"We're going round in circles"

Inevitably, France's gilets jaunes protesters debate the metaphysics of roundabouts

It's a different sort of revolution

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WHEN HISTORY comes to study the *gilets jaunes* (yellow jackets), two symbols will mark their cause. One is the high-visibility jacket that French law requires motorists to carry in case of accident, and is now a uniform of protest. The other is the roundabout.

It was on *ronds-points* across France that the *gilets jaunes* first gathered to protest against a rise in green taxes on motor fuel. It is at the country's most famous one, the Place de l'Etoile in Paris, that protesters have converged for their weekend revolts. President Emmanuel Macron spoke of the "distress on so many roundabouts". With their blazing fires, makeshift camps and festive tinsel, the occupied roundabouts have become places of muscular resistance and hubs of cheerful, defiant solidarity.

Pioneered by Eugène Hénard, a town planner, in the early 1900s, the roundabout is a fitting emblem. Since the 1990s the modern version, often topped with decorative kitsch, has spread widely across semi-rural France. Far from bike-sharing, Uber-hailing, Macron-voting Paris, this is where people's lives are spent in what Daniel Behar, a geographer, calls "territorial zapping": in the car between jobs, homes and the sprawl of out-of-town discount stores. Those who occupy the roundabout, he argues, are "at the same time from somewhere and from nowhere".

One French writer attributes the roundabout's metaphorical force to the fact that it is egalitarian, offering access to all. Another argues that it is the cruel appearance of mobility that makes the roundabout symbolically apt. Victims of the "fantasy of fluid capitalism", argues Jean-Pierre Denis, the *gilets jaunes* are not marching to a destination, nor even *en marche* (on the move), as in the name of Mr Macron's political party. They are crying "stop!" exactly at the point at which they ought to be moving.

A hard core of yellow jackets vows to keep up the protests, despite a sharp drop in numbers in Paris on December 15th, after Mr Macron's concessions. Some now want protesters to quit the roundabouts. In a country of existential reflection, the concept of circular motion embodied by the roundabout inevitably invites metaphysical commentary, even if inadvertently. "We can't keep spending all our time on a roundabout," declared Jacline Mouraud, a founder of the *gilets jaunes*: "Because, in any case, that would only end up going round in circles."

This article appeared in the Europe section of the print edition under the headline "To the roundabouts"

Transylvania's IT hub

Romania has a city it can boast about

Cluj, in Transylvania, is showing a shrinking country how to grow

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TRUCK-MOUNTED ROCKET launchers rumbled through Cluj's city centre, followed by ranks of soldiers. Warplanes screeched low overhead. On December 1st Romania celebrated the centenary of its birth as a modern state. It is smaller now than in 1918, but unlike its former neighbour, Yugoslavia, founded on the same day, it has at least survived.

Still, many Romanians did not feel much like celebrating. The economy is growing, but 3m-4m people have left since 1990. On January 1st Romania takes over the presidency of EU ministerial meetings, but the European Commission has chastised its government for backtracking on anti-corruption reforms. Infrastructure and the public health-care system are in poor shape. Deloitte, a consultancy, ranks the country last in the EU for quality of life.

Surprisingly, perhaps, the people in this Transylvanian city feel smug. Cluj is one of only two towns in Romania whose population is growing rather than shrinking, notes Emil Boc, the mayor. He keeps a large pet turtle in his office in the magnificent town hall, dating from the Austro-Hungarian era; his flat is too small for the tank. Likewise, Cluj is too small for its 450,000 people. Construction should begin next year on homes for 200,000. Cluj's "core asset", says Mr Boc, is its 100,000 students. That includes more than 3,000 foreign ones, a rarity in a country where locals tend to go abroad to study.

After the fall of communism, Cluj was an "industrial graveyard", says Calin Hintea of Babes-Bolyai University; the city's then mayor spent his time agitating against the large Hungarian minority. But in 2007 Mr Boc asked Mr Hintea and his colleagues to put together a municipal strategy. It gave priority to universities over factories. Now Cluj is home to 1,350 IT companies and an estimated 20,000 developers and engineers, up from 12,000 in 2014.

Yet after five years of spectacular growth, Cluj is hitting its limits. One-fifth of Romania's working-age population is abroad. Cluj, too, is facing labour shortages and escalating wage demands. Wouter Reijers, a Dutch businessman, says he pays his engineers double what he did five years ago. Native construction workers are so scarce that Vietnamese ones are needed to staff the city's building sites.

Cluj's IT companies need to start developing their own products rather than picking up outsourcing work from elsewhere, says Diana Rusu, who runs Spherik, an IT business accelerator. Companies are "fighting like mad" to buy the best talent, says Paul Brie, a Romanian who emigrated to France but returned to Cluj in 2014 for an attractive job at an IT company.

New restaurants have sprung up and once-crumbling historic buildings have been lovingly restored. But Cluj's IT-led boom has led to rocketing property prices. Even food and household goods are more expensive here than elsewhere. Not just the poor and the elderly but average folk are being pushed out of town. Madalina Mocan, a political scientist, says some of her students commute an hour and a half to get to university. Nonetheless, Ms Mocan says proudly, when she tells fellow Romanians she is from Cluj, "they say 'Wow!'"

This article appeared in the Europe section of the print edition under the headline "Transylvania's IT hub"

Charlemagne

Christmas, when Europeans argue with their familes about Europe

An annual clash between Europe's anywheres and somewheres

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EVERY CHRISTMAS Stephan Beneke, a 36-year-old accountant for a global shipping firm, packs up his car in Hamburg and drives his young family back to the sleepy one-church village in Germany's former east where he grew up. "I left Gieseritz at 18 to go to university. I couldn't get out fast enough," he recalls. Today he works with clients from all over Europe. Half of the pupils at his children's pre-school are non-German. "Hamburg is a real harbour city. It's very open," he says. Returning to the village at Christmas, he is struck by the contrast. Those who remain tend to be older and less educated. Many work on surrounding farms. "Most people were born there. They say they don't like Europe, don't feel European and don't see Europe."

Each year the continent's big cities disgorge the young, mobile and educated as they return to the villages or small towns where they grew up and where their less mobile friends and relatives still live. British airports have their busiest day of winter on December 21st; Germany's autobahns are most jammed on the 22nd. In Poland countryfolk refer disparagingly to the *sloiki* (jars), the thrusting young people who quit Warsaw over Christmas, returning with glasses of food packed by their parents. Like Thanksgiving in America, Christmas is a rare time when the young and rootless sit down with the old and rooted, gorge on festive nosh and quarrel about politics.

"We have made Europe, now we must make Europeans," proclaimed Jean Monnet apocryphally. The father of European integration might think that job now complete if he came back to life and encountered Mr Beneke packing up his car, or the Italian barista or the Swedish banker queuing for flights at a London airport, or the Czech student boarding a coach home after a university term in Bologna. Yule-time travellers like them represent a "European" demos that is not merely a figment of a Eurocrat's imagination.

These people speak a common tongue: typically English, and often other languages to boot. They inhabit a common milieu: big city centres and university towns, to which they are attracted by the cultural variety and high-skill jobs that cluster there. They are bound by common experiences such as travel, exposure to other Europeans and academic qualifications (even those who move for more mundane jobs, the Spanish barman working in Berlin, say, tend to be more educated than those among whom they grew up). They benefit palpably from continental integration, the skilled work generated by cross-border trade and the opportunities created by EU programmes. Mr Beneke is one of 9m Europeans who have done an "Erasmus" university exchange. The programme—which has also produced some 1m Erasmus babies—is captured in "L'Auberge Espagnole", a cult French film set in a multi-national student flat in Barcelona. "I'm French, Spanish, English, Danish," says Xavier, the protagonist. "I'm not one, but many. I'm like Europe, I'm all that. I'm a real jumble."

This European class has a political wing. Cities and other places where the educated and mobile gather are diverging from their hinterlands. Pro-European Green parties are surging there, most notably in Germany. Mayors such as Rafal Trzaskowski in Warsaw, Femke Halsema in Amsterdam and Sadiq Khan in London are among their country's most outspoken opponents of Eurosceptic populism. Emmanuel Macron came top in the first round of France's presidential election last year thanks to similar sorts of voters, and hails "the Europe of Erasmus". In March expatriate Italian voters bucked their country's nationalist trend and voted primarily for the Europhile Democratic Party. Sporadically, such voters take to the streets in anti-Brexit, anti-xenophobia or Europhile "Pulse of Europe" marches, protesting, in effect, against the politics of their provincial cousins and former classmates. "The problem with the educated is that they're a tribe that don't think they're a tribe," jokes David Runciman, a political scientist at Cambridge University.

The Christmas getaway is a rare moment when this European Europe intersects en masse with the other, national Europe—and everything in between. "I love my father very much, but he has a totally different mindset," says Mr Beneke. "He doesn't like the EU because he says Germany pays too much and shouldn't have the euro. And he's not alone in that opinion in the village." The cities are becoming more liberal as the countryside becomes more conservative, he frets. Christophe Guilluy, a French geographer, agrees, arguing that votes for the nationalist Northern League in provincial Italy and the recent *gilets jaunes* (yellow jackets) protests in France are just the latest manifestations of the growing divide between Europe's metropolitan regions and its peripheral ones. It is no coincidence that one of the past year's hottest European political texts was "Return to Reims", a decade-old but newly translated account by Didier Eribon, a French philosopher, of revisiting the working-class mining town where he grew up.

All I want for Christmas is EU

Christmas feasts, whether carp or ham, goose or turkey, sometimes degenerate into unjolly arguments about the euro, the EU, Brexit or immigration. As the wine flows, tempers may fray. Why is Uncle Gustav such a bigot? Why is my daughter-in-law so naive? Will we still be able to buy French wine next year?

In the long term the European project will succeed only if the gap between the Christmas stay-at-homers and the Christmas travellers closes, at least a bit. That is, if Europe starts to mean a bit more to those who currently scorn it. Mr Beneke, a self-

aware sort of Europhile, spies an opportunity. If the festive season exposes this divide by bringing different parts of Europe into uneasy proximity, he says, it is also a chance to heal it somewhat: "To compromise you must understand, and to understand you must talk. The first step is to talk." He's right. In that spirit, Charlemagne wishes all Europeans a talkative Christmas.

This article appeared in the Europe section of the print edition under the headline "Driving each other mad for Christmas"

Goodbye, good chap

Britain's good-chap model of government is coming apart

The norms of British politics have collapsed, just when they are most needed

Print edition | Britain Dec 18th 2018

THE GOVERNMENT has discovered an ingenious method of not losing votes: don't hold them. Earlier this month Theresa May's unpopular Brexit deal faced certain defeat in the House of Commons. Instead, the government pulled it. To postpone the vote it ought really to have sought Parliament's permission—at least, that would have been "in democratic terms, the infinitely preferable way...in any courteous, respectful and mature environment," according to John Bercow, the speaker of the House. But the government decided not to bother, using a sneaky procedural method to go over MPs' heads.

Britain's ramshackle constitution allows plenty of scope for such shenanigans. Whereas every other Western democracy has codified its system of government, Britain's constitution is a mish-mash of laws and conventions, customs and courtesies. Britain sees no need for the legalistic or (worse) European idea of writing down its constitution in one place. Instead it relies on the notion that its politicians know where the unwritten lines of the constitution lie, and do not cross them. "The British constitution is a state of mind," says Peter Hennessy, a historian who calls this the "good chap" theory of government. "It requires a sense of restraint all round to make it work." Yet amid Britain's current crisis, such restraint has been lacking.

In 2018 the good-chap principle has taken a battering. Gaming the rules has become the only way for the Conservative government, which lacks an effective majority in the Commons, to cling on. Brexit has strained the hardware of Britain's constitution, such as the civil service and the courts. But the software—the norms that govern day-to-day politics—has been infected with a virus, too. The chaps in government are less inclined to be good.

One reason is desperation. Last year, for the first time since 1974, a general election spat out a government without a majority (the Tories rule only with the conditional support of the Democratic Unionist Party's ten MPs). Every vote is a dogfight. "Pairing" arrangements—when MPs from opposing parties promise to sit out a vote if their opposite number can't make it—nearly fell apart this summer after a Tory MP voted even though his Lib Dem "pair" was on maternity leave. A similar breakdown of trust in the 1970s saw near-dead MPs wheeled from hospital through the division lobbies.

When votes cannot be won they are sometimes being ignored. If the government looks likely to lose an "opposition day debate", which has no binding effect but expresses the will of Parliament, it has taken to boycotting the motion. Thus in 2017 it ignored a vote to pause the roll-out of universal credit, a big welfare shake-up. Earlier this month Parliament voted to find the government in contempt, after it refused to publish legal advice on its Brexit deal. The latest row is over whether a motion of no confidence in Mrs May, tabled by the opposition, should be merely symbolic (as Labour intended) or a binding verdict on the government (as the Tories insist).

The prime minister's weakness has allowed cabinet ministers to ignore informal codes of conduct. In July the then work and pensions secretary, Esther McVey, was found to have misled Parliament over universal credit, but did not resign. The principle of collective cabinet responsibility is also being stretched. Ministers happily improvise on government business in public, floating the idea of holding a second Brexit referendum, say.

The personalities of today's leaders have contributed to the erosion of political norms. Though she is a stickler for rules, Mrs May has become politically unembarrassable. In 2017 she stayed in post despite losing her majority in an election that was considered unlosable. This month she clung on after winning a confidence vote in which 117 of her own MPs voted against her. Jeremy Corbyn, Labour's leader, is perhaps more shameless still: in 2016 he refused to budge even after losing a confidence vote among his MPs, on the basis that under Labour's rules the members pick the leader.

The disregarding of political conventions might matter less than before, given that British governments face more formal constraints than they used to. During the upheaval of the 1990s and early 2000s, parts of the constitution shifted from misty precedent into law. Scotland, Wales and Northern Ireland won new constitutional settlements. The Human Rights Act and the EU's Charter of Fundamental Rights laid out clear freedoms. The Cabinet Manual, which provides guidelines on matters such as when ministers should step down, came out in 2011. The chaps in office can get away with less than in the past.

But Brexit is sending this trend into reverse. Britain is swapping its "protected" constitution, which gives citizens recourse to a higher legal power, for an unprotected one, points out Vernon Bogdanor of King's College, London. Brexit removes things like the EU's Charter of Fundamental Rights from Britain's constitution. And embedded in Brexit legislation are plans to give ministers sweeping "Henry VIII" powers to shape the law in areas that were previously handled by the EU. What's more, some

other newish laws increase the scope for prime ministerial misbehaviour. The Fixed-term Parliaments Act of 2011 tore up long-established principles about what constituted a confidence vote in the government. Under the act, a shameless prime minister could conceivably try to cling on even after losing such a vote.

Leaving the EU could result in a "constitutional moment", says Professor Bogdanor, forcing Britain to reappraise its rules and add new protections to replace those lost. More likely there will simply be fewer checks on Britain's politicians. As long as they behave like good chaps, that will be fine. But the lesson of the past two years is that, in times of crisis, they don't.

This article appeared in the Britain section of the print edition under the headline "Goodbye, good chap"

Do ask, do tell

The next census will count LGBT Britons for the first time

Current guesstimates vary wildly. But will the census be much more reliable?

Print edition | Britain Dec 22nd 2018

THE 22 OFFICIAL surveys that estimate the number of lesbian, gay and bisexual Britons would disgrace the back of an envelope. According to one, 0.9% of Britons are not heterosexual. Another puts that figure at 5.5%. Guesstimates for the transgender population are fuzzy, too. The government "tentatively" reckons there are 200,000-500,000. So Lisa Power, who co-founded Stonewall, an LGBT charity, says she is delighted that statisticians plan to ask for the first time about sexual orientation and gender identity in the next census, in 2021. "If you don't count, you don't count."

Policymakers will find the figures helpful. LGBT folk have more mental-health troubles than straight people, says Paul Twocock of Stonewall. Wonks armed with data ought to be able to meet this demand more accurately. The government struggles to budget for policies to promote minority rights, like those that allow gay marriage or ban employment discrimination. Census data would let councils see the extent to which such minorities were represented in their areas. Doctors' surveys suggest an uneven spread among London boroughs, for example. One in ten residents in Lambeth—which includes Vauxhall, a gay hotspot—say they are not straight, compared with one in 70 in Havering.

LGBT-rights campaigners are chuffed. Some suspect the census may reveal there to be more transgender folk than widely thought. "There might be a huge, submerged section of the population," says Matthew Parris, another co-founder of Stonewall. Exposing it could normalise transgenderism, he says.

Yet there could just as easily be an undercount. The census is filled in by the head of household, who might wrongly assume other members are straight. (To avoid awkward conversations at home, the authorities will let people answer sex and gender questions themselves if they prefer.) And unlike most census questions, the new ones will be voluntary. "It might not catch quite a lot of people who feel prickly or private," says Mr Parris.

Other respondents may misunderstand what they are being asked. In one survey, some older gay men said they had changed gender identity when they simply meant they had come out. The government may find that if it asks queer questions it gets some queer answers.

This article appeared in the Britain section of the print edition under the headline "Do ask, do tell"

Hard to swallow

As Theresa serves up a turkey, Brussels pouts

MPs hate the Brexit deal, but the EU refuses to sweeten it

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IF ANYONE DESERVES a prize for stamina, it is Theresa May. The prime minister spent the run-up to Christmas defending her Brexit deal before MPs, who still show no sign of voting for it. She had hoped the EU summit on December 13th and 14th would agree to sweeten the deal to make it easier for MPs to swallow, particularly regarding the Irish "backstop" that may keep Britain in a customs union. But EU leaders refused. They said they hoped not to use the temporary backstop, but rejected a time limit or a unilateral British right of exit.

Mrs May still hopes to win something from Brussels that helps her to get the deal through Parliament. She cites earlier changes for countries that have had problems ratifying treaties, from Belgium and the Netherlands to Ireland and Denmark. But there are big differences with Brexit. It is more palatable for the EU to make concessions to a member than to a non-member. It is easier to find changes that help to reverse a narrow referendum result, as in those countries, than to overturn a big negative parliamentary vote of the sort Britain is heading for. And in past cases the process has taken months or years, whereas Brexit is due in March.

All this means the parliamentary vote on the deal, planned for mid-January, looks sure to be lost. What then? Mrs May's strategy seems to be to run down the clock. The March 29th deadline will be closer, and with it the risk of a no-deal exit. Yet although time pressure could change a few Tory minds, she will need Labour votes to get her deal approved. And with Labour leaders pressing for an early election instead, she is unlikely to secure them.

This is leading MPs and even some in the government to ponder alternatives. Some ministers suggest a series of indicative votes in Parliament to test whether other forms of Brexit—the close Norwegian model, or a looser Canadian-style arrangement—might win greater support. But none of these is likely to command a majority. Anyway, the response in Brussels will be that only Mrs May's version of Brexit, negotiated over almost two years, is on the table and ready to be ratified.

This explains growing talk of a second referendum. Mrs May says this would do irreparable damage to British politics. But Mujtaba Rahman of the Eurasia Group, a consultancy, puts its odds at 40%. It is now, in effect, the most popular backstop.

This article appeared in the Britain section of the print edition under the headline "Brussels pouts"

Bagehot

The elite that failed

Britain's political crisis exposes the inadequacy of its leaders

Print edition | Britain Dec 22nd 2018

IN THE PAST year the British body politic has endured an astonishing list of maladies. The cabinet has lost a foreign secretary and two Brexit secretaries, not to mention lots of lesser fry. Parliament has voted to hold the government in contempt. The Conservative Party has held a vote of no confidence in the prime minister and left her badly wounded. And it is going to get worse. There is no parliamentary majority for any Brexit deal, and no way out of the impasse that won't break promises—and possibly heads.

There are two popular explanations for this mayhem. One is that Europe was always destined to tear Britain apart, since too many Britons loathe the evolution of the common market into a European Union. A second is that Brexit has provided a catalyst for a long-simmering civil war between successful Britain (which is metropolitan and liberal) and left-behind Britain (which is provincial and conservative). Both explanations have merit. But there is also a third: that the country's model of leadership is disintegrating. Britain is governed by a self-involved clique that rewards group membership above competence and self-confidence above expertise. This chumocracy has finally met its Waterloo.

Consider the decision that unleashed the current disaster. David Cameron gambled the future of the country on a simple referendum—51% and you're out—whereas other countries, confronted with less momentous decisions, opt for two-stage votes and super-majorities. He made the gamble only in order to see off a challenge from the Europhobic wing of his Tory party and the defection of voters to the UK Independence Party. He set great store by his ability to sell the EU at home and to win reforms in Brussels, despite the fact that he had spent much of his career grumbling about Europe and antagonising the EU bureaucracy (including removing Tory MEPs from their broad right-wing coalition). His resignation ignited a civil war between his former Oxford chums Boris Johnson and Michael Gove, whose mutual destruction paved the way for Theresa May. Mr Cameron then rewarded other pals for losing an unlosable referendum, with peerages, knighthoods and, in the case of Ed Llewellyn, his Eton mucker and chief of staff, a seat in the Lords and the ambassadorship to France.

Or consider the current race for the Tory leadership that Mrs May launched last week when she was forced to promise her party that she would not lead it into the next election. The Tories are in turmoil not just because they are divided, but because the various candidates are inadequate. Jeremy Hunt, the foreign secretary, lacks principle; Sajid Javid, the home secretary, lacks charisma; and Mr Johnson, the right's champion, is an embarrassment who this week declared that Britain shouldn't balk at leaving the EU without a deal, on the grounds that it might produce only a temporary shortage of Mars bars.

Britain's leadership crisis is rooted in the evolution of the old establishment into a new political class. This evolution has been widely hailed as a triumph of meritocracy over privilege, and professionalism over amateurism. In fact, the new political class has preserved many of the failures of the old establishment. It is introverted and self-regarding, sending its members straight from university to jobs in the Westminster village, where they marry others of their kind. It relies on bluff rather than expertise, selecting those trained in blaggers' subjects like PPE and slippery professions like public relations and journalism (Mr Cameron worked in PR before going into politics, whereas Mr Gove and Mr Johnson, along with his brother, another Tory MP, were hacks).

At the same time, the political class has abandoned one of the virtues of the old establishment. The old ruling class preserved a degree of gentlemanly self-restraint. Senior politicians left office to cultivate their gardens and open village fetes. The new political class, by contrast, is devoid of self-restraint, precisely because it thinks it owes its position to personal merit rather than the luck of birth. Thus meritocracy morphs into crony capitalism. Tony Blair has amassed a fortune since leaving office and George Osborne, Mr Cameron's former chancellor of the exchequer, is following eagerly in his footsteps.

The triumph of the new elite coincided with the erosion of other paths into the leadership class. The Labour Party traditionally recruited working-class talent through the trade unions and local government. Its 1945-51 government was successful in part because it boasted big figures like Ernest Bevin, who honed his leadership skills in the unions, and Herbert Morrison, who ran the London County Council. The Conservatives recruited from a broad range of constituencies, from the squirearchy to the armed forces and the business world (both Joe Chamberlain and Stanley Baldwin came from highly successful Midlands-based companies).

A national bluff, called

There are some welcome signs that the political system is beginning to develop antibodies to the rule of the chumocracy. The Labour Party has broken with the Blairite habit of dropping metropolitan MPs into regional constituencies and has begun promoting first-rate local talent such as Angela Rayner (who left school at 16 with no qualifications and a child on the way). The Tory party has succeeded in recruiting impressive former soldiers such as Tom Tugendhat, as well as members of ethnic

minorities such as Mr Javid, the son of an immigrant bus driver. The creation of powerful local mayors is devolving decision-making from London and creating new avenues into the national political elite.

Unfortunately, this self-correction comes too late. The failure of Britain's political class not only opened the way to the Brexit vote. It also opened the way to the capture of the Labour Party by Jeremy Corbyn and his far-left clique. Many Britons despair that they face a choice between Brexit and chaos under the Tories and socialism and chaos under Labour. If next year goes as badly as this one, they may end up with both.

Animals in court
Do they have rights?

Animals and the law

Gradually, nervously, courts are granting rights to animals

Chimpanzees and elephants first

Print edition | International Dec 22nd 2018

HAPPY WAS one of seven Asian elephant calves captured, probably from the same herd, in Thailand in the early 1970s. Named after Disney's seven dwarves, they were shipped to America and sold to circuses and zoos. Happy and Grumpy ended up in the Bronx zoo, where they lived in an enclosure for 25 years. In 2002 they were transferred to a larger enclosure with a second pair of pachyderms, Patty and Maxine. Their new environment was a little closer to the wild one, in which elephants form large families. But Patty and Maxine charged at Grumpy, injuring her. Unable to walk and with suppurating wounds, Grumpy was euthanised.

Happy was then paired with a younger female elephant, Sammy. She died of kidney failure in 2006. But meanwhile Happy had become a scientific celebrity. In 2005 she became the first elephant to pass the "mirror self-recognition test", an indicator of self-consciousness. Scientists painted a white cross over her left eye, and led her to a large mirror. Happy repeatedly touched the marking with her trunk, showing that she recognised herself. Most animals (and human infants) cannot do this.

Now Happy is stretching the limits of people's understanding of animals once again. On December 14th a court in New York state heard a request to grant her a writ of *habeas corpus.* Steven Wise, a lawyer, argued that, as an intelligent, self-aware being, Happy is entitled to the full protection of the law. *Habeas corpus*, an ancient common-law principle, guards against arbitrary imprisonment.

So far, all applications for *habeas corpus* relief for animals have been turned down in American and European courts. However, in a case in May 2018 involving Tommy, a chimpanzee, one of the judges said he thought the main argument for denying *habeas corpus* to chimps was wrong. This is that they lack the capacity to carry out legal duties or be held accountable for their actions. As the judge pointed out, "the same is true for human infants and comatose human adults, yet no one would suppose it is improper to seek a writ of *habeas corpus* on behalf of one's infant child." Happy's case is likely to drag on for a while. When it is resolved, it could fundamentally alter the way some animals—especially great apes—are treated in law.

Over the past few decades, the science of animal cognition has changed people's understanding of other species. In several, researchers have discovered emotions, intelligence and behaviour once thought to belong exclusively to humans. But the law has changed slowly, and in one respect barely at all. Most legal systems treat the subjects of law as either people or property. There is no third category. Legal persons possess rights—guaranteed protections. Property does not. Because domesticated animals are economic assets, the law has always regarded animals as property.

Some lawyers and animal-rights advocates say the time has come to change that, arguing that it is justified both by science and by rising concerns about animal welfare. Opponents reply that to give animals rights would not only be unprecedented but, by erasing distinctions between them and people, would undermine something fundamental to being human.

For years, people seeking to improve the lives of animals have sponsored animal-welfare laws. In November, voters in California passed a ballot initiative (a referendum) that requires larger minimum spaces for caged farm animals. In the past decade the European Union, India, Colombia, Taiwan, seven Brazilian states and California have all banned the testing of cosmetics on animals. New York and Illinois banned circus elephants, while voters in Florida banned greyhound racing.

Recently, animal advocates have tried to push existing welfare laws into new areas. In Iowa, the Animal Legal Defence Fund sued a private zoo for infringing the Endangered Species Act, which protects wild animals. It won, and the US Department of Agriculture revoked the zoo's licence. The same organisation, arguing that Oregon law permits victims of violence to sue for redress, filed suit for damages on behalf of an eight-year-old racehorse, Justice, who had been found severely frostbitten and malnourished and whose owner had been convicted of neglect. The suit was denied but is the subject of an appeal.

At least eight jurisdictions have written into law that animals are sentient beings, including the EU (in one of its foundational documents, the Lisbon treaty) and New Zealand. These "sentience laws" have had surprisingly little impact. No cases have been brought in New Zealand, for example, which amended its animal-welfare act to say animals are sentient in 2017. But three American states have passed pet custody laws which give the idea of sentience practical meaning. These laws say that if a couple divorces and cannot agree on the terms of separation, the interests and feelings of any animals in the household must be taken into account. Animals are thus treated more like children than furniture.

To some animal advocates, expanding existing welfare laws or writing new ones does not go far enough. They argue that such laws fail to protect animals from captivity and that some highly intelligent species, such as great apes and elephants,

should not be treated as property at all, but as beings with rights.

Animals have appeared in court before. At Clermont in France, a pig was tried and convicted of killing and eating the baby of Jehan and Gillon Lenfant on Easter Day, 1494. It was executed by strangulation. At Autun, in the early 16th century, Bartholomew Chassenée defended rats against a charge of destroying the barley harvest. He persuaded an ecclesiastical court that, since it would be dangerous for the rats to travel to court, they could legally ignore the summons. What has changed is that animals are plaintiffs, not the accused, and lawyers are demanding they be granted the status of legal persons.

That idea is not quite as far-fetched as it might sound. A legal person does not have to be human. Companies have long been legal persons, able to act in court in their own right. In 2017 New Zealand granted legal personhood to the Whanganui river, in order to boost the power of local Maoris to protect it. In the same year, the High Court of the Indian state of Uttarakhand gave legal personhood to the Ganges and Yamuna rivers in its territory, though this ruling was reversed by India's Supreme Court.

Activists have tried to give animals protection under ordinary laws, not just animal-welfare rules. People for the Ethical Treatment of Animals (PETA), an activist group, sued a photographer, David Slater, who had been taking pictures of wild macaques. One day, the macaques used his camera to take selfies (see picture) which Mr Slater published. PETA sued in America's federal courts, saying Mr Slater had infringed the monkeys' copyright. The suit was kicked out, with the judge opining: "I am not the person to weigh in on this. This is an issue for Congress and the president."

Other cases have got further. India's environment ministry said in 2013 that cetaceans (a group that includes dolphins and whales) were "non-human persons" with "their own specific rights". The ministry told state governments to reject any request to keep cetaceans for entertainment.

The following year, India's Supreme Court ruled that all animals have an inherent right to life under the constitution, though they can still be property. The case concerned a custom called *jallikattu* in which men tame young bulls, often by mutilating them. The court ruled that "every species has a right to life and security [and] that, in our view, "life" means something more than mere survival...or instrumental value for human beings." Still, the court said it was up to parliament to write laws safeguarding those rights and it did not change animals' status as property.

The boldest legal challenge has come from attempts to give animals *habeas corpus* rights. In 2005 animal-rights organisations in Brazil applied for *habeas corpus* protection for Suiça, a chimpanzee in a zoo. She was found dead in her cage before the court could rule. In 2007 Austrian activists applied to make one of their number the legal guardian of Hiasl, a chimpanzee who had been released from a pharmaceutical laboratory. The case ended in the European Court of Human Rights, which rejected the application.

Reversals have been frequent. In 2015 a court in New York issued a writ of *habeas corpus* on behalf of two chimpanzees, Hercules and Leo, but the judge changed her mind the next day, deleting the reference to *habeas corpus*. Another New York court threw out similar applications for Tommy and Kiko, two more chimps.

A Happy ending?

In the past few years, however, animal-rights lawyers have started to win cases. In 2014 the criminal appeals court of Argentina said Sandra, an orangutan in the Buenos Aires zoo, was a non-human person—though the court has jurisdiction only over animal-cruelty cases, so this was a ruling on welfare, not *habeas corpus*. The biggest victory came in 2016, when a judge in Mendoza, also in Argentina, ruled that Cecilia, a chimpanzee, was a non-human person who had been arbitrarily deprived of her freedom by being placed in the city's zoo. He ordered her to be taken to a sanctuary in Brazil, where she remains. It was the first ruling of its kind. It was followed in 2017 when Colombia's Supreme Court ruled that Chucho, a spectacled bear, was a non-human person and ordered him to be taken from Barranquilla zoo to a wildlife reserve.

But so far, except in South America, objections to animal legal rights have carried the day. These are: that it is unclear which species should get protection and which rights they should get; that giving great apes rights could hamper medical research; that giving some animals limited rights might open the door to giving farm animals a right not to be eaten; and that, if consciousness and cognition give rise to rights, they would apply to artificially intelligent machines, too.

The upshot is that "the law is a patchwork," says Kristen Stilt, who teaches animal law at Harvard Law School. Animals still lack rights, but the bright line separating them from people has been dulled by sentience laws and rulings in India, Argentina and Colombia. As the judge in Tommy's case said, "the question will have to be addressed eventually...Should such a being be treated as a person or as property, in essence a thing?" Meanwhile, Happy awaits the result of her day in court in solitary confinement, an unnatural state for an elephant. She is, when all is said and done, just somebody's property.

This article appeared in the International section of the print edition under the headline "Do they have rights?"

Porcelain

An appreciation of porcelain in four objects

Why ancient traditions and modern innovations keep collectors coming back for more

Print edition | Christmas Specials Dec 18th 2018

CUP THE Falangcai Poppy Bowl in your hands. Its rim pulls out, like a lower lip readying for a sip. The biscuit—the form of the vessel itself—is fine, semi-translucent when held to the light, weightless like the poppies and the yellow, pink and lavender blossoms that creep up its side. The pads of your fingers can feel the vegetation's slight relief, the bolder buds of the flowers. The bare white glaze behind is flawlessly smooth.

In the 18th century, during the reign of the Qianlong emperor, this bowl was thrown, glazed and fired in Jingdezhen, a town near the Yangzi river. Jingdezhen's potters had held the secret to the finest porcelain at least since the early days of the Tang dynasty, a thousand years before, and possibly for longer. It was then enamelled and finished in the Forbidden City's workshops. It made its way to Europe, and eventually to the collection of a French opera singer. The opportunity to hold it comes in a viewing room in Hong Kong, five days before it is sold at auction for HK$169m ($22m) to a private collector.

Marco Polo, thought to be the first to have brought such wonders to Europe from China, called them *porcellana*, an Italian term for the lustrous white cowrie shells this strange substance resembled. Fittingly, the Chinese character for such shells, once used as currency in ancient China, appears in the character for treasure. And porcelain was treasure the rich came to crave. Augustus II, an extravagant king of Poland, had perhaps 36,000 pieces by the time he died in 1733. His cause of death was gangrene; his disease was what he termed *die Porzellankrankheit*—porcelain sickness.

When the *Amphitrite*, the first French ship to sail to China for trade, returned from Canton (today Guangzhou) to Port-Louis in 1700, its 167 crates of porcelain, finer than any before seen on those shores, caused a far greater sensation than its silks and other fineries. Just as important was what it had left behind in Jingdezhen. On its outbound journey it had not just been filled with sumptuous brocades and fussy mirrors, imposing pendulums, honeyed liqueurs and, quite possibly, portraits of the Sun King himself as tribute to the Kangxi emperor, fourth in the Qing dynasty. It had also carried Père d'Entrecolles, a Jesuit priest from Lyon. His mission was not to win over the heathen in general, but potters, clay-miners and kiln-stokers in particular. He was to steal the secrets of porcelain for France. For over a decade he skulked around the kilns and clay seams of Jingdezhen, stealing bits of the sticky pale-grey earth the potters worked with and sending them home.

In the 16th century European guesses about porcelain's composition ranged from alabaster—a form of the mineral gypsum—to crushed shells buried for centuries. Towards the end of the 17th century a German physicist melted a fragment of Jingdezhen porcelain and correctly identified its make up as comprising alumina, calcium and silica. What Père d'Entrecolles discovered in Jingdezhen was kaolin, a chalky earth that takes its name from a nearby mountain. The plasticity provided by kaolin's interleaved layers of silica and alumina, if allied in just the right proportions with powdered petuntse, a firmer stone, allowed potters to throw larger vases than anywhere else. Its whiteness was second to none.

Jingdezhen had other natural advantages. Abundant pine groves in the surrounding valleys fed its fires. Local limestone and ferns were ground to make glazes. But kaolin apart, its greatest advantage lay in centuries of consistent imperial enthusiasm. The city's name is derived from that of the Jingde emperor, who around the beginning of the 11th century ordered that some of its kilns should make a line of wares exclusively for his use, stamped on their base with the seal of his reign. Later emperors reserved the purest kaolin seams for themselves; when they were exhausted, they were sealed up to prevent scavenging of the royal clay by crafty potters. By the 14th century the potteries of Jingdezhen were at the centre of what Robert Finlay, author of "The Pilgrim Art", describes as "a commercial enterprise unprecedented in range and volume in the pre-modern world".

At its heart was a system for the division of labour without any contemporary rivals. D'Entrecolles noted the distinct roles of stone-miners and wood-choppers, clay-kneaders, throwers, trimmers and stampers, wheel-spinners, kiln-loaders and unloaders, and three sorts of bakers: "hot-fire men, slow-fire men, and circulating-fire men". In all, it took 72 pairs of hands to form a single vessel. Individual kilns specialised too, some producing only tea caddies, or wine cups, or brush washers.

D'Entrecolles' intelligence proved vital to Europeans seeking to recreate porcelain as a material. William Cookworthy's successful efforts to turn a talc-like white earth mined on the Cornish moors—kaolin, now known in this context as China clay—and other rocks into a British porcelain were aided by reprinted letters from d'Entrecolles. He also made use of d'Entrecolles' tips on glazing. It was in part from d'Entrecolles' dispatches that Josiah Wedgwood, an English potter, developed the division of labour that made his own factories so successful in catering to the middle-class yen for china.

But the flow of knowledge and craft was not just one way. D'Entrecolles also reported that the gifts from France that the Kangxi emperor had most valued were enamels—*falangcai*, or foreign colours, from the Persian word for Frank. Decorating copper or glass with lead-based colours was a European craft that lent itself well to porcelain. The emperor, as fever-struck in his way as Augustus II, enlisted a handful of Jesuit painters to apply the enamels in the imperial workshops and to supervise his Chinese artisans as they assimilated the new technique. Kangxi was not above a little supervision of his own, peering over the shoulders of his craftsmen to inspect his trinkets. Few emperors had a greater influence on Chinese porcelain.

In the reign of Kangxi's grandson, Qianlong, those same workshops brought forth the Falangcai Poppy Bowl you held in Hong Kong. Its exquisite enamel work, experts now think, was applied by both Chinese hands and European ones. Other innovations from abroad followed. By the end of Qianlong's reign, as Edmund de Waal reports in his book "The White Road", potters in Jingdezhen were imitating Wedgwood's sky-blue-and-white jasperware, with its white relief superimposed on a blue-stained body. Barges loaded with plates bearing Arabic inscriptions and fusty dinner sets mimicking English chinoiserie made the long trip from Jingdezhen to the sea.

Two: Shards

You pick up another piece of porcelain; but not, this time, complete. A blue dragon clings to the edge of a jagged shard, ogling a flaming pearl that floats just out of reach. Once it competed with a counterpart for the magical orb, which in Chinese art is meant to grant every wish. But the bowl on which they were painted was smashed. Perhaps it had a flaw. Perhaps it was just dropped. Either way, most of it is lost. The dragon survives to covet the orb it will never attain—but now it has no competitor.

The shard has value; you are haggling for it. Nevertheless, it is also a fake. The mark on its base suggests the Ming dynasty. But it was probably forged in the Qing dynasty, two centuries later.

At the weekly antiques market in Jingdezhen, where you squat on your haunches bargaining for the dragon shard, scooters honk and growl their way through piles of age-old fragments, some real, some old fakes, some new fakes. The few that are genuine mostly come from clods of earth churned up at the city's construction sites, which shard-hawkers creep on to at night. Others pan for porcelain in the river.

The scavengers have been forbidden for some years from foraging for fragments at ancient kiln sites. Most have been exhausted anyway. Gao Yongchuan, a shard-merchant from the province of Hebei, about 1,200km to the north, says there will be none left to sell within a decade. In a cramped hotel room, with the air of a smuggler, Mr Gao quietly unwraps bundles of old newspaper to reveal six imperial porcelain chips, one barely larger than a thumbnail. Some buyers collect them, he says, and some potters study them to learn old techniques—often as a path to making better fakes.

Many say the copying is not to deceive, but because earlier pieces are unrivalled. The "chicken cup", a tiny wine cup painted with hens and cocks, has been copied for centuries on this basis. When in 2014 Sotheby's sold an original chicken cup to Liu Yiqian, a Chinese billionaire, for a record-setting $36.3m, Wang Wei, his wife and a museum curator, had 10,000 high-quality replicas made for her museum by Xiang Yuanhua, a Jingdezhen potter whose workshop specialises in replicas of imperial china.

Feng Yibai, the third generation of a family of potters and a student of Mr Xiang's, has since sold over 2,000 chicken cups at 200 yuan ($29) a piece. They are accurate to a few tenths of a gram, but not intended to be identical to the original—slight details of the painting have been changed. Nevertheless, he says, fraudsters have smashed some of them and stuck them to authentic bases to pass off as originals. (As it happens, 200 yuan was the asking price for the dragon shard; perhaps thanks to the wish-granting pearl, haggling got it down to 120.)

Despite a bounty of shards and records, many old techniques have been lost, and so the transfer of knowledge down the ages is imperfect. It has also been deliberately interrupted. During the Cultural Revolution, Mr Feng was enlisted to work in one of the city's ten state-owned porcelain factories, most of which churned out perfect white busts of Mao Zedong. Mr Feng's copied the same coffee cup for 20 years until it went bankrupt, along with the rest, in the 1990s.

Three: Modernity

Slip a silky ring, studded with large sapphires, on to your finger. It is cool to the touch, and so long that it arcs from the knuckle up to the middle joint. It resembles a twisted shell—happily so, for those who know the etymology of "porcelain"—but it is in fact a bean pod. China has a long tradition of giving such pods to newly-weds as a fertility charm.

A human hand must be able to grasp, flail and smack; a porcelain ring feels dangerously unsuited to such things. So you shyly pull it off and hold it as delicately as the $22m Poppy Bowl. In fact the ring (pictured here) can be knocked, dropped and stamped upon with impunity: the porcelain is five times harder than steel. But you wouldn't dare. Would you?

This porcelain is the invention of Wallace Chan, a maker of fine jewellery from Hong Kong and the creator of a $200m diamond-and-jade necklace. Mr Chan likes to bend materials to his will. He engraves his diamonds; he moulds titanium; for seven years he worked on the composition of this unbreakable porcelain. There is plenty to be charmed by in Mr Chan's invention. He upends the idea that porcelain is precious because it breaks.

Mr Feng declares the vessel "a beggar's bowl", to chortles from his workshop

As olive trees that have not been burned by invaders were a sign of peace in ancient Greece, so china tureens and teapots held in a family for generations have become markers of a genteel and secure life. The more sheltered the life, the greater the collection: the Xuande emperor once placed a single order of 443,500 pieces for daily use at his court. Porcelain is meant for delicate perching on mantelpieces, to be admired but not touched, as children were once to be seen and not heard. Mr Chan says he was inspired to make it unbreakable by a time when, as a boy, he dropped and broke an adult's porcelain spoon that he was forbidden to handle.

His tough porcelain turns this sense of value around; it lasts because of its own inner strength, not because its environment is safe and stable. The gold, silver and platinum traditionally used for jewellery lose their perfection, but his polished porcelain stays pearly white. Mr Chan mixes his purified kaolin with between six and 16 other materials, among them iron and zirconium. He says the formula is an industrial secret, and he guards it as closely as any Ming-dynasty potter.

Mr Chan is not alone in reimagining porcelain. In 2010 Ai Wei-wei, an artist, filled the hall of London's Tate Modern with 100m porcelain sunflower seeds commissioned from more than 1,600 artisans in Jingdezhen in a piece that offered a commentary on authenticity, commodification and tradition. Another of his pieces, "Blossom", a bed of hundreds of handcrafted porcelain flowers, highlights the unified creative force that allows the individual artisan to prosper. Caroline Cheng, a ceramic artist based in Yunnan province, fixed some 20,000 porcelain butterflies made in Jingdezhen to traditional Chinese dresses for her "Prosperity" series, shown at the British Museum. From the sunflower to the butterflies, all were serially produced, but each was individual.

Mr Ai's sunflower seeds also threw into relief the creeping irrelevance of a city that was once an undisputed innovator. He was able to procure the services of all those artisans because the production of everyday ceramics happens elsewhere now, much of it in the industrial cities of Chaozhou and Zibo. This industry has little use for tradition or craft. It is a cut-throat competitor just like its fellow Chinese mass-producers, who seek advantage by fair means and foul. In 2014 an agent with ties to the Chinese government was charged with trying to steal the colour white from DuPont, an American chemicals giant. DuPont is the world's largest producer of titanium dioxide, a brilliant pigment seen in everything from tennis-court lines to skimmed milk to sunscreen. The latter-day reversed-polarity d'Entrecolles had been trying to learn DuPont's process secrets. He got a 15-year prison sentence.

Four: The wheel

More porcelain in your hand: a pot-to-be. In the studio where Mr Feng made his chicken cups you press fingers and palms into a soft, pale clay on the potter's wheel. In sprightlier days Mr Feng used to mine his own materials; he spent five years testing mixtures to produce an 18-clay porcelain so lustrous that it needed no glaze. Now he relies on the Victory Porcelain Factory in Jingdezhen, a large rundown barn where stones are ground to powder to produce 70 tonnes of various clays a day. The porcelain clay under your hands, roughly 50% kaolin, is just the sort of thing d'Entrecolles might have secretly shipped back to France.

It starts off spinning silkily against your palms. Before long it is uncomfortably sticky—that is the kaolin—and you are tempted to add water. Resist. If you moisten it, the bowl will end up a twisted mess. The clay is like a first love; effortless to begin with, all-too-quickly unforgiving.

You wrestle with it and that makes things worse. The vessel eventually cut from the hump is charitably declared "a beggar's bowl" by Mr Feng, to chortles from his workshop.

You are not a novice. On Sundays you spend a few hours in a studio in Shanghai. It is run by the artist of the porcelain butterflies, Ms Cheng, who has another workshop in Jingdezhen; it attracts an array of refugees from the whirl of an ever more modern and polished city. They leave with soothed nerves and Christmas gifts of various levels of proficiency with which to delight friends and relations.

In Mr Feng's studio it is harder, though. The clay is demanding, the wheel, as is the way of Jingdezhen, unusually close to the ground. Even on a low wooden stool you are completely doubled over, bowing to the clay, perhaps in reverence the first time round, the second time in supplication. Another mound of clay rises and gives in to the pressure of palms. The sides of the bowl lengthen slowly, like a sigh of relief. Between forefingers and thumb the rim arcs out after a gentle squeeze. The master-potter says that this one is a *piekou* bowl, from the character meaning to throw, evoking the form of its flared walls. The transfer of knowledge continues.

Editor's note (January 7th 2019): *Due to an editing error, this piece did not originally mention Edmund de Waal's book "The White Road". This has been rectified.*

This article appeared in the Christmas Specials section of the print edition under the headline "Made of China"

The making of Americans

The glorious diversity of Queens, New York

From Guyanese songbirds to Archie Bunker

Print edition | Christmas Specials Dec 18th 2018

A BRISK AUTUMN Sunday morning in Richmond Hill, a scruffy, bland neighbourhood deep in south-central Queens. Half a dozen men gather on the southern edge of a pocket park named for Phil "Scooter" Rizzuto, a beloved post-war shortstop with the New York Yankees. There is an air of hushed anticipation among the men: small talk, warm air blown into cupped hands, frequent glances up and down the otherwise quiet street. An occasional plane passes overhead, perhaps to La Guardia, perhaps to JFK.

The gathered men are all from Guyana, and speak in the lilting accents of their South American homeland. A few blocks away Singh's Roti Shop is heaving with families out for their Sunday morning saltfish bakes and curried chicken with dhalpuri roti. Guyanese people began emigrating to America in the late 1960s; numbers picked up as economic and political conditions at home declined in the 1980s. Today around 250,000 of them live in America, most of them in the New York area and a lot of them in Queens.

A windowless white van pulls up, and out come two cages, each holding a lively-looking black bird. Their songs cut through the otherwise quiet park: declining five-note trills with grace notes, entirely unlike the pigeons or crows that coo and caw across the city. The gathered men look at the birds intently as they sing. Asked what sort of birds they are, a rangy young guy shrugs: "Don't know the name. They just sing, sing, sing nice."

They also compete to be deemed the nicest. Rizzuto Park has hosted the Guyanese community's songbird contests on Sunday mornings for years. Large sums of money are rumoured to be wagered on these contests; the price of a champion bird can reach four figures. Today's seems more of an audition, or perhaps some choristic sparring, than a fully-fledged bout. There is no judge to be seen. But there is still a certain furtiveness. A man with a cropped white beard and wool beanie looks darkly at the inquisitive stranger at the edge of their circle—"You wan' see pretty birds," says the older man, "you go up to the Bronx Zoo."

Queens lies at the west end of Long Island, which means it is a creation of the most recent ice age. The islands and peninsulas north of New York harbour—Long Island, Nantucket, most of Martha's Vineyard, Cape Cod—were pushed into place by the bulldozer blade of the Wisconsinan ice-sheet. The terminal moraine which marks its greatest extent forms a strip of high ground across the borough. The aspirationally named Richmond Hill—more of a gentle incline, really—sits on the south side of that low ridge.

After the ice retreated, the seas rose to fill the East River—the narrow neck of Long Island Sound that sits to the north of Queens—and the lagoons that fringe its southern shore. Then the birds arrived, some settling the wetlands and marshes year round, some stopping by for seasonal replenishment. Native Americans followed, living in loose bands across Long Island. The flow first of ice, then water, then wildfowl shaped this place and the life it made possible. Now Queens shapes and is shaped by a constant flow of people.

Manhattan has energy and money; Brooklyn has hipster cachet and old-world, brownstone beauty; the Bronx has pugnacity; Staten Island has apartness. Queens has no clear defining quality (and it is most definitely not hip, whatever the estate agents may tell you). But it has the vibrancy of a whole world. Around 160 languages are spoken across the borough; residents hail from almost 200 countries. Nearly half its residents are foreign-born; most speak a language other than English at home. Few places can boast the linguistic, ethnic, religious and cultural diversity of Queens. To wander its streets is to walk through what makes America great.

Worldly, and fair

Start in Flushing, in the north. When the Dutch West India Company bought out the Matinecock people to create the colony of New Netherland, they named this bit Vlissingen, after a port in Zeeland long known in English as Flushing. Not long after its founding, its residents began accepting persecuted outsiders—not from over the ocean, but from across the East River.

Peter Stuyvesant, a governor of New Netherland, was a religious zealot. He issued an edict forbidding his subjects from harbouring Quakers, whom he abhorred, on pain of imprisonment or eviction. A settler in Flushing who defied this order was banished back to Holland. In 1657, 30 of the townsfolk sent Stuyvesant a letter in reply that came to be known as the Flushing Remonstrance.

"We desire", they wrote, "not to judge lest we be judged, neither to condemn lest we be condemned, but rather let every man stand or fall to his own Master…If any [Quakers] come in love to us, we cannot in conscience lay violent hands upon them…for we are bound by the law of God and man to do good unto all men and evil to no man." It was among the earliest endorsements of religious freedom in the New World, and more robust and disinterested than many that followed. No signatory was a Quaker. By protesting, all risked their fortunes. Their stand came to define what America could be.

Later refugees included African-Americans in the early 19th century, drawn by the tolerance shown to Quakers and, in the early 20th century, eastern European Jews—including your correspondent's great-grandparents, fleeing pogroms on what today is the Polish-Ukrainian border. The Bowne House, where Quaker meetings were held in the 1660s, still stands—just blocks away from a Korean supermarket, a Sikh temple, a blue-domed mosque, various synagogues and churches of a wide range of denominations. Stuyvesant, one hopes, is spinning in his grave.

This is not to say that everyone who ends up in Queens is drawn by a particular vision of religious freedom. Most come, as most migrants come to any spot, simply because some people they know, or their family knows, already live there. That is why Flushing hosts one of New York's three biggest Chinatowns. Strolling around the area where Flushing's subway station sits you hear not just Mandarin and Cantonese, but also Hokkien, Hunanese, Shanghainese, Hakka and Sichuanese, as well as Mongolian and Uighur.

Leaving along Roosevelt Avenue you cross Flushing Creek. Once it was mighty—the outlet through which the Hudson flowed to the sea. But that was before the ice age rearranged the neighbourhood, sending the Hudson down its current path. Today it is a poky little stream, bounded and half-buried, fouled with decades of industrial waste. Flushing Meadows-Corona Park, on what might generously be called its banks, hosted World's Fairs in 1939 and 1964.

In 1939 to get to the fair was to take the train; from the middle of the 19th century to the middle of the 20th, the railways were the artery by which people flowed to and through Queens. In the 1870s farmers near Flushing were used to living alongside those who commuted into New York City (meaning, at the time, Manhattan).

Today the only patch of that agrarian 19th-century Queens which can still be seen is the Queens County Farm Museum, a 47-acre tract in distant Floral Park, perhaps the oldest continually farmed land in the state. On early autumn afternoons you can buy tomatoes, greens, chilies and honey all produced across the road from a dense thicket of brick two-storey homes.

Beyond the meadows, Elmhurst is among the most diverse neighbourhoods in Queens. An array of Latino merchants and restaurants—Venezuelan, Peruvian, Guatemalan, Salvadoran—line the streets. Shortly before noon Ecuadorean food carts show up where Roosevelt Avenue meets Junction Boulevard, piled with trays of steamed maize, fried chicken, squash and, at the centre of each cart, a massive, deep-fried pork shoulder, equal parts delicious and intimidating.

In 1960 what was then Elmhurst-Corona was 98% white. After Queens joined Manhattan, Brooklyn, the Bronx and Staten Island to become the five-boroughed city of New York in 1898, its northern part boomed, attracting immigrants from Germany, as well as southern and eastern Europe and Ireland. Around 1960 Latin American, Caribbean and Asian immigrants began arriving. African-Americans moved in to North Corona, Latin and Asian immigrants to the rest of the area and whites began leaving. Between 1960 and 1980, amid a cratering of its white population, Elmhurst-Corona's overall population grew by more than half.

Corona was the home of Archie Bunker, an archetype of mid-century Queens, and mid-century white American manhood. Between 1971 and 1983 Mr Bunker, played by Carroll O'Connor, provided the focus for two sitcoms, "All in the Family" and "Archie Bunker's Place"—a gruff, bombastic, bigoted but big-hearted blue-collar patriarch. He disparaged all non-white minorities—blacks, Hispanics, Asians—as well as Jews, Poles and Catholics. He was endlessly outraged by the social and cultural changes of the 1960s, by the growing diversity of his neighbourhood and his own increasingly liberal offspring (in particular, his son-in-law).

Bunker was neither buffoon nor a caricature, and certainly was not a role-model. In a way, though, like Queens itself, he provided the old America with a way to understand acculturation. Embarrassed young white liberals could see that their grouchy, bigoted fathers were not irredeemable—just products of a different era. Bunkerish viewers could see that Hollywood liberals were laughing with him, affectionately, rather than at him. Viewers who happened not to be white, heterosexual Protestants may have viewed him with considerably less affection.

We can hitch a ride to Rockaway Beach

Some might see Mr Bunker as the borough's most important cultural figure, edging out Martin Scorsese, Paul Simon and Louis Armstrong—were they not all eclipsed in recognition at least by Peter Parker, a Spider-Man from Forest Hills (also home, as it happens, to the Ramones, but that is another story). The unmean streets around Midtown High School are far from the mythic Krypton-to-Smallville-to-Metropolis world of Superman, or the plutocratic privilege of Batman; but that distance makes Spider-Man closer, and more relatable, to his fans. Queens is the right place for a friendly neighbourhood superhero—one who, in the recent film "Spiderman: Homecoming", has a debate-team rival played by a Guatemalan-American; a best friend played by a Hawaiian-Filipino-American; and a prom date who is African-American.

Back in Elmhurst, heading west, the neighbourhood becomes more South-East Asian. The Wat Buddha Thai Thavornvanaram, a Thai Buddhist temple tucked down a small side street, is among the oddest structures in the borough, its ornate, peaked, golden gables and doorframe grafted onto an otherwise utterly ordinary two-storey brick building. Inside, several dozen people line up to present food to three shaven-headed monks. Thawin Pukhao, the senior abbot, said that this is about the average number of congregants on weekdays; weekends and festivals are much bigger.

Trained in Thailand, Thawin says that when his master invited him to go abroad, "I thought maybe to Japan or China. But now I feel that this is my second hometown…In the temple, these are my people." A few blocks east is a newer Buddhist temple—Tibetan, festooned with prayer flags and carpets, a prayer wheel and plastic bottle filled with coloured oil at every seat. The very different temples sometimes hold events together. Like many New Yorkers, Thawin appreciates getting to meet "different types of people, different cultures…we learn from each other how to live together".

On the other side of Roosevelt Avenue from Thawin's temple is the Jackson Diner, one of the area's older Indian restaurants. Its clientele is as diverse as the neighbourhood: South Asian teens, a Korean mother and daughter, burly city workers in their

dark T-shirts and orange vests, two Caribbean women laden with shopping bags. The food will win no awards for innovation, but the curried goat is tasty enough—rich but not greasy, nor too gamey.

The manager, Manjit Singh, is a small, amiable man with the sort of watchfulness common to lifers in the restaurant industry. When his father founded the diner in 1983, he says, the neighbourhood had only four or five Indian shops. "This restaurant used to be a Woolworth's. Next door, the Patel Brothers' store? That was a Key Foods." The flow shifted. Today the businesses on the diner's street are almost exclusively Indian. And things are changing again. Near the Jackson Heights subway station the Gulshan Pharmacy's sign boasts "We speak in Bengali, English, Hindi, Nepali and Spanish". There are more Bangladeshis than there were before, says Mr Singh. Shopfronts along and just off Roosevelt have signs in Nepali and Tibetan.

Just as the Irish, Italians and Jews of Mr Bunker's time decamped to the suburbs, or warmer climes, the Indian-Americans of Jackson Heights are on the move. "We've grown used to driving," says Mr Singh. He rattles off places his friends now live: Atlanta, Houston, North Carolina. He himself now lives farther out on Long Island: "More space, better schools," he sighs, the haunting call of the migrant to the suburbs.

Immigrants normally come to Queens because they have links here. They land at JFK, and stay for five years, fifteen, a generation. Then they or their children move on. America has changed them and they have changed America—witness Mr Parker's classmates. Across Jamaica Bay from JFK, a more ancient migration is taking place, on softer wings. The Jamaica Bay Wildlife Refuge is part of a 9,000-acre national park, America's first to be located entirely within a city. It has a whispering, undulating beauty made more wondrous by the flight paths above it, and the world famous skyline on the distant horizon. Visitors park just off a heavily trafficked road but, once past the gatehouse, on raised paths through the tall grass, the sounds and smells of urban life vanish quickly.

The bays, salt marshes, woods and ponds draw the area's oldest migrants: snow geese, oystercatchers, warblers, plovers, egrets, herons. Hundreds of species pause in Queens for a time on journeys before heading north or south, depending on season and custom. They come back; they pass through. The ecosystem, like all ecosystems, is defined by flow, not stasis. Above them, occasionally, an aircraft comes in to land, a new family on board. And, too far away to hear, but still there in the mind, small birds are singing sweetly to Guyanese gamblers in a park, elsewhere in Queens.

This article appeared in the Christmas Specials section of the print edition under the headline "Elsewhere, in Queens"

Origami

Origami spreads its wings

From child's play to spacecraft, by way of mathematics and mechanical engineering

Print edition | Christmas Specials Dec 18th 2018

CONVERSATIONS AT THE International Meeting on Origami in Science, Mathematics and Education often pause for a hand to dart into a pocket, emerge with a square of plain paper and fluently fold it up to make a point—both geometrically and rhetorically. The tables at the meeting, which was held in Oxford last September, are strewn with paper constructions that must have taken weeks to make and which participants are nevertheless welcome to handle. But the meeting is not just, or even mostly, about folded paper. It is about the folds themselves: how to design them; how to think about them; how to use them. It is about making creases in everything from steel to sheets of carbon mere atoms thick. It is about differential geometry and elastic moduli. It is about adult nappies and satellite antennae. The more ways are found to fold things up, it seems, the more wide open the field becomes.

People have folded things up since there were things for them to fold. In Europe, for many centuries, the things folded were mostly cloth; in Japan and China, paper. The uniting of these traditions within a single systematised craft is largely a 20th-century phenomenon, as is its description as "origami" (*ori,* the Japanese for fold, *kami* for paper); in Japan the practice was previously known as *tatogami*.

Friedrich Froebel, the man who invented the kindergarten, was the first person to suggest the systematic use of folding as a way of teaching geometry. Educators steeped in "Froebelian" methods—whose number, intriguingly, included the mother of Frank Lloyd Wright, a revered architect—spread folding for learning and fun as far as kindergarten itself. Some mathematicians took note. In "Geometric Exercises in Paper Folding", published in 1893, T. Sundara Row took on with folded paper various problems geometers had tackled with compass and straight-edge since the days of Euclid: finding exactly half of the angle between two creases, say, or constructing a figure of three or nine or 15 perfectly equal sides. It could be applied to algebra, too. Mark a spot on the midline of a piece of paper, and fold the paper in as many ways as you can that touch its bottom edge to that spot; the folds will inscribe a parabola, as described by quadratic functions such as $y=x2$.

Good clean educational fun. But nothing could be folded that could not be equally well done with Euclid's tools—until, in 1936, Margherita Beloch, an Italian mathematician, developed a form of folding that produced the curves of cubic functions ($y=x3$). Mastery of such functions lets you "double the cube"—calculate from the length of the side of one cube what the length of the sides of a cube with twice its volume would be. It is a problem that cannot be solved with just edge and compass, and had stumped the ancients. Folding was more than just drawing lines without a pencil.

A few mathematicians took these ideas further (though for the most part they abandoned paper for idealised folds more suited to mental manipulation). They moved from everyday algebra to differential algebra and, in so doing, from flat sheets to curved ones, and even to non-Euclidean geometries like that with which the theory of relativity describes spacetime.

While the maths of folding raised its ambitions, so did the craft side. In 1958 Lillian Oppenheimer founded the Origami Centre, which in turn led to the current organisation, OrigamiUSA. It did much to bring together traditions from East and West and also opened up, on a personal level, the art's link to science. Acknowledged "masters" of OrigamiUSA have included Michael LaFosse, a marine biologist, and John Montroll, an electrical engineer. It was surely not a coincidence that one of Oppenheimer's highly mathematical children, Martin Kruskal, spent time studying the folding-up of spacetime inside black holes.

In 1989 a few such enthusiasts convened a meeting to explore what origami could contribute to science and engineering. Robert Lang, a former laser physicist, says that meeting in Ferrara, Italy, "played an outsized role in the triggering of the explosive growth that we're now in the middle of, because it brought together isolated individuals and fields."

He should know. Since hanging up his lab coat and taking origami on full time, Dr Lang has had a hand in a mind-bending array of pursuits both academic and artistic, penning 21 origami how-to books along the way. At the sixth sequel to the meeting in Ferrara, the one in Oxford, he is treated like a rock star.

It works on paper

Dr Lang's greatest hits have been in formalising and building enthusiasm for the mathematics behind origami with systematic, quantitative studies on how to achieve a particular shape starting from a single flat, square, uncut sheet. He developed software that can compute the folds and their order for almost any beast imaginable. The patterns that the program spits out for, say, deer with multiply-branching antlers, are staggering to behold, both in their flat and folded forms. The mathematical operations through which the former becomes the latter, one can only imagine, represents a peculiarly elegant trajectory through a vast and bewildering space of possibilities.

The flashiest early example of origami solving a scientific problem was when Koryo Miura and Masamori Sakamaki, astrophysicists at Tokyo University's space-science department, devised a new approach to the unfolding and refolding of a satellite's

solar panels, first put into practice in 1995. The obvious approach is to fold them as one does a map. But anyone who has tried to return a good-sized map to its folded state knows the damage it can inflict on the paper. The scientists' insight was not to fold the panel at right angles, which produces rectangles between folds, but at a slightly skewed angle, producing parallelograms. This creates a panel that can be completely unfolded just by tugging two of its opposed corners out, and refolded by pushing them in.

To have a fold named after you is a rarefied honour in the origami world, but "Miura-ori" has since earned that distinction. Simon Guest, who works on structural mechanics at the University of Cambridge, calls it the "crucial link between origami and science", and vividly recalls the first time he saw it. Dr Lang says the fold connects "hundreds of moving parts that move in different directions in a synchronised way"—which is just what builders of exotic experiments are often aiming for. "There are so many connections that it shouldn't be possible for it to move," he says. "That's really powerful, and those properties come almost naturally from patterns that arise in the world of origami."

In the wake of the Miura fold, more scientists and engineers took an interest, and more applications began to crop up in the scientific literature. In 2012 America's National Science Foundation decided that this sporadic enthusiasm could do with some institutional legitimacy, and set up a programme called Origami Design for Integration of Self-assembling Systems for Engineering Innovation, or ODISSEI; it offered grants to scientists interested in trying an origami-based approach to a problem, on the condition that they collaborate with origami artists. It was, in the rather non-paper-friendly words of Larry Howell, a mechanical engineer at Brigham Young University, in Utah, "like throwing gasoline on a match". The still-spreading flames lit up the Oxford meeting.

Though origami is at the centre of this applications boom, many of the devices displayed and discussed in Oxford represent a kind of goal reversal. For a recreational folder, the purpose is to finish with a given shape, such as a *tato*, the traditional paper purse that accessorises a kimono; for many applications, it is the unfolded version of an object that is the useful one.

Quite a few such applications are medical; the human body, like outer space, is best entered with small packages that can be spread out once you reach your destination. There are stents for arteries, retinal implants for the eye, forceps that scrunch up to pass through a tiny incision before getting to work within the body. Not all the bodily uses are interior, though. Dr Howell's group is developing new designs for nappies, folding away the structures within them to better control the wicking of liquid and to fit to a wider range of body shapes.

Some are for lab use. One group has built a flat, origami-inspired contraption which is folded up by the growth and movement of the cells living on it. Another group is showing off sheets of carbon atoms—graphene—that bend into shape when their environment changes—for example, when it becomes more acid. It is at such scales that self-assembling systems—the SS of ODISSEI—come into their own, beyond the reach of fingers or tweezers.

Back in the visible world there is shape-shifting furniture based on a puzzle called a Yoshimoto cube that folds into a wide array of squishy seating options, to the delight of its child users. A three-metre-tall architectural arch made from fibreglass folds flat for transport. A fairing for locomotives is designed to reduce aerodynamic drag but to fold away when the engines are parked, or used in the middle of a train; it could, its makers say, save millions of dollars a year in fuel. "Origami tubes"—imagine a Miura-folded sheet further folded into an extensible prism—are unusually stiff in some directions. Architects and car designers have taken notice. Thanks to Dr Lang and many others, there is a general, mathematical folding theory underlying all these applications.

"Rigid origami" needs new maths; it also offers new abilities

As a result the mathematics of origami has moved beyond early efforts to show how much higher maths could be recapitulated in folds (answer: a surprising amount). The folders are now providing the mathematicians with interesting new challenges, which can elicit intriguing mathematical proofs. For example, Erik Demaine, a computer scientist at MIT, has proved that any straight-sided figure—an octagon, a cityscape silhouette or a blocky Bart Simpson—can be extracted with exactly one straight cut if you fold the paper up the right way first (you can make a just-one-cut Christmas tree, and your own Miura fold, at economist.com/origami). This is just the kind of thing Dr Lang relishes: "gaining an understanding of a phenomenon that we see in the world of folding but don't yet have a mathematical description for".

The need for such approaches becomes acute when you move to materials other than paper—materials which cannot be treated by assuming that they are infinitely thin and stress-free. Bend a sheet of steel and it will not lie flat. It may also be under considerable strain at and far from the fold. Such "rigid origami" needs new maths; it also offers new abilities. The non-local strains in non-paper materials can be used to generate forces which will make things fold, or unfold, seemingly spontaneously. To make the most of such wonders, though, you need a much richer theory. Dr Demaine, whose particular interest is in curved folds, another frontier with even more demanding analytical requirements, says that work is under way toward a unified theory of rigid origami as good as that now available for paper.

Such a theory, he cautions, may not exist. But he and his colleagues will have a lot of fun looking for it.

Correction (December 20th 2018): *An earlier version of this article suggested that OrigamiUSA descended directly from the Origami Centre. Its original incarnation was in fact set up as a non-profit, separate from the Origami Centre. The piece also suggested that Robert Lang's folding software created a design for one origami praying mantis eating another; in fact that design was done by hand. Sorry.*

This article appeared in the Christmas Specials section of the print edition under the headline "The function of folds"

Patronage

Patreon, Kickstarter and the new patrons of the arts

Once the gift of princes, patronage is now the spare change millennials pay podcasters

Print edition | Christmas Specials Dec 18th 2018

KATHRYN ROSE faced a dilemma typical for a jobbing composer when she started out on her career. Hide her choral compositions away and show them only to those willing to pay for them? Or share her work with the world and earn a pittance? It was a choice between retaining control or giving access, explains Ms Rose, a Canadian who settled in London two decades ago: "But not both."

Ms Rose chose to give access. All her work is available for free under a creative commons licence, which allows people to use it with attribution. Yet money comes in anyway. On the website PayPal, donors can decide whether to give Ms Rose a quaver (£4 per month, or $5), a crotchet (£8), or a minim (£16). Kofi, an online tip jar, allows people to chip in more. Some 30 people support her on Patreon, a patronage website. "Exposure is not always worthwhile," says Ms Rose. "But exposure plus getting paid anyway? I won't complain."

Artists pleading for money is nothing new. Every fortnight in the back pages of *Private Eye* a middle-class begging bowl is passed around. For £3 per word, the British satirical magazine will print a plea for financial assistance, coupled with bank account details or an email address. "FLEDGLING OPERA SINGER £8k of conservatoire funding desperately sought," reads one. Another asks for £80,000 so she can attend drama school in New York. A Greek actress, cellist and singer asked for one year's rent so she has "time to practice". Staff at *Private Eye* cheerfully admit that they have no idea whether the section works.

But online, creative types are having far more success. Gone are the popes, dukes and Austrian princes who funded and protected the likes of Michelangelo, Shakespeare and Beethoven. In their place are websites that allow ordinary people to become patrons. Consumers have become contributors: giving a few pounds or dollars to artists, wonks, podcasters, politicos, writers and even university professors whose work they enjoy. Ms Rose is just one artist relying on this new system of patronage to fund her work. The result is that an old idea is having its time again.

I've got the brains, you've got the looks

On Patreon over 100,000 people are backed by nearly 3m punters. In 2018 the total pot of money behind them was $300m. Jordan Peterson, a Canadian psychology professor who rails against political correctness and notions of white privilege, has 8,000 supporters. Together they pay an estimated $1m annually to support his YouTube videos, which he then posts online free of charge. Writing in the 18th century, Edmund Burke described patronage as "the tribute that opulence owes to genius". Today it is the spare change millennials pay podcasters.

In its early incarnation, around the time of the Renaissance, patronage was a necessity for European artists, writers and musicians. Sustained creativity was not possible without it. A wealthy, powerful patron provided financial means and political cover. In return, oleaginous praise for benefactors seeped from the pages of any eventual work.

Machiavelli dedicated his "History of Florence" to his patron Pope Clement VII, declaring himself a "humble slave". In 1593, William Shakespeare began his poem "Venus and Adonis" with a dedication to the Earl of Southampton. "If the first heir of my invention prove deformed," wrote the playwright, "I shall be sorry it had so noble a godfather." Galileo offered to name Jupiter's moons after the Grand Duke of Tuscany in an act of cosmic sycophancy.

Praise was not the only price. A 15th-century missive from the Duke of Milan to the painter Vincenzo Foppa read: "Drop everything, jump on your horse and come here to us." During a tangle with his bosses, Michelangelo moaned: "I cannot live under pressures from patrons, let alone paint." Given his concerns that his on-off patron Pope Julius II wanted to kill him, a sense of pressure seems fair enough.

Some artists rebelled. After enjoying huge success early in his career, Rembrandt delighted in telling patrons to get lost if he did not appreciate their demands. Such declarations of independence could backfire. As Paul Crenshaw, an art historian, points out, when Rembrandt ran into financial trouble later in his career, he struggled to find a patron willing to bail him out.

The legacies of Shakespeare, early and late Rembrandt (if not the middle bits) and others might suggest that patronage was a rip-roaring success. But there is a survivor bias in such a reading. Everything now accepted as great benefited from patronage; but so did lots that is now forgotten. Plenty of dross was paid for, points out Werner Gundersheimer, a historian of the Renaissance, and untold amounts of talent may have gone unfunded.

The second problem was in part because the interests of artist and patron were not identical. The artist strives to create what is great, the patron to be associated with it—something more easily done when the greatness is already apparent. In 1755 Samuel Johnson, on being offered patronage for the dictionary he had already created, replied "Is not a Patron, my Lord, one who looks with unconcern on a man struggling for life in the water, and, when he has reached ground, encumbers him with help?" His dictionary defines a "patron" as "a wretch who supports with indolence and is paid with flattery."

Let's make lots of money

Dr Johnson would perhaps then have been satisfied when aristocratic whim was squeezed out by something more powerful: the market. From the late 18th century the burgeoning middle class pushed patrons to the fringes of artistic life by buying reading material, prints and more in their thousands and later their millions. High culture was no longer the preserve of the rich, but a permanent fixture of bourgeois life.

Samuel Johnson's dictionary defines a "patron" as "a wretch who supports with indolence and is paid with flattery."

Where profit was not possible, the patron persisted, points out Jonathan Nelson, a professor at Syracuse University in Florence. Putting on an opera still requires deep pockets, just as it did in 18th-century Europe. But mass-market books, photographs and phonographs had, by the mid-20th century, largely commodified culture. The change broke the direct connection between artist and audience, creating a new generation of middlemen (and they were mostly men) and of publishers, record label executives and film producers. Quantity became quality, and art lost some of its "aura", as Walter Benjamin, a philosopher, argued in his essay "The work of art in an age of mechanical reproduction", published in 1935.

At the end of the 20th century, though, what had been commodified started to dematerialise. Culture that had come in a physical form, whether on vinyl (or CD) or printed on paper, started to be delivered digitally, something to which consumers were unused and for which they initially proved unwilling to pay. Music revenues fell from $24bn in 1999 to $15bn in 2010 and have stayed at roughly that level since. Newspapers suffered a similarly steep decline. For some forms of culture, the market that superseded the models of patronage of early modern Europe is no longer enough. Now the new patrons are filling some of the gap.

Patronage is no longer one-to-many, as it was for the Medicis in Renaissance Florence. It can now be many-to-one. In an essay published a decade ago, Kevin Kelly, a former executive editor of *Wired*, a technology magazine, argued that a creator could make a living with the support of just 1,000 "true fans". If each fan was willing to spend about $100 per year on someone's work—the cost of driving out of town for a gig and staying the night, or just a few evenings in the cinema—and if an artist could capture that money, he could attain a form of creative freedom. In an era where popular YouTubers can attract hundreds of thousands of people, converting just a fraction of them to paying customers is enough to make a living, based on Mr Kelly's formula.

Although the internet hurt conventional forms of media, it opened up possibilities for projects that did not easily fit mainstream outlets. Since 2014 a group of German filmmakers has made videos chronicling the first world war, in real time week by week. The Great War Team rakes in $14,500 per month from roughly 3,500 patrons. Other, even more niche, tastes abound. People producing strange (often pornographic) art are among the most successful on Patreon. The broader consequence is that superstardom—or indeed, genius—is not necessary to make a living. Laurie Penny, a British writer whose 650 patrons pay her just over $3,500 per month, defines it as "nanocelebrity": she may be recognised on the bus, but she still gets the bus.

The appeal for the beneficiaries is obvious. What entices the patrons less so. Some forms of culture now resemble public goods, which a market typically struggles to provide, points out Kimberley Scharf, a professor of economics at the University of Birmingham. An album funded by a few willing donors can be made available to download for free. If everyone can lay hands on the end product, why be the mug who pays the up-front costs?

Some such public-good problems are solved by the state, which provides what the market will not. That is a sensible position when it comes to national defence. Not so much when it comes to podcast production.

Free-riding was less of a problem for the patrons of old. As one Italian put it in 1473, his artistic outlays were to "serve the glory of God, the honour of the city, and the commemoration of myself". Such men wanted to signal status, and they wanted to do penance (something which, if done conspicuously, served the former purpose too). No palazzo in Venice was complete without a portrait of the Virgin in each room.

Some modern consumers feel driven by a secular version of the same motivation. Stian Westlake, one of the authors of "Capitalism Without Capital", which looks at the consequences of the world's increasingly intangible economy, argues that people are decent intuitive economists; they know when something is unsustainable. And they know which public goods governments will and won't provide. "My take is that we're massively overpaid in tech, and I need to balance the books if the state won't," says one developer who supports eight people, mostly left-wing activists, on Patreon.

Given such enlightenment on a large-enough scale, patronage can fill the gap left by market failure and government reluctance. Possibly the clearest example of this is the *Guardian*, a British newspaper which refused to put up a paywall. In 2016, about 150m browsers visited its free website each month; subscribers numbered fewer than 200,000. Instead, since the summer of 2016, a little notice has appeared on the bottom of many stories: "Since you're here," it begins, "we have a small favour to ask". It is a begging letter, asking *Guardian* readers for a few pounds per month. "It was a bit of a punt," says one person involved. A successful one: today 340,000 people donate monthly. Another 375,000 gave one-off donations in 2017. If people are willing to pay and let others benefit, free-riding is no longer a problem. Instead, funding culture becomes borderline charity.

Perry Chen, who co-founded Kickstarter, which lets people crowdfund everything from backpacks to art exhibitions, argues that simply supporting the arts and funding projects makes people feel good. Early access to, or a discount on, an eventual product is nice. But the big payoff is enabling work to be produced in the first place. Patronage helps cultural consumption become more of an experience and the experience remains personal even after the artwork is shared with the rest of the world. If mass production, as Benjamin argued, removes the "aura" that surrounds culture, then patronage brings some of it back.

Some patrons get handwritten notes of thanks, or a visit to the studio where a show is filmed. They can suggest what topics a YouTuber talks about that week, or fire questions during a live question-and-answer session. The two people who give Ms Penny $250 per month receive a promise of special treatment. "I will definitely write you a letter of effusive thanks," Ms Penny says on her Patreon page. "And we can go for dinner if we're in the same city and I'm positive that you don't want to murder me

and eat my skin."

People fed up with politics, on the left and the right, throw money at those who appear to offer an alternative. For some punters being a patron is a form of commodified dissent, argues Riley (who goes by one name only), one of the hosts of Trashfuture, a leftist podcast. It now has 232 patrons, sending just over $1,000 its way each month. Matt Bruenig funded the People's Policy Project, a left-wing think-tank, through Patreon in 2017. Mr Bruenig already had a large audience before Patreon, with 130,000 followers on Twitter, garnered largely from arguing about the left-wing American politician Bernie Sanders. But now his ideas—expressed through radical papers, such as one on a wealth fund—have a larger audience. And his army of patrons suggests that there is an appetite, at least among younger types, for more radical left-wing proposals in America: with 1,700 patrons Mr Bruenig raises around $9,200 each month.

Figures on the other end of the political spectrum also benefit. Stephen Yaxley-Lennon, a far-right campaigner from Britain who goes by the name Tommy Robinson, allows people to donate through his website, so he can "cover stories about terrorist billboards, about migrant rapes, elections and women standing against [Social Justice Warrior] policies in Europe". His pitch is similar to any other plea for patronage. "I couldn't keep doing what I do without you," he wrote, next to a PayPal button with suggested donations of £5, £25 and £50 on either a one-off or monthly basis. (PayPal dropped Mr Yaxley-Lennon after *The Economist* approached it for comment, pointing out that the far-right activist violated its terms and conditions.)

With new patronage platforms, old problems remain. Racking up followers is difficult, points out David O'Brien at the University of Edinburgh. Amassing a few thousand fans of freely available work is hard enough, never mind persuading some of them to pay. The middle men who emerged throughout the 19th and 20th centuries were not inherently parasitic. Publishers and record labels could nurture talent, relying on cross-subsidies from mainstream artists to develop more literary or avant-garde ones. Now budding creative types face two routes: try their luck with the algorithms that divvy up the enormous audiences of YouTube or Facebook, or seek out success in a depleted traditional sector.

Discovering talent is not Patreon's concern, says Jack Conte, who co-founded the website in 2013. Those who have not already achieved modest online fame still rely on a market that no longer properly functions. In the past, a record label would invest in a musician or group, says Will Page, the director of economics at Spotify, a music streaming company. "Today, one of the first questions the label will ask the artist is: 'what audience are you bringing me?'"

Do you want to be rich?

As a result the new form of patronage tends to reward those who are already established. "If you don't have a big audience, you probably won't do well," admits Mr Conte. But if you have an enormous one, success is likely. One example is the blog "Humans of New York". It has been on Patreon since August 2018. What started as a website chronicling lives of random New Yorkers has since swelled to a whimsical juggernaut with 19m followers on Facebook. The blog's large audience did not convert into ready cash, says Brandon Stanton, its creator. Instead, he made money from traditional sources: he gave speeches and sold books featuring his photos and interviews. Now thanks to 23,000 patrons, he no longer has to drum up funds. Mr Stanton keeps shtum about how much he receives, but the minimum monthly donation is $1.50, implying an annual six-figure income from donations.

The new model of patronage offers benefits to a few—and often those on its extreme edges. It does not create large new avenues for artists to be discovered by unwitting fans. Instead, the likes of Patreon often act as a pawnshop for internet celebrities. The result is that patronage, in its older conventional sense, may still be most needed when it is least likely. Three centuries on, it is the vision of Dr Johnson rather than Burke that rings true.

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Warriors remembered

Remembering Norwegian heroism 75 years on

Five veterans follow the footsteps of a daring sabotage operation against the Nazis

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IN A FARMHOUSE a little way from Hardangervidda, a vast and wild plateau in central Norway, five elderly figures are gathered in the kitchen, warmed by a cast-iron stove, their feet in woollen socks. The table is set with coffee mugs, a lit white candle and a large plastic tub of home-made raspberry jam. Grey reindeer skins and tightly woven blankets drape the chairs. On top of the electric oven is a baking tray bearing six trout, each stuffed with spring onion and parsley. It might be any backwoods Norwegian home—except for the second table nearby, on which are placed several maps, black-and-white photos and a Thompson sub-machine gun.

The men have known each other since the early 1960s, when they attended Krigsskolen, Norway's answer to West Point or Sandhurst. They tumbled out of aircraft as trainee paratroopers together. They learned winter warfare by being dropped on the Vidda and digging snowholes for survival. Each went on to a military career. They drifted apart but then became closer again. Late in life they are deepening their renewed friendships through shared activity. Tonight they are about to set off on an adventure.

Their host is Torger Moeller, a wiry 77-year-old with a white beard who chomps gently on a curved, unlit pipe. He carved much of the house's furniture himself and fitted the pale pine planks to its walls. A self-taught taxidermist, he stuffed the eagle owl, sparrow hawk and grouse that glower down on his guests. He has the gnarled hands of someone who works outside every day.

Beside him is Tryggve Tellefsen, a watchful man with a wry smile and a check shirt. He reached the rank of major-general, leading international peacekeeping forces in Sinai and Macedonia, before becoming a diplomat and overseeing ground-breaking, if unsuccessful, peace missions in Sri Lanka and the Middle East. He is the mildest-mannered of the talkative group; he leaves tantalising, sometimes deferential, pauses in conversation. Mr Moeller quickly fills the gaps.

At the head of the table sits Anders Mostue, shorter, bespectacled, quick with a toothy grin. He is warmly self-deprecating, and the others happily chip in, mocking him as "only fit for sitting down": he quit their rigorous infantry life to be a mere pilot of fighter jets and helicopters. Mr Mostue beams at the slur.

Oddmund Hammerstad, an enthusiastic and sturdy man and also the chief organiser of the gang, was Norway's secretary of state for defence for five years. These days you can often find him at Mr Moeller's retreat, lugging around lumber as his host finds excuses to build yet more cabins—the total is now up to seven. It is several hours drive from his home in Oslo, but he's happy to make the trip: "Old buddies, you see."

The last of the five is Arne Mathiesen, nicknamed "the Moose". He used to run an NGO that promotes the benefits of skiing; in a snow-covered country that loves sport, this was hardly a chore. Tonight he wears a silk neckerchief imprinted with a finely detailed map—in green, yellow and white—of Hardangervidda. "In case we get lost", he says.

That is not likely. Mr Moeller, the host, knows the Vidda better than most. He spent many years guiding small groups of tourists to its glacier. He knows the plateau's natural history, its human history and its prehistory, too. He points out the traces left by stone-age hunters, such as the lines of boulders in and beside rivers that once served as reindeer traps, and the circular ponds in which they kept lowland trout with which to stock the summer lakes. Humans have found ways of hunting and trapping on this often forbidding plateau for perhaps 6,000 years.

More recently they have also learned to fight. As well as guiding tourists, Mr Moeller used to be an instructor for NATO winter-survival courses on the Vidda. He is the only one of the five to have seen battle; a UN mission in the Congo taught him first hand what a Thompson gun could do. During the cold war, he was part of a secret network of "stay behind" armed veterans, men given weapons and orders to mount resistance if Soviet forces ever occupied Norway. He still sleeps with guns close at hand.

A daring raid

But it is an earlier act of resistance against occupation that the men sitting around the table are discussing. The next day they will start retracing a path taken by a group of Norwegian commandos a generation older than them, who, in February 1943, attacked a plant at Vemork, on the southern edge of the plateau. The plant, created to use hydroelectric power to make fertiliser, had developed a rare speciality in the manufacture of deuterium oxide—"heavy water". In a nuclear reactor, heavy water slows down neutrons, and thus speeds up nuclear reactions. The allies believed Vemork's heavy water was crucial to Germany's development of atomic weapons.

The first raid on the site, in November 1942, had been a disaster. Operation Freshman involved British commandos landing gliders close to the plant. The gliders went off course and crashed. The survivors were captured, tortured and executed by the Gestapo: 38 were killed in all. In the 1943 assault which the veterans are commemorating—codenamed Gunnerside—Norwegian

commandos parachuted in well away from the target, from where they were to cross the Vidda undetected, join forces with a smaller group, codenamed Grouse, which had acted as scouts for the ill-fated Freshman, and mount the attack.

As officer cadets at Krigsskolen the veterans had heard lectures from the Gunnerside commandos. Some then served under them. They liked to discuss whether they, too, would have been as brave, had they ever been deployed in similar fashion. "These young men were the same age [in 1943] we were when at cadet school", says Mr Moeller. In the 1970s, when Mr Hammerstad and Mr Moeller were still in the army, they spent time with Jens Poulsson, one of the commandos. His stories of winter survival under reindeer pelts captivated them. Mr Moeller recalls that "he really was tough, a man of the mountain". It is hard to imagine him capable of a greater compliment.

The veterans' journey across the Vidda will honour the commandos' memories, as well as bringing back those of their own youth—of that which was taken and that which abides. Leaning back from the kitchen table, his pipe, Tommy gun and Colt pistol his props, Mr Moeller sets out his plans for the trip. At dawn they will drive half-an-hour between high snow banks out to the Vidda proper. "Then we march on skis from the northern edge." The men have been training throughout the winter months, skiing with 15kg backpacks. They will be taking clothes, water and food. "I've not carried a backpack like this for 50 years," says the Moose. "I feel a mixture of excitement and a little nervous."

As the evening ends, the men retire to billets around the house—except for Mr Mostue, who is banished to an unheated log cabin on account of his snoring. Before going to bed, Mr Moeller takes a dark-framed, black-and-white photo from the wall of his living room. It shows his grandfather, a railway conductor who "helped resistance men and a few Jewish people" escape the occupation, Mr Moeller says. "He lent them his spare uniform so they could go by train to Sweden…but the Gestapo caught him." He spent years suffering near-starvation in a labour camp close to Berlin and died not long after liberation. Mr Moeller wants to mark his bravery.

The next morning, under scudding clouds, the veterans prepare to head south across the Vidda. The group has decided against Mr Moeller's proposal that they don white camouflage and carry heavy wartime weapons as if in a re-enactment. Instead they wear sun goggles, highly visible red coats and colourful woollen hats. They carry mobile phones and a satellite-based alarm system, they spray skis with the latest wax.

A frisson of anticipation is evident. The men compare their mountain knives and backpacks. Mr Mostue's bag is oddly heavy and the veterans take turns lifting it. He later admits he had stashed two bottles of aquavit in it as personal "fuel". Mr Mathiesen clips on military-issue, steel-edged white skis and laments his sleep was broken by a stress-induced nightmare. Mika, Mr Moeller's dog, bounds ahead of them into the white. Mr Mathiesen is not so care-free. "We are on the edge of our comfort zone here."

He is proven right. The veterans ski for an average of seven hours a day for four days. They cover 20km a day, resting by night in isolated cabins. They pull a sledge with some supplies. It is an arduous regime, and Major-General Tellefsen suffers, falling behind. He is about to sink into the snow when two others grab him. Reluctant, tight-lipped, he admits he has chest pains and nausea. A park ranger is called and extracts him on a snowmobile.

Your correspondent takes a less strenuous route, travelling by snow scooter to their midway point, a cabin called Jansbu. His guide is a ranger on the plateau, Lars Inge Enerstvedt, a jovial, white-bearded giant who resembles Father Christmas. He has a flock of sheep which grazes the edge of the Vidda as his father's did before them. Over a lengthy meal of chewy boiled lamb with sharp tyttebaer (lingonberry) jam, sweet elk-heart jerky, aquavit and beer, he talks with awe of the predators the flock faced; the lynx which prowls woods of birch and pine in the valleys on the plateau's edge; higher up the wolverine, a remarkable navigator and killer. "The best will kill 200 sheep in a summer," he says matter-of-factly. They are protected, but only up to a point. Scientists on the Vidda are trying to extract DNA from samples of wolverine scat in an effort to identify the most murderous individuals for culling.

Evidence of another hunter is easy to spot. Just after dawn, in the driver's seat of a roaring snow scooter, Mr Enerstvedt points out black cliffs on the plateau. These are streaked white with eagle droppings. Eagles can bring down large prey. He describes tracking a reindeer—a young, adult female—after a bird swooped onto its back: "first one eye had been pecked out, then the other, then there was a long trail of blood in the snow, then it was over."

The Vidda is treeless, vast—some 9,000 square kilometres (3,500 square miles)—and high, mostly at around 1,300 metres (4,000 feet). When the wind howls temperatures can feel far colder than -30°C (-22°F) shown on a thermometer. It can also feel bleak, and empty. "There is only wilderness…it is the largest, loneliest and wildest mountain area in northern Europe", wrote Knut Haukelid, one of the commandos who hid on it in 1943. He recalled "naked mountains" where gales thrashed for days, pinning him and his comrades in remote huts or buried in snow-holes.

It is a wilderness, but not a wasteland. It is marked with evidence of rich stories and of human and animal activity. Mr Enerstvedt speaks of divine spiritual power in the space—it can be profoundly moving to spend time there. He refers to a pair of black boulders near the eastern edge of the plateau as "holy rocks", important to indigenous Sami, a nomadic people now mostly found in northern Norway. He also talks of a "long worm" lurking in one lake, a cousin of the Loch Ness monster. He says a mountain on the hillier western part of the plateau is sacred and should not be walked upon.

Fridtjof Nansen and his fellow explorer Roald Amundsen trained on the plateau in preparation for polar expeditions more than a century ago. In the 1940s the occupying Germans struggled to tame parts of it. They talked of building an airstrip high on the Hardanger glacier from which to launch glider-bombers towards Britain. One of their bulldozers is said to lie up there in a glacial crevasse.

Deep in the wilderness

At Jansbu, a remote, red-painted cabin by a frozen lake, your correspondent prepares a welcome for the veterans by digging out packed ice and snow from the door, lighting a wood-burning stove and melting snow for drinking water. Pairs of ptarmigan

hidden among low rocks nearby bark at him all the while.

Pencil drawings of trout adorn the hut's planked walls, as do portraits of Amundsen and Nansen. The snow that surrounds it is hard and dusty early in the morning. Beneath a crust of ice, however, it is more yielding, with the texture of fresh bread. As the day warms, the brittle surface thins and cracks, exposing wet mush underneath. In the hours that pass that afternoon, evidence of visitors appears: footprints in the snow of hare, shrews and an Arctic fox.

The veterans arrive triumphant in bright afternoon sunshine, two days into their trek. Glowing with satisfaction, they slump inside the cabin and devour calorie-rich meals of fried meat, rice, vegetable stew, burgers, bread and coffee. They pass around slabs of milky chocolate. Aquavit flows. Mr Moeller and Mr Hammerstad again debate details of the saboteurs' attack. They take turns to inspect diaries in the cabin dating back long before the war. These record names of visitors and the size of fish they caught. The Gunnerside commandos did not sign in. The veterans do.

Close to Jansbu they had passed the spot where the parachuting commandos came to ground 75 years earlier. Mr Hammerstad had telephoned a radio station in western Norway to deliver commemorative greetings from the wilderness to Joachim Ronneberg, the last-surviving saboteur. The veterans have a great admiration for Mr Ronneberg. He had been a pacifist before the war, but after the invasion of Norway he fled to Britain and volunteered to fight. He had been a boy scout leader—a big plus for a commando, says Mr Moeller—and could navigate well in the wild. He was also very calm. Some of the other saboteurs were eager to shoot the guards on the bridge which led to the heavy-water plant and willing to kill a Norwegian hunter they met on the plateau lest he report on them. Each time Mr Ronneberg, commander of the Gunnerside group despite his youth, ordered them not to kill. He died this year at the age of 99, not long after the old friends retraced his journey.

After a night at Jansbu, the veterans left for two more days on skis, but not on the route they had intended. Sudden springtime warmth—one of the untoward weather events to which Mr Enerstvedt says the plateau is increasingly prone as the climate changes—had spoiled the conditions on the saboteurs' route south. Instead they re-crossed the northern end of the Vidda, postponing the second part of the traverse.

The saboteurs had skied the rest of the way over the plateau to Rjukan. It is a handsome town at the bottom of a valley so steep that sunshine does not reach it in winter. An adjustable mirror on the edge of the plateau directs a beam of light to the town centre each afternoon. An old cable-car whisks sun-starved residents up to a café on the edge of the Vidda.

Seven kilometres away the power station at Vemork remains. Once the largest in the world, it looks like a fortress wedged into a cliff. The plant that produced the heavy water was just beside it. In 1943 both were reached by a suspension bridge across a gorge and a rock-strewn river. This was the bridge where Mr Ronneberg spared the guards and thus preserved the element of surprise. Instead, nine men clambered down the steep gorge in waist-deep snow, across the river and up the cliff on the other side. They evaded the mine field that informers from the factory had told them about and avoided the 30 guards and their dogs. Mr Ronneberg and another man squeezed through a narrow cable vent into one of the plant's cellars; two others joined them by breaking a window. The explosives they placed destroyed a precious stock of 500 litres of heavy water and damaged the nine machines used to produce it.

The sound of the explosions was muffled by heavy snow. The guards, once alerted, bungled their first response, failing to turn on searchlights. The attackers climbed back up to the Vidda, where they were met by a savage storm. Most of the men, led by Mr Ronneberg, managed to ski to safety in Sweden. The leader of German forces in Norway, General Nikolaus von Falkenhorst, declared the attack to have been "the most perfect commando operation" he had ever seen. He overruled plans to shoot ten locals in retaliation—a response the commandos had feared, and which had weighed heavily on them.

Today the plant is a museum. In 2017 its cellar was excavated. Clambering inside on ice-covered concrete, water dropping from the walls, the smashed ceiling lit by torches, it is easy to imagine the midnight attack. On the walls are marks and words left by plant workers in the early 1940s. It will be opened to the public next year.

The forgotten mission

How significant was their attack? The operation raised the status of Norwegian commandos and boosted morale among allied special forces. The wider consequence was less clear. The German atomic-weapons programme, it turned out, was not as advanced as the allies feared. "In retrospect we know that Hitler was not focused on an atomic bomb", says Mr Hammerstad. However, Germany still moved to replenish heavy-water stocks and rebuild the plant's machinery. Mr Ronneberg offered to lead a second mission. America carried out aerial bombing instead. It killed 23 civilians but failed to damage the plant.

In 1944 the occupiers decided to move all the heavy water to Germany, which meant shipping it across nearby Lake Tinn by ferry. Knut Haukelid, a commando who had stayed in the region, struck again, placing explosives in the hull of the ferry, sending the precious barrels of heavy water to the lake's unreachable depths along with 14 Norwegians and four Germans.

Beside the lake a stone memorial marks the sinking. Waterfalls tumble from cliffs nearby. Tufts of mist float over dark green pine trees. It is a forlorn and beautiful place, but one that feels far from the white windswept Vidda above, home to eagles, reindeer and the memories of soldiers and friends. Up there, in the spring of 2019, the veterans will again don goggles and clip on skis. They will return to the hut at Jansbu before skiing south for several days to finish their journey. Once more they will leave their marks on the snow, hear the ptarmigan bark, relish old friendships and recall those who went before.

This article appeared in the Christmas Specials section of the print edition under the headline "On the Vidda"

Choral music

Sacred choral music touches on deep religious, moral and political questions

William Byrd, master of polyphony, had much to say on all of them

Print edition | Christmas Specials Dec 18th 2018

Editor's note: *To listen along as you read, click the links in the text. These pieces were performed for* The Economist *by the choir of Jesus College, Cambridge.*

IN 1605 Charles de Ligny, a Frenchman, was having a drink in the *Fleur de Lys* pub near the Tower of London when someone noticed what was in his bag. Soon after, government spies burst in, arrested him and threw him in Newgate prison. The seditious document was a copy of sacred choral music by William Byrd.

How could this possibly be grounds for arrest? To most people today, sacred choral music of the 16th and 17th centuries is a calming oasis, or perhaps a devotional aid. But its history is a troubled, sometimes violent, one. Singing certain sorts of music could lead to public censure, or worse. The story of Byrd (1540-1623), an English Roman Catholic who contrived to remain part of the Protestant establishment he defied, illustrates the role such music played in political and theological struggles.

Though singing had a place in Christian worship long before, the earliest works of Europe's sacred music of which records remain come from around the 10th century. This early choral music was largely "monophonic", a tune often sung by a single person, without accompanying harmony or chords, such as plainchant .

This was not due to a lack of sophistication. "Polyphony", music of interweaving tunes and harmonies, is part of humankind's common heritage. Medieval people were not backward or stupid; monophonic music was a conscious choice made by those in positions of religious power. They thought it quelled the passions and encouraged devotion, Peter Pesic reports in his book "Polyphonic Minds". Although plainchant has a rhythm, it is mostly imperceptible; by contrast, the need for the different parts of the piece to stay connected means polyphony must have a beat. Church elders were not afraid that congregations would start tapping their toes or swinging their partners. But they were still worried. In 1159 John of Salisbury, a scholar and bishop, asserted that the "effete emotings" of polyphonic singers "can more easily occasion titillation between the legs than a sense of devotion in the brain." In the 13th century Thomas Aquinas argued that polyphonic music might suit God and the angels, who could know many things at once. Humans, he feared, were not up to such multi-tasking.

Melisma the moocher

Despite this, polyphony gained a foothold in church music, and over time it became ever more ornate—even obscurantist. "Viderunt omnes" (1198?), a work by the composer Pérotin, is a prime example, rich in "melisma"—the singing of a single syllable while moving between several different notes. The first syllable, "*Vi-*", is spread over 40 bars—40 seconds, at a reasonable tempo— before the singers move to the second syllable, "*-de-*" . Elegant; not intelligible. Humans can barely understand words which are so showily and radically slowed down and prolonged.

The spread of polyphony led to a backlash. Pope John XXII (who canonised Aquinas) appeared to admit that he rather liked polyphony. Yet his papal bull in 1324 censured music in which the "melodies are broken up by hockets [melodies shared by two voices] or robbed of their virility by *discanti* [an improvised line complementing the tune proper, often in a higher register]". As late as the end of the 14th century the author of a treatise on plainchant noted that he could not recommend polyphony as "I am a monk, and must not give opportunity for lasciviousness."

Such opportunities nevertheless arose. Consider the Eton Choirbook of the late 15th century, the most famous collection of music from England's Catholic days. It consists of sacred vocal music in Latin, beautiful but elaborate and obscure. "Salve regina" by John Browne is relentless in its richness. The final "Salve" builds through fully 35 bars of melisma on the syllable "
.

In the 16th century the Protestant Reformation sought to put a stop to such things. Protestants wanted worshippers to have a personal relationship with God and to read the Bible in the vernacular, rather than Latin. Music which rendered texts unintelligible had to go. The Catholic counter-reformation took a somewhat similar line. At the Council of Trent (1545-63) there was discussion of "whether that type of music…which delights the ears more than the mind…should be taken away from the masses". Ideally, music "should be sung so that the words are more intelligible than the modulations of the music." Polyphony persisted, but in a more austere form. The "Missa Papae Marcelli" by Giovanni Pierluigi da Palestrina (c.1525-1594) sounds fairly ornate to modern ears. But it showed that polyphonic music could be intelligible .

Byrd introduces dissonances that, to 16th-century ears, would have sounded highly unusual

This was the setting in which Byrd, England's greatest composer, plied his trade. He seemed like an archetypal establishment figure, part of the Chapel Royal, the monarch's choir, from his boyhood to his death. In 1575, along with Thomas Tallis, a composer who had taught him his craft, he was granted a 21-year royal patent that gave him a monopoly over the printing and publishing of polyphonic music. He wrote plenty of pieces in adoration of the queen; indeed, he was Elizabeth I's favourite composer
.

Byrd could never have led a quiet life. He was an irascible man who nursed plenty of grudges: in his will he refers to the "undutiful obstinacy of one whom I am unwilling to name". Kerry McCarthy, in a biography of Byrd, also points out that in the 1590s he fitted lead pipes to Stondon Massey, his house in Essex. This "may not have contributed to the sanity or equanimity of the Byrd family," she notes. But plenty of artists are grumpy and mad. Byrd's bigger problem—and the reason why, for centuries, he was not granted the same official approbation as Tallis, who hid his faith better—was his fervent Catholicism.

Henry VIII, Elizabeth's father, had severed the Church of England from its allegiance to the Church of Rome. Under his son, Edward VI, the Church of England turned decisively Protestant; after Edward's death Henry's elder daughter, Queen Mary, restored Roman Catholicism. After Mary's death Elizabeth brought back Protestantism. The new state religion was brutally enforced. In 1588 alone an estimated 22 priests and 16 lay people were put to death because of their Catholic sympathies.

Byrd, for all his establishment credentials, appeared with his wife Julian on government lists of "recusants"—those who refused to abjure their allegiance to Rome. Once he was fined £200 (more than £70,000 at today's prices) for failure to attend Anglican services. He was suspected of involvement in a planned Catholic uprising in 1583 to free Mary Queen of Scots from prison. Sir Francis Walsingham, Elizabeth's spymaster, said he would "seek out matters against Byrde". Despite the queen's favour, Byrd's life was "spent in fear…of the knock on the door at midnight", as John Rutter, a contemporary composer, puts it.

Are you now or have you ever been…

The Anglican polyphony of Byrd's time is nicely presented in Tallis's "If Ye Love Me", a setting of a passage from the Gospel of Joh
. The words are in English. They are also easy to understand, in part because, at least at the start, the singers sing as one. Byrd could write such things. He was a post-Council of Trent Catholic, and placid Tallis's influence on him is easy to hear. But he wanted to write music that was richer and more mysterious, harking back to Browne's "Salve regina". To that end he composed many pieces intended not for the court or cathedrals, but for secret papist gatherings, such as those said to have taken place at Ingatestone Hall in Essex. It is from Ingatestone that Charles de Ligny was probably returning when he was arrested in that London pub. The hall has not one but two "priest holes" where Catholic clerics could be hidden from Elizabeth's spies.

The conflicting pressures of life and faith produced in Byrd a music both subtle and sublime, full of symbolism aimed at his fellow Catholics—and occasionally secret messages to them. He had three techniques for making his political and religious points.

The first was his choice of text. Especially in his later career, he preferred Latin, for which there was by then no place in Anglican services. The Latin text of Byrd's "Deus venerunt gentes" contains references to "the heathen [who] have set foot in thy domain". Joseph Kerman, a musicologist, argued that the text refers to the hanging, drawing and quartering of Edmund Campion in 1581, who became a Catholic martyr .

Byrd's second tactic was to make subtle use of Catholic motifs and to quote from the work of composers who flourished in easier times. As noted by Richard Turbet, an academic, the beginning of " Victimae paschali " appears to copy the tune from the " Domine Deus " by Jacob Clemens non Papa (1510?-1556). (The "non Papa" bit was inserted to avoid confusion with Pope Clement VII.)

Byrd's third tactic was the most oblique. Hidden musical messages are woven through his compositions like gossamer embroidery. Take the first 15 seconds of the piece "Ave verum corpus" ("Hail, true body"), probably composed in 1605. In everyday speech it would make sense to stress the first or third words of that opening line. Byrd instead chooses to stress the second, "verum", w
. The technique highlights the doctrinal issue, central to Catholics, of transubstantiation. The truth of the body being hailed, according to Mr Kerman, is that of "the Eucharist which miraculously is the Body".

The finest example of Byrd's musical trickery, however, is in the "Mass for Four Voices", written in 1592-93. The piece was published without a title page, to conceal the identity of the printer. The title hints at the fraught environment in which it was written: with masses having to take place in secret, it was difficult to assemble a large choir.

The composition follows the conventional structure of a mass. But it is in the final line of the final piece, "Agnus Dei, qui tollis peccata mundi, dona nobis pacem" (or "Lamb of God, you take away the sins of the world, grant us peace"), that all the action takes p
.

Byrd's intention with the final three words of the piece is to emphasise the absence of peace in the harried lives of English Roman Catholics. As "Dona nobis pacem" is sung over and over, Byrd introduces dissonances that, to 16th-century ears, would have sounded highly unusual. On repeated listening, they become more jarring still as Byrd pleads with the authorities to leave him and his co-religionists alone. The waves of discord, it seems, will never end; the notes move gradually downwards, conveying death and decay.

And then the piece, wholly unexpectedly, closes on a serene G major chord. Peace has been granted. In music as in faith, if not in politics, the struggle of the Catholic is beautifully, eternally resolved.

This article appeared in the Christmas Specials section of the print edition under the headline "Dona nobis pacem"

Making you you

Establishing identity is a vital, risky and changing business

A state monopoly on people's official identities may be weakening

Print edition | Christmas Specials Dec 18th 2018

NEVER DITCH a party without an excuse. On a cold Sunday night in 1409, the great and the good of Renaissance Florence—men of the governing classes, painters, goldsmiths, sculptors—had gathered for dinner. Donatello was there, so was Filippo Brunelleschi, the engineer behind the great dome of the Duomo. But where was Il Grasso the woodcarver? "The fat one" had not even had the decency to send his regrets. Such a snub deserved a response.

Brunelleschi had a plan: take away his identity. "In revenge for his not coming this evening," he said, according to Antonio Manetti's 15th-century biography of the architect, "we'll make him believe that he has become someone else."

Grasso returned home from his workshop the next day to find his front door locked. He knocked, expecting his mother, only to hear a voice—Brunelleschi's—that sounded uncannily like his own. The voice called itself Grasso and referred to him as Matteo, a local craftsman. Just then, Donatello walked by: "Good evening Matteo, are you looking for Grasso? He's just gone inside."

Baffled, Grasso headed for the Piazza di San Giovanni to seek out friends, elucidation, reassurance. Instead, officials from the city's merchant court set upon him, calling him Matteo and demanding he pay off his outstanding debts. He spent the night in jail. The next day the real Matteo's brothers came along to "settle his debts", then carted him home for dinner. Grasso was gaslit: "I am no longer Grasso and have become Matteo."

Valentin Groebner, a historian, uses the story of Il Grasso to illustrate his study of how people were identified in early modern Europe. It reveals two fundamental principles of personal identity. The first is that any individual's identity is contingent on the recognition of others. The second is that anything like a modern life is rendered all but impossible when that recognition is not forthcoming, or is suborned.

Put those two things together and you see why the provision and policing of identity is one of the foundations of the modern state and the lives lived in it. A person's sense of who they are depends on many things, and is not necessarily either stable or singular. People can identify in many ways, and often do so simultaneously. Your correspondent will happily reveal that he is an immigrant (never an expat) but also a *pukka* Londoner and none dare say him nay. Political and social culture—at least in the liberal West—have matured to a degree where an increasing number of countries allow him to choose his pronouns and assert his gender unilaterally. But a claim that his name is Leo Mirani, that he was born in 1983 and that he is a legal alien resident in Britain holds little weight without documentary evidence in areas regulated by the state: finance, housing, employment, marriage.

In the 19th and 20th centuries the power to issue legal identity, like the power to issue fiat money, became a state monopoly. When states do not properly apply this power, people suffer. In the poor world those without proof of identity may be cut off from food rations, public housing and other government assistance. That is why the 1989 UN Convention on the Rights of the Child lists the right to birth registration and to a name second only to the right to life, and why the aim of a "legal identity for all" is included in the sustainable development goals the UN has set for 2030. The World Bank reckons that at least a billion people lack an official proof of identity. Being undocumented means being cut off from the modern economy—or working in the shadows and risking exploitation. Identity is a vitally important service for citizens if they are to fully participate in the economy and society.

The fact that this service depends on the state raises problems. Identity, like tokens of monetary value, can be taken away by the state that issues it. A hundred years before India's government declared, in 2016, that all 500- and 1000-rupee notes would cease to be legal tender, the Italian authorities invalidated all passports belonging to military-age men with immediate effect, causing confusion on a similar scale.

Being undocumented means being cut off from the economy, or working in the shadows and risking exploitation

The problem is rarely so obviously daft as in a recent case in Romania where a court refused to overturn a man's death certificate on the grounds that, though incontestably alive, he had appealed too late. "I have no income and because I am listed as dead, I can't do anything," he said. Sometimes the oddities are simply inconvenient. Zhang Ying, one of this newspaper's data journalists in China, cannot make doctor's appointments or file taxes online because the unusual character for her name, Ying, does not appear in the official database of standard Chinese characters.

Sometimes real harm is done. For a worked example look no further than Britain. Britons, or at least those whose political voices are heard, have for generations seen the idea of being asked for their papers by an organ of the state as disturbingly continental. The identity services offered by the state are circumscribed appropriately. Compulsory identity cards have only been issued during wartime; efforts to reintroduce them have been repulsed.

In 2017, though, the media started reporting on dozens of legal residents being harassed, detained or in some cases deported because they could not prove their right to be in the country. A "hostile environment" policy of making Britain unwelcoming

to illegal immigrants had carried through to children of immigrants who came to Britain from the West Indies and elsewhere after the second world war—the "Windrush generation", so named after one of the ships on which they travelled. Since the Home Office had disposed of old "landing cards", forms that documented the arrivals, a generation of Britons risked becoming illegal aliens.

The response of many observers, including liberal ones like this newspaper, was to call for a national identity register. But the fact that such registers are now a necessity does not mean that they are not, also, a worry. The information revolution means that far more data than ever before can be associated with people entered in such registers, a possibility being used liberally—which, in these matters, risks meaning illiberally—by states of all sorts. China and India are both developing elaborate systems not just to identify over a billion people each, but to organise their lives.

This issue is exacerbated by another change to the world of identity—online authentication. The power governments guard in the physical world has, online, been taken up by Facebook and Google. Nine out of ten non-Chinese websites that allow their users to log in with the credentials provided by another company use one or both of them. The economic incentives of the internet mean that these systems, like government bureaucracies, associate identity with ever greater swathes of information built up by the data-brokers who manage the flows of information between advertisers, tech firms and consumer companies. The firms which provide identity services have insight into the lives of their users, as states have into the lives of their citizens.

This introduces new vulnerabilities. The gaslighting of Il Grasso required that his "friends" know a great deal about the intimate details of his life. Outside police states, that level of detail was rarely accessible to 20th-century bureaucracies. Increasingly they now have the means to create such portraits—as a result, so do bad actors within the system, and criminals who break into it. As the gap between physical, self-asserted identity and remote, information-based identity has grown, the risk of being known to and identifiable by people you have never met increases. Again, the analogy with money illuminates. There are good reasons for society to have evolved from value stored in the weighable gold of Florentine ducats to the digital codes of bank databases. But that does not mean the new system is in all ways more secure.

Data breaches are common—Equifax, Yahoo and Marriott have all lost customer information. So are attacks. Mat Honan, a journalist, had his Google, Twitter and Apple accounts hijacked by hackers who used loopholes in each platform's identity verification processes. As Mr Honan put it, "every time you call Pizza Hut, you're giving the 16-year-old on the other end of the line all he needs to take over your entire digital life."

But information technology provides possible avenues for improvement, too. Identity, in the state's eyes, is a marker of a relationship that determines what you owe it and it owes you. New systems could allow the obligations and the identity to be unbundled—for each individual to be able to show that they deserved something without having to say who, exactly, they were.

Jeremy Bentham, an English philosopher, suggested in the 18th century that people should have a unique identifier based on their name and place and date of birth tattooed on their wrists. He believed this would improve people's daily transactions: "Who are you, with whom I have to deal? The answer to this important question would no longer be liable to evasion."

In future it may be possible to ask simply, "Do you have the qualities I seek in a counterparty to this deal?" and receive an answer you can trust from someone whose name you need not know. But it may also be possible to meet people who know exactly who you are, and what you've done, without you wanting them to.

2. Naming of names

To do the things that states want to do—be that tax their own people, fight other states, or improve the human condition—requires a particular way of seeing the world. As James C. Scott, a political scientist, suggests in his seminal work, "Seeing like a State: How Certain Schemes to Improve the Human Condition have Failed", the pre-modern state was, in many crucial respects, particularly blind. It knew precious little about its subjects, their wealth, their landholdings and yields, their location, their very identity. It lacked anything like a detailed "map" of its terrain and its people.

The building blocks of a functioning society that people in the rich world mostly take for granted—permanent surnames, street numbers and addresses, standard units of weights and measurement—all came from attempts to draw such maps and thus make the world legible, as Mr Scott put it, to its states.

A map is a system of co-ordinates. So is an identity. It takes descriptors applicable across the population and uses them to specify an individual. Hence the double sense of "identity" as something that people share and something which defines them as themselves. In Middle French *identité* means the "quality or condition of being the same" (think identical twins). It was not until 1756 that the word came to be used to denote individuality.

For most people over most of history it has been the sameness that has mattered: identity tended to be a group designation. Sects, ethnicities and religions distinguished themselves from others and signalled membership of their groups through dress and headgear. Mostly this identification came from the group itself; sometimes it was imposed on them. As early as the eighth century Jews were required to wear distinctive clothing in the Islamic world, a practice adopted by medieval Catholic Europe and revived more recently by the Nazis.

Most early states were able to operate with these broad identities by being pretty broad-brush themselves; they dealt with intermediaries such as local chieftains, village heads and holy men, or through collective fines or punishment. They had some need for specifics: the Romans, peculiarly adept at organised violence, established the notion of a census so the state could keep tabs on young men of fighting age and call them up as necessary. But states cared much more about land, yields and ownership than they did about people per se. Domesday Book, through which William the Conqueror made legible the English lands he had invaded in 1066, was concerned almost entirely with primary landowners; peasants are listed by first name—a very vague form of identity—along with other assets such as land and mills. This way of looking at the world lingered for centuries: Louis XVI managed to escape from revolutionary Paris in 1791 because passports issued to nobility at the time listed their staff by description and nothing else. Louis assumed the dress of a valet.

In this world surnames—qualifiers added to the name proper—that denoted family were important almost exclusively when there was land or title to inherit. The vast mass of the people made do with a single name, which in a village is quite enough, since everyone knows you anyway. That said, names were quite few. As late as the 18th-century 90% of England's men were either Charles, Edward, Henry, James, John, Richard or William. (William the Conqueror may not have been interested in the little people, but they happily named sons after him.) When needed, specificity could be added with a patronym or a professional description which, if its possessor passed on his profession, might run in the family. Smith was the most common surname in England for centuries; Johnson preserves a popular patronymic, as does Wilson.

It was only in 15th-century Florence that tax officials began to insist on a second name to help them see who was who, imposing a surname on those who lacked one. But away from rich cities and the seats of power things were slow to change. It took until the 17th century for people in the remotest parts of Tuscany to acquire fixed last names.

The modern notion of state-sanctioned identity can be dated to September 20 1792: "From this day forth begins a new era in the history of the world," as Goethe put it. Admittedly, Goethe was not referring to a decree on *l'état civil*—civil status—made on that day by the National Assembly. He had in mind the Battle of Valmy, at which the French revolutionary army, imbued, it is said, with a new spirit of nationhood, beat the Prussians, who outnumbered and outgunned them. But the creation of civil status was a watershed too. It took the question of identity away from a hodgepodge of vouching for one another, parish records and the like. It changed the state's attitude from that of previous censuses, such as the one called for in the constitution of the United States, which required only enumeration, not identification. It established the state's direct and unique bureaucratic relationship with every citizen.

The 19th century saw the idea of such unique and authoritatively recorded relationships established as the primary form of identity across the metropolitan and colonial world. This was in part a response to the increasingly anonymous milieu of the Industrial Revolution's cities, where identity could be assumed and shucked off more easily than in smaller communities. Part of this new state enforcement of identity was a legal prohibition on changing your name without seeking permission. Another was the identity card. France introduced them in Algeria in 1882, for vagrants in metropolitan France in 1912, and for foreigners in 1917.

The identities of criminals were of particular interest. In 1828 Prussia standardised the ways in which the police described people. In 1885 France adopted Alphonse Bertillon's anthropometric system for identifying prisoners by measuring bits of the body (branding had been abolished in 1832), moving identity away from the social and legal world of names and heritage and into the measurable and purportedly objective world of anatomy. The system was soon adopted around the world, as was the standardised mugshot, another idea of Bertillon's.

If state records were correct, your body no longer needed to be written on, as Bentham had suggested, in order to reveal definitively who you were. The anatomical measure that came to rule the roost was the fingerprint, simply taken, easily reproduced, purportedly unique—and also, remarkably, present even when the identifiable body that had left it was gone. The ability of the state to read the world was taken to a new level.

3. The truth of reconciliation

The fingerprint was just the start. There exist today any number of unique identifiers. The field of biometrics offers recognition by face, gait, retina, ear and more. There are official documents. And there are also mobile phone numbers, social network IDs, smartphone device IDs, constellations of browser cookies. Records of each are largely created separately from each other, and administered by divergent or competing interests within and outside the state. When reconciled, they can produce detailed portraits of the person they identify, locating them according to all sorts of varied co-ordinates.

Two current attempts at such reconciliation—one public, one private—stand out for their efforts to make such things work across huge populations: India's "Aadhaar" ID project and Facebook. They both show how the control of identity is evolving in the 21st century. Neither is reassuring.

Like Aadhaar, Facebook is a juggernaut dimly understood even by its own creators

Aadhaar, which means "foundation", is a 12-digit number tied to a person's name, gender, address, date of birth, and the biometric information of ten fingerprints and two irises. It exists "to make every Indian, no matter how poor or marginalised, visible to the state," Nandan Nilekani, a software billionaire and the architect of the programme, wrote in his 2015 book, "Rebooting India". Making the pitch for the programme in a previous book, "Imagining India", he argued that "creating a national register of citizens, assigning them a unique ID and linking them across a set of national databases…can have far-reaching effects in delivering public services better and targeting services more accurately." If you hear echoes of Jeremy Bentham and James C. Scott in that you are not wrong.

Mr Nilekani's vision was of less fraud, more efficiency, greater transparency and a lot more inclusion; Aadhaar was to bring hundreds of millions into the formal labour and financial markets. In the eight years since the first number was issued to Ranjana Sonawane, then a 30-year-old housewife in a remote village in western India, Aadhaar has achieved nearly universal coverage of India's 1.3bn residents, in part by being admirably flexible. It requires no last names, and the address can be as vague as "behind the jamun tree". It is non-binary with respect to gender, too.

But it is not, as originally conceived, voluntary. By the summer of 2018 Aadhaar was required or encouraged by nearly every government agency and programme. In one or more of India's 29 states, it had been mooted as a requirement for access to subsidised grain, cooking gas, free school lunches, welfare payments, government pensions, public health care, fertiliser subsidies, scholarships, fellowships and rehabilitation from sex trafficking; to get a birth or death certificate, buy railway tickets, move large sums of money, file taxes, or buy and sell property. People reported being asked for Aadhaar when trying to send mail at the post office. The Reserve Bank of India ordered banks to link the number with accounts. The department of

telecoms required it for a mobile phone subscriptions. Websites for arranging marriages started asking for it. Amazon asked people for Aadhaar numbers to track lost packages.

The question of whether all this was constitutional was brought to the Supreme Court. In September it ruled that it was, and allowed its use in the administration of welfare payments, subsidies and taxes, in effect making it mandatory. But it narrowed its use by the state and banned it for private companies. That restriction may not last. Arun Jaitley, the finance minister, has hinted that the government will pass new legislation to allow private use of the national ID.

Has Aadhaar made good on its promise to plug the holes in India's leaky social-welfare system, cut corruption and ensure that the deserving get access to cheap grain and fuel? No one knows. When asked, a former boss of the Unique Identity Authority of India (UIDAI) called his successor to ask if there had been any studies of savings. There hadn't.

Aadhaar has in some cases cut off access to benefits for people who previously received them and were not obviously fraudulent. Those who never got access in the first place have suffered, too. In February a woman gave birth outside a public hospital after being turned away for not having Aadhaar. Rural workers guaranteed employment by the law have had wages delayed because of Aadhaar's shoddy implementation. Residents of Jagdamba Camp, a slum in South Delhi, say the complexity of the system for linking Aadhaar to new ration cards has resulted in family members being dropped off the list. Sainaj, a 55-year-old housewife, could not register her 29-year-old daughter, who is paralysed and unable to leave the house. She no longer receives food benefits, disability benefits, or free medication. Others complain about repeated, often fruitless trips to the local ration office to re-register or link their documents, eating into the day's earnings.

Moreover, the system is prone to leaks, theft, misuse and overuse. No one knows for certain how much Aadhaar-associated data have been shared with whom, but in January 2018 Rachna Khaira, a reporter at the *Tribune*, a newspaper, bought a database with details on 1bn Indians for 500 rupees ($7). India's states each have their own copies, and layers of sub-contractors have access to them. A system designed to prevent fraud has given rise to a whole new economy of fraudulent activity—such as the sale of fingerprints.

Mr Scott identifies four factors that are necessary for the failure of such "schemes to improve the human condition": an administrative imposition of order that is inflexible and leaves out a lot of details about things in an attempt to make them simpler; an ideology that elevates science and technology above all else; an authoritarian state; and a prostrate civil society.

India fulfils the first two conditions and, under the Hindu nationalism of Narendra Modi, the prime minister, it is worryingly close to meeting the third. Journalists reporting on Aadhaar's shortcomings have been intimidated by authorities. When Ms Khaira bought that bootlegged billion-person database the UIDAI filed a criminal complaint against her. In a country where both national parties stand accused of using voter lists to systematically target and murder minorities, it is not paranoia to fear a government with access to a comprehensive database on every citizen.

India does, however, possess a noisy and determined civil society. The Supreme Court ruling in September was the result of more than two dozen separate cases filed on legal, technical, constitutional and right-to-privacy grounds by concerned citizens. And the court's ruling has acted as a check on the scheme's ever-expanding scope, and limited the transfer of power from the identified to the identifiers.

The same cannot be said of Facebook, de facto identity provider of the non-Chinese parts of the internet. It is not just that nearly 2.3bn people use the service at least once a month, all identified by what seems to be a real name, all not only providing portraits of themselves but also helpfully linking themselves to their friends and interests (not to mention identifying pictures of each other). Almost every website, app and service now requires log-in details. Many people find it convenient to use the same social-network identity for many of these log-ins, and Facebook, as the biggest social network, has 60% of this "social log-in" market. Tinder, a dating app used by tens of millions of people, until recently required all its users to have a Facebook log-in, relying on its identity-verification procedures to keep creeps at bay. But that also creates a single point of failure. A data breach, revealed in September, compromised some 50m "access tokens", which are used as people log in to other sites.

On top of this, Facebook's ad infrastructure uses cookies to track the activity of users and non-users across the web; it also has ways to track what they do in other apps, and what they do offline. When someone swipes a loyalty card in a supermarket, the name, address and email address are useful bits of information for the retailer to reconcile with Facebook's records, and it does so. This lets it build detailed—if not always accurate—profiles. Its policy of requiring real names links what it knows about online activity to offline identities. Facebook has become the internet's equivalent of Aadhaar, a custodian of identities to which all other data that people might be interested in can be linked.

Like Aadhaar, Facebook is a juggernaut dimly understood even by its own creators. Its complexity makes it difficult to foresee problems and its size makes it impossible to control. Facebook has so far proved reluctant to self-regulate to any serious extent. Despite two years of negative publicity, and fresh scandals about data misuse emerging nearly every week, it is stuck reacting to them pretty much piecemeal. Some argue that users can simply vote with their feet, but there are no signs of that yet. It is not so much that it is hard—though it is for many. It is that most people don't really seem to care.

4. The need-to-know basis

"Many of us in this room think we know how we use digital identity. But the truth is I am baffled most of the time. I just click OK," said Adam Cooper, who helped set up the British government's online identity system, Verify, and now works at ID2020, an organisation working to bring identity to the undocumented.

Mr Cooper was talking to a room full of specialists at a panel discussion in the House of Lords. The mood was gloomy. Steve Götz, another panelist, started his remarks by apologising "because I'm from Silicon Valley and we have created many of the problems we're trying to solve today". A similar sentiment pervaded an identity conference in Marseille in September. "The internet was built without identity management," laments Thorsten Niebuhr of WedaCon, a German firm that does just that.

"Most of us in the industry are aware of the problem. We've been talking about it for at least a decade. There are standards, but there is no coordinated effort" to manage digital identity.

It is because of that omission that Facebook has been able to dominate online identity, which for many of those at the meetings was problem enough. But the lapse also represents an opportunity cost. For most purposes the amount of information now linked to a digital identity, be it a Facebook log-in, an Aadhaar number or whatever, is extraneous and open to abuse. What a commercial or civic exchange requires is normally the ability to verify a fact about you—your age, say, or solvency—rather than to know who you are. When your correspondent went to that discussion at the House of Lords the security guards did not need to know who he was (though in a country with ID cards they probably would have asked for one). They needed to know he was unarmed, which was ascertained by other means.

With a good ID system, such an approach could be freely applied to aspects of life much subtler than the presence or absence of weaponry. It would be possible for people to verify facts about themselves without providing the opportunity for a panoramic snoop around their lives: to give the co-ordinate on the map that is relevant to the question asked without giving the other coordinates needed to specify exactly who you are.

Yoti, a London-based startup which wants to become the "world's trusted identity platform", is one of many attempts to provide such a service. Its system stores government ID documents and biometrics. If a user wants to buy a bottle of wine at a supermarket self-check-out and needs to prove their age, they scan a QR code and take a selfie using Yoti's app. The retailer can be sure of their age, but no one has seen their name or nationality.

Several startups are entering the market. Many are looking to blockchains, such as the one which underpins bitcoin, and other "distributed-ledger technologies" to do for identity what cryptocurrencies claim to do for money—disentangle it from the state. Canada's SecureKey, which uses a blockchain for "triple blind" privacy (meaning neither the issuer of an ID, the recipient, nor SecureKey sees more than needed for authentication), is backed by banks and telecom firms. Omidyar Network, an investment firm, is pouring money into identity companies. GSMA, a trade group of mobile-network operators, is promoting its own identity system along similar lines.

Governments and international organisations are interested. Countries around the world look to Estonia as a standard-bearer in issuing secure and useful e-identities. Austria's eID, which makes it impossible to link identifiers across services, is seen as a model of privacy. But there have been disasters too. Nigeria's MasterCard-branded biometric ID system has been widely criticised. Kenya is considering the collection of several forms of biometrics and DNA, too, in a programme that makes India's look like a model of restraint. A new Venezuelan ID is used to track voting.

Immigration authorities and thermostats would set their own thresholds of acceptability

The need for secure online identities will become more urgent as the world digitises further. Connected devices are steadily infiltrating homes. Smart meters for utilities are becoming commonplace, as are smart thermostats. Voice-activated speakers such as Amazon's Echo are increasingly popular. The median American household had at least five connected devices in 2017. That number may well double within a few years, and no one can say at what level it will plateau. All those devices need to be able to verify who is using them. Nobody wants a hacker opening their garage door or adjusting the heating. Passwords for every individual device are a non-starter. Large-scale biometric scanning is inevitable. If this all works with systems that endlessly check precisely who is doing what, rather than simply that whoever is doing something has the right to be doing it, privacy as it has been understood is over.

Identities which individuals can administer for themselves through a trusted non-state third party, or even a distributed ledger—"self-sovereign identities", as their advocates call them in a rather "captain of my soul" sort of way—offer more benefits than just verification without undue disclosure. State ID documents often say who you were as much as who you are; self-sovereign ones could be bang up-to-date. And they could work probabilistically. "There is a 70% chance this is who it claims to be," a machine would say. Immigration authorities and thermostats would set their own thresholds of acceptability.

There are two big obstacles to developing such systems. One is apathy. People do not adopt new IDs unless there is a reason to do so. States get around the problem by making it mandatory. Private companies must offer more. Microsoft introduced Passport, a digital ID for the web, two decades ago but it never took off. There were not enough users or websites to sustain it. Facebook became the internet's identity provider by offering a range of other attractions.

The other problem is that few people have the patience to manage their own affairs, even when given the choice. People have for years talked about models of user control of data in the context of Facebook and Google. Yet no real options have materialised. Most people say they are concerned about the use of their personal data, but are perfectly happy to give it up with very little incentive, something academics call the "privacy paradox". It is a paradox that keeps Facebook in business.

It is fruitless to blame people for this irritating inconsistency. It is the way people are. Perhaps more fruitful is to take aim at tech entrepreneurs and those to whom they look for inspiration. If enough of them were to take seriously the case for self-sovereign identities—and thus forswear the advantages that conveniently identity-tagged portraits of their customers bestow—they might provide an incentive for the development of such a system. If it could be made easy and fun, it might even be popular.

5. Lost and found

As much of the world risks being over-identified, however, remember those who remain underserved. You do not have to travel to the poor world to find one of the billion-plus people without proof of identity. You can find them in Baltimore, the biggest city in the American state with the highest median income.

For several months this year, students from Johns Hopkins University and members of Living Classrooms, a local NGO, operated an "identity clinic" for anyone who walked in. Visitors tended to be ex-convicts who had lost their documents. Some were homeless, some were recovering addicts. A few were all three. Volunteers helped them navigate the bureaucracy required

to regain recognition. The clinic can only help those who were born in the state of Maryland—out-of-state birth certificates are even harder to track down.

Acquiring proof of identity without proof of identity is not easy. The undocumented must make trips to the Department of Vital Records (for a birth certificate), the Social Security Administration (to regain relevant numbers) and then to the Motor Vehicle Administration (for state ID). It is a time-consuming process.

Other documents are needed, too. Recently released offenders often do not have a home, so cannot show an address. Sometimes the volunteers send people to free health clinics, which provide a letter confirming overnight stay, thus establishing residence.

Carrick Bastiany-Gaumnitz was here one April morning for help getting his social security number. He did not say how he lost his ID; the clinic has a policy of asking no questions. He was chatty and full of energy. He hoped to go back to the local community college to take classes in physics. He had an idea for a startup.

Mr Bastiany-Gaumnitz was in a better position than Il Grasso; he could prove his identity to himself. He could reach into his pocket and pull out his phone, unlocking it with his fingerprints. He could log in to his Facebook account or his email. Yet none of these were sufficient: on the day we met he could not rent a car, find a stable place to live or apply for a job. He existed in flesh and blood, and as a consumer on Facebook, but was an illegible smudge to the state. Regaining his papers would make all the difference, he says. "A little thing like ID opens up a lot of possibilities for me."

Correction (January 7th 2019): *This piece originally said that the World Bank estimates that 1bn people lack a birth certificate. It is more accurate to say that they lack an official proof of identity. This has been amended.*

This article appeared in the Christmas Specials section of the print edition under the headline "Making you you"

A Russian tale

The inner workings of Vladimir Putin's state

A set of illicit recordings reveal the fall of Alexander Shestun

Print edition | Christmas Specials Dec 18th 2018

MOSCOW'S MAXIMUM security Lefortovo jail, where the KGB held its most important prisoners, has seen its share of revolutionaries, commissars, dissidents, ministers, oligarchs, governors and generals. Alexander Shestun is different.

Until his arrest in June, he was the head of the district of Serpukhov, an outlying city in the Moscow region. But he matters more than his job title suggests. His rise and fall give an insight into the mechanics of power in Russia and its lever—the Federal Security Service (FSB). Under President Vladimir Putin this has become even more dominant than the Soviet KGB he once served. Mr Shestun played a part in that transformation; he was also its casualty.

He acted as a "torpedo"—an undisclosed accomplice used by the FSB to blow up its rivals. There are dozens of such people. But Mr Shestun distinguishes himself by his habit of recording incriminating discussions and releasing excerpts on YouTube. His case is revealing because it is typical; it is exceptional because, at the moment of his downfall, when the FSB turned against him, he took the world with him into the room. This is his story.

Alexander Shestun made a name for himself in the 1990s as fearless—an *otmorozhenny kommers*: literally, a frostbitten businessman; idiomatically, a hard case. "I never paid protection money, never negotiated, always hit back," he said in an interview not long before his arrest.

Frostbite is a useful attribute in Mr Putin's Russia; indeed it is one the president himself embodies. To be willing to escalate above and beyond any acceptable level of risk is a powerful strategy.

Audacity, adventurism and charisma served Mr Shestun well in the lawless but opportunistic decade that followed the collapse of the Soviet Union. He became the richest man in his area. He also realised that to protect his wealth, he needed legitimacy. So in 2003 he turned himself from a tough, leather-jacketed, gold-chain-wearing *kommers* into an elected politician.

A mentor running an adjacent district told him to "imagine that the whole district, everything in it is yours: your schools, your kindergartens, your factories, your people, your money."

Mr Shestun took his advice. What was good for Serpukhov, he reckoned, also had to be good for Shestun—and vice versa. His constituents, with whom he was broadly popular as a man who got things done, accepted this as the way of the world. He built roads, brought in investors, revamped a big park with hotels, horse riding, a spa and a landing strip for sport's planes.

To stay in the game, he joined the Kremlin's United Russia party, ensured that he won good results for Mr Putin in elections, and made deals with criminal bosses, the police, parts of the prosecutor general's office and, most fatefully, the FSB.

But by 2017 the game had turned against him. Mr Shestun was feuding with a more powerful vassal, Andrei Vorobyov, the governor of the Moscow region in which Serpukhov sits. He was seeking to displace Mr Shestun as part of a broader plan to consolidate power.

Unlike the self-made Mr Shestun, who personified the wild capitalism of the 1990s, Mr Vorobyov stands for the crony capitalism that characterised the 2000s. Whatever his other talents, he had a pedigree and connections, and these were essential to his pursuit of money and power. His father was the right-hand man of Sergei Shoigu, Russia's defence minister and one of Mr Putin's closest and oldest allies; Mr Vorobyov calls him his "political godfather". Gennady Timchenko, one of Mr Putin's cronies, is an investor in the Vorobyov family's fish firm. A member of the prosecutor general's family works for Mr Vorobyov on a "voluntary basis". Mr Vorobyov personifies the imbricated business and political networks that Mr Putin oversees.

For much of the 2000s so much money was sloshing around that men like Mr Shestun and Mr Vorobyov could both get rich. But as resources have become scarcer and appetites have grown, the conflicts between local lords have intensified.

Trying to defend his fief, Mr Shestun appealed for justice to Mr Putin, the tsar. On April 19th he uploaded to YouTube a plea to the president, along with extracts from recordings he made a year earlier. They include his conversation with Ivan Tkachev, a top FSB general who had been his handler and who is responsible for jailing some of the most powerful men in Russia, including regional governors, oligarchs, ministers and police generals.

The conversations took place between April 20th and May 2nd 2017. Mr Shestun says that he has released only a part of them. In one, by the entrance to the Office of the Presidential Administration, Mr Tkachev, using the familiar *ty*, is trying to get Mr Shestun to see reason. Mr Vorobyov has promised that, if Mr Shestun resigns as Serpukhov chief, a legal case against him will go away.

Mr Vorobyov, Mr Tkachev continues, has gone right up to the president. Mr Putin's deputy chief of staff is personally involved. "Are you kidding! They will simply run you over with a steamroller," Mr Tkachev says. "That is all. They will pull you in jail, anyway, and you will sit there for as long as they keep you there. You must understand this. Did you see how they steamrollered Surgrobov?"

An otmorozhenny kommers: literally, a frostbitten businessman; idiomatically, a hard case

Denis Surgrobov ran an economic-crimes task-force and set up a sting operation against one of Mr Tkachev's men. He is serving a 12-year jail sentence. His colleague, Boris Kolesnikov, is dead, having apparently jumped from a sixth-floor interrogation room.

"Don't you want to live any longer?" Mr Tkachev inquires.

"Don't you feel sorry?' Mr Shestun asks. "I have five children."

"I do, but that is not what this is about." To soften things, Mr Tkachev adds encouragingly that it's not as though Mr Vorobyov is going to be around that long, either. But Mr Shestun, the frostbitten businessman, refuses to back down. To give in would be to lose status, power, money and above all dignity.

Mr Tkachev has a last try. "Listen, this is a command of the president!...Whether you want to or not, you won't stay. I am telling you this." He brings up the cases of two regional governors who were recently jailed after digging in their heels. "All the election lists—from governors to heads of districts—go through me. I see who will get steamrollered in one month, who in two, who in three, who will get replaced, who is scared."

Mr Tkachev then ushers Mr Shestun into the Office of the Presidential Administration, where a high-level official tells him to write an undated resignation letter and promises protection. When Mr Shestun refuses, he tells him: "You should have accepted my proposal. You did not. So let's consider that this conversation never happened. OK? That is it, thank you. Goodbye."

In his appeal to Mr Putin, Mr Shestun said the words reminded him of a gangster movie. "I could not believe that things like this could be coming from *gosudarevy lyudi* [literally, the sovereign's servants], that they can be openly blackmailing me and my family."

Mr Shestun's disbelief was feigned. He clearly knew that *gosudarevy lyudi* behave this way all the time. He did not object to the feudal rules as such, just to them being overstepped.

Mr Shestun had first met Mr Tkachev in 2009. A group of corrupt prosecutors and a businessman, acting as their intermediary, were trying to blackmail him, extract protection money and gain control over some natural resources. Fighting off the racketeers, he made a pact with the FSB. They put a wire on him so that he could collect evidence of corruption in the prosecutor general's office. This would serve as ammunition for the FSB's own fight to become the dominant security service.

The FSB's rivals in the prosecutor general's office hit back, arresting Mr Shestun's deputy and opening a case against Mr Shestun himself. Mr Tkachev assured Mr Shestun that he could protect him. Mr Shestun decided to hedge his bets. He recorded a public appeal to Dmitry Medvedev, who was then serving as president, and uploaded it on YouTube. It included excerpts in which the prosecutors tried to extort money.

Mr Medvedev is said to have watched the video. The case against Mr Shestun was dropped. But the prosecutor general's office refused to endorse charges against its own men and they stayed in their jobs. Mr Shestun's deputy stayed in jail. A stand-off.

Two years later Mr Putin prepared to return to the Kremlin as president, and the FSB sought dominance over the prosecutor general's office. Mr Shestun once again proved a valuable asset, informing the FSB about a chain of illegal casinos being run by the prosecutors.

Gambling was outlawed in most Russian cities in 2009, but continued to operate under the protection of the prosecutors and the police. "You will get a great PR case," Mr Shestun recalled telling his FSB handlers. "Every TV channel will show news reports featuring a spinning roulette wheel, weeping old ladies who gambled their pensions away and you, their protectors against greedy prosecutors. You will be the heroes. The prosecutors won't be able to get off."

A media campaign followed. Photographs and videos were leaked of prosecutors celebrating their birthdays with buckets of black caviar and vodka. Several prosecutors were arrested and many more fired. The name of Artem Chaika, the prosecutor general's son, and his connections with casino prosecutors surfaced in a court hearing.

Yuri Chaika, the prosecutor general, saved his son and his own job. His deputies were less fortunate. One officer in the prosecutor general's office who oversaw the work of the FSB was said to have attempted suicide and died in hospital five days later. Another was run over by a dustbin lorry while crossing a street in Moscow. Mr Shestun knew both men. He had shared his tapes with them and urged them to rein in their people.

The Kremlin did not mind the infighting between its enforcers. It yielded compromising material on its top officials, an essential instrument for wielding power. Mr Putin has built a system where everyone spies on everyone. Rivalry over Russia's riches feeds a war of all against all, letting Mr Putin act as the ultimate arbiter. The FSB achieved its main goal—it made the prosecutor general pliable and dependent.

At first Mr Shestun thrived from this rivalry. A picture of the FSB's director hung over his desk. He played volleyball with a former head of the FSB and current Secretary of the Security Council. His status was well above that of a provincial district head.

But in 2013 his fortunes turned. That was when Mr Shoigu, governor of the Moscow region and one of Mr Putin's closest allies, became minister of defence. Mr Vorobyov, his deputy, stepped into the vacancy. Whereas Mr Shoigu had preserved the balance of power in the region, Mr Vorobyov quickly moved to seize control.

Empowered by Mr Putin, Mr Vorobyov abolished direct elections of district and municipality chiefs in the Moscow region. He also stripped them of the right to distribute land and issue construction licences. Mr Shestun resisted. He engineered special provisions to protect his elected position and confronted Mr Vorobyov when his men tried to shake down a business partner.

And so Mr Vorobyov blocked flows of regional cash into Serpukhov. The only new projects that came its way were two rubbish dumps and a prison. Mr Shestun turned down all three.

In April 2017, as Mr Shestun began to think about the end of his term, Mr Vorobyov prepared to pounce. A faction in the FSB opened an investigation into the sale of the land on which Mr Shestun's house had been built, threatening to seize it. Mr Vorobyov sent his chief of staff to tell Mr Shestun that the FSB would drop the case if he resigned. Mr Vorobyov would guarantee his immunity.

Mr Shestun once again refused to do Mr Vorobyov's bidding. That was when Mr Tkachev was enlisted to talk some sense into his torpedo. Mr Shestun recorded their conversation, this time off his own bat.

When Mr Shestun told his wife about his conversations, she advised him to resign. Instead, he let Mr Tkachev know that he had the tapes and was willing to go public if he felt in danger. Shestun says that Mr Tkachev told him: "'Be my guest. Publish what you like. I will say that I have never seen you before.'"

With less than a year before the presidential election in March 2018, an informal moratorium on political infighting meant that everything went quiet. In late 2017, though, came the landfill crisis. An old landfill in Serpukhov, designed for 300,000 tonnes of waste a year, had received 1.2m tonnes of the stuff. Nearby residents did not like being used as an increasingly noxious dumping ground for Moscow's waste. In November a few hundred men and women tried to block the access to the site. The entire police force of Serpukhov came to drag them away. But Mr Shestun turned up in his stretch Mercedes to stop them.

In March 2018 the residents of Volokolamsk, another town in the Moscow region, staged a mass protest against Mr Vorobyov with pitchforks made out of cardboard. They threw snowballs at him and nearly tore apart his local district chief. The landfill issue stoked anger at the inequality between the elites in Moscow and themselves and their run-down surroundings. "If my grandson dies in hospital I will shove these glasses into your arse," one protester told a bespectacled official. Several towns planned a co-ordinated demonstration on April 14th, Mr Vorobyov's birthday. In early April Mr Tkachev called Mr Shestun and told him to ban these protests.

Mr Shestun heard him out, recorded him and doubled down. When April 14th came, instead of banning the protest, Mr Shestun spearheaded it, helping demonstrators through police cordons. He also won a court case against the firm operating the landfill, ordering it to close down. And despite having been told not to run for re-election in September, he put himself forward as a candidate. Having run out of allies in the FSB and the police, he decided to join his constituents. Like a genuinely democratic politician, he sought shelter with the people who had elected him.

On April 19th the FSB searched his office and found some envelopes full of cash, which Mr Shestun says they had planted. He realised that his arrest would come next. That afternoon, he released a video appeal to Mr Putin and uploaded the taped threats from Mr Tkachev and others to YouTube. Nobody, possibly not even Mr Shestun, knows why. Friends say he was expecting changes in the government after the elections. Did someone use him as a torpedo against Mr Tkachev or Mr Vorobyov? Or did he just decide to go down like a true *otmorozhenny kommers*?

Out in the cold

In the early morning of June 13th, the first day for registering candidates in local elections, the police blocked the road to Mr Shestun's house. Some 40 men in black masks armed with machine guns burst in. His wife recorded his arrest. He held his teenage son in his arms for as long as he was able. Then he was bundled into a van and driven away to Lefortovo prison.

Mr Tkachev would not comment to a Russian journalist on Mr Shestun's allegations. Asked if he had troubles after the tapes, Mr Tkachev replied: "No troubles. Everything is fine. I am always open for a conversation." The FSB has not responded to our questions. Neither has Mr Vorobyov, though he did tell the Russian media that Mr Shestun's case was with the courts.

After a hunger strike, Mr Shestun was transferred to a hospital facility in another prison, Matrosskaya Tishina—"Sailors' silence"—then back to Lefortovo. He offered to testify against high-ranking FSB officers.

He is writing letters and has released more recordings of Mr Tkachev trying to win his co-operation. "You are a normal guy, not a traitor, you know how to take a punch," Mr Tkachev says. "It would have been better if you had clashed with criminals." He explains the game: "The president is also talking to [criminal bosses]. How can he not? Of course he does. Such is life, you see." Mr Shestun is a fool to trust the Russian people; they are "cowardly and manageable".

Prosecutors want to send Mr Shestun for a psychiatric assessment. Russia has a long, ignoble tradition of declaring rebels mad. But Mr Shestun fights on. "Unless I get killed, it could end badly for any opponent. I never go into 'reverse'. I will fight to the end."

This article appeared in the Christmas Specials section of the print edition under the headline "The rise and fall of Alexander Shestun"

Gleaning

The return of gleaning in the modern world

How much can an ancient practice do to alleviate hunger?

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AT THE SALON in Paris in 1857, Jean-François Millet exhibited a painting called "Des glaneuses" ("Gleaners"). It caused a scandal. Millet had long made a point of painting peasants at their labours, but this big canvas was his strongest provocation. Into a decorous world of silks and parasols it introduced rough women, plump in their homespun skirts, rumps in the air, grubbing for ears of grain dropped after the harvest. One critic complained of "ugliness and...grossness unrelieved". Another said it made him think of the scaffolds and pikes of the Terror of 1793.

Millet had seen the women differently. He found them dignified, doing their work in a sanctifying late-summer light, companions to his peasant "Angelus". In this, as well as their humble roughness, he caught the essence of gleaning.

To begin with, it is not scavenging. To scavenge means to search for things that others have discarded, as children rummage for plastic bottles and phone parts on the rubbish tips of Delhi. Nor is gleaning foraging, which is to gather foodstuffs from the wild, as fashionable restaurateurs scramble for chanterelles and samphire. Nor is it scrumping, which is stealing, usually on a dare.

Items which are gleaned are the good and usable fruit of human activity; they have not been discarded, merely overlooked, or thought not worth bothering with. In Henry Mayhew's exhaustive, wonderful chronicle of the Victorian urban underclass, "London Labour and the London Poor" (1851), his equivalent of rural gleaners are the river-dredgers who, when coal is accidentally dropped from a collier-brig, fish down to find it. In a striking analogy with rural gleaners in their ploughed fields, one tells him that "there's holes and furrows at the bottom of the river...I know a furrow off Lime'us Point, no wider nor the dredge...[where] I can git four or five bushel o' coal. You see they lay there."

In less wasteful and more straitened times, the yield was small: grain for the hens, one sack for the miller. Nervous authors called their books "gleanings" to stress their insignificance and fend critics off. These days, what is gleaned has slipped beneath the notice, or the need, of giant retailers and the capabilities of giant dust-raising harvesting machines. Sometimes the weather leaves a crop unsellable: after the searing summer of 2018, many apples were smaller than supermarkets would accept. Some 20-40% of fruit and vegetables, according to gleaning campaigners, are rejected by British and American supermarkets on purely cosmetic grounds: the demand, for example, that courgettes should look identical. In America, about 2.7m tonnes of "ugly" produce is thrown out every year.

Modern Westerners who are happy to pick produce in the fields all day (in Britain, chiefly Eastern Europeans) are in short supply. But many harvesting machines leave behind perfect low-hanging tomatoes or strawberries in their beds. One grower of blackcurrants in Sussex, whose fields are regularly visited by gleaners, reckons that machines get only 60-80% of his crop. Businesses may go under, too, abandoning the crops in the field. Agnès Varda's film "The Gleaners and I" (2000) documents the stripping of a whole unharvested vineyard before birds, or wild boar, move in. Whatever the cause, the modern yield may be substantial. The principle, though, is the same: if all is to be gathered in, the most efficient tools are the sharp human eye and the delicate human hand.

Rights and rules

Unlike scavenging and foraging, which tend to be individual enterprises with commercial potential, gleaning has almost always been communal and charitable. Its roots lie in the allocation of fair shares between individuals. The leavings of prosperity, the unneeded or overlooked fragments, are made available to those who need help, whether in dole at the monastery gate or from a sacking bag filled in a harvested field. Millet's gleaners were engaged in a task reserved for paupers by the local commune; in the background, the regular harvest is being stacked up in abundance.

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The right of the poor to glean had biblical provenance. "Thou shalt not wholly reap the corners of thy field, neither shalt thou gather the gleanings of thy harvest," said God to Moses in Leviticus 19:9-10; "...neither shalt thou gather every grape of thy vineyard; thou shalt leave them for the poor and stranger." In Deuteronomy, a sheaf forgotten in the field was to be left "for the stranger, for the fatherless and the widow"; and "When thou beatest thine olive tree, thou shalt not go over the boughs again." The Book of Ruth in the Old Testament tells the story of literature's most famous gleaner, a pauper and an alien in Judah who so enchanted the landowner, Boaz, that he instructed his reapers actively to help her: "Let her glean even among the sheaves, and reproach her not: And let fall also some of the handfuls of purpose for her, and leave them." Ruth's gentleness and humility did much to give gleaning, and the allowing of it, a colour of holiness.

Much of medieval Europe accepted a right to gleaning, but carefully. This was no free-for-all, and the rules remained intact, in some places, until the 20th century. A "guard sheaf" would be left in a field to protect it until the harvest was complete.

When this was removed a bell signalled that gleaning could start. And when the bell rang in the evening, gleaning stopped. The morning bell rang on the late side, at eight or nine, to give busy households time to get ready. All had an equal chance to gather their share.

Gleaning was also a significant part of the income of peasants and villagers, perhaps as much as one-eighth of annual earnings in central and southern England in the 18th and 19th centuries. But as the open fields were increasingly enclosed, farmers worried about damage to crops and simple trespass on what was now private property. When Mary Houghton went gleaning in 1788 on the fields of James Steel in Suffolk, she ended up in court, with a judgment that gleaning was a privilege, not a right. Mr Steel had no obligation to let her gather ears of corn; it was up to him whether he would kindly let her.

Mary Houghton undoubtedly thought gleaning her right. Whether she thought it a privilege is harder to say. Traditionally, perhaps because it required tidy-mindedness rather than physical strength, gleaning was left to women—as were other back-breaking tasks, such as turnip- and potato-picking, or ridding fields of stones. (Some insist that gleaning isn't really gleaning if no stooping is involved.) Working in prickly stubble, often in fierce sun all day, was arduous. But there was good company, and the children could glean too, carefully picking up straws in bunches of 20 or so, with the ears out, then tying them with their own stems, like little bouquets. The gleaners of literature were imagined carefree, singing as they worked and weaving cornflowers through their hair. The old woman H.E. Bates observed in Northamptonshire in the 1930s, "the last survivor of an ancient race", as he called her, "moving across the field under the mellow sun, nipping up the ears in her quick hands, shaking her sack", was too busy to notice flowers. Nonetheless she looked "eternal", as natural in the landscape as the birds.

In France the *Code Pénal* still states that gleaning is allowed "from sunrise till sunset…when the harvest is over." But no one seems to know the rules, especially as there is almost no gleaning for grains any more. The oyster-pickers filmed by Ms Varda off the Atlantic coast glean around the commercial beds after storms, but how closely, and how many they may take, are hotly debated questions. The gleaners she finds elsewhere are often lone scavengers, mostly the very poor, who are as likely to root through supermarket bins as to wander hopefully through fields. The most poignant throwback to older ways comes when a clutch of muddy village children, gleaning potatoes near Arras, burst into a chorus of "*Lundi, des patates, mardi, des patates, mercredi….*" With the breakdown of old community patterns, old-style organised gleaning has gone out, too.

Not many songs, but scattered chat and laughter, are heard in the fields at Maynards Fruit Farm, in East Sussex, on a warm day in June. The farmer has invited the Sussex branch of Britain's Feedback Gleaning Network, the country's largest, to pick what is left of his rhubarb crop. Persistent rain has made the crop come on too early, and he needs to clear the field to let more come through. In effect, this time, the 15-20 gleaners who arrive are harvesters rather than clearers-up. The principle seems the same to them.

Gathered by Facebook

These days there is no summoning bell. Instead, a perky alert comes by tweet or Facebook post: "Bracdrop [cabbage glean] at Wigden near Canterbury. Be there at 9…Over and sprout." The Sussex Gleaning Network alone contains 900 names. The people at Maynards come mostly from Brighton, the nearest city; almost none are from the countryside, and this is normal. Gleaning is now an urban and green preoccupation, requiring toilets, parking and travel expenses. The gleaners are dressed for work in jeans and walking boots, but need instruction on how to handle the small, sharp knives with which they will trim the stalks in the field. The acreage is not large, but after bending to pick rhubarb for six hours, they are tired. In return they find fun and comradeship in the open air, and pride in the stacks of stuff they pose with afterwards.

Cutting waste is the gleaners' first motivation, but poverty comes a close second: other people's, rather than their own. By government estimates, 10m tonnes of food goes to waste in Britain each year, 70% of it thrown out by ordinary households. Britain is the chief offender in the EU, which in total chucks 89m tonnes of food away. Meanwhile around 20% of Britain's adults, and 14.5% of America's households, are classed as "food insecure" in some way, unable to get nutritious food as often as they need it. Few, on either side of the Atlantic, have tried to guess how much fresh produce rots before it leaves the field. But farmers who took part in a Vermont Food Loss Survey in 2016 estimated annual vegetable and berry loss at 16%, and a British farm-waste survey by Feedback in 2018 came up with a figure of 10-16% across all crops, "in typical years".

Set against the waste, gleaners' efforts seem a drop in the ocean. In most years, Feedback gathers around 100 tonnes of produce. But every little helps. Gleaning has again become an adjunct to more organised social welfare. And, in some places, there is still a religious flavour to it. In America the Society of St Andrew, the oldest and biggest gleaning operation, draws 40,000 gleaners mostly from churches, synagogues and other faiths (including Islam), making the biblical basis explicit. Both there and in Israel, most gleaning is run by faith groups.

Calls for gleaners now target the young and fit from a wide area, but there are exceptions where local, neighbourly help is paramount. One gleaning programme in Oregon takes in only members whose household income is at or below 200% of the federal poverty guideline; all, therefore, are poor, and many are elderly or disabled. Some "adopt" people who are physically unable to glean themselves and share their gatherings with them.

The gleaners see themselves as noble agitators. They mount "rescues" to "save the veggies"; they talk of an "Arable Spring" and a "Glean Revolution". They eagerly calculate how many people could be fed each year if everything was saved, and employ just-in-time logistics. Getting produce from the fields to tables in charities, hostels, shelters and lunch clubs requires a fleet of sometimes refrigerated vans. In Britain, FairShare, which has about 20 branches, runs the vans; the fruit and veg are then used by Foodcycle, a national charity, to make meals for needy people, mostly in cities. In America, the Society of St Andrew distributes 9000 tonnes of food a year to a network of pantries serving the urban poor. The gleaner network of south-central Pennsylvania alone counts 120 "community partners". Such networks are growing.

Could gleaners get more? Undoubtedly. Field gleaning relies, as it always has, on good relations with farms. But those most open to the idea are small, family-run businesses, not enterprises of scale. Farmer psychology can be difficult, and some feel

ashamed to call in gleaners, as if it is an admission of failure. Others dislike the thought of half-trained workers in their fields. Gleaning is sometimes best offered as free help: workers for Maine's Gleaning Initiative will do other jobs too, such as sorting squash.

Gleaning could be more urban and suburban, and in some places it is. Around Silicon Valley in California, Village Harvest, founded in 2001, gleans citrus from gardens, backyards and old orchards. In Britain garden-gleaning is confined mostly to Hackney, a now-hipster (and mostly gardenless) part of East London. Pickings from such places give a lean return for the labour involved. Again, gleaners need to break into the world of big producers who care less about waste. They also need to persuade big supermarkets to tolerate imperfection. Both Morrisons in Britain and France's Intermarché now sell wonky veg—"inglorious" ones, as Intermarché happily calls them.

In America, where only about 10% of available edible food is recovered, worries about the cost of charity have also held back gleaning. The America Gives More Act of 2015 allows a permanent deduction for farm businesses that welcome gleans of up to 15% of taxable income. But legal caveats about trespass and damage can be fierce, and laws covering gleaning vary greatly from state to state: the east and west coasts broadly welcoming, the heartland much less so.

Inglorious glorified

The scale of the practice may have changed out of all recognition, but the philosophy—almost a theology—of gleaning remains the same. It completes and expands the harvest, so that the greatest possible number can share in it, especially the poor. It appreciates, and makes full use of, all that man and nature between them have provided. Community ties are strengthened by it. Beyond that, the act of gleaning can enrich in particular ways. Each gleaner, as in a religious service, enters not only the experience of the group but also an individual world of gathering and quiet accumulating. Gleaning can become contemplative, almost mesmerising. In this attitude of humble seeking, the harvest can be of thoughts, images and understandings, as much as food.

On a balmy October day the Sussex gleaners have assembled again, this time at the orchard in Stanmer Park. Some will do actual harvesting; others will do real gleaning, tidying what falls, or has fallen, on the ground. The fruits, seedling Bramleys, have been left to turn red and sweeten. They glow against a perfect sky.

No one is in a hurry. They do what they can, working methodically round a tree or a patch, feeling the netting bags grow heavy round their necks. It is very quiet, the loudest sound the thud of apples in the long grass. The words "waste" and "revolution" rise out of some conversations. Other talk is of crumbles and cream. Under one bent old tree, two girls in headphones stop work and start dancing.

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From the archives

Who The Economist has written about over the past 175 years

And where we have written about, too

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WHEN THE ECONOMIST was founded in 1843—the year that Charles Dickens published "A Christmas Carol"—it looked to the present and future. Animated by the belief "that free trade, free intercourse, will do more than any other visible agent to extend civilization and morality throughout the world", its founders set out to cover trade, politics, and literature in 16 pages of run-on sentences every week.

This year, for our 175th anniversary, we have looked over copies of *The Economist* Past to see how what the paper covered has changed over the decades. The results were not as clear-cut as we had hoped. Some of this is down to the limitations of current software, some to our past style. Captains of industry like Andrew Carnegie or Henry Ford proved hard to separate from their namesake libraries, institutions and car companies. And we usually referred to Napoleon III of France, for example, simply as "The Emperor"—the same way we referred to the tsars or kaisers of their days, not to mention, more recently, large penguins. As we became more international, though, we came to understand that identities obvious in London were not so in Addis Ababa, and changed our style to require that a person's full name be used in every article mentioning them.

In the 100 years before that, our focus was on political questions in Britain, Europe and the empire. In 1860 we lamented the "little intelligence in England as to the political discussions in America", but we ran just three dispatches on the campaign that saw Abraham Lincoln elected. By contrast, readers got almost weekly updates on Italian unification. We only mentioned Mao Zedong once before 1945.

We are now not only more worldly; we are also more people-y. Even accounting for the length of the paper, Margaret Thatcher was mentioned three and a half times more often at her peak than was William Gladstone at his, part of a general trend towards reporting on personalities. We are also broader in our interests; Charles Darwin, for example, received just over a dozen mentions in his lifetime, all of them in passing. We now manage that many mentions of him every few years.

Copies of *The Economist* Yet To Come were unavailable for analysis at press time. As always, suggestions for what they might contain are welcome.

This article appeared in the Christmas Specials section of the print edition under the headline "The ghosts of The Economist Past"

Zip fasteners

The invention, slow adoption and near perfection of the zip

Being associated with taking off clothes turns out to be good marketing

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IT IS A little bit of magic. A gesture up and a seam comes together. A gesture down and a garment comes apart. The zip was one of the later fruits of the Industrial Revolution, and one that was slow to ripen: the internal combustion engine, the turbine and the light bulb spread across the world much faster. But the zip, too, has become ubiquitous—and in a much more intimate way. Those magic gestures have meaning.

In 2017 the global zip market was reckoned to be worth $11.2 billion, bigger than the market for condoms. It is predicted to reach $19.8 billion by 2024. It is not growing because of exciting new uses, just because of more luggage and clothes: a boom in cheap, disposable fashion and developing-world demand for Western-style clothing. But if consumption is global, the industry is not. Remarkably, up to 40% of the market, by value, may be controlled by one Japanese company: YKK, which makes more zips every year than there are people on the planet.

Eye eye

That the zip is relatively new, and was slow to spread, fits into the broader history of fastening. It is an arena where innovation has been slow and fitful—surpisingly so, perhaps, given peoples' perennial need for clothes and luggage and their attachment to modesty and warmth. Take the button. As a decoration, it can be dated back almost 5,000 years, to what is now Pakistan. But for most of that time there were no buttonholes. Many societies held things together with loops and toggles, perhaps of horn. Others used buckles. The 11th-century Bayeux Tapestry shows men in cloaks pinned at the neck with brooches. Most people tied and wrapped.

Things got more interesting in Europe's Middle Ages, a period more innovative than it is often given credit for. Laces started to make a strong showing in the 12th-century. They ran up the side of the *bliaut*, the sweeping garment worn by both men and women; they can be seen on the statues adorning Chartres Cathedral. In the 13th century, in Germany, the button at last met its hole. Then, in 14th-century Britain, the earliest ancestor of the zip showed up: the hook and eye. Their appeal lay in fastening two edges smoothly, with no need for them to overlap, as buttons require, or to be obviously laced. They were, and are, fiddly, flimsy little things, but those who could afford them could afford to have someone else do the fiddling for them, too. These days they survive mostly as point-to-point fastenings, sometimes above a zip, often on bras, a development for which women can thank, or remonstrate with, Mark Twain. The writer patented a hook-and-eye clasp on stretchy material in 1871.

It was in that same era of unparalleled American industrial creativity that the zip was first produced. Robert Friedel, who has written a history of the zip, calls it "an unlikely invention". Thomas Edison's light-bulb filament made the vital service of illumination both more powerful and, soon, much cheaper. Alexander Graham Bell's telephone made something previously impossible possible. Though both had their belittlers, plenty of people saw the need for such things, and quickly seized on their potential. When it came to the world of fasteners, though, Mr Friedel notes, "there was no general sense that this was an area begging for improvement, much less replacement".

The Universal Fastener Company of Chicago was built around an innovation by Whitcomb Judson, an oddball whose main obsession was developing a pneumatic streetcar driven by compressed air. He imagined using a sliding guide to pull together a line of hooks and a line of eyes on a boot, a notion that he patented in 1893. Alas, the two sides of Judson's zip proved liable to come apart rather easily, defeating its purpose. Judson split, too, to further develop his no-more-successful streetcar.

The company was saved by Gideon Sundback, an immigrant engineer from Sweden. His developments were inspired, it is said, by two interleaved sets of soup spoons, stacked bowl on bowl but with their handles pointing alternately to one side and the other, and thus locked firmly together. Ignoring the company's new name—the Automatic Hook and Eye Company—he ditched the hooks and eyes and replaced them with today's design, more or less: two rows of metal protuberances with a tooth on one side and a socket on the other, forced together and prised apart by a puller. A similar design was patented by a Swiss woman named Katharina Kuhn-Moos around the same time, but it was never manufactured.

Sundback's improved zip proved hard to market, not least because of the previous, dud design. It was used on utilitarian accessories—money belts, tobacco pouches—but the rag trade proved resistant. The first world war, though, gave the zip its break. In 1918, the US Navy began to put them on its aviator jackets. Then, in 1923, B.F. Goodrich, an American company best known for tyres, put zips on its rubber galoshes. It called the new footwear Zippers, thus giving the device—previously the "hookless fastener"—its name. (The British, for reasons unknown, changed the name to "zip".)

But the device was still expensive, and this impeded its progress. When the company's salesmen found New York dressmakers resistant to the zip's charms, they invoked stereotypes of stingy Jews to explain their failure. But what businessman or woman would pay 35 cents for a zip for a one-dollar skirt when a button cost five cents?

The great unzipping

The resistance was not just about dollars and cents, though. It was also about what the zip represented: easy access; unfettered undoability. As late as the early 1930s it was seen as too strange and quite possibly too sexual to catch on, especially on women's clothing. Aldous Huxley, in his novel "Brave New World", published in 1931, realised that this could, regrettably, end up as a feature, not a bug. The inhabitants of his dystopian World State wore "zippicamiknicks" and "zippyjamas", showing them simultaneously to be disturbingly modern and endlessly sexually available. As a later novelist, Tom Robbins, put it, "Zippers are primal and modern at the very same time. On the one hand, your zipper is primitive and reptilian, on the other mechanical and slick…Little alligators of ecstasy, that's what zippers are."

What Huxley looked on with distaste—modernity, mass production, copious and meaningless sex divorced from reproduction—sounded quite appealing to others. In 1930 Elsa Schiaparelli, an avant-garde designer, was the first dressmaker to feature prominent zips in her collections. Wallis Simpson, the lover and later wife of King Edward VIII, was a fan. The king's subsequent adoption of the zipped fly is credited with its popularity in Britain, but young men were flocking to them everywhere. In 1940 a survey at Princeton University found the trousers of 85% of its students were zipped not buttoned. The class of 1894, by then in their 60s, still kept their flies buttoned almost to a man.

After the war, the zip took on a double life. It could be an ostentatious statement of toughness, rebellion, even danger. Think Marlon Brando in his leather jacket in "The Wild One" or, later, the zips which adorned the significantly less robust fashion of punk. But in dressmaking it functioned as a near absence, a slightly heavier seam which allowed clothing tighter than any since the days of corsets to be got into—and out of.

"I can never get a zipper to close," Rita Hayworth says suggestively to her on-screen husband in "Gilda" (1946). "Maybe that stands for something. What do you think?" The way in which dress design made zipping and unzipping joint activities added to the zip's frisson. And as Jess Cartner-Morley, a British fashion writer, points out, the post-war migration of the zip from the side of the dress to its back gave a "stark signal" about who was best placed for the unzipping. It wasn't the wearer. In "Live and Let Die" (1973), Roger Moore, as James Bond, goes so far as to unzip a woman's dress behind her back without even touching it, thanks to his handily magnetic watch. Seen this way, the barely noticeable zip reached its highest potential when it wasn't even there at all. That is why the protagonist of Erica Jong's novel "Fear of Flying", published in 1973, calls the no-power-games, consummately easy, consummately pure sex she longs for "the zipless fuck".

"I can never get a zipper to close—maybe that stands for something. What do you think?"

The tough and macho side and the sexual-access side of the zip could, naturally, fit together. Witness the real metal zip with which the denim crotch on the cover of the Rolling Stones' album "Sticky Fingers" was adorned. Punk's zips were as closely related to those of the fetish scene as they were to icons of the 1950s. If the sexiness of zips mostly lay in getting out of your clothes, for a minority it lay in getting into them—zips could do up garments of rubber or PVC deliciously tight.

There were still doubters, especially when it came to flies. Having metal teeth in delicate places is not without its worries. As Jerry Seinfeld, a comedian, once quipped, "It's a mink trap down there." Some felt buttons still made a statement. And some just worried about the zip's reliability. Ronald Reagan said he would only ever wear a button fly because he was afraid of accidental openings—a reasonable concern for an actor and for a president.

Zipper-de-do-da

Once near universal, did the zip mutate into ever better forms fit for ever more markets? No. There have been innovations: plastic teeth to replace metal ones; the coil zip, using continuous spirals of nylon to form the teeth, making them more flexible and lightweight. But much of the focus has simply been on improving quality. Precision in zip manufacture is everything. Misalignment as thin as a piece of paper can cause jams. A broken zip, unlike a lost button, often leads to a garment being discarded.

The improvements have been almost exclusively led by YKK, which guarantees that each of its zips will last for 10,000 uses. Tadao Yoshida, "the zipper king", founded the company in 1934, but had to start again after his Tokyo factory was bombed in the second world war. Soon the post-war company had gained a reputation for quality and reliability outside Japan. When Sundback's patents expired in 1960, YKK expanded into America. Talon, the descendant of the original Universal Fastener Company, faded before the onslaught. As the garment industry moved offshore, the Japanese zips followed. The company now operates in 73 countries, with much of its production in China.

YKK has developed zips that are waterproof, heat resistant and that glow in the dark. The heart of Japanese business is the concept of *kaizen*, or continual improvement, and Hiroaki Otani, YKK's boss, says the company is investing heavily in R&D. But the improvements seem to be much more in process than in the product. What more is there for the zip to do? "Wouldn't people like to do up a zip on the back of the dress with a touch on their smartphone?" offers Mr Otani, musingly. Leaving aside the risk of hackers, and James Bond's colleague Q, it is not clear that this will become much of a market.

"If the main function has not changed, it is then about how to apply it in different circumstances and products," says Patarapong Intarakumnerd, a professor of innovation in Tokyo. Some doctors, for example, speak longingly of a zip that can replace stitches after operations where they may need to access the same part of the patient's body again. Radical innovation often comes from outside the dominant industry, points out Mr Intarakumnerd. Smartphones came from computer makers like Apple, not phone companies. Maybe some non-clothing, non-luggage industry will find a reason to reinvent and reimplement the zip.

Meanwhile, there are still bits of the wardrobe the zip has yet to conquer. Why, for example, are shirts still mostly buttoned, or even poppered, when they seem an obvious candidate for zipperdom? There is no clear answer, says Mr Friedel. He thinks fastenings "establish niches through customs, functionality, advertising and more, and then they become custom".

And custom has, in this area, left the zip with very few rivals. Velcro, the most notable new fastening of the 20th century, inspired by the burrs of a plant, has limited appeal. It is used mainly for children and the elderly. It allows a range of fits, which is handy, particularly in footware. But it has its drawbacks; since the American army adopted it for uniforms in 2004, soldiers posted in dusty Iraq and Afghanistan have complained that it copes poorly with sand. And besides, there is not the beauty, the smooth, silent, sophisticated up-and-down of the zip.

And the zip does not really have to improve, or be replaced. Sometimes too much stress is put on progress. The technologies that matter most are not the ones around the corner. They are the ones in massive use. The zip was not born of radical new science or cunning craft, nor even of any deep need. Now that it is established, it says much less than it once did about sex, rebellion and modernity. It is unlikely to solve any of the world's major problems. It was simply a clever way of making something a bit easier that happened to catch on. In that sense, it is like thousands of workaday inventions that shift from novelty to necessity, without much song and dance, and end up hard to better.

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The best young economists

Our pick of the decade's eight best young economists

They mostly want to change the world, not just fathom it

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"THE SOLUTION in Vietnam", said William DePuy, an American general in 1966, "is more bombs, more shells, more napalm." But where exactly to drop it all? To help guide the bombing, the Pentagon's whizz kids calculated the threat posed by different hamlets to the American-backed government in South Vietnam. Fed with data capturing 169 criteria, their computer crunched the numbers into overall scores, which were then converted into letter grades: from A to E. The lower the grade, the heavier the bombing.

Almost 50 years later, these grades caught the eye of Melissa Dell, an economist at Harvard University. Those letters, she realised, created an unusually clean test of DePuy's solution. A village scoring 1.5 and another scoring 1.49 would be almost equally insecure. But the first would get a D and the second an E, thus qualifying for heavier bombing. To judge the effectiveness of the onslaught, then, a researcher need only compare the two. Simple.

Or not. Inconveniently, the scores had not survived: only the letter grades (and the 169 indicators underlying them, preserved because of an IBM lawsuit). To resurrect the algorithm that linked the two, Ms Dell embarked on what she calls a "treasure hunt". She stumbled on an old journal article which suggested the army had removed hundreds of musty records waiting to be catalogued by the National Archives. She tracked those files to Fort McNair where a military historian dug out the matrices she needed to reverse engineer the algorithm.

That kind of tenacity is one reason why Ms Dell, who is still in her 30s, is among the best economists of her generation. We arrived at that conclusion based on an investigative strategy somewhat less sophisticated than those for which she is celebrated: we asked around, seeking recommendations from senior members of the profession. They named over 60 promising young scholars. We narrowed that list down to eight economists who we think represent the future of the discipline: Ms Dell and her Harvard colleagues Isaiah Andrews, Nathaniel Hendren and Stefanie Stantcheva; Parag Pathak and Heidi Williams of the Massachusetts Institute of Technology (MIT); Emi Nakamura of the University of California, Berkeley and Amir Sufi of the University of Chicago Booth School of Business. Taken together, they display an impressive combination of clever empiricism and serious-minded wonkery. They represent much of what's right with economics as well as the acumen of top American universities in scooping up talent.

This is the fourth time we have assembled such a list, and a pattern emerges. The first group, from 1988, was dominated by brilliant theorists who brought new analytical approaches to bear on long-standing policy questions. Back then, theorists were treated like the "Mozarts" of the profession, according to one member of that generation. Two of these maestros have since been to Stockholm to collect Nobel prizes: Paul Krugman in 2008 and Jean Tirole in 2014.

In those days, empirical work enjoyed less prestige. As Edward Leamer of the University of California, Los Angeles noted earlier in the 1980s, "Hardly anyone takes data analyses seriously. Or perhaps more accurately, hardly anyone takes anyone else's data analyses seriously." It was easy for economists to proclaim a seemingly significant finding if they tweaked their statistical tests enough.

By 1998 theory was giving way to a new empiricism. One member of the cohort we chose that year, Harvard's Michael Kremer, was arguing that randomised trials could revolutionise education, much as they had revolutionised medicine. Another, Caroline Hoxby of Stanford, showcased the creative potential of a "quasi-experimental" technique: the instrumental variable. She wanted to know whether competition for pupils improved school quality. But this was hard to gauge, because quality could also affect competition. To untie this knot, she employed an unlikely third factor—rivers—as an "instrument". Places densely reticulated by rivers tend to be divided into many school districts, resulting in fiercer competition between them. If these locales also have better schools, it is presumably because of that competition. It is not because better schools cause more rivers.

This cohort's Mozart—the empiricist with, if anything, "too many notes"—was Steven Levitt of the University of Chicago. In his view, "Economics is a science with excellent tools for gaining answers but a serious shortage of interesting questions," as Stephen Dubner, a journalist, once put it. In pursuit of more compelling questions, he roamed freely, carrying his tools into unconventional and even quirky areas of research (penalty kicks, sumo and "The Weakest Link", a game show). The result was "Freakonomics", a bestseller written with Mr Dubner, and a phalanx of imitators.

Ten years later, many of our picks of 2008 also excelled in empirical work. Esther Duflo of MIT institutionalised the randomised trials that Mr Kremer helped pioneer. Jesse Shapiro of Brown University—still under 40, but we are not allowing double dipping—delighted in some of the same empirical virtuosity as Mr Levitt.

The work exemplified by these two waves of economists (and many others) amounted to a "credibility revolution" in the discipline, wrote Joshua Angrist and Jörn-Steffen Pischke, authors of the revolutionary movement's textbook, "Mostly Harmless

Econometrics". Like many revolutions, this one was founded on a change in the mode of production: the introduction of personal computers and digitisation, which brought large bodies of data into economists' laps.

Like all revolutions, this one was followed by a backlash. The critics lodged three related objections. The first was a neglect of theory: the new empiricists were not always particularly interested in testing formal models of how the world worked. Their experiments or cleverly chosen instruments might show what caused what, but they could not always explain why. Their failure to distinguish mechanisms cast doubt on how general their findings might be. Like jamming musicians who never write anything down, they could not know if their best grooves would return in new settings.

The second objection was a lack of seriousness. "Freakonomics" had encouraged an emerging generation of economists to trivialise their subject, their critics alleged, somewhat unfairly. "Many young economists are going for the cute and the clever at the expense of working on hard and important foundational problems," complained James Heckman, a Nobel laureate, in 2005.

The new empiricists were also accused of looking for keys under lampposts. Some showed more allegiance to their preferred investigative tools than to the subject or question under investigation. That left them little reason to return to the same question, unless they found more neat data or a new oblique approach. This hit-and-run approach makes some scholars nervous, since even a perfectly designed one-off experiment can deliver a "false positive".

Delving deeper

Where does that leave today's bright young things? This year's cohort has certainly picked up its predecessors' empirical virtuosity. Their papers are full of the neat tricks that enlivened the credibility revolution. Mr Pathak and his co-authors have compared pupils who only just made it into elite public schools with others who only just missed out, rather as Ms Dell compared villages on either side of the Pentagon's bombing thresholds. The study showed that the top schools achieve top-tier results by the simple contrivance of admitting the best students, not necessarily by providing the best education. Ms Dell and her co-author showed that bombing stiffened villages' resistance rather than breaking their resolve.

Ms Williams has exploited a number of institutional kinks in the American patent system to study medical innovation. Some patent examiners, for example, are known to be harder to impress than others. That allowed her to compare genes that were patented by lenient examiners with largely similar genes denied patents by their stricter colleagues. She and her co-author found that patents did not, as some claimed, inhibit follow-on research by other firms. This suggested that patent-holders were happy to let others use their intellectual property (for a fee).

Our economists of 2018 also show great doggedness in unearthing and refining new data. Ms Dell is interested in the economic consequences of America's decision to "purge" managers from Japan's biggest companies after 1945. To this end she is helping develop new computer-vision tools that will digitise musty, irregular tables of information from that time.

For a paper called "Dancing with the Stars", which shows how inventors gain from interactions with each other. Ms Stantcheva and colleagues painstakingly linked some 800,000 people in a roster of European inventors to their employers, their location and their co-inventors in order to find out what sorts of propinquity were most propitious. Mr Hendren has joined forces with Harvard's Raj Chetty (another of our alumni of 2008) to exploit an enormous cross-generational set of data from America's census bureau. The data link 20m 30-somethings with their parents, who can be identified because they once claimed their offspring as dependents on their tax forms. The link has allowed Mr Hendren to study the transmission of inequality from one generation to the next.

The 2018 cohort's combination of clever methods and dogged snuffling out of data comes along with a rejection of some of the more frolicsome manifestations of earlier new empiricists. Many of them display an admirable millennial earnestness. They are mostly tackling subjects that are both in line with long-standing economic concerns and of grave public importance. Ms Williams seeks a more rigorous understanding of technological progress in medicine and health care, which many commentators casually assert was the largest factor in improving people's lives over the past century. Ms Dell is interested in the effects of economic institutions, such as the forced labour used in Peruvian silver mines before 1812. The lingering consequences of that colonial exploitation are visible, she says, in the stunted growth of Peruvian schoolchildren even today.

Ms Stantcheva studies tax, perhaps the least cute subject in the canon. As well as investigating the public opinions and values that shape today's tax systems, she also studies taxation's indirect and long-term consequences. Taxation can, for example, inhibit investments in training or scare off the inventors who drive innovation. On the other hand, successful professionals often have to work hard as a signal of their ability to their bosses, who cannot observe their aptitude directly. That rat race, she points out, limits their scope to slack off even in the face of high top rates of tax. With Thomas Piketty of the Paris School of Economics (the most obvious omission from our list in 2008) and another co-author, she has explored how tax rates affect rich people's incentives to work, to underreport income, and to bargain for higher pay at the expense of their colleagues and shareholders. When that third incentive predominates, top rates as high as 80% might be justified.

Mr Hendren's work on the market's failures to provide health insurance was, he says, "ripped from the headlines" of the Obamacare debate. His more recent research on social mobility is almost as topical. The son of a black millionaire, he has found, has a 2-3% chance of being in prison. Among white men only those with parents earning $35,000 or less have odds of incarceration that high. Black disadvantage is not confined to bad neighbourhoods. Mr Hendren and his co-authors have discovered that black boys have lower rates of upward mobility than white boys in 99% of America's localities. Young black women, on the other hand, typically earn a little more than white women with similarly poor parents. This research with Mr Chetty should inform a broad swathe of thinking about race in America.

Crisis? What crisis?

In short, our picks of 2018 are looking for the intellectual keys to important social puzzles; they are willing to move lamp-

posts, turn on headlights or light candles to find them.

Mr Pathak provides a good example of this question-driven, issues-first approach. In his work on school choice he began by examining the matching algorithms that many American cities use to decide which pupils can attend oversubscribed schools. Previous systems encouraged parents who were in the know to rank less competitive "safety schools" above their true favourites. Mr Pathak's research has helped promote mechanisms that allow parents to be honest.

Now that these improved formulae have caught on, Mr Pathak's algorithmic expertise is less urgently required. A different kind of economist, committed to the algorithms more than the schools, might have dropped education for problems tractable to similar approaches in other fields. But Mr Pathak is exploring other ways to improve school quality instead.

This habit of sticking with big questions should make this generation of scholars less vulnerable to the curse of false positives. But this is not the only way in which the new crop is helping to clean up the academic literature. One rule of thumb when reading journals is that dull results that nonetheless reach publication are probably true, but that striking, eminently publishable stories should be taken with a pinch of salt. Mr Andrews's quantitative work on these problems seeks to weigh out the appropriate salt per unit of splashiness. According to his calculations, studies showing that the minimum wage significantly hurts employment are three times more likely to be published than studies finding a negligible impact. Knowing the size of this bias, he and his co-author can then correct for it. They calculate that minimum wages probably damage employment only half as much as published studies alone would suggest.

Mr Andrews has also scrutinised the instrumental variables that featured so heavily in the credibility revolution. To work well, an instrument (such as the river networks Ms Hoxby used as a proxy for school competition) should be tightly linked to the explanatory factor under examination. Often the link is weaker than economists would like, and their efforts to allow for this may be less adequate than they suppose. Mr Andrews and his co-authors have reassessed the reliability of 17 articles published in the profession's leading journal, suggesting better ways for economists to handle the instruments they use. "No econometrician has generated more widespread excitement than him in a very long time," according to Edward Glaeser of Harvard (one of our 1998 batch).

So how have these question-driven economists tackled the biggest economic question of the past decade: the global financial crisis? That disaster posed a problem for quasi-experimental empirical methods, which work better for data-rich microeconomics than for macroeconomics, where the data are less plentiful. The scope for macroeconomic experimentation is also limited. On April Fools' Day an economist circulated an abstract purportedly co-written by Ben Bernanke and Janet Yellen in which the former central bankers revealed they had raised and lowered interest rates randomly during their stints in office in a covert experiment known only to themselves. In reality, as Ms Nakamura points out, the Federal Reserve employs hundreds of PhDs to make sure its decisions are as responsive to the economy (and therefore non-random) as possible.

None of today's bright young macroeconomists have reinvented their sub-discipline in the wake of the Great Recession in the way that John Maynard Keynes did after the Great Depression (although Keynes was already 52 when he published "The General Theory"). If they had they would have drawn more attention from the nominators of this list.

Yet, unlike our batch in 2008, this year's group does contain two economists who have carried the credibility revolution some way into macroeconomics. Ms Nakamura, who writes many of her papers with Jon Steinsson, also at Berkeley, has used micro methods to answer macro questions. Working with the Bureau of Labour Statistics she has unpacked America's inflation index, examining the prices for everything from health care to Cheerios entangled within it. Whereas macroeconomists typically look at quarterly national data, her work cuts up time and space much more finely. She has divided America into its 50 states and the passage of time into minutes. This has let her shed light on fiscal stimulus and the impact of monetary policy as seen through the half-hour window in which financial markets digest surprising nuances from Fed meetings.

One of her most provocative papers is also the simplest. She and her co-authors argue that America's slow recovery from its recent recessions is not the result of a profound "secular stagnation" as posited by Larry Summers (one of our 1998 picks). Rather it reflects the fact that the rise in the number of working women, rapid for several decades after the war, has since slowed. In the past, the influx of women put overall employment on a strong upward trajectory. Thus after a recession, the economy had to create a lot of jobs to catch up with the rising trend. In more recent decades, employment trends have flattened. Thus even a relatively jobless recovery will restore the economy to its underlying path.

Our final pick, Mr Sufi, is, like Ms Nakamura, exploiting voluminous data unavailable to scholars of previous downturns to understand the Great Recession. Had America merely suffered from an asset bubble in housing (like the dotcom bubble of the 1990s) or a lending mishap (like the savings and loan crisis of the 1980s), it could have weathered the storm, he feels. But high levels of household debt made the spending fall unusually severe and the policy response (a banking rescue and low interest rates) surprisingly ineffective. Mr Sufi and Atif Mian of Princeton University find evidence for their macro-view in a micro-map of debt, spending and unemployment across America's counties. The households of California's Monterey county, for example, had debts worth 3.9 times their incomes on the eve of the crisis. Spending cutbacks in counties like this accounted for 65% of the jobs lost in America from 2007 to 2009, they estimate. The Obama administration's failure to provide more debt relief for homeowners with negative equity was the biggest policy mistake of the Great Recession, they say.

Because they want to change the world, not just delight in its perversity, many of these economists engage closely with policy. Ms Stantcheva now sits on France's equivalent of the council of economic advisers. Mr Sufi is pushing for mortgage payments to be linked to a local house-price index, falling when the index does, but allowing the lenders a small slice of the homeowners' gains if the market rises. He and Mr Mian have also proposed linking student-loan repayments to the unemployment rate of recent graduates.

Intriguingly, this concern for real-world outcomes is pushing some of these young economists back towards theory. In recommending a policy reform, an economist is saying that it serves some objective better than the status quo. That objective

needs a theoretical rationale. A goal like improving well-being might seem bland and unexceptionable. But most policies hurt some people while helping others. How should society weigh the hurt against the help?

Ms Stantcheva and Emmanuel Saez, of the University of California, Berkeley, have proposed a theoretical framework that accommodates different answers to that question (utilitarian, libertarian, Rawlsian, and so on). Meanwhile Mr Hendren has calculated that the American tax system is implicitly willing to impose $1.5-2 of hurt on rich people to provide $1 of help to the poor. That provides one possible benchmark for evaluating new policies.

Engaging with policy can take a toll. "I've testified in about 15 different school-committee meetings," says Mr Pathak. "I've had families shouting at me." But it is also stimulating, he adds, not just because it helps people, but also because it enriches research. "Testifying in school-committee meetings is one of the richest sources of research ideas I've ever had."

When Thomas Menino, Boston's long-serving former mayor, expressed concern that the city's policy of busing kids to their school of choice across the city was undermining the sense of community around some schools, Mr Pathak looked into "walk zones", which reserve systems some places for children living within walking distance. Seemingly innocuous details of such schemes turned out to have far-reaching effects. The theoretical subtleties he uncovered proved to be "incredibly rich", Mr Pathak says, keeping him fruitfully busy for a couple of years on something that "there's no way we would have looked at…without interacting with Boston and the mayor." By answering practical questions rigorously, economists can both make themselves useful and be spurred in interesting new directions.

The importance of fingerwork

Mozart's first biographer claimed that the child prodigy composed his music feverishly in his mind, without ever coming to the "*klavier*". Many people came to believe that he could compose whole masterpieces while walking after dinner, travelling in a carriage or "in the quiet repose of the night".

More recent musicology casts doubt on this account. Much of Mozart's work was sketched out, or even improvised, on a keyboard; he is thought to have done little composition without one.

The theorists of the 1980s resembled the mythical Mozart of the popular imagination, completing beautiful deductive theories with their minds, before seeing how they played in the real world. The best young economists of today more closely resemble the less magical Mozart described by later scholars. Just as he walked back and forth between his compositional sketches and his piano, they move back and forth between their theoretical notation and their empirical instruments, searching for the keys to knowledge.

***Correction (December 18th 2018)**: An earlier version of this piece said that Emmanuel Saez was at Harvard. He is in fact at the University of California, Berkeley.*

This article appeared in the Christmas Specials section of the print edition under the headline "Sweet and serious songs"

Multisensory architecture

The rise of buildings for the deaf and blind

Architects are adapting to the need for more multisensory design

Print edition | Christmas Specials Dec 18th 2018

WITH BOTH hands plastered to the wall in front of him, Braulio Thorne, who lost what was left of his sight in 2017, guides himself slowly down the hallway of the Selis Manor, an apartment block for the blind. His faded brown T-shirt says "Brooklyn" but outside the sirens are wailing Manhattan. His fingers are undeterred. They travel past the cool handle of a door and then find what they were looking for: a bumpy stretch of small, glass tiles that announce he has arrived at the lift.

Mr Thorne often visits the building's patio garden just past the lobby, where in spring the fragrances of Himalayan Sweet Box flowers planted along the perimeter will pull him from one part of the space to another. "Finding a point of interest is important for us," he says as the lift hisses closed behind him. "Sighted people still don't get that if you don't see it, it doesn't exist."

In 1991 Al Pacino spent three days at the Selis Manor learning how to be blind for his role in the film "Scent of a Woman". If Mr Pacino were to visit now he would leave with a profoundly different impression of how tenants interact with the building. In 2016 a team of designers renovated the complex with structural, textural, and olfactory updates—not just visual ones.

The update is part of a broader trend towards multisensory architecture: work which considers a building's acoustics, lighting, tactility and smell. A number of firms have started to prioritise the needs of people with a wide range of sensory abilities. In doing so, they embrace vision's neglected sibling senses in their blueprints.

In his treatise "On Architecture", Marcus Vitruvius, a Roman architect and civil engineer wrote that buildings should be *firmitas, utilitas, venustas*: solid, useful and beautiful. His successors have differed as to the degree to which those attributes stand separately or together, some happy with baroque decoration, others devoted to the idea that true beauty is that of form following function. But they have by and large followed Vitruvius in seeing beauty as primarily visual—a requirement that "the appearance of the work is pleasing".

Increasingly, however, people need more from the spaces they occupy. About 466m people worldwide have significant hearing problems and 36m are blind. According an American study from 2016, fully 94% of those between the ages of 57-85 had some kind of sensory disability, and most suffered from impairments to at least two of the five senses. As people now live much longer lives, the numbers will climb: the World Health Organisation predicts that the number of people with hearing disabilities will double by 2050.

Designers are now trying to catch up. Chris Downey, a blind architect who contributed to the Selis Manor renovation, was invited in 2015 to consult for Grimshaw Architects, a British company. The firm was designing a sustainability pavilion, which is currently under construction, for the World Expo 2020 in Dubai. Mr Downey would walk his fingers across embossed lines on blueprints, just as he imagined visitors might later walk their feet through the pavilion, says Augustine Savage, a Grimshaw designer. And he challenged their preconceptions. To keep people protected while crossing the pavilion's bridges, for example, railings were going to be added in. Mr Downey suggested softer, bigger barriers that guests could lean into in order to pause and absorb the space around them. The idea converted what was going to be a begrudged concession to safety, says Mr Savage, into "an enhancement to the whole design".

Architects at Hall McKnight, an Irish firm, are set to begin construction in 2019 on a building on the campus of Gallaudet University, a liberal-arts college for the deaf in Washington, DC. It will be the first in the school's history designed to accommodate both the hearing and the hard-of-hearing communities in the area. Many of the building's sensory details came from watching people use sign language, says Alastair Hall, a principal of the firm.

Renderings show a skylight in the roof, as poorly-lit areas muffle gesture communication, and curved rooms with interior-facing windows to allow for signing across the building. Textured concrete is used along the walls, since "there is a kind of natural engagement with the tactile," says Mr Hall. Shelved alcoves will probably dot the space providing places where smartphones can be propped up. Video conferencing is to the deaf what a phone conversation is to the hearing, but with one key difference—both hands have to be used. The team's multisensory work at Gallaudet has already started to influence the firm's other designs.

Good vibrations

Early buildings for the deaf and blind, built in the 19th or 20th centuries, were as marginalised and isolated as their inhabitants then were. Schools were often built by the same architects who had designed state hospitals and mental institutions. Dormitories at the Oregon School for the Deaf were based on prison blueprints. Most were on the outskirts of cities; one, in Maine, was on an island. These spaces were frequently "void of dignity," says Jeffrey Mansfield of MASS Design Group, an architecture firm.

A few architects took advantage of this enforced segregation. The Wyoming School for the Deaf, designed in 1962, featured classrooms shaped like pentagons and octagons instead of rectangles; more sides allowed students to better form a circle around the teacher as he signed lessons to them. Hollow wooden floors were installed to transmit vibrations, a feature used by teachers for getting attention from deaf ears by pounding their feet.

After an earthquake in 1983 shook the Idaho School for the Deaf and Blind, administrators worked with local architects to improve it in its rebuilt form. They created wider hallways to help sign-language users communicate while walking, carpeted the floors and walls to soften distracting noises for the blind, and attached shades to the windows to reduce glare. These two schools were revolutionary in their attention to sensory detail. But they were exceptional, says Mr Mansfield, who is himself deaf. It was too easy "to build an institution and to place it miles away," as William Cruickshank, an expert in education, wrote in 1967. Once completed, "there ultimately resulted a state of lethargy towards it".

As attitudes towards the deaf and blind shifted, thoughts about buildings built for them also started to become more progressive. Yet the biggest leap only happened relatively recently, in 2006. That year Hansel Bauman, an architect, established the DeafSpace Project at Gallaudet to work out over 150 guidelines on how to design with the deaf in mind.

Mr Bauman is adamant that DeafSpace is very different from ideas such as "human-centred design" and "universal design". Architecture for the deaf community should go beyond the goal of producing a design that simply suits its users well, he says. Instead spaces built for the deaf should understand and promote their community's culture, too.

DeafSpace started to make an impact in 2015, when Gallaudet launched an international competition that challenged architects to grapple with the concept behind the project. The result was a way of observing the world through a different lens—one which requires people to think not just about how a building looks, but how it feels, and how its spaces accommodate deaf users. That perspective became critical to the careers of hundreds of architects. Deaf spaces could no longer be ignored.

In October 2018 students from the Yale School of Architecture spent time on Gallaudet's campus as part of a studio course to learn how to "extend the limits of human bodies", as one professor put it, and to listen to deaf students as they explain "their experience of sensing". This suggests that the field is shifting. None of the architects interviewed for this piece had ever been taught how to design for a sense other than the visual. Mr Downey, the blind architect, understands why. "Our medium is the drawing, whether it's digital…or drawn by hand. That's our currency." If an architect were to focus on something like sound instead, they have to answer the question: "How do you draw acoustics?" Perhaps some form of virtual reality will one day answer this question, allowing acoustics, air flows and surface textures to be primary attributes of imagined space.

Beauty you can stroke or sniff will be a boon not just to the blind and deaf. Mr Downey should know. Until he was 45 years old, he had near perfect vision—but surgery to remove a brain tumour took his eyesight, too. Ten years later, he has come to realise that sight is the "most detached sense we have". Smelling, hearing, feeling, tasting: these are more multifarious, in some ways more profound. By thinking about these senses in buildings, Mr Downey believes the result is "a richer, more delightful environment for everyone".

Now in his flat in Selis Manor, Mr Thorne is standing at the back of his living room. He waves at the windows directly behind him. They are now bigger, while the bamboo flooring is smoother than the tiling that was there before. "That's very important to us," he says, tapping the surface with his cane. "We don't want to slip." But if he had to choose just one thing about the new design that he most appreciates? Mr Thorne scans the room, and then points to the newish thermostat: "Because it talks to me."

This article appeared in the Christmas Specials section of the print edition under the headline "Feel it to believe it"

Team Ethan

The family of a boy without a cerebellum found out how to take its place

What goes on inside skulls can be distributed outside of them

Print edition | Christmas Specials Dec 18th 2018

"HE SHOT A six-year-old in the eye!" There's trouble in the playground on Ford Island. A handful of Navy kids have spent the afternoon scrambling up green slides and over climbing frames that are coated with smooth brown plastic, firing on each other with outsized Nerf guns. The mug of the Honolulu evening is tightening, and proceedings have turned dramatic.

Ethan Deviney, the accused, trots out to the pavement and states his case to his mother. To the extent, he insists, that he may have shot someone in the eye, he is vindicated through being the prior recipient of a foam bullet to the tooth.

Heather Deviney marches her son back into the playground. A stout boy in an Indianapolis Colts jersey, not the least bit hurt, stands at the apex of a protective huddle of children. "Can you say you're sorry, Ethan?" Heather asks. He can, and he does, and then he goes one better. "Let's hug it out," he says, grinning and flinging his arms wide. Colts jersey hugs gingerly. All is well.

Ethan is a skinny 11-year-old boy with a broad smile. He says hello to nearly everyone he sees in public and gets uncontrollably excited in the presence of new sets of Lego. His father, Jeff Deviney, is a captain in the US Navy's Civil Engineer Corps. Heather is a graphic designer. Ethan has two older brothers, Jared, 16, and Corbin, 19. And he is one of just ten people known to have been born without a cerebellum.

Put your hand on the back of your head, where the skull curves down to the neck. Your cerebellum is an inch or two beneath your palm, a dense knot of brain tissue which sits slightly apart from the rest. In just 10% of the brain's volume, the cerebellum contains half of all its cells. You would think that would mean it was vital. But though Ethan's life without one has its challenges, it is in most ways pretty close to normal—because what his absent cerebellum cannot do, the rest of his brain and the rest of his family can.

Equating family ties with a missing piece of the brain sounds odd. But maybe it, too, is close to normal. Maybe Ethan's unusual circumstances simply reveal a general but easily overlooked truth: that there is a fungibility between what bodies and minds can do, and the minds involved do not have to share one body.

Ethan was born in the early morning of November 28th 2006, a Tuesday, in San Diego. He was a healthy baby; the knot in his umbilical cord seemed inconsequential. But by the end of his first year, Heather noticed that Ethan was not sitting up or crawling at the same stage as her first two boys. Photos from the time show him lying on his belly, playing intently with toys.

At 18 months, Ethan was referred to a development specialist at Rady's Children's Hospital in San Diego. The doctor found him an odd mixture of progress and lag. His cognitive development was right on track: he knew how to find things that had been hidden; he was able to solve puzzles. Socially and physically he was normal for his age, and his fine motor skills, tested by playing with blocks, bottles and toy cars, were OK. But his gross motor skills—his ability to hold his body steady or to crawl—were a long way behind. His language abilities were delayed, too.

Tough love

What was going on was not clear. Forms of autism, or epilepsy, or cerebral palsy were considered, but none provided a satisfactory explanation. What Ethan needed was easier to work out. He had session after session of physical and speech therapy. Supporting his development, Heather says, became the family's primary mission. "There was a lot of tough love to encourage walking. It was 'Off the floor, off the floor, off the floor'. It was our whole life." They had pushed their first two boys hard, Jeff says. They would not treat Ethan any differently.

With regular therapy and intensive family support, Ethan's movements and speech became stronger, but he still couldn't stand or walk unaided. When Heather took Ethan to a new paediatrician in Los Angeles the doctor warned that there was a high likelihood that Ethan would never be able to move around without assistance. The Devineys redoubled their efforts, still not knowing what they were helping him overcome.

Then, in summer 2009, aged three and three-quarters, Ethan stood up. The family was at a baseball game, watching Jared play. Ethan was mucking around in the grass in front of the stands, a few feet from his parents. Heather looked around at the precise moment that Ethan pulled himself to his feet and stood upright for a few seconds, while everyone else's attention was focused on the game. "It was monumental," she says. "I was moved to tears."

Since antiquity the cerebellum—"little brain" in Latin—has been understood as an anatomically, and presumably functionally, discrete part of the brain. Galen, a Roman physician, thought it the valve between brain and body through which "animal spirits" flowed. It would take another 1,400 years for Constanzo Varolio, an Italian anatomist who pioneered the dissection of the brain's soft tissue, to reveal the regularly repeating tight-packed whorls of tissue of which it is made.

Varolio decided that the cerebellum must be the brain's seat of taste and hearing. In the 18th and 19th centuries, though, anatomists observed the effects of its removal or damage on balance and movement. A goat with half its cerebellum removed,

for example, subsequently swayed and fell but suffered no loss of consciousness. Neuroscientists noticed that patients who had suffered damage to their cerebellum often walked awkwardly or slurred their speech.

Today, the cerebellum is understood to be the brain's quality-assessment centre, ensuring that actions the higher brain has decided on go according to plan. The electrical signals that travel from the upper brain out to, say, the arm, to tell it to type, pass through the cerebellum, which takes down a copy of the plan. When information describing the movements in progress comes back from the arm muscles, the cerebellum's tightly meshed network of billions of nerve cells compares the situation described to the original plan, detects any deviations, and sends a better-honed signal back out to the arm. At the same time, the network of cells adjusts its internal wiring so as to make sure any error is less likely to happen again. As well as supervising the smooth running of the body through endless cycles of error correction, the cerebellum helps the brain and the body learn from their mistakes and miscommunications.

Until recently, this quality-assurance infrastructure was thought to be limited to the oversight of physical movements. But brain scans now suggest that the cerebellum's remit is much broader. "The cerebellum does the same thing to emotion and cognition that it does for motor control," says Jeremy Schmahmann, a neurologist at Harvard Medical School. Just as physical movements are monitored, controlled and regulated by the cerebellum, so too, it turns out, are other sorts of thought, including speech and emotional work. The set of mental actions required to remain calm under pressure, for instance, runs through the cerebellum.

Flipping through old pictures, Heather is particularly keen on the ones that show Ethan standing, running, or jumping

All this takes place far below the threshold of consciousness. It is a sort of internalised automation, allowing processes to go on in the background without any attention. You don't know that you are doing it. But you would notice very quickly if you stopped.

Ethan had his first brain scan on October 15th 2010, just before his 4th birthday, at Le Bonheur Children's Hospital in Memphis. By this stage, his doctors had begun to suspect a damaged cerebellum. But that was not what the scan (reproduced here, with a scan of a normal brain below for comparison) showed. His cerebellum was not damaged. It was absent; there was a featureless dark hole where the cerebellum would be. His brain—or his body, depending which way round you look at it—lacked an autopilot.

Heather says the scan "opened up a whole new world". The family had felt alone, isolated by a condition that no doctor quite understood. Now Heather was finding Facebook groups devoted to cerebellar issues and learning the right keywords to put into search engines. The term "cerebellar hypoplasia", meaning underdevelopment of the cerebellum, led her and Ethan to Dr Schmahmann's office in Boston the following year.

Learning that her son's brain was not so much damaged as simply missing a part also allowed her to see her and her family's supporting role more clearly. "If you were born without a leg, you would put on a prosthetic and that would be it," she says. Being born without a cerebellum was more complicated. But prosthesis was still possible. It just had to be provided by people.

The person doing the most work is Ethan. Unfortunately, he cannot tell you much about how he does it. When you ask Ethan how it feels to do things that the cerebellum is supposed to govern, such as walking, he has trouble answering, and that is fair enough. To him, walking—something he does with a loose, slightly swaying gait—just feels like walking. But he is doing it in a very different way to most people.

Mind the gap

"We think the neural circuits are learning this somehow," says Dr Schmahmann, "but without the smoothness and automaticity of the cerebellum." One possibility is that the basal ganglia, parts of the brain responsible for the formation of habits, are taking up at least some of the slack. This would mean that Ethan remembers how to walk in the same way that you remember morning rituals, or your preferred route to work. You might think of those as being things you do "on autopilot", but the process is not quite the same. A habit does not provide the same sort of self-regulating feedback that an aircraft or cerebellum's autopilot provides. It is more a stereotypical sequence of actions. To make good the absence of a cerebellum with circuits designed to encode habits is to bridge a gap that is not meant to be bridged. If that is what Ethan's brain is doing, it is something that takes a lot of support.

Of his handful of patients without cerebellums, Dr Schmahmann says: "What we're finding is that with intensive rehab, bringing things to conscious awareness and making [patients like Ethan] conscious about what they need to focus on, you allow them to improve." Those without such intense rehab learn to walk and talk much later than Ethan.

The Devineys have, without really knowing it, built some of the functions of Ethan's cerebellum into his life, and their lives, through other means. When he was younger, they had to show him how to walk, how to control his body, over and over. As she flips through old pictures, Heather is particularly keen on the ones that show Ethan standing, running, or jumping, all things he learned to do against the odds. Her efforts were Ethan's efforts. The Devineys, says Dr Schmahmann, are Ethan's exoskeleton, an external support system shouldering the load of the one that is missing inside.

Ethan's family still regularly plays that role. During a day at the beach, as Ethan comes up from the ocean to the gazebo the family is sitting under, he walks over a patch of ground carpeted with small, spiky pine cones. Walking on them is painful, and Ethan doesn't really adapt to it. He loses control a little, his smooth temperament upset along with his balance. His mother goes over and picks him up, carrying him the few feet to the chairs. He starts saying that he wants to go home: "I think I'm done now, Mom." The hiccup makes him want something familiar, something that can guide him along, because his cerebellum is not there to help him.

Heather is having none of it, though, and soon enough Ethan is back to normal, chatting and asking questions.

"Why are you writing a story about me, Mr Reporter?" he asks.

"Because you and your family are interesting, Ethan, and I think people who read the story can learn something from you."

The answer is acceptable, and Ethan goes back to the Lego figures he brought with him from the car.

Science tends to treat the brain as the be-all and end-all of mental life—what it is constrains what people can think and do. Philosophers speculate about how people can know that they are not simply isolated brains in a vat, hooked up to input and output mechanisms that lie to them. But watching Ethan and his family deal with the absence of a chunk of brain makes you re-examine what you think you know about the organ. Some of what keeps Ethan going is thanks to other bits of his brain pitching in to take up the slack. But some is due to other people's brains. In this sense "Team Ethan" may be a special case of a broader principle: that all people rely on an external support network to be the people that they are.

Ethan, Incorporated

This idea that being a person is something distributed beyond a specific body drives the work of Hélène Mialet, a French philosopher and anthropologist. Her book "Hawking Incorporated", published in 2012, was an anthropological examination of the late Stephen Hawking and the human and mechanical aids which made it possible for him to navigate the worlds of knowledge and everyday life. The people and machines that surrounded him choreographed Hawking's genius, Ms Mialet wrote in his obituary.

She is currently applying a similar analysis to people with diabetes, trying to understand how the people and objects around a type I diabetic stand in for the pancreas within them that does not work. A doctoral student of hers has studied Lance Armstrong, trying to understand the network of people, objects and materials which supported his cycling prowess.

This blurring of a biomolecular perspective with that of the social world and its man-made objects is a deliberate strategy. Ms Mialet argues that humans are "distributed" across these worlds; that what it is to be someone extends beyond a single body. But because such distribution is fundamental, it is also hard to see—except in exceptional circumstances. It is conceptually quite easy to study the cellular networks within skulls and immune systems, even if the actual experiments are hard. It is more difficult to get to grips with the networks beyond the body. They are so much a part of life that, like the action of the cerebellum, they are accepted automatically. But when the external networks start taking the place of an internal one—of a missing cerebellum, or an unbalanced insulin metabolism, or a nervous system raddled by amyotrophic lateral sclerosis, like Hawking's—their role is made more apparent. At least, it is to the theorised, anthropological eye.

This general idea of making up on the outside what is missing on the inside makes sense to Andy Clark, a cognitive scientist and professor of logic and metaphysics at the University of Edinburgh. "Brains don't care whether stuff gets done on the inside or on the outside, just as long as it gets done," he says. If using a prosthesis allows a more efficient use of resources, the brain jumps at the chance. Using calculators or search engines does not leave the human mind uncomfortable; it is just a convenient outsourcing. Ethan's replacement of his entire missing cerebellum with services from other parts of his brain and family may not even be that extreme, Mr Clark suggests. "We don't think of the successful poet or artist, 'Oh, poor thing, they can't do that in their heads, they need pens and paper and software'," he says.

How might one prove that this is more than a figure of speech—prove it in the way a brain scan proves things? Not by measuring which data from the environment are linked to what process in the brain, Mr Clark says, at least not with today's technology. But there is other corroborating evidence for the distributed self. Look at the way people with retrograde amnesia, who cannot remember events before an injury, use their phones to carry on healthy social lives. "They rely on trails they lay down in software space to remind themselves of what they're doing and why they care." Their lives are shaped by a structure they have built outside their brains.

Taking care

The load on Ethan's external networks is now shifting. Heather no longer has to think much about Ethan's physical coordination. Now she worries about him making friends. "I'm a really social person, so it's hard for me to see him being uninterested in that," she says. Friendship, like other sorts of balance, can be hard. Understanding what another person wants, or what they are talking about as they explain some event over which the two of you might bond, is the kind of function the cerebellum takes care of without you having to think about it. Ethan will have to practise. "We're in a more cognitive chapter," says Heather.

It will be one that the family will write for itself. Heather spends less time on the cerebellar Facebook groups these days. Almost all the children on there have far more serious disabilities than Ethan, with walking or talking being difficult. They all have cerebellums that are damaged in one way or another, not completely non-existent ones like Ethan. Somehow, not having a cerebellum at all is better than having a damaged one. Dr Schmahmann says it is likely that Ethan's cerebellum was destroyed by the equivalent of a freak accident, one that left the rest of the brain untouched (possibly a stroke of some kind, due to his knotted umbilical). Other children's cerebellar issues are just one of an array of confounding factors. Ethan's are more discrete—and thus more susceptible to distributed replacement by other parts of his brain, by his family, by objects in his life.

With his Lego, he sits back on his ankles and leans forward at the waist to pore over the field of components, deep in concentration, in thrall to the instructions. He is not his chattiest self when in Lego mode. But watching him and helping him (help from an amateur is clearly not making up any deficit, but it is politely accepted nonetheless) it feels like his brain is leaning on the design behind the Lego set. The logic of its structure frees him from the load of having to use the missing part of his brain designed to automate the fitting together of patterns.

At Honolulu Zoo, he sounds out the names of exotic birds as he and his mother wander past their enclosure. Each animal, whether lion or lemur, gets about 15 seconds of attention before Ethan announces that he is "moving on". He explores the zoo voraciously, padding along every branch of the path, as thorough and explicit in mapping it out as he is in playing with Lego. Peering into the elephant enclosure, Ethan's foot slips off the path. It's a tiny thing, but it bothers him disproportionately, just like the pine cones. He starts asking to go home. Heather reaches out, steadies his shoulders, and Ethan races on to the next

attraction.

This article appeared in the Christmas Specials section of the print edition under the headline "The network within, the network without"

It will never take off

The great Texas emu bubble

What if tulips had been six feet tall and ran at 50km an hour?

Print edition | Christmas Specials Dec 18th 2018

THE SUN is a giant, gleaming emu egg in the sky, and if you gaze long enough at the Milky Way, you can see the long body of an emu formed from the stars. The world's second largest bird after the ostrich, the emu is native to Australia and has long been a source of mythical inspiration—and sustenance—for Aboriginals. The big bird claims a place on Australia's coat of arms, stamps and 50-cent coin. It even sparked a military deployment, the Great Emu War of 1932, when soldiers were sent to Western Australia to kill them and thereby save the farmers' crops. The emus won.

From the 19th century, the three-toed bird started to spread its flightless wings and became a prized oddity in zoos worldwide. A century on, the emu was also seen as a potential source of red meat—a healthier version of beef. It was in this guise, as livestock, that the emu came to Texas in the 1980s. It did not end well for most of the emus, or most of their owners.

Enthusiasm and emu-friendly regulations saw the price of a breeding pair of emus, just a few hundred dollars in the late 1980s, rise to a whopping $28,000 by 1993. The next year it doubled again. The American Emu Association, an industry group, saw its membership rise 27-fold between 1988 and 1994, to 5,500 members, most of them in Texas.

The rationale for bringing the emu to Texas was that Americans wanted healthier meat, that the state has a long history of raising cattle for slaughter, and that, heck, it was the 1980s, and all sorts of weird stuff was happening. Some boosters also heralded the potential of ostriches, but emus won out over their ratite cousins. In its fundamentals, though, the Texas "emu bubble" of the 1990s was, like all investment bubbles, stoked by exuberance and greed. "Men, it has been well said, think in herds," wrote the Scottish journalist Charles Mackay in 1841 in his book "Extraordinary Popular Delusions and the Madness of Crowds". Had Mr Mackay travelled to Lubbock or Midland a century and a half later, he would have believed that men think in mobs, as groups of emus are sometimes known.

From flowers to feathers

As in all bubbles, from 17th-century Dutch "tulipmania" to 21st-century bitcoin, word of the wonders of the emu spread by all the social networks available, from word of mouth to small ads in local papers. Their boosters were keen to point out that there was more to emus than steak. They provided oil for lotions, skin for leather, feathers for clothes and enormous emerald eggs for four-person omelettes. Best of all, in terms of inflating a bubble, emus provided you with more emus, and thus an incentive to spread the word yet further and sell emus on to other would-be ratite-ranchers.

The state government also played a role in helping the emu market take flight. Between 1992 and 1995 the Texas department of agriculture reportedly gave out $400,000 in loans to encourage emu ranching. The state also offers tax breaks to people who use their land for agricultural purposes, which is enough of an incentive for some people to find animals to graze on their property even if they have no intention of farming; emus fitted the bill. And Texas law was, and is, extremely lax when it comes to the import of exotic animals. The state is believed to have more tigers living in captivity in backyards than exist in the wild worldwide.

The new emu owners were not experienced investors—or emu raisers. "We were clueless. We had never even raised chickens," says Gina Taylor, who bought a pair of emus with her husband in 1995, soon after they moved from Dallas to a rural town called LaRue. They used a laundry basket with a heat lamp over it to incubate eggs in their kitchen.

Such a rough-and-ready approach seems quite appropriate for emus, which are somewhat scruffy beasts. But even if not sleek, they do have some redeeming features. They need much less land to graze than cows. They are quieter, too, except during the breeding season, when the females make booming noises and males grunt. Though this was not necessarily a selling point in Texas, the birds have a powerfully proto-feminist attitude to the patriarchy. Females choose males, rather than vice versa, sometimes going so far as to fight over them. Males take on the responsibility of incubating the eggs, refusing to leave the nest to eat or drink for weeks at a time, and then raising their chicks as single parents.

Divorced from the mob

However, those who anticipated a life of gentle emu-care and handsome profits found themselves disappointed. One challenge was that emus were not easy to handle. They are as tall as human beings, growing up to 190cm (6 feet 2 inches) and easily weighing 55kg (120lb). Being the only birds with calf muscles helps them sprint at up to 50kph (30mph), prompting some dramatic high-speed chases when they escaped. They can also kick. A young Hispanic man who had crossed one came into an emergency room in Austin in the mid-1990s with bad cuts and bruises shouting "Pollo gigante!" (Giant chicken!).

And raising the birds was not cheap. People ploughed tens of thousands of dollars into it. The emus required fencing and feed. The most forward-thinking emu owners bought expensive equipment to microchip their flocks, because emu rustling

became a problem as values rose. So did emu fraud. Some retirees and speculators put their savings into emus that were sold to them but never delivered, sparking lawsuits over avian Ponzi schemes.

A few dozen restaurants in Texas briefly added emu to their menus, including Dunston's, a popular steak house in Dallas, but consumers were hard to win over. Emu claims lower cholesterol and fat, and higher iron, but it is more expensive than beef and less familiar. Small farmers never co-ordinated to get the distribution or quality control they needed to make it a profitable, large-scale enterprise. Even emu enthusiasts did not make the meat a staple of their diets. "We occasionally ate an emu burger, but never ate any of our own," says Ms Taylor.

As the hoped-for demand failed to materialise, the supply continued to increase. Emus lay 5-15 eggs in each clutch and can keep doing so for more than 16 years. With 12 surviving chicks a year, a single breeding pair can spawn 133 breeding pairs within five years and nearly 36,000 within ten years. The population boomed at precisely the moment it was becoming clear that Americans had no appetite for a new red meat.

The bubble popped painfully. By 1998 emus were worthless. Rather than keep paying to feed them, many owners just abandoned them. Some farmers cut their own fences, hoping their emus would leave and become someone else's problem. When Parker county, west of Fort Worth, auctioned off 211 birds it had rounded up in 1998, they fetched only $2-4 each. You can sometimes find emu-burgers at Twisted Root, a chain in Dallas, alongside elk-burgers. But not often.

One result is that there are mobs of feral emus in parts of Texas—farm survivors and their descendants. Occasionally they show up in small towns or nearly cause crashes as they cross country roads. Animal-control officers and police struggle to catch them. When they do, they often have no way to transport them, because they are too tall to fit into dog kennels.

Your correspondent went to visit a female emu that had been successfully corralled and now resides at the Wildlife Rescue & Rehabilitation, a non-profit centre outside of San Antonio. This one is probably descended from a farm emu hatched in the 1990s, but no one can be sure. Emus can live 30 years. She has been there for several years and spends her days walking the perimeter, like a watchman making constant rounds, although she is shy and does not want to come close, even for a treat of a sweet pumpkin offered freely through the fence. She seems to know that humans are fickle and untrustworthy.

The emus that were freed were the fortunate ones. Some despairing farmers simply stopped feeding them, starving them to death. Others shot them. Two brothers outside Fort Worth decided to eliminate their emus with baseball bats to the head. They had killed 22 of their 100-strong mob before the police came, summoned by appalled neighbours. Some lobbied to charge the brothers with animal cruelty, but no charges were ultimately filed. "Texas likes to think of itself as the wild, untamed West, where man can do what he wants to do, to hell with who he's doing it to," explains Lynn Cuny, founder of Wildlife Rescue & Rehabilitation. "Animals are viewed as property, which people can discard or destroy like old pieces of furniture."

The emu was not the last species to fall foul of human greed. Since the 1990s, many Texans have pinned their hope for riches on new animals, such as white-tail deer and long-horn cattle. And just as Texans have not learned from their experience with emus, nor has the world. More recently India experienced its own emu boom, with farmers piling into raising the big birds. They made the same mistake Texans did by focusing on hatching new birds instead of creating demand for the meat. The market collapsed in 2013.

From the human point of view, this is a tale of never learning. From the emu's, it is adaptation in action, every economic fiasco an evolutionary opportunity. From the plains of Texas to the streets of India, emus are flapping those tiny wings they do not really have and making the most of wherever it is they find themselves. Let the wild emus roam.

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Lady Murasaki

Modern Japanese dating habits, through the eyes of a medieval novelist

The author of the Tale of Genji casts a waspish eye on 21st-century romance

Print edition | Christmas Specials Dec 18th 2018

A THOUSAND YEARS after completing the world's first great psychological novel, "The Tale of Genji", its author, Lady Murasaki Shikibu, returned to Japan. Though she had always believed in ghosts, she was quite surprised to be one. She was even more surprised to see how her homeland had changed over the course of a millennium. Fortunately, a journalist from *The Economist* was at hand to show her around.

LADY MURASAKI: My guide to the future is not pleasant to look at. He is some kind of foreigner, with a huge nose, eyebrows like hairy caterpillars and ridiculously plain clothes. He is so lacking in decorum that he neither wears perfume nor alludes to Chinese poetry when talking. However, I am lost, so I will have to stay with him for now. He appears to be a fan of "The Tale of Genji", which is pleasing.

THE ECONOMIST: The honour is all mine. Your story of the "shining prince", Genji, and his lovers is the seed from which whole groves of literature have grown. Though the aristocracy of the Heian period [794-1185] lies so far from the world of today, your rollicking romance still brings it alive for us. Tell me, is it true, as scholars say, that one of Genji's lovers is based on you?

LM: It would hardly be appropriate for me to answer that.

TE: I apologise for my shameful temerity. But having looked through the window you opened onto a vanished world of great artistic sensitivity, where noblemen wooed noblewomen with calligraphy and verse, I am, like so many of your readers, intensely curious about you. You lived in an age when women were not supposed to study much, yet you devoured the men-only books in your father's library and outshone every male writer your country has ever produced. Gaye Rowley, a professor at Waseda University, calls you a "feminist icon".

LM: So you have women professors now?

TE: We do.

LM: That is strange. But it pleases me. And do the men of knowledge from your lands admire me too?

TE: They do today. In the past, not always. The first to read you, in Victorian times, were often shocked by your...sophistication. One Scottish historian denounced your aristocrats as "foully licentious, utterly effeminate...pampered minions and bepowdered poetasters". Others, however, were entranced by the cult of beauty you describe. As am I by your magnificent dress.

LM: It's just a simple thing. Twelve layers of silk robes, each with a different colour to match the hues of the winter landscape.

TE: In such simplicities lie marvels. And with your eyebrows shaved off and repainted halfway up your forehead, and your teeth dyed black, you look very stylish...but I am afraid in today's world you may attract unwanted attention. Would you like to borrow something more comfortable?

LM: I hardly think I should take advice on robes from a man who wears no silk. Where are we?

TE: This is the capital.

LM: Heian-kyo?

TE: No, the city we call Kyoto has ceased to be Japan's capital, and the palaces and temples you remember are gone—though the shrines to the sun goddess at Ise are still rebuilt every 20 years, as they were in your day. The Emperor has moved to a new eastern capital. In your life you would not have deigned to notice it. It was a humble fishing village.

LM: It has grown, I take it?

TE: It is home to five times more people than lived in all of your Japan. Shall we step outside?

LM: No. I do not go outside unless it is a festival day and the Empress commands me to accompany her.

TE: Perhaps the Empress grants ghosts more freedom?

LM: Perhaps. Just this once. Goodness gracious! Hundreds of palaces, so tall that I can barely see the top of them. Carriages moving without servants to carry them. Why is everyone so tall? Why are the streets so dazzling when the sky is dark? And where are all the dirty people?

TE: Those are shops, cars and artificial lights. All these passers-by are what you would call "mere people" (*tadabito*), who work for a living. But they wash in hot water every day and are far richer than the "good people" (*yoki hito*) of the Heian court.

LM: You mistake me for someone who cares about mere people, however disturbingly well they live. Speak to me instead of the things that matter: art, poetry, music, love. Do people still drink rice wine under the cherry blossoms, marvel at their fleeting beauty and sadly contemplate the transience of life?

TE: Yes, and they still find sumo wrestling tawdry but amusing. They have also invented new art forms: a ceremony for drinking tea, a way of arranging flowers and a kind of musical theatre called *noh*. You might enjoy those. You will hate their *kabuki*, though. It is all about warriors disembowelling themselves with swords.

LM: You jest, in your dull way. Warriors offer nothing but crass manners and dull repartee. They are to be laughed at, not made the subject of tales.

TE: I'm afraid ignoring the warrior class didn't work out well for your "good people". I'll lend you a history book.

LM: Then let us speak of something less ugly. Do modern Japanese have contests to see who can compose the best love poem? Or "winding water parties", where friends sit by a stream on which cups of *sake* float, taking turns to pluck out a cup, sip from it and then recite a fitting verse?

TE: No, but they often stand up in front of their friends and sing love songs loudly after they have had too much to drink. Indeed, they occasionally sing songs by a group of musicians who call themselves *Hikaru Genji* (Shining Genji).

LM: Aaah, Genji. When he danced the "Waves of the Blue Sea" he was so graceful that the Emperor himself was moved to tears.

TE: People still cry at dance, and music. At concerts by famous singers who dance with energy, the young people even scream.

LM: I hope they act with more refinement when courting. May I ask: how many wives and concubines do you have?

TE: Just the one.

LM: You are a mere person, then, not a good person?

TE: Very mere. But today even the Emperor has only one wife.

LM: I see. So if she produces no sons, he would have to name a son by one of his concubines as his heir?

TE: As far as I know, he doesn't have any concubines.

LM: The Emperor has no concubines? That is disgraceful.

TE: Almost all married men have only one wife. Some have mistresses, but they keep quiet about them. Some young people give up on romance entirely. They find it too much bother, and stay at home staring at their screens instead.

LM:Romance is too much bother? I cannot believe that. Still, I am glad to hear that people still have screens at home. Mine was elegant. The frame was of polished wood, the drapes changed colour with the seasons. It was a delight to sit behind it and listen to a suitor declare his ardour by talking about the fading autumn leaves. If he was charming I would invite him round to my side of the screen to "see" me...

TE: I see.

LM: If he was boring, I would slip off into another room and he would be left talking without a notion that there was no one there.

TE: I think we are talking about different types of screen.

LM: No doubt your modern screens are less tasteful. But tell me more about young people today being too lazy to love. I find that hard to imagine. For us, the rituals of the chase were a joy. A nobleman would hear rumours of a lady's beauty. He would send her a letter—and it would have to be a work of art.

TE: Yes, that has certainly changed.

LM: First, he would choose the right paper. Then, he would compose a 31-syllable poem on some aspect of nature, with an allusion to a classical Chinese poem and a hint at the depth of his passion. He would write it with perfect calligraphy, and attach a sprig of willow or plum blossom that matched the mood of the poem. Then he would send it by a well-dressed messenger boy and wait, with palpitating heart, for her reply.

TE: The calligraphy was crucial?

LM: No one could love a man or woman who did not master letter-writing. I remember once, when Prince Genji was lying with me in my room, he received a missive from his new wife, the 13-year-old Princess Nyosan. I was worried. I could not expect Genji to be faithful to me; that would hardly be fitting for a man of his exalted rank. As one of his favourite lovers, though, I hoped that his new wife would not capture too much of his attention. And she wrote as a child! Genji needed the family ties of marriage—but he let me glimpse the letter and said: "Well now, you see you have nothing to worry about."

One historian denounced Heian-era aristocrats as "foully licentious, pampered minions"

TE: Bad handwriting is no longer an absolute bar to finding love. A bigger problem today is poor social skills. There was a vivid example recently, when a 35-year-old Japanese man married a moving picture—we call it a hologram—of an imaginary singer. He organised an expensive wedding ceremony, explaining that unlike real women, his virtual wife would never call him *otaku* (a geek), cheat on him or grow old.

LM: That's not so odd. The Emperor Ichijo promoted his cat to the fifth rank of the nobility, entitling it to wear a prestigious head-dress.

TE: Cat-lovers, eh? Back to courtship: modern young people who can be bothered write messages to each other on their shiny screens, which deliver them instantly. If two people like each other, they meet at a restaurant and eat raw fish together.

LM: Raw fish? That does not sound nice. And if they have not met, how do they recognise each other?

TE: Again, it is through the screen. Take this one, in my hand. It is displaying Tapple, one of Japan's most popular dating apps. It makes romance simpler.

LM: Why would you want to make it simpler? Surely the fun is in the endless complications?

TE: Many young people are shy, so the machine asks them questions to draw out information that lovers might want to know. You can search for someone who lives in the same area, or has the same hobbies. For men the most popular hobbies, according to Tapple, are drinking, staying at home and music.

LM: Noble pastimes! And this machine which is a screen and a letter and a messenger boy, it can find people who like the same kind of things as you?

TE: Yes.

LM: Can you find men who love "The Tale of Genji"?

TE: Here are ten of them. Genji is still popular, even if some people read it in *manga* form, with pictures.

LM: How gratifying. And I do like the pale, puffy face and wispy suggestion of a beard on this one. What's his calligraphy like?

This article appeared in the Christmas Specials section of the print edition under the headline "The ghost of courtship past"

Quiz

Our Christmas quiz

An opportunity for seriously curious readers to stretch their wits

Print edition | Christmas Specials Dec 18th 2018

OUR CHRISTMAS quiz this year is loosely based on our regular weekly columns. The last question in each group asks what theme (apart from the column) links the previous four answers.

Bagehot

1. Walter Bagehot was the third editor of *The Economist*. His father-in-law was the publication's founder. What was his name?

James Wilson

2. Of which politician did our current Bagehot columnist write that "he is regarded by his friends and enemies alike as shallow, showboating and self-serving"?

Boris Johnson

3. Walter Bagehot trained as a barrister at which of the four inns of court in London?

Lincoln's Inn

4. Of whom did Walter Bagehot write in 1869 that he had surrendered the state to "amateur politicians" selected not by merit "but by personal favour"?

Ulysses Grant

5. What theme links these answers?

The theme is that they are names of US Presidents

Charlemagne

1. The column, which deals with events in Europe, is named after the first Holy Roman Emperor. Before he achieved that title, of which people was he king?

The Franks

2. The EU approved Microsoft's takeover of GitHub this year. What is the name of Microsoft's search engine?

Bing

3. Which historian wrote an acclaimed history of Europe after 1945, called "Postwar"?

Tony Judt

4. Which Italian lake featured in the film "Ocean's Twelve"? The film's star, George Clooney, has a villa on its shoreline.

Lake Como

5. What theme links these answers?

The theme is crooners: Frank Sinatra, Bing Crosby, Tony Bennett and Perry Como

Lexington

1. Our Lexington column takes its name from one of the first battles in the Revolutionary War. Which other Massachusetts town is traditionally linked with Lexington as the site of the first engagements?

Concord

2. Which was the first American city to host the Olympics?

St Louis

3. Which variety of the Christmas tree is considered the original and traditional version?

Norway Spruce

4. Which anti-war song was a hit for Orchestral Manoeuvres in the Dark in 1980?

Enola Gay

5. What theme links these answers?

The theme is famous planes; the Concorde, Spirit of St Louis, Spruce Goose and Enola Gay (the plane that dropped the first atom bomb)

Bello

1. Bello is our column on Latin America but is also the Italian word for handsome man. Which singer had a posthumous hit with "Brown Eyed Handsome Man"?

Buddy Holly

2. A tape of which children's character singing "I Love You" was allegedly used to torture prisoners at the Guantánamo Bay base in Cuba?

Barney (the purple dinosaur)

3. Which actress plays the part of Eleven on the Netflix show "Stranger Things"?

Millie Bobby Brown

4. What do Americans call the game that the British call "draughts"?

Checkers

5. What theme links these answers?

The theme is that they are all Presidential pets. Buddy was Bill Clinton's labrador, Barney was George W Bush's terrier, Millie was George H.W. Bush's spaniel and Checkers was Richard Nixon's cocker spaniel

Banyan

1. The Banyan column is named after a tree. What fruit (not edible to humans) does it bear?

Figs

2. The orangutan is a critically endangered ape living in the forests of Borneo and Sumatra. What was the name of the first Clint Eastwood film in which his co-star was an orangutan?

Every Which Way but Loose

3. Which phone and personal digital-assistant brand was revived by Verizon, in a miniature model, in October?

Palm

4. Which Japanese carmaker has the bestselling electric car?

Nissan

5. What theme links these answers?

The theme is leaves, fig leaves, loose leaf (tea), palm leaves and the Nissan Leaf

Chaguan

1. Our Chaguan column takes its name from the Chinese word for "teahouse". In 2016 which nation drank the most tea per head?

Turkey

2. What is the English name for the white tea called Bai Hao Yin Zhen?

Silver needle

3. What name is generally given to the crunchy snack, flavoured with seafood, that is often served as an accompaniment to Chinese meals in the West?

Prawn crackers

4. Name the British poet laureate who wrote a poem called "Tea" that begins "I like pouring your tea".

Carol Ann Duffy

5. What theme links these answers?

The theme is Christmas: turkey, pine needles, Christmas crackers and Christmas carol

Bartleby

1. The name of the Bartleby column is drawn from a short story by Herman Melville, who wrote another story which was turned into an opera by Benjamin Britten. What was it?

Billy Budd

2. Melville lived for part of his early life in upstate New York. What is the name of the American football franchise in that region?

Buffalo Bills

3. Who was the first king of both England and Scotland?

James I and VI

4. Which teen idol was the star of the 1970s TV show "The Partridge Family"?

David Cassidy

5. What theme links these answers?

The theme is the Wild West: Billy the Kid, Buffalo Bill Cody, Jesse James and Butch Cassidy

Schumpeter

1. Our business column is named after Joseph Schumpeter, an economist, who came up with the term "creative destruction" to decribe the process of innovation. What form of cycle concept, popularised by Nikolai Kondratiev, did Schumpeter also think it explained?

Long wave

2. What business indicator does the Baltic Dry index measure?

Shipping rates

3. Which American TV show asks entrepreneurs to pitch their business ideas to potential investors? (The British equivalent is called "Dragons' Den".)

Shark Tank

4. Which American business-jet maker produces the popular G650ER model?

Gulfstream

5. What theme links these answers?

The theme is the sea (or ocean)

Buttonwood

1. The Buttonwood column is named after an agreement to trade securities in 1792. In which street was it signed?
Wall Street
2. Which country's domestic stocks were added to the MSCI emerging-market index this year?
China
3. Which city is home to the Zalando online clothing retailer and wants to be one of Europe's leading tech hubs?
Berlin
4. Which design magazine was founded by Tyler Brûlé?
Wallpaper
5. What theme links these answers?
The theme is walls

Free exchange

1. Free exchange is our column about economics. Which well-known economist said, "Nobody ever saw a dog make a fair and deliberate exchange of one bone for another with another dog"?
Adam Smith
2. Which Nobel prizewinning American economist wrote "The Price of Inequality"?
Joseph Stiglitz
3. Which American planner was renowned for reshaping New York in the 20th century by the creation of new highways and parks?
Robert Moses
4. The Great Train Robbery was one of the biggest cash heists in history. Which rock star played Buster Edwards, one of the gang, on film?
Phil Collins
5. What theme links these answers?
The theme is Genesis (Collins was the lead singer) and Moses was traditionally supposed to be the author of Genesis

Johnson

1. The Johnson column is named after Samuel Johnson, the 18th-century lexicographer. What tourist spot did he describe as "Worth seeing, yes; but not worth going to see"?
Giant's Causeway
2. In 2017 which verb did the Merriam-Webster dictionary define as to antagonise (others) online "by deliberately posting inflammatory, irrelevant, or offensive comments or other disruptive content"?
Troll
3. The letters "oe" are rarely written together in American English. But the name of which city, America's fifth-largest, contains them?
Phoenix
4. What word is used to describe private startups with a valuation of more than $1bn?
Unicorn
5. What theme links these answers?
The theme is mythical creatures in the Harry Potter series: giants, trolls, the phoenix and the unicorn

We received five correct responses to the quiz, so have decided to give prizes to all of them. The winners are Zachary Harper, Paul Harvell, David Marshall, Karol Zemek, and a family entry from Mick, Gail and Rata Ingram. Each will receive a copy of "Seriously Curious", *The Economist*'s new book. Congratulations to the winners and thanks to everyone who took part.

This article appeared in the Christmas Specials section of the print edition under the headline "That was the year that was"

Wild swimming

Finding yourself in the rivers, lakes and ponds of England

Freshwater swimming as exploration and therapy

Print edition | Christmas Specials Dec 22nd 2018

IN THE MIDDLE of the deepest lake in England I nearly lost my nerve. Wast Water is nestled in the western corner of the Lake District, an area once beloved by Romantic poets. A winding road cuts along one bank; on the other looms Scafell Pike, the tallest mountain in England. The water glints metallic, reflecting the grey, overcast sky.

Beneath me were 70 metres of icy water; I was swimming the ceiling of Westminster Abbey or Canterbury Cathedral, a nave of darkness below me, its contents—its population, perhaps its intention—unknown. I felt vertiginous and slightly nauseous. It started to rain, streaking my sight when I lifted my head from the water below. Short, choppy waves pushed at me like a playground bully. My hands turned first pearly white and then pink, numb and raw. My wetsuit, which I had not worn in the water before, felt tight around my throat. I panicked: the water suddenly seemed sinister, my limbs sluggish.

And once I was out, shivering on the strip of shingle, the feeling returning to my hands and feet as pain, I wanted to get back in.

There is something addictive about wild freshwater swimming. Charles Sprawson, whose "Haunts of the Black Masseur" (1992) dived deep into the links between literature and swimming, wrote that for romantics who relished the pastime, like Lord Byron and Coleridge, "It was as though water, like opium, provided the swimmers with a heightened existence, a refuge from the everyday life they loathed." Physiologists talk of the endorphins released by the temperature shock of cold water. Swimmers call them "endolphins", and crave them. But wild winter swimming can bring on hypothermia, pneumonia, cardiac arrhythmia. As Frances Ashcroft, a physiologist at Oxford, explains in "Life at the Extremes", the water's appetite for warmth grows keener the more you move through it. In that physiological stress there is a taste of the sublime. Roger Deakin, a film-maker and environmental campaigner, describes the effect of a plunge into a Scottish waterfall in his book "Waterlog":

> It was gaspingly, shockingly, ridiculously cold. This was water straight from the mountain that sends your blood surging and crams every capillary with a belt of adrenalin, despatching endorphins to seep into the seats of pleasure in body and brain, so that your soul goes soaring, and never quite settles all day.

"Waterlog", which celebrates its 20th anniversary in 2019, did for wild-water swimming what Nick Hornby's "Fever Pitch" did for football fandom. In the practitioner, it evoked a sense of being understood; in the outsider, fascination. A compulsive journey across Britain' seas, lakes, rivers, canals, moats and open-air pools, its author pulling on his wetsuit at the merest glimmer of a ripple, the book had the thrill of addiction. Beyond that, Deakin was also immersing himself in the landscape, reflecting on who uses it and who can roam through it, and on the eccentric, clubby nature of his country.

At a difficult time of my life, I slipped into fresh water myself. My initiation into wild swimming was hardly adventurous, or stressful. But it gave me an inkling of what was to come, and taught me something about that clubbiness.

Ladies, gentlemen and herons

The Kenwood ladies' pond on Hampstead Heath is one of three reservoirs built in the 17th century to provide Londoners with fresh water. Today the pond is used by psychoanalysts before their day of listening begins; mothers who talk about errant children to their friends, swimming breaststroke side-by-side; elegantly-coiffed pensioners who all know each other by sight. In summer many defy the rules and sprawl topless in the meadows around the pond or drink with friends.

On one of my earliest dips there on a cool spring day in May I paused on the edge, nervously eyeing the water and the blackboard propped up by the steps on which the water temperature was scrawled in chalk (18°C). "Come on, girl!" a woman behind me boomed, loudly counting down the metal steps as she took her plunge bottom-first with no let or hesitation.

Soon I became hooked: racing to the pond after work, the haze of a sweaty Tube carriage stripped away as I dived in, or getting there early on an autumn morning, when the pond was cool and still. The more I went, the more I found myself part of a growing informal association of freshwater enthusiasts, many of whom Deakin had inspired to swim. For some he opened the way to writing, too. In "Swell", Jenny Landreth wrote about women who swam, often overlooked by writers such as Mr Sprawson. There are personal accounts referred to, regrettably, as "swimmoirs" and "waterbiographies". There are novels based on swimming-club friendships and poetry collections dedicated to outdoor bathing.

The devotees appreciate the pastime's freedom, comity and perspective. No lanes exist to marshal you; no demands are made upon you to swim clockwise, or end to end. You sometimes share the water with humans, always with non-humans. Herons swoop across your head, their elegance in mid-flight making you pause mid-stroke; dragonflies dance from lily pad to lily pad, flashes of blue in the gloom; even, on occasion, the mixed blessing of a nibbling fish. Unlike a walker, firmly on solid ground and below the sky, the suspended swimmer is within and without, seeing one world from a new angle while partially submerged in another that remains unseen.

When I decided to retrace a small part of Deakin's journey to understand the phenomenon he unleashed and my place in it, the Highgate men's pond, down the hill from the ladies', was the nearest of his sites to hand. It is not normally open to the likes of me: but when building works at Kenwood closed the ladies' pond for two weeks rumour had it that, if women turned up early enough in the morning, they would be allowed in.

Unlike the ladies' pond, which is tucked away modestly behind trees, the men's pond is a wide sweep of open water, clearly visible from the paths. In summer, men in very small speedos lounge around as if in a gender-swapped version of an Ingres painting. Back in the 1990s a row broke out between the heterosexual "men of muscle" who trained boxers there, as an article in the *Guardian* put it at the time, and the gay "butterflies" who frequented the pond in the summer months, over nudity and gay men supposedly "colonising" the Heath. Most of these tensions seem to be resolved now that swimming trunks are compulsory.

Early one weekday morning, I made my way to the men's pond. As I pushed open the door to the pond, which was emblazoned with the sign "MEN ONLY", I felt the thrill of trespass, accompanied by a slight anxiety about being booted out by boxing champions. No need: I soon heard the laughter of women rippling behind a screen. The mist that had seemed to dissipate as I walked up the Heath lingered at the edges of the brown water. I did one round of the pond, my breath becoming slightly shorter, choppier, as I did so. As I hauled myself up the steps a male swimmer in his early 60s stood on the jetty and flexed his biceps like Popeye.

My toes remained torpid for about an hour after I got out of the river, my feet like two slabs of blubber

From Hampstead to Cambridge. Deakin takes one of his first swims there, in the River Granta: "deep, cool and inscrutable". I went farther downstream, where the river is the Cam, accompanied by Edward Williams, a cross-channel swimmer who now runs one of the largest swimming schools in East Anglia. A friend of his is a member of a naturist club which uses a stretch of the river near where the poet Rupert Brooke once swam naked with Virginia Woolf.

You come to it by a secret grassy track, and no signs point to it. We snuck in, prudishly pulled on our swimming costumes, and stepped down the slippery wooden steps into the water. It was 14°C: enough to cause a sharp intake of breath on entering, and to make my arms tingle, but not cold enough to scald. A current slowed us down as we went out through the brown water, and then sped us up as we turned back. As we got out, two elderly male naturists slid into the water without a sound, their hair silvery in the sunlight.

As at the men's pond, there was a frisson from being where you maybe shouldn't be; not quite of transgressing rules, but of their irrelevance. Deakin claimed that swimming will always be a subversive activity: one which allows you "to regain a sense of what is old and wild in these islands, by getting off the beaten track and breaking free of the official version of things." The thrill of getting into the muddy water partly springs from the feeling that, once you are in, you are obscured from a world that might want you elsewhere.

From uniform to freedom

The place Deakin swam in nearly every day was the moat in his garden in Suffolk. It is where he starts the book and almost finishes it. Since his death from a brain tumour in 2006, his house has passed to new owners, who said I could swim there like "Rog". So after Cambridge I drove to Suffolk, the landscape around me becoming more expansive and emptier as I did so. As the evening light started to fade, I got to the village where Deakin spent much of his adult life. It felt uncannily as if I would find him swimming in his moat when I arrived.

The new owner warned me that the water would be cold and to keep away from the black clumps floating on the water. "They smell like shit," she explained. As I walked barefoot from where I had parked my car I stumbled through a rather vicious patch of weeds. Sitting at the edge of the water, the soles of my feet and my ankles prickling pink, I thought I spotted a snake in the moat. I put a toe in, fear suddenly rippling through me. And then, in a flash, I went in. Light-green water obscured my vision. It was cold, but not as spine-tingling as the Cam. Once in the water, the stings and my fear both faded. I swam a dozen lengths while the wind rippled through the trees, whistling like waves crashing on a shore. Afterwards I found green slime slicked under my bathing suit.

Most people I speak to about swimming outdoors say they cannot stand the idea of not being able to see to the bottom of the pond. But I found it had much the same exciting sense of possibility, of exploration, as when you land in a new country for the first time and have to navigate your way around it. Until I swam in Wast Water, I had never experienced the terror, which I learnt afterwards is commonplace, of the outdoor swimmer suddenly realising how far away they are from the shore, how far the depths stretch out below.

The aspect of swimming in Wast Water which both terrified and thrilled me most, however, was the cold. I was not unprepared. Although many who swim outdoors consider wetsuits to be cheating—the membership page of

the Serpentine club in Hyde Park actively discourages new members from wearing them—Deakin got one made for himself, so that was good enough for me. While I wriggled and squirmed into different suits at a water-sports shop around the corner from *The Economist*'s offices, it became apparent that years of wearing uncomfortable school uniforms had actually prepared me for something other than a loathing of woollen skirts. "When I tell men to pull the wetsuit on like a pair of tights," sighed David, the shop assistant, "they just don't get it." I told myself the silky wetsuit I walked out with would be used only when the water dipped below 10°C.

Suspended by the cold

Having braved Wast Water (10°C) in the suit, I decided to try somewhere even colder. Had I wished to, I could have claimed my motive was scientific. A range of medical researchers have tried to measure the cardiovascular benefits of cold-water swims and to see whether, as swimmers sometimes claim, such immersion weakens common colds. Some of these studies hark back to the practice of sea-bathing in the 18th century or to the craze for sojourns in elegant cold-water sanatoriums a century later. A study from 2012 by Mark Harper, a British doctor, on whether the effect of an immune system bracing itself against the cold could help patients recover after surgery, quotes Richard Russell, who in 1752 claimed that sea-swimming could cure "scurvy, jaundice, Kings'-evil, leprosy, and the glandular consumption".

Others have tried to see whether cold-water swimming could help depression and other forms of mental anguish, too. In his film "Floating", released in 2017, Joe Minihane, a film-maker and Deakin devotee, explored the effect of swimming outdoors on his anxiety. In 2018 a study was published in the *British Medical Journal* (BMJ)that followed a 24-year-old woman who had been treated for depression and anxiety for eight years as she embarked on a weekly course of cold open-water swimming. She found the cold helped her with the symptoms of depression.

Looking for endorphins strictly on an amateur basis took me to the River Wharfe. When Deakin went to the Wharfe, which cuts through the Yorkshire Dales like a dagger, he swam first in the picturesque stretch which runs past the ruins of Bolton Priory before going farther north to try his most terrifying swim of the book, a canyon called Hell Gill. I lacked the expertise, or the climbing equipment, to do the latter. But, with two other keen swimmers, I decided to go upstream to the end of the Strid, one of the most dangerous bits of water in Britain.

A little pebble beach opened up to a fork in the river, a point where the rapids broke into calmer water. It was called, rather worryingly, the Valley of Desolation (where the sign added, ominously, that no dogs are allowed). The water was 8°C. I waded in and started swimming towards the rapids. Soon my feet and hands were numb. If I put my head underwater, a knife seemed to pierce my skull. I felt suspended by the cold, as well as the water; it seemed to lift me out of my body. The current meant that my usual expansive breaststroke only inched me forwards. After an hour or so of swimming I got out. It was then that I realised I couldn't feel my feet.

As I sat in a tearoom trying to warm up my extremities—my toes remained torpid for about an hour after I got out of the river, my feet like two slabs of blubber—I thought of the BMJ study, and the chemistry of my brain. I felt there must be something happening there. But it was also not the whole story. Often when I arrived at the ladies' pond my thoughts were overcast, and the darkness of the water reflected my mood. Yet for half an hour all that needed my focus was the opaque water in front of me, through which my hands looked ghostly pale; the only decisions I had to make were front crawl, breaststroke or backstroke. The coldness was a stimulant. It was also a comfort: a way to to remind myself that I was, that I am, alive.

From Economist Films: *Cold-water swimming is surging in popularity. What makes taking the plunge so powerful for the mind and bo*

This article appeared in the Christmas Specials section of the print edition under the headline "Cold comfort"

Solar eclipsed

Rooftop solar remains marginal in America

Blame a patchwork of regulation, utilities and an immature business model

Print edition | Business Dec 22nd 2018

AMERICANS LOVE the concept of rooftop solar, according to opinion polls. Well they might. Large solar farms may be the most cost-efficient way to harvest energy from the sun, but the case for homeowners to put panels on their roofs looks compelling. Panels do not belch carbon dioxide. Electricity is generated where it is consumed, easing the strain on transmission lines and power plants. President Donald Trump may have slapped tariffs on imported solar panels earlier this year, but the average price of a residential solar-power system is less than half its level in 2010.

This combination of greenness and cheapness has allure. Paul McMaster, a homeowner in Florida, has leased solar panels from a company called Sunrun since the summer. In August Mr McMaster's electricity bill was about $100. By October it was $15. In 2017 rooftop solar installations in America, measured by gigawatts of capacity, were nearly ten times what they were in 2010.

Nevertheless, Mr McMaster remains unusual. Home solar panels still generate less than 1% of America's total electricity. Although nearly 2m homes now have panels on top, recent growth has been anaemic. Wood Mackenzie Power and Renewables, an energy consultancy, expects rooftop-solar installations to be flat in 2018. Installations will rise in only two of America's biggest ten solar markets. That would still be progress, in relative terms, for in 2017 volumes sank by 15% (see chart).

Supporters of rooftop solar are well-accustomed to ups and downs. President Jimmy Carter, keen to promote alternative energy after the Arab oil embargo, installed solar panels on the White House in 1979. His successor, Ronald Reagan, removed them seven years later and gutted Mr Carter's solar budget. Even so, today's stuttering progress is striking. Two factors lie behind it: regulatory uncertainty and the unreliable business models of solar firms.

Start with regulation. At first sight, this seems to be solar's friend. In December, for example, officials in California upheld a mandate to require rooftop panels on new homes from 2020, boosting demand. Generous subsidies, including a 30% federal tax credit, add to solar's attractiveness. Under a policy called net metering, a utility has to pay a homeowner retail rates for any extra energy generated, which, as in the case of the McMasters, can substantially lower a household's monthly bill.

Yet these subsidies are also responsible for ebbs and flows in demand. Uncertainty about how tax reform would affect solar projects weighed on growth earlier this year, says Michael Weinstein of Credit Suisse, a bank.

More generally, the rules governing the way rooftop solar is regulated are in flux. Its appeal has long varied from state to state, based on electricity rates (the higher the rate, the greater the value of rooftop solar), as well as subsidies and the availability of sunshine. This variation may become still more exaggerated. In the three months to October, 45 states and Washington, DC, considered policy and rate changes for rooftop solar, according to the NC Clean Energy Technology Centre in Raleigh, North Carolina. These included changes that would depress residential solar.

A critical question is how to price power produced at home. It used to be that electricity flowed in one direction, from utility-owned power plants to customers, who simply paid more for consuming more energy. But Mr McMaster and his shrinking electricity bill are a utility's nightmare. Power giants shoulder fixed costs for maintaining the grid but, under net metering, earn less from customers with solar panels. So utilities say they must raise fees for customers, disproportionately hurting people without panels—which could prompt more people to use solar.

As more customers pair solar panels with batteries, they will be able to store the electricity they generate, rather than selling it back to utilities. But David Frankel of McKinsey, a consultancy, points out that most households would still connect to the grid "as a giant battery backup, essentially". Utilities' fixed costs would remain. And in the long term, the less overall demand there is for utilities' electricity, the less need there is for big infrastructure investments, for which regulated utilities have historically received a rate of return guaranteed by state commissions.

If net metering is imperfect, there is little agreement on what should replace it. "Everyone is still experimenting," says Mr Frankel. In some states, such as New York, regulators are considering new ways to value the electricity that rooftop panels generate, as part of efforts to modernise the grid. California is moving more customers to "time of use" rates, which rise with demand. That will encourage more customers to invest in batteries, so they can save their solar power to use at peak hours.

In other states, utilities have lobbied for changes that may suffocate rooftop solar. Kansas, for instance, in September approved new fees for customers with solar panels on their roofs; a utility in Montana has proposed something similar. "A lot of these debates are about trying to block competition," argues Lynn Jurich, Sunrun's chief executive.

Navigating this shifting landscape would be hard for the most robust business model. But the solar industry has struggled to produce profits reliably at scale. In 2014 SolarCity, chaired by Elon Musk, was America's largest installer of home solar. It and Vivint Solar, its closest competitor, spent to expand quickly. But even as they sought dominance, success still depended on local factors, including electricity rates, sunshine, state incentives and installation fees. The cost of a home solar system can vary by up to 20%, depending on inputs such as permitting costs. America has over 18,000 local jurisdictions; permitting rules vary greatly among them.

Most important, selling solar systems is labour-intensive. Salesmen knock on doors and explain complex contracts. All together, service and other "soft" costs are nearly 70% of a home solar system's price.

By around 2016 investors were losing patience with meagre profits and mountainous debt. That year Tesla, another of Mr Musk's firms, bought SolarCity (prompting some Tesla shareholders to charge that Mr Musk and other directors misled investors for their own benefit). After the acquisition Mr Musk boasted, at a Hollywood film set, of solar modules made to resemble roof shingles. Yet production of these has been limited and installations of existing panels have plunged. To improve cashflow, Tesla now mostly sells panels at stores instead of leasing them door-to-door.

Vivint Solar, backed by Blackstone, a private-equity firm, has brought in a new chief executive, David Bywater. He has redirected sales staff to the most promising markets, such as California. "At the end of the day you have to be a rational economic actor," says Mr Bywater. He is pursuing more modest but profitable growth. The market nodded approvingly for much of the year—until November 30th, when Vivint said that a vehicle controlled by Blackstone would sell 8m shares at a discount, sending the firm's stock price plunging.

Sunrun is now America's top installer, with about 15% of the market. Unlike Tesla, its strategy is still centred around leasing panels, and it has remained disciplined about spending, says Stephen Byrd of Morgan Stanley, a bank. Ms Jurich has tried to overcome the variability inherent in rooftop solar—software can incorporate local permitting rules, for instance, and lower design costs.

But challenges of scale and profitability remain, argues Cory Honeyman of Wood Mackenzie Power and Renewables, particularly as firms try to court customers beyond early adopters. Pressure to lower sales costs will intensify, as the deadline approaches for the expiration of the federal tax credit for residential projects in 2022.

The falling cost of batteries may be the thing that propels the industry forward. Mr McMaster is now leasing not just panels from Sunrun, but a battery as well. That helps him use solar power at night or when a power line goes out—all too often, in storm-prone Florida. Ms Jurich expects virtually all of Sunrun's installations to include batteries in five years. "Batteries will make solar irresistible to a lot of people," argues Mr Weinstein. Until then, expect conditions to remain variable.

Correction (December 18th 2018). *This article was changed to make clear that Tesla still leases some panels. Moreover, the chart used the incorrect unit for American residential solar-panel capacity. It is MW not GWh. This has been updated. Apologies.*

This article appeared in the Business section of the print edition under the headline "Solar eclipsed"

Bartleby

If consultants ran Christmas

An elf-and-safety nightmare

Print edition | Business Dec 22nd 2018

MEMO FROM: Bognor Consulting Group. To: Santa Claus, North Pole HQ, Lapland.
Thanks for asking us to have a look at your business model. Our staff have now recovered from their frostbite and have a number of significant suggestions for a revamp before next year.

First, the brand name. The business seems to use several different monikers, including St Nicholas, Santa Claus and Father Christmas. We suggest settling on one of the three. Father Christmas is clearly paternalistic and gender-biased. St Nicholas is too overtly religious. Santa Claus is a much more inclusive term. Once trademarked, there is a ton of money to be made from merchandising rights, particularly from greeting-card companies and department stores. Frankly, your intellectual property is an underutilised resource.

Making better use of it could help address your most glaring challenge: the lack of any revenue stream. Mince pies, carrots and glasses of brandy are not a sound basis of remuneration for a multinational organisation. And who pays for the raw materials needed to make the presents? Given the lack of paperwork about your funding, we are surprised that the authorities have not launched an investigation into money-laundering.

Next, the distribution system. We admit you have an excellent record to date. However, in attempting to deliver millions of presents from a single point over the course of one night, you have been flying by the seat of your sled. It would take just one injured reindeer or a chimney accident and the whole system would grind to a halt. It is far from clear how you co-ordinate your flights with air-traffic-control systems.

Outsourcing is the obvious answer. Amazon, Fed Ex and UPS would do the job just as efficiently. If the chimney-delivery route is still preferred, then small drones may be the answer.

Now let us turn to working conditions. Basing your operation at the North Pole exposes your workers both to extreme cold and, thanks to climate change, melting ice. It is a health-and-safety (or should that be elf-and-safety) nightmare. Speaking of which, our human-resources department is unsure whether employing elves should be classed as an admirable diversity policy or discrimination against *Homo sapiens*. As with distribution, the operation could be outsourced. The elves could be retrained, perhaps as shoemakers.

Our team was also very concerned about animal welfare. Asking reindeer to fly around the world in one night, pulling a heavy load, must put an enormous strain on their physiques. One of the reindeer has a very shiny nose and we recommend immediate veterinary attention.

The next issue is data protection. You tell us you have a "list" which records whether children are "naughty or nice". We are afraid that checking it twice is simply not an adequate safeguard. Children, and their parents, have the right to inspect the list to see whether they agree with your assessment. Even keeping the list is a breach of data-protection rules around the planet. And how are the data compiled? The fact that you see children when they are sleeping, and know when they are awake, suggests surveillance on an Orwellian scale. This must be stopped immediately. If you insist on pre-gift monitoring, simply look at the children's Snapchat accounts. That should tell you all you need to know.

While we are on the subject, how do you know which families celebrate Christmas and which do not? In some jurisdictions, you may be liable to a religious-discrimination lawsuit.

We are also worried about succession planning. No insult intended but the white beard suggests you are past retirement age and your rotund physique does not bode well for your health. You need to hire a graduate, preferably from an Ivy League college such as Yule University.

The good news is that you do live up to many of the precepts of modern business theory. Just-in-time delivery, a flat management structure and a purpose-driven ethos are all things we recommend to other clients. And no one can say that flying reindeer are not "agile".

Finally, we need to talk about the terms of our bill. Our expenses were considerable; have you seen the price of a first-class seat on Lapland Airways? Your offer of a train set and slippers was very kind, but we prefer a bank transfer. Mind you, if you could drop a hassle-free Brexit solution down the chimney, the people of Britain would be very grateful.

A phoneless vision

Masayoshi Son floats part of SoftBank to help pay for his huge tech bets

Don't call us a telephone company

Print edition | Business Dec 22nd 2018

MENTION SOFTBANK and most Japanese people, understandably, think of telecoms—it is Japan's third-largest wireless carrier. The company hopes to weaken that association. SoftBank is listing its telecoms arm; shares in the unit were due to begin trading on December 19th, after *The Economist* had gone to press. SoftBank Group was expected to raise ¥2.6trn ($23.4bn) by selling off just over a third of the company. It is selling 1.76bn shares for ¥1,500 each, making it Japan's biggest-ever initial public offering and only just shy of the record set by Alibaba, a Chinese e-commerce titan in which SoftBank Group owns a stake of about 29%, in 2014.

That is good going for a firm whose earnings have been lacklustre and which faces big challenges. Providing mobile services is a lucrative affair in Japan—prices are far higher than in other developed countries. But it is also a mature business and the population is shrinking. SoftBank has a quarter of the market, trailing NTT DoCoMo and au. NTT DoCoMo has already said it will slash prices after pressure from the government to lower costs; the other two are likely to have to follow suit. Next year the trio will face new competition from Rakuten, a Japanese e-commerce giant that is about to become the nation's fourth mobile-network operator.

Other problems are more particular to SoftBank. A service outage lasting over four hours, affecting 34m customers mainly in Tokyo and Osaka, sent its shares down by as much as 6% in trading on December 6th. And the firm has said it may have to spend money replacing all the hardware in its 4G and 5G networks that it gets from Huawei, one of its main suppliers, after Japan became the latest country to air security concerns about the Chinese firm.

Even so, the Japanese public, bombarded by TV advertisements for the listing, has flocked to buy shares. SoftBank benefits both from domestic investors' lack of options and its own strong brand. For them, putting in ¥1,500 and receiving a relatively high dividend payout, of around 5%, with no currency risk is an attractive proposition. "Mrs Watanabe is looking at yield, not the fundamentals in the long term," says Chris Lane, an analyst at Sanford C. Bernstein, a research firm, referring to the proverbial Japanese retail investor.

The IPO's attractions are equally clear for Masayoshi Son, SoftBank's founder, who is shifting his firm away from telecoms towards investing in tech entrepreneurs around the world. Through his Vision Fund, an investment vehicle financed in large part by Saudi Arabia's sovereign-wealth fund, he has bought stakes in companies such as Uber, WeWork and Arm (a British chip firm). The IPO is a way to take some cash out of a part of SoftBank that is not growing as swiftly and to put it into racier bets, while retaining control.

Mr Son also hopes the sale may solve his main frustration since he veered away from telecoms to backing tech founders: that investors do not properly appreciate SoftBank's transformation and that they therefore undervalue it. The company's shares have been trading at a hefty discount, of around 40%, to the value of its assets (see chart). This discount arises in part because many telecoms-focused investors in the group are not thrilled to see their cash being funnelled into risky and opaque tech investments at high prices. Now these investors will be able to buy shares in a more predictable phone company while those with a higher risk appetite can stay with SoftBank.

Closing the discount depends on a number of factors, however. What happens to the group's high level of debt will be critical. SoftBank has around ¥18trn of interest-bearing debt, or over six times its operating earnings, thanks partly to its acquisition of Sprint, an American telecoms firm, for $20bn in 2012. The risk the debt mountain poses is the concern most often cited by investors, says Mr Lane. Some of this debt will go to the separately listed mobile unit and may be "non-recourse", meaning that SoftBank may no longer be liable for it if the subsidiary defaults. For now, Japan's negative interest rates, adopted by the Bank of Japan in 2016 as part of its quantitative-easing programme, allow firms to borrow without worrying too much; they should remain for at least a year.

Critics complain, too, that Mr Son's plans are wildly ambitious but unclear; and that "key man" risk around him remains too high. That suggests hopes for a re-rating of the parent's shares may go unanswered. Investors in the mobile arm might face an additional governance risk, if the subsidiary tries to please its parent and majority stakeholder rather than ensure returns for minority shareholders.

As for the Vision Fund itself, Mr Son was criticised for failing to distance himself from Saudi Arabia when its crown prince, Mohammed bin Salman, was linked to the killing of a Saudi journalist in its embassy in Turkey in October. Startups might be more reluctant to accept Mr Son's cash as a result, some rival tech investors say.

Early divestments from the fund seem to have worked well, however. When Walmart bought SoftBank's stake in Flipkart, an Indian e-commerce firm, in May, it reportedly paid almost double what SoftBank did less than a year earlier. SoftBank invested in Uber at a valuation of around $48bn; reports suggest its valuation will be north of $100bn when it lists on the stockmarket,

possibly in the first quarter of 2019. Next to that kind of money, the telecoms business, expected to make ¥700bn of operating profit this year, looks like small fry.

This article appeared in the Business section of the print edition under the headline "A phoneless vision"

Migrating nerds

Indian technology talent is flocking to Canada

As immigrant techies shun the US, its neighbour has rolled out the red carpet

Print edition | Business Dec 22nd 2018

WHAT WOULD induce a software developer to quit a good job in Silicon Valley and trade California's sunshine for Toronto's wintry skies? For Vikram Rangnekar, born in India and educated in America, the triggers were the restrictions placed on immigrant tech workers holding an H-1B visa (starting companies or taking long holidays is discouraged) and what looked like a 20-year wait to get the green card he needed in order to settle down. Rising anti-immigrant sentiment under President Donald Trump's administration did not help. Two years later he thinks he made the right choice. "I didn't want to spend the best years of my life on a restrictive visa."

People like Mr Rangnekar are part of an exodus of tech workers from Silicon Valley. Pushed out by the cost of living as well as by a less welcoming American government, they are being pulled in by countries such as Canada, where tech vacancies are forecast to reach 200,000 by 2020. Canada is gambling that by the time America wakes up to the cost of discouraging immigrants its tech sector will have secured some of the best talent.

The starting-point is pretty promising. Toronto already has expertise in artificial intelligence (AI) and an array of promising firms such as Wattpad, a storytelling platform with 65m readers. The city added more tech jobs in 2017 than the San Francisco Bay area, Seattle and Washington, DC, combined. Ottawa is home to Shopify, a publicly traded e-commerce platform valued at C$19bn ($14bn). Montreal, another AI hotbed, has Element AI, a lab co-founded by Yoshua Bengio, a specialist in deep learning—and newish labs opened by Facebook and Samsung.

Yet Canada is in the third tier of destinations globally, says a study on venture-capital investment, "The Rise of the Global Start-Up City", co-authored by Richard Florida, an urbanologist. To move up, the government has tweaked both its permanent and temporary immigrant programmes. Applicants for permanent residence get extra points for tech skills. Temporary visa holders are told their spouses will be allowed to work. Justin Trudeau, the prime minister, often underlines that in multicultural Canada, diversity is welcomed. Publicly funded health care sometimes gets a mention. "All of this is designed to pivot Canada away from the nativist policies of Trump," says Ravi Jain, a Toronto immigration lawyer who has many tech clients.

Such tactics seem to be working, especially with Indians, a mighty force in Silicon Valley, where they form the largest group of immigrant tech workers. Indians from America and elsewhere snapped up almost half of the new temporary visas (processing time: two weeks) that Canada began issuing in June 2017 at the behest of the tech industry. The number of Indian nationals taking the slightly longer route to permanent residency surged between 2016 and 2017—up by 83% for those who entered under a federal skills programme, up by 122% for those selected by provinces to fill specific vacancies, and up by a whopping 538% for those who entered based on work experience. "I can clearly see the reason why people are shifting to us," says Allen Lau, the chief executive of Wattpad. "The US is becoming less friendly."

Still, the government knows it cannot be complacent, says Ahmed Hussen, minister of immigration, refugees and citizenship. It has set up research chairs at universities, overhauled support programmes and in its most recent budget earmarked C$2.5bn over five years in direct industry funding for innovation. It is one thing for Canada to attract disaffected immigrant tech workers from Silicon Valley. Now Maple Valley, as some call it, must make it worth their while to stay.

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Peace offering

China scrambles to sustain its trade truce with America

By cutting tariffs and downplaying industrial policy, China tries to win over Donald Trump

Print edition | Finance and economics Dec 22nd 2018

THEIR WORDS were guarded, their tone sober. At a Politburo meeting to discuss economic plans for 2019, China's top leaders agreed that they should be ready for problems and must, above all, maintain domestic stability. It was a striking contrast with the same meeting a year earlier. Then the Politburo oozed confidence, concluding that China was the world's economic engine, with a new level of power.

This nervous, inward turn explains why, after a year of eye-for-eye fighting with America, China is determined to bring the trade war to an end. The view, once commonly heard in Beijing, that it could outlast America in a grinding tariff battle has given way to the realisation that, as the country with the huge trade surplus, China has more to lose upfront. Optimism that the government could fight on two fronts—taming its heavy debt burden at the same time as taking on America—has also cracked. The economic outlook has darkened. Analysts are debating whether the government will, once again, deploy a big fiscal stimulus to prop up growth.

So the swagger from a year ago is being replaced by more conciliatory messages. At a recent forum Ma Jiantang, vice-president of a think-tank under the cabinet, emphasised the deep ties between China's and America's economies. "We are inseparable," he said. The immediate goal for Chinese officials is to sustain the trade truce that Presidents Donald Trump and Xi Jinping agreed to after the recentG20 summit in Argentina. They have until March 1st to reach a deal, otherwise the two countries may hit each other with tariffs again.

China's peace offering is starting to come together. The government has made or hinted at a series of concessions over the past two weeks. It has resumed purchases of American soyabeans, announced tariff cuts on auto imports and indicated that it will modify an industrial policy that stokes suspicion abroad. This is the most notable series of steps taken by China to respond to America's trade gripes. Whether they will satisfy Mr Trump is another matter.

The early signs are that he likes what he sees on the table. On December 14th, after the Chinese state council said it would temporarily cancel an extra 25% import tariff on American cars (imposed in retaliation for American tariffs), Mr Trump tweeted with glee. "China wants to make a big and very comprehensive deal. It could happen, and rather soon!"

But Chinese negotiators are not about to uncork fine bottles of *moutai* just yet. One wild card is Meng Wanzhou, the finance chief of Huawei, a Chinese tech giant, who was detained by Canada on an extradition request from America. China has tried to insulate her case from the trade talks. Conveniently, it has been able to focus its ire on Canada, detaining two Canadian citizens in China as thinly veiled revenge. But if Canada does hand Ms Meng to America, the truce would come under strain. Moreover, America might pick new fights. The justice department is reportedly set to indict Chinese hackers over economic espionage.

China has also learned that Mr Trump is an unpredictable combatant, torn between two camps within his administration. Doves such as Steven Mnuchin, the treasury secretary, supported previous offers by China to buy more American energy and agricultural products. Hawks, especially Robert Lighthizer, the United States Trade Representative, have wanted more, demanding that China halt practices that allegedly let its firms pilfer technology from America. And it is not just the hawks. James McGregor, head of China for APCO Worldwide, a consultancy, says that foreign businesses want to see "serious results", having endured all the tariff drama.

The crucial question is therefore what kind of results China can deliver. Reducing tariffs on auto imports and buying soyabeans should not count for much. Those measures merely return the trade relationship to its position a year ago. But demands for fundamental change are much harder for China. They cut to the heart of its economic model, potentially requiring it, for example, to curtail subsidies for state-owned companies.

Chinese negotiators are focusing on two themes, according to people familiar with the talks. First, they are walking away from the "Made in China 2025" plan, a blueprint for turning the country into an advanced manufacturing power. Foreign businesses object to it because it specifies market-share targets for China in sectors from biotech to robotics. Chinese officials have already downplayed its significance, describing it as a vague, aspirational document. References to it have all but vanished from state media. Now, the government appears ready to rescind it formally. Even the *Global Times*, a nationalist state-owned tabloid, has called for a new plan.

Second, the government wants to show that foreign companies play on a level field. Liu He, the lead Chinese trade negotiator, has asked the central bank to devise guidelines for how "competitive neutrality" would work in China, according to

someone briefed on the project. The idea, promoted by the OECD rich-country club, is that state-owned companies can form part of a healthy market economy provided they enjoy no special advantages. China will try to convince Mr Trump that it is serious about meeting this standard.

China is matching its words with actions—up to a point. After a flurry of approvals, it can argue that it is opening its economy to foreign firms. Tesla is on track to be the first foreign carmaker to have a wholly owned manufacturing facility in China. UBS, a Swiss bank, recently became the first foreign firm to be allowed a majority stake in a Chinese brokerage. ExxonMobil will soon start to build a wholly owned petrochemical complex, which until recently foreign firms could not do. China has also published tougher rules for protecting intellectual property, which foreign companies have long demanded.

Placating American negotiators will, however, be difficult. The challenge for China is to prove that these are more than cosmetic changes to an economic system in which the state remains overwhelmingly powerful. Scepticism abounds. As long as the government wants to build state-owned companies into global powerhouses, foreign rivals will have good reason to think that the deck is stacked against them in China.

On December 18th China celebrated the 40th anniversary of the start of its "reform and opening" period, the rebirth of the economy following Mao's disastrous rule. Some had hoped that Mr Xi would use the occasion to launch bold new reforms. But in a speech at the Great Hall of the People in Beijing, he instead reflected on how far China had come, guided by the Communist Party's strong hand. A humble veneer cannot conceal China's pride in its own success over the past four decades, even if the past few months have been turbulent. It is reluctant to junk and replace what it sees as a winning formula.

This article appeared in the Finance and economics section of the print edition under the headline "Peace offering"

Buttonwood

Why foreign investors are losing interest in India

As prime minister, Narendra Modi's form has disappointed

Print edition | Finance and economics Dec 22nd 2018

IT WOULD BE wrong to say that the only people who attended English county cricket in the 1980s were scoreboard enthusiasts, old men with flasks of cold tea and red-faced types there for the all-day bar. A few oddballs went to watch the cricket. A big draw was Graeme Hick, a Zimbabwe-born batsman and a relentless runmaker for Worcestershire. He eventually qualified to play for England in 1991. In front of bigger crowds and faster bowling, he could not reproduce his blistering county form.

In cricket-mad India, a parallel might be drawn between Mr Hick and Narendra Modi, the prime minister. Mr Modi was also the object of high hopes. He was elected with a thumping majority in May 2014 on his record in Gujarat, a well-run Indian state. But on the bigger stage, the form he showed as a state minister has often deserted him. A recent clash with the central bank, the Reserve Bank of India (RBI), that led to the resignation of its governor, Urjit Patel, is the latest—and most serious—mis-step.

The rupee fell after Mr Patel resigned. But India under Mr Modi has been one of the more stable emerging markets. The stockmarket has seemed to defy gravity, thanks in large part to domestic investors steadily switching from gold and property into shares. That buying has masked the disquiet among foreign investors, who have quietly pulled money from India. The sense that Mr Modi has blown a good chance to transform India is widespread.

The hallmarks of Mr Modi's 12 years in Gujarat were ambitious projects run by honest civil servants. The results are tangible. The roads around Ahmedabad, the state's commercial capital, are excellent. The water supply is abundant. Gujarat's 18,000 villages are connected to the electricity grid. Gujarat was already a state with lots of factories and formal jobs. One of Mr Modi's innovations was to use IT to cut through red tape for new businesses. He was project-manager-in-chief. A handful of trusted civil servants gave orders. Those further down the chain of command were held to account.

Mr Modi excels in this "project mode", says Reuben Abraham of the IDFC Institute, a think-tank. Judged by the number of toilets installed or kilometres of road laid, his time in the top job is a success. India's GDP growth rate of 6-7% on his watch is not too shabby. Yet for a poor country with a fast-expanding population, 6-7% growth is a baseline. A government in project mode will not lift it. "You need deeper, systemic reforms," says Mr Abraham. Those require a coherent strategy and policymakers capable of adapting it as conditions change. This is at odds with Mr Modi's command-and-control style.

His defenders point to some big-bang reforms. A national goods-and-services tax (GST) has replaced a mosaic of national, state and city levies that were a barrier to trade within India. The country has a newish bankruptcy code. The central bank has an inflation target and a monetary-policy committee. But these were ideas bequeathed by the previous administration. The single Modi-branded policy—cancelling high-value banknotes to crush the black economy—probably did more harm than good.

And progress has been set back by the clash with the RBI. The government pressed it to remit more of its reserves and to go easy on state-owned banks with bad debts. There are two sides to every dispute. Central bankers have a habit of standing on their dignity while dodging accountability. But Mr Patel was clearly sinned against. Mr Modi has not grasped that there is little point in a bankruptcy code to aid the clean-up of banks, or a state-of-the-art monetary policy, if the government overrides the central bank when elections loom.

The sales pitch about India's potential was already wearing thin. "A lot of investors have tuned out," says Dec Mullarkey of Sun Life Investment Management. The trade dispute between America and China is just one more missed opportunity. A pickup in foreign direct investment in Indonesia, Vietnam and the Philippines may be a sign that American firms are seeking to reshape supply chains to exclude China. India ought to benefit, too. But its bewildering array of labour laws and scarcity of commercial land hold back its progress as a manufacturing hub. The GST apart, Mr Modi has done little to change that.

Mr Hick could not adapt his game to more testing conditions. His poor form for England is sometimes attributed to the burden of expectation and technical flaws. Perhaps the same goes for Mr Modi in economic policymaking.

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See-through wrapper

Transparency threatens Isle of Man insurers' business model

When customers see how high the fees are, will they flee?

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THE SEASIDE promenade in Douglas, on the Isle of Man, a self-governing British Crown dependency, boasts grand Victorian buildings and a horse-drawn tram. Once they helped it to compete with the likes of Llandudno and Blackpool for the tourist masses of England's north-west. When cheap air travel meant these holiday towns were abandoned, most fell into disrepair. But Douglas reinvented itself as an offshore financial centre. Today finance provides over a third of the island's GDP, of which around half is from insurance. Now new transparency rules put that at risk.

From January 1st the island's insurers will have to be more open with clients, in particular on the subject of brokers' commissions. Britain has had similar rules since 2013. International organisations such as the OECD, a club of rich countries, and the Financial Action Task Force, an intergovernmental anti-money-laundering organisation, increasingly require such standards for their seal of approval.

The island's main insurance business is not at risk. The "offshore bonds" it started offering in the 1970s allow British residents to pay a lump sum, usually at least £50,000 ($63,000), to be returned on an agreed date. These count as life insurance, though the insurance payout is typically just 1-5% of the lump sum, and can be as little as £1. The appeal is tax-efficiency: deferring income-tax liabilities or avoiding inheritance tax. Britain's tax authority could kill these off, but it has tolerated them for decades and shows no sign of a change of heart.

Rather, it is the island's growing business of life insurance for expatriates and the global rich that is under threat. The other big offshore insurance centre, Bermuda, specialises in property-and-casualty insurance and reinsurance, mainly for hurricane risk in America. For the Isle of Man, by contrast, life insurance accounts for over 90% of its insurers' assets under management: £69bn out of £75bn. And within life insurance, it specialises in asset protection and asset management rather than death benefits or annuities.

A striking example is a policy offered by Old Mutual International (OMI), a subsidiary of London-listed Quilter, which pays out a lump sum of millions of pounds to heirs in Singapore inheriting property in Britain, allowing them to foot the inheritance-tax bill without needing to sell the properties. But this policy at least has a large cash payout; many others are "wrappers" that simply fold existing assets into insurance payouts. Reasons to buy range from wealth protection—from high taxes, government expropriation or succession squabbles—to tax arbitrage. In many countries the proceeds of a life-insurance policy attract less tax than a direct inheritance.

Unhappily for Manx firms, these products are sold with hefty commissions. Some of their brokers in far-flung countries charge 6-7% of a policy's value. Though that is similar to commissions in onshore jurisdictions—around 6% in Ireland, for instance—onshore life insurance is mainly about death benefits, annuities and to an extent savings. A better comparator for Manx products is financial advice, where commissions have been slashed. In Britain financial advisers must charge retail investors fixed fees rather than commissions, to avoid conflicts of interest.

Business might shift to avoid the new rules. One Manx official worries about competition from the British Virgin Islands. Or clients boggling at the newly revealed fees may switch to a different sort of vehicle for asset protection, for example the trusts in which Jersey and Guernsey, also Crown dependencies, specialise.

The Isle of Man will still benefit from a stable legal environment and specialist talent. It already offers some products that rely on neither Britain's tax forbearance nor rich individuals elsewhere. Notably, the Manx operations of Zurich Insurance, a global insurer, focus on life-insurance and pensions schemes for the employees of multinational firms. But the island's financial industry will have to diversify: to new types of customers such as corporations, for example, or to products that are less dependent on brokers.

This article appeared in the Finance and economics section of the print edition under the headline "See-through wrapper"

Free exchange

Why Americans and Britons work such long hours

Society as a whole must judge whether or not there is more to life than work

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THE YEAR ahead will, like every year, consist of just under 8,800 hours. Most people will spend about a third of that time sleeping, and another third or so arguing on social media. Much of the remainder will be spent at work. There is increased interest in corners of the political world in trying to reduce the amount of time people must spend on the job. The Labour Party in Britain has said it will consider introducing a four-day work week when it is next in power. Figures on the American left are similarly intrigued by the idea. To assess whether such moves to reduce working time have any merit first requires an understanding of why hours in those countries have not fallen more already.

Declines in hours worked per person are among the least-sung benefits of economic development. In the late 19th century workers in industrialised economies knew labour and little else. In 1870 full-time work generally meant between 60 and 70 hours of labour per week, or more than 3,000 hours per year. Over the century that followed rising incomes were accompanied by a steady drop in weekly hours, which had fallen to about 40, on average, by 1970. Though less conspicuous a boon than larger pay packets or higher living standards, the drop was a gift to working people of a thousand or so precious hours of free time each year.

Hours worked are hard to measure. But the best analyses suggest that such gifts have been far less generous in the years since, in some countries at least (see chart). In France and Germany hours worked per person have continued to drop over the past few decades, albeit more slowly than in the past. In Germany, where one of the largest trade unions recently won for its workers the right to a 28-hour working week, employees now put in fewer than 1,400 hours per year. The decline in America and Britain has been substantially smaller; indeed hours worked in those countries have actually risen since the 2000s.

Why should time spent in work vary so much? Analyses of differences between countries focus on culture: of course leisure-loving Europeans put in fewer hours than puritanical Americans and striving Koreans. Such stories are often unsatisfying, however. Italians and Greeks work many more hours than their supposedly more diligent northern neighbours, for instance. Economists, for their part, often think about the choice to work more or fewer hours in terms of competing "substitution" and "income" effects. Forces that increase the return to work (such as reductions in marginal tax rates or higher pay) make each hour of work more lucrative, and can therefore cause workers to choose to work more: to substitute working hours for leisure time. On the other hand, when people are richer they tend to consume more of the things they enjoy, including leisure. So, a higher effective return to work, by raising income, can also lead to a decline.

Most studies find that in practice the income effect dominates: as wages rise, people work less. The recent rise in hours worked in America and Britain thus looks odd indeed, especially since working time is rising most among high-income workers. It is fashionable to explain this oddity by citing the increasingly enjoyable nature of high-skilled work. Today's knowledge workers are surrounded by clever colleagues tackling interesting and challenging problems that matter in the real world. Why should they sacrifice time spent in such rewarding ways for hours spent on leisure activities that are often less satisfying?

That undoubtedly describes the circumstances of some fortunate workers. Yet there is more than one way of seeing this dynamic. Research by Linda Bell of Barnard College and Richard Freeman of Harvard University, for example, concluded that inequality accounts for much of the difference in hours worked between America and Germany. When the income gradient in an economy or within an occupation is steeper, people work longer and harder in order to increase their chances of moving up the income ladder. Inequality might thus contribute to higher GDP (the difference in output per person between America and Belgium, for example, is entirely down to differences in hours worked rather than output per hour). But as a result, success in elite professions often hinges as much on a willingness to focus on work to the exclusion of all else as on other factors.

Better together

Moreover, many workers may feel they lack control over the length of time they are expected to work. The power of labour, suggest Michael Huberman of the University of Montreal and Chris Minns of the London School of Economics, matters as much as inequality in determining work-time trends. Historically, organised labour has led the charge for reduced working hours. Withered trade unions in America and Britain have been far less able to win concessions than have their continental counterparts. Similarly, they have lacked the clout to win the higher pay that would allow poorer people to work less without intolerably lower incomes.

Unions' role in winning shorter work weeks is not only about bargaining power. In an important sense, the choice of how much to work is necessarily a collective one. Professionals, however much they love their jobs, might come to appreciate a world in which raising a family or taking all of their allotted holiday time does not disqualify them from promotions. But unless professionals agree to cut back collectively, those that opt to take more leisure risk simply being squeezed out, leaving decisions to the work-obsessed few who ascend to management.

Just as importantly, individual decisions regarding work inevitably evolve in response to choices made by peers. Edward Glaeser of Harvard University, Bruce Sacerdote of Dartmouth College and José Scheinkman of Columbia University describe a "social-multiplier" effect, which boils down to the notion that spending time in a particular way is more enjoyable when others do the same. It is costly to miss work when others are there, and more fun to attend festivals when others are also free to do so. Individual flexibility in choosing working time is important; different people have different needs and preferences. But at some level, society as a whole must judge whether or not there is more to life than work.

This article appeared in the Finance and economics section of the print edition under the headline "The time off your lives"

COP24
Not all hot air

COP24

The UN's latest climate meeting ends positively

But there is a lot more to do if global warming is to be stopped

Print edition | Science and technology Dec 22nd 2018

HOSTING COP24, the latest of the UN's annual climate summits, in Katowice was meant to symbolise the transition from an old, dirty world to a new, clean one. Spiritually, the city is the home of Poland's coal miners. Today, it is replete with besuited management consultants and bearded baristas. The venue itself was on top of a disused mine in the city centre.

Ahead of the two-week powwow, which concluded on December 15th, many feared the meeting would instead highlight the unresolved contradictions involved in that transition. So it came as a relief when nearly 14,000 delegates from 195 countries managed—more or less, and a day late—to achieve the gathering's main objective: a "rule book" for putting into practice the Paris agreement of 2015, which commits the world to keeping global warming "well below" 2°C relative to pre-industrial times, and preferably within 1.5°C.

This outcome was far from assured. Setting an abstract goal, as governments had in Paris, is simpler than agreeing on how to go about reaching it. Technicalities—what counts as a reduction in emissions, who monitors countries' progress and so on—can be politically thorny. Poland's right-wing government, which presided over the talks, lacks both friends (alienated by, among other things, its anti-democratic attacks on judicial independence) and green credentials. Observers were braced for a diplomatic debacle.

Implementing the judgment of Paris

The summit got off to an inauspicious start. At the outset Poland's president, Andrzej Duda, declared that his country cannot reasonably be expected to give up its 200 years' worth of coal reserves. In France, his opposite number, Emmanuel Macron, caved in to massive protests and suspended a planned fuel-tax rise intended to help curb greenhouse-gas emissions from transport. Days earlier, Brazil had withdrawn its offer to host next year's summit after Jair Bolsonaro, the president-elect who takes office in January and who would love to follow his American counterpart, Donald Trump, out of the Paris deal, said his government had no interest.

Despite these early setbacks, negotiators resolved most of 2,800-odd points of contention in the rule book's pre-summit draft. Michal Kurtyka, the amiable Polish bureaucrat who chaired the proceedings, turned apparent haplessness into a virtue, by leaving delegates space to thrash out their differences.

Poor countries won firmer assurances that rich ones would help pay for their efforts to curb their greenhouse-gas emissions and to adapt to rising sea levels and fiercer floods, droughts, storms and other climate-related problems. The rich world, for its part, cajoled China into accepting uniform guidelines for tallying those emissions. Thus stripped of their most powerful voice, other developing countries reluctantly followed suit. If any cannot meet the standards, they must explain why and present a plan to make amends. This concession, long demanded by the Americans, may not persuade Mr Trump to keep the United States in the deal. But it could make things easier for any successor who wished to re-enter it after Mr Trump has left office.

Besides haggling over the rules, a handful of countries—including big polluters such as Ukraine—used the jamboree to announce plans for more ambitious "nationally determined contributions" (orNDCs, as the voluntary pledges countries submit under the Paris deal are known). The city councils of Melbourne and Sydney, in Australia, joined a growing number of national and local governments intent on phasing out coal. So did Israel and Senegal. In the wake of Brazil's desertion, Chile stepped in to organise next year's summit, which convention dictates should happen in Latin America. The Paris compact has thus not come apart at the seams.

Predictably, for negotiations that need to balance the interest of nearly 200 parties, no one leaves Katowice entirely happy. Vulnerable countries, such as small island states imperilled by rising seas, worry that the findings of a recent UN-backed scientific report outlining the dire consequences of another half a degree of warming, on top of the 1°C which has happened since the beginning of the Industrial Revolution, have been underplayed. Rich countries grumble that poor ones can still get away with emitting too much carbon dioxide.

Mr Kurtyka was also unable, because of Brazilian objections, to break an impasse on carbon trading. This is an arrangement that allows big belchers of CO{-2} to offset emissions by paying others to forgo some of theirs. Brazil balked at proposals intended to prevent double-counting in such trading, because it believed they penalised its large stockpile of carbon-trading

instruments, such as promises not to chop down patches of the Amazon. As a result, the issue has been kicked into the long cassava.

The direction of travel is, nevertheless, correct. Earlier in the meeting Ottmar Edenhofer, a veteran German climate policymaker who is director of the Potsdam Institute for Climate Impact Research, had feared that Katowice would mark "the beginning of the end of the Paris agreement". For all its shortcomings, the compromise which emerged is not that.

But after all is said and done, the 2°C goal (let alone the 1.5°C aspiration) still remains a distant prospect. The current set of NDCs puts the world on course for more or less 3°C of warming—and Kiribati and the Marshall Islands at risk of submersion. Campaigners, who spiced up the stodgy talks with a dash of sit-ins and marches, were right to decry the lack of ambition as unequal to the task of sparing future generations from climate catastrophe. The rule book is itself no nostrum for the planet's man-made fever. The only real medicine would be firmer commitment to decarbonising economies. And, as Mr Macron is finding, that medicine can be bitter.

This article appeared in the Science and technology section of the print edition under the headline "Not all hot air"

Combating tropical disease

Scanning mosquitoes with infrared light could help to control malaria

Their spectra are full of valuable information

Print edition | Science and technology Dec 22nd 2018

MALARIA KILLED 435,000 people last year, most of them in Africa. The parasite that causes the illness is carried by females of some, but not all, species of mosquitoes of the genus *Anopheles*. An insect becomes infected by biting an infected human being. Over the course of ten to 12 days, the parasites then multiply inside her. Once this has happened she transmits them with her bite.

The threat posed by an individual mosquito thus depends on its species, sex and age. Knowing these for lots of local insects gives a better idea of where, when and how to intervene in a particular place. If the locals are, for example, of a species that prefers to bite people inside houses, or to rest indoors after feeding, fumigating household interiors is the best approach. If not, it may be better to locate and disrupt breeding sites, using aerial spraying.

Sex is easy to determine. Males have bushy mouths—in essence, beards. Females do not. Determining species and age, though, is slow and laborious. DNA must be sequenced. Bodies must be dissected under microscopes. Chemical analyses must be performed. Laboratories in Britain and Tanzania are therefore testing an alternative—infrared spectroscopy.

Mario González-Jiménez, a chemist at the University of Glasgow, uses a diamond and a piece of steel that act as a hammer and anvil, crushing the mosquito to be analysed. The infrared light is then provided by a laser. With the insect duly splattered across one facet of the diamond, this laser is shone through the crystal onto it. The light reflected back out of the crystal by the insect's remains is run through a spectroscope for analysis.

Part of the incident light will have been absorbed by various chemicals in the mosquito—particularly chitin (a structural carbohydrate), proteins and lipids in the animal's cuticle. This absorption shows up in the reflected light's spectrum as an absence of certain frequencies. These absences are called Fraunhofer lines, after the German physicist who discovered them two centuries ago. Particular molecules create particular patterns of Fraunhofer lines, as the missing light energy has been absorbed to drive the vibrations of atomic bonds within those molecules.

Properly analysed, Fraunhofer lines provide information about the exact chemical make-up of whatever is reflecting the light. Their patterns in spectra therefore correspond to the different chemistries of species, sexes and ages. That permits the construction of a library, with which unknown insects can be compared.

Diamond geezers

That, at least, is the theory. Dr González-Jiménez is trying to put it into practice. His methods are now 83% accurate at recognising species, and close to 100% accurate at recognising age. He and his colleagues are also using the process to try to determine how resistant the now-dead insect being examined would have been to insecticides.

What works in a laboratory in a Scottish city might not, though, work in the African countryside. The person in charge of testing that out is Fredros Okumu, science director of the Ifakara Health Institute, a Tanzanian organisation. Ifakara runs Mosquito City, a research facility in the Kilombero River valley. Mosquito City's buzzing, whining "biospheres" mimic local field conditions, even down to banana plants and goats. Besides testing the equipment, Dr Okumu and his team are also trying to extend the range of data that mosquito spectra can provide, including into the way the insects behave. Some mosquitoes, for example, feed only on people. Others dine as well on chickens, cows and goats.

This is all valuable information. But it will be much more valuable if it can be gathered easily in the field. Engineers at Glasgow are therefore working on a laser optimised to emit light at the frequencies best suited for analysing mosquitoes. Meanwhile, those at Ifakara are experimenting with shoebox-sized versions of the apparatus that can be taken into the countryside. Their aim is eventually to shrink this to something the size of a mobile phone. That could shine a whole new light on the problem of malaria.

This article appeared in the Science and technology section of the print edition under the headline "Learning the lines"

The search for life on Mars

New results suggest there is no methane on Mars

Living organisms are thus less likely

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ON EARTH, most of the methane in the atmosphere has been belched by living organisms, so finding the gas on Mars would be happy news for seekers after extraterrestrial life. Sadly, news announced on December 12th, at the annual meeting of the American Geophysical Union (AGU), in Washington, DC, was anything but happy. Preliminary results from *ExoMars Trace Gas Orbiter*, a European craft that has been circling Mars for the past two years, give a thumbs-down to the idea that there is methane in its atmosphere.

Previous observations, from orbit and by telescopes on Earth, suggested Mars might sport traces of the gas. These were backed up by data from *Curiosity*, an American Mars rover. In its six years crawling around a crater called Gale (pictured above) *Curiosity* has both detected methane and recorded seasonal ups and downs of the stuff that cycle from a modest 0.25 parts per billion during the winter to 0.65ppbn in the summer, with spikes up to 7.0ppbn.

That cyclical pattern has intrigued researchers back on Earth. Broadly speaking, there are two possible sources for Martian methane. One is outer space, whence carbon-rich molecules, some of which are likely to break down into methane, arrive constantly on meteors of various sizes. The other is from under the planet's surface.

Methane from both sources will mix eventually into the atmosphere. But if the gas is coming from underground, it will be more concentrated near its source, and might well appear on a seasonal basis. The process could be a geological or geochemical one that is encouraged by the relative warmth of summer. That would be interesting. Or it could be biological, with methane-generating bugs waking up during the summer months. That would be headline-grabbing. For either to be the explanation of the seasonality observed by *Curiosity*, the rover would have to have had the luck to land in an area of such methane seeps. But such lucky breaks do happen.

Regardless of their source, any methane molecules in Mars's atmosphere would, on the basis of experiments on Earth, be expected to hang around for centuries. It was to find signs of this more widespread material that a spectroscopic instrument called NOMAD (Nadir and Occultation for MArs Discovery), which is on board *ExoMars Trace Gas Orbiter*, was designed. And, as Ann Carine Vandaele of the Belgian Institute for Space Aeronomy told the AGU, NOMAD has failed to find the slightest hint of methane in the Martian atmosphere. Since NOMAD is 20 times more sensitive than the methane detector on board *Curiosity*, this is bad news.

The findings are still under review, pending publication in a journal, and are therefore preliminary. But they do not surprise Kevin Zahnle of the Ames Research Centre, in California, a laboratory belonging to NASA, America's space agency. Dr Zahnle has long argued that *Curiosity*'s reports of Martian methane are artefacts. They are only marginally higher than control readings, and those readings indicate the rover itself may be a source of methane (though nobody knows how), which further complicates taking accurate readings.

The optimists will not be deflected, though. They note that NOMAD can probe only the upper part of Mars's atmosphere. Air with an altitude of less than 5km is beyond its range. Moreover, when *ExoMars Trace Gas Orbiter* flew over Gale, a dust storm obscured NOMAD's view of anything within 30km of the surface. Such optimists thus argue that the idea of methane seeping from the crater cannot be discounted. What NOMAD does seem to show is that, if methane exists at all in Mars's air, it is rare and confined to low levels of the atmosphere. But for now, neither side is willing to give way.

This article appeared in the Science and technology section of the print edition under the headline "Whiffs of reality"

Heavy engineering

Not all important technological advances are flashy bits of IT

Riveting may have met its match

Print edition | Science and technology Dec 22nd 2018

THERE ARE many ways to stick things together: glue; solder; welds of various sorts. But one that remains surprisingly popular is riveting.

In some ways, riveting is about as old-fashioned a method of union as it is possible to imagine. A rivet is a mushroom-like stud, with a cap and a stem. The stem is pushed through matching holes made in the two materials to be joined, so that its end is proud. The proud end is then made into a second cap, using a hammer or a rivet gun.

Clumsy though all this is, riveting's rivals have never displaced it completely, particularly in aircraft, because it creates strong joints and also because some materials are hard to weld without causing damage. The rivet, though, may now have met its match, in the form of a process called refill-friction-stir spot welding. This mouthful, being worked on by several groups of engineers, is a modification of friction-stir welding, which was developed in the 1990s by the Welding Institute, an industry-funded laboratory near Cambridge, England. As the name suggests, friction-stir welding employs frictional heat from a rapidly rotating tool, which looks like a drill bit, to soften the metals to be joined—but, crucially, not to melt them.

The result is something with the gooey consistency of toothpaste, says Anthony McAndrew, one of the leaders of the refill-friction-stir-welding research project at TWI, as the institute is now known. The next trick is to give the goo a stir, which is done by the rotating tool. Once the stirred goo has cooled, the result is a strong bond.

Friction-stir welding has applications in things like computer-making. But a version producing individual spot welds, typically used in heavy industries, has proved less successful. One concern is that the rotating tool leaves an indentation in the weld. Apart from being unsightly, this could introduce a weakness. Refill-friction-stir spot welding addresses that difficulty by using a plunger to push softened material back into the hole once the weld has been made.

That modification could propel refill-friction-stir spot welding into the big time, because the result of the refill is not only stronger, but smooth. This is crucial to the aerodynamics of products such as cars and aeroplanes.

According to Dr McAndrew, the version of refill-friction-stir spot welding that TWI is developing, in collaboration with Kawasaki Heavy Industries, is now close to commercialisation. When that happens, riveting's long story may, at last, be over.

This article appeared in the Science and technology section of the print edition under the headline "A riveting yarn"

Tourism in Saudi Arabia
Oasis or mirage?

Oasis or mirage?

Saudi Arabia wants millions to visit a marvel in the desert

Strict social rules and a reputation for being a murderous autocracy might prove to be impediments

Print edition | Books and arts Dec 22nd 2018

THE ANCIENT Nabataean site of Mada'in Saleh, in north-western Saudi Arabia, is a place where the dead commune with the living. All along the sides of the valley, overlooking what was once a busy oasis, hundreds of massive carved tombs, hewn from the orange-yellow rock, stand guard. The people who built them came from Babylon, Persia, ancient Greece and Rome. Mada'in Saleh was an important stop on the trading route that brought precious incense from the south of the peninsula to the Nabataean capital, Petra, across the border in what today is Jordan, and to the Roman empire beyond.

In the first century AD the merchants of Mada'in Saleh decorated their mausoleums with carvings of lions, gazelles, rabbits, mountain goats, leopards, hyenas, hyraxes, foxes—even a hedgehog. And they ordered thousands of elaborate stone inscriptions, which show how the written language of the area evolved from Phoenician to Arabic. They evoke a generous society. Inscriptions offer thanks for safe travel and a good date harvest. One displays a contract between two sisters, setting out how, when the time comes, Najan, the older, will take the lower tomb and her younger sibling, Nahmiya, the upper one.

In the Middle Ages Mada'in Saleh attracted such travellers as the Moroccan adventurer Ibn Battuta; 500 years later, Charles Doughty, a Victorian writer, called it "that fabulous Mada'in Saleh, which I was come from far countries to seek in Arabia". Today Ahmed Alimam, a knowledgeable guide, says: "It is the landscape that is the hero here, not the human."

A prince and the desert

Few people today have heard of Mada'in Saleh. Fewer still have visited the wonder 1,000km north-west of Riyadh. That might be about to change. Having long restricted access mainly to archaeologists, the authorities now want to turn the marvel and the surrounding Al Ula region, with its rocky outcrops and thousands of relics, into a vast visitor attraction. In telling the story of how Saudi Arabia became the cradle of Islam, they want to turn the small town of Al Ula into Saudi Arabia's capital of culture, a match for Mecca as its religious centre and Riyadh as the heart of the country's politics and finance.

Crown Prince Muhammad bin Salman launched the initiative in 2016, as part of a bid to diversify the economy. By 2030 the aim is to double both household spending on culture and entertainment and the number ofUNESCO World Heritage Sites (Saudi Arabia has five already, of which Mada'in Saleh was the first). The blueprint calls for the world's biggest Islamic museum and new jobs in tourism, especially—in a country where roughly two-thirds of the population is under 30—for young people.

Prince Muhammad is said to enjoy his weekends in the desert at Al Ula, where at night you can lie in the sand and ponder the Milky Way undisturbed by light pollution or noise. He keeps a close eye on the project. The government has set up the Royal Commission for Al Ula (RCU), which has been given power to oversee planning in a region roughly the size of Belgium. The chairman is Prince Badr bin Abdullah, who recently became culture minister, too. "Think of Al Ula as a living museum," says Amr AlMadani, an American-trained electrical engineer who is the commission's CEO. "Every rock there has a shape, every road is a testimony to trade. I don't think there's a place in the world that has so many civilisations in one place."

Separately, after Emmanuel Macron, France's president, hosted a dinner for Prince Muhammad at the Louvre earlier this year, the two governments signed an accord to develop Al Ula. Potentially worth billions of dollars to French firms, the ten-year deal includes the establishment of a new €300m ($340m) Saudi-funded French Agency for the Development of Al Ula, with which the Saudis are supposed to collaborate on urban infrastructure, environmental issues, tourism and archaeology, as well as a new outpost of the Institut Français, which promotes French language and culture. It also includes provision for a special fund to support French museums and their collections, for which France has requested an additional €1.2bn.

To please his princely bosses, Mr AlMadani is forging ahead on various fronts at once. But progress is sketchy. Two members of an international advisory board, made up of museum bosses, academics and tourism executives, have already resigned. "It's completely chaotic," says one adviser. "There's no plan. Just rush, rush, rush." For example, the RCU recently announced a scheme to turn Al Ula into a destination for rock climbers, and has commissioned several large-scale outdoor artworks from high-end Western artists, without a clear sense of how those amenities will fit in.

Many of the people working for the French agency cut their teeth on building Louvre Abu Dhabi, a grand project that has turned the UAE into a cultural hotspot since it opened a year ago. Yet although the Saudis recently forked out €20m, the first instalment due to the agency, the French seem to have been frozen out. Eight months after the accord was signed, none of the

agreements that will govern its implementation, for example on proposed museums of pre-Islamic and Islamic civilisations, has been negotiated.

Quite apart from the bureaucratic muddle, for all the site's appeal the Saudis and their partners face multiple challenges in trying to make it a global tourism destination. First, there is its fragility. Al Ula, and Mada'in Saleh in particular, are at risk from pollution and degradation if too many people flock in. More than 400,000 visited Petra last year; the Saudi goal is to have 2m a year at Al Ula by 2035. Half are expected to be domestic and most of the rest from beyond the region. Accommodating them will require a new airport and thousands of hotel rooms. Mr AlMadani sees the danger. The place is "so serene and simple", he acknowledges, that "less intervention [may be] better". He vows that Al Ula "won't end up being the Disneyland of culture."

Paradise lost

Then there is the question of how to draw foreign tourists to Saudi Arabia. What concessions will the authorities make to lure them in? Potential hiccups range from the availability of visas to the dress code: spending a week trekking or sightseeing in a full-length *abaya* will be sweaty. Unwinding with a glass of wine at the end of the day may not be possible. Family dips may be problematic, too, depending on the ages and genders of the swimmers.

Forging a holiday paradise under an authoritarian regime with a strict Wahhabi culture was always likely to prove a tough mission. The brazen killing in October of Jamal Khashoggi, a blogger and columnist, in the Saudi consulate in Istanbul—allegedly on the orders of Prince Muhammad himself—made it even harder. Visitors might have been willing to accept strict social norms as a price worth paying to see one of the most dramatic archaeological spectacles in the Middle East. They will be far less likely to choose Saudi Arabia if Al Ula is ruined by bad planning and overdevelopment—or if the country is unable to shed its reputation as, in the words of one adviser to the RCU, "brutal, antidemocratic and murderous".

This article appeared in the Books and arts section of the print edition under the headline "Oasis or mirage?"

City of angels

A magnificent noir novel, written in verse

"The Long Take" is about a soldier who washes up in Los Angeles after the second world war

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The Long Take. By Robin Robertson. *Knopf; 256 pages; $27. Picador; £14.99.*

THE SOLDIER who comes home from the war is one of literature's most venerable figures, dating at least to Homer and Aeschylus. The veteran in "The Long Take" is Walker, a Canadian who, after the Nazis are defeated, washes up first in New York and then Los Angeles. Like the travails of Odysseus and Agamemnon, his tale is mostly told in verse—a medium rarely used in novels, and hardly ever this successfully.

Readers wary of the form need not be: Robin Robertson's poetry injects rhythm and momentum into a narrative that is equal parts art and superbly modulated rage. Its main reference point is not myth but movies. Walker is a film buff in a noirish world of booze and broads. People call each other "buddy", "friend" and "Mac", and say things like: "You and me are all washed up, see? Kaput." After a night on the tiles he is "blurred from drink/like an accidental photograph".

In Los Angeles he takes a job as a cub reporter, falling in with two veteran hacks:

> They smoked full-time, traded girls like baseball cards,
> wore their hats tipped back,
> had a bad word to say about everyone, told stories
> even they didn't believe.

"Sometimes", Walker hypothesises about a national self-image that seems to have been forged on screen, "I think the only American history is on film."

He drinks because he is traumatised, stuffing his ears on New Year's Eve to blot out the boom of the fireworks. On a flight to Los Angeles from San Francisco, where he has been reporting on California's homeless, many of them fellow veterans, he realises that: "The stewardess was standing over him—frightened,/it looked like./Someone in his seat was screaming." During the D-Day landings and in the fighting that followed Walker has witnessed terrible things, memories that are distilled in snatches of prose, as are those of his early life in Nova Scotia. This fractured format helps to convey the sense of a disintegrating mind:

> The tide coming in on a soldier impaled on a German tripod, his guts stringing out around him like a kilt…All these men: waiting so long, to die so fast.

The story unspools through the late 1940s and into the 1950s, picking up echoes of the McCarthyite witch-hunts and the stirrings of the civil-rights movement. Los Angeles—invoked in a litany of street names, a love letter that is also an elegy—is razed and redeveloped. Sending him off on assignment, Walker's editor spells out the racket for him:

> I mean the fact that two-thirds of this cityis a fenced-off ghetto;
> that there's graft and corruption running right the way through.
> I mean the fact that this is a country where there aren't enough homes,
> enough jobs, where one in six Angelenos are ex-servicemen
> and they're lying out on Skid Row—but all anyone ever talks about is watching for Russians,
> HUAC locking up half of Hollywood,
> the government building more bombs.
> We won the war, but we're living like we lost it.

Gradually the violence of war and the depredations of the city bleed into each other; towards the end, Walker encounters an "old doll" whose face is "a ruin of crumbling plaster…her mouth/like it'd been dug out with a knife." "The Long Take" is a wondrous novel about visions and reality, about the aftermath of conflict and the making of America, and the impossibility of going home.

This article appeared in the Books and arts section of the print edition under the headline "City of angels"

Economic data, commodities and markets

Print edition | Economic and financial indicators Dec 18th 2018

What the world reads now

The news events that most engrossed audiences in 2018

Online readers devoured stories about the royal wedding and Vladimir Putin

Print edition | Graphic detail Dec 18th 2018

IT IS CALLED the "beautiful game" for a reason. The 2018 men's football World Cup, hosted by Russia in June and July, kept the world riveted. According to Chartbeat, a company that tracks readership of online news articles, it was among the events that drew the most attention in 2018. Chartbeat's data cover some 5,000 publishers, half of which are in English-speaking countries, and about a quarter in Europe. The firm has provided audience figures for some 3m articles, spanning 33 topics.

What other news events engrossed the world in 2018? The royal wedding between Meghan Markle and Prince Harry drew the most eyes on a single day, with 1.1m hours spent reading articles as they tied the knot. Another heart-warming story, the rescue of young footballers from a cave in Thailand, got 3.4m hours of attention in total.

More often, however, big news was bad news. Sudden tragedies like the murder of Jamal Khashoggi, the mass shooting at a high school in Parkland, Florida, and the collapse of a bridge in Genoa in August received 12m hours between them. Longer-lasting woes in poor countries failed to drum up comparable interest: Yemen's civil war got just 3.5m hours for the entire year.

Business stories get less attention on the whole. But revelations that Facebook, the world's most popular social network, had allowed nefarious use of its data drew 3m hours of readership. Big personalities help to draw eyeballs: Elon Musk, the mercurial founder of Tesla and SpaceX, got 7m hours of attention in a year in which he was sued for securities fraud.

As in 2017, no one attracts eyeballs like President Donald Trump. His summit with North Korea's Kim Jong Un in June got 1.5m hours of readership. He would probably have preferred less attention to stories about Russian meddling during the 2016 presidential election, which have amassed 12m hours in 2018. Readers were particularly interested in his party's performance in the mid-term elections, which attracted 26m hours.

Mr Trump isn't the only world leader who fascinates readers. Brazil's election of Jair Bolsonaro, a populist in Mr Trump's mould, has collected 9.7m hours. And although Russia's president, Vladimir Putin, drew the most interest during the World Cup, his comfortable re-election and his navy's seizure of Ukrainian ships also kept audiences glued to their screens.

Sources: Chartbeat; *The Economist*

This article appeared in the Graphic detail section of the print edition under the headline "What the world reads now"

Thomas Keating
Silence as Presence

Silence as Presence

Obituary: Thomas Keating died on October 25th

The pioneer of modern contemplative prayer was 95

Print edition | Obituary Dec 22nd 2018

FOR THE past century and more, many people have assumed that God is absent. The massacres of two world wars, the atrocities of the Holocaust and the gulags, have occurred despite the supposed existence of a divine source of love, truth and compassion. If God was there, his silence seemed to condemn him to irrelevance. Yet the life-work of Thomas Keating, a Trappist monk for 74 years and abbot for 20 years of St Joseph's Monastery in Spencer, Massachusetts, was to teach that this very silence was God and that, through silence, he could be reached.

He might well say such a thing, since he had been so long in his austere order that abnegation was a way of life. Within his cell he had nothing but a bed, desk and chair; he owned not even his heavy white and black robes, only his thin-rimmed spectacles, his shoes and his washbag things. In short, the practice of the presence of God was almost all he had. But that was a treasure so immense and inexhaustible that, after a while, he could not bear to go on locking it up within himself.

Nor was it enough to pray hard in isolation for those shut out of his secluded life, such as the devastated middle-class New York family he had abruptly left behind, ending their dream that he too, like his father and grandfather, would make a maritime lawyer. His share in the divine life had to be shared with others. He had to go beyond the monastery walls and teach laymen, battling with daily life, his way of silence. In time, with licence from his superiors to travel and teach and by posting his lectures on YouTube, his tall, lanky figure, with high-domed bald head, became famous across the world and in other faiths. Rabbis, imams and the Dalai Lama were among his friends.

His theme was simple. Only through silence could his listeners come to the Silence that was God, and rest in it. He spoke modestly, with encouraging smiles, about achieving it, since he had been through so much trial and error himself. At the age of five (having sneaked into mass in the mornings on his way to school, not telling his non-practising parents), he made a serious bargain with God: if he let him live to 21, for he had been very ill, he would become a priest. He kept the bargain through Yale, gradually cutting out opera, movies, radio, dating or anything enjoyable, until he found himself one day sitting on a kerb outside the college chapel longing to die, because all he wanted to do was talk to God. There seemed nothing else worthwhile in the world; the more stripped-down his life could be, surely the better. The Trappist severity he embraced in the years that followed, initially at Our Lady of the Valley in Rhode Island, held him fast in almost total silence. But he also sometimes felt desperate there, unable to leave or find any kindness in his superiors.

The path he recommended, by contrast, was gentle. He instructed his listeners, naturally enough, to sit comfortably and close their eyes. ("Once you sit down, the Spirit has got you.") There was no text to think about, as in the ancient Cistercian practice of *lectio divina*, for that would impose visualisations, memories and complications. As it was, thoughts could come and go; they would not be beaten back, but welcomed as inevitable, until they became simple background noise to a foreground of "centring prayer".

A sacred word, "Lord", perhaps, or "Peace", would recall the mind to rest if it strayed. Each listener chose their own, and kept it, as a symbol of their intention to resume the exchange. For contemplation was not a static thing, but a dynamic encounter, a back and forth: twice a day, for 15 or 20 minutes, opening, opening, opening. As in any relationship the start would be clumsy, but only the intention counted. Afterwards it would get easier. There was no need to go anywhere in this journey; God was within and, in silence, had a chance to manifest. After a time, perhaps considerable time, you would sit with God as long-married couples might sit: silent, but holding hands.

Some listeners thought this sounded like modern mindfuless, the stilling of thoughts to be simply "in the moment". There were similarities, but he preferred to put it in the context of Christian contemplation through the ages: of the Desert Fathers or St John of the Cross, who wrote that "God's first language is silence." (Father Thomas liked to add, to that, "Everything else is a bad translation.") He also gave contemplation a modern twist, calling it "divine psychotherapy". In centring prayer the mind was purified of emotional traumas repressed, often from childhood, in the unconscious, and the false self made true again, open in humility ("the greatest strength there is") to grace and to the needs of others. Long before Freud, a loving God had been secretly doing this.

Among the eagles

His teaching was not without controversy. The monks at St Joseph's were upset when, after a decade of stern asceticism as

their abbot, he began to promote contemplation. They, and some other Catholic ecclesiastics, disliked his deep respect for the spiritual traditions of all religions, especially Buddhism, with which he felt a special affinity. In 1981 he resigned as abbot, a job he might have held for life. He went west to St Benedict's in Snowmass, Colorado, a community he had helped to found in the late 1950s, and set up a centre for retreats and conferences. There he lived apart, in a mountain house loaned by friends, among the eagles who loved solitude as much as he did.

This looked like withdrawal from the world, but he disagreed. He had spent his life spreading outside the monastery the practice of the presence of God. He saw it as a struggle to establish the pre-eminence and proclaim the eternality of love. As a young monk in the 1940s, he had been given a spiritual deferment from military service that made him feel strongly guilty afterwards, especially when visiting war graves. But in the cemetery at Anzio he had seemed to hear the dead whispering that his campaign—in which he too had to give everything—was one of awakening: of drawing one by one each listening soul to find, in silence, Presence.

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