The Economist

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Trump v the spooks

The stain of Guantánamo

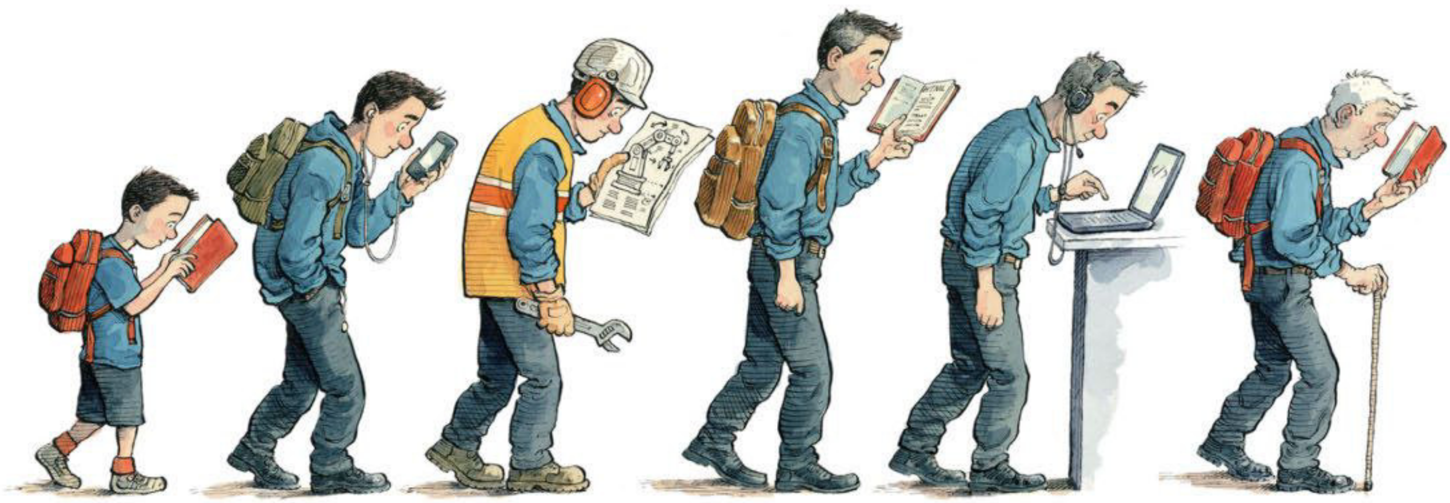
Pop stars and patronage in Congo

Inflation's welcome return

Lifelong learning

How to survive in the age of automation

A SPECIAL REPORT



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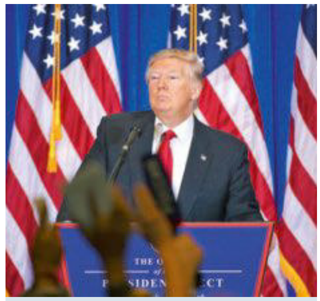

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Politics

A dossier compiled about alleged links between **Donald Trump's** campaign and Russia, and containing lurid tittle-tattle about the president-elect, was published on BuzzFeed. The dossier was based on unverified material prepared by an investigative firm for Mr Trump's opponents. America's intelligence agencies included a classified summary of its findings in its assessment of alleged Russian interference in the election. A spokesman for the Kremlin said it had no compromising documents on Mr Trump and called the allegations "absolute fantasy".

The Senate started the process to vet Mr Trump's nominees to key posts. Democrats, pointing to a letter to them from the head of the Office of Government Ethics, said the **confirmation hearings** were being rushed and the vetting was far from complete. Rex Tillerson, Mr Trump's pick for secretary of state, responded to concerns about his close business ties to Russia by saying the country's actions were a danger and NATO was right to be worried.

A jury sentenced Dylann Roof, a white nationalist, to death for murdering nine black people at a church in **Charleston**, South Carolina, in 2015.

Barack Obama gave his farewell speech as president. Just as Washington warned about factional parties and Eisenhower fretted about the rise of the military-industrial complex, Mr Obama cautioned his fellow Americans not to take democracy for granted.

A founder of Iran's revolution

Ayatollah **Akbar Hashemi Rafsanjani**, a former president of Iran and hugely influential since the 1979 revolution, died. He was 82.

A Palestinian attacker killed four **Israeli soldiers** by driving a lorry into them near the Old City in Jerusalem.

Yoweri Museveni, who has ruled **Uganda** for 31 years, named his eldest son as a special adviser in a move interpreted as preparing him to become president. His son, Muhoozi Kainerugaba, used to lead a special-forces unit tasked with protecting him.

Mutinous soldiers in **Ivory Coast** seized the city of Bouaké and kidnapped the defence minister in a dispute over pay. They returned to barracks after promises of more cash. But the country, which fought a civil war in the early 2000s, remains riven by ethnic tensions.

No let-up

Afghanistan suffered a series of terrorist attacks. A bomb near the parliament in Kabul claimed over 30 lives; another in the southern city of Kandahar killed 11 people, including five diplomats from the United Arab Emirates. Another attack, in the nearby city of Lashkar Gah, killed several pro-government militia leaders.

Chinese military aircraft flew close to **Japan** and **South Korea**, and its sole aircraft-carrier sailed close to **Taiwan**, prompting all three countries to scramble forces in response.

King Vajiralongkorn withheld his assent for the draft constitution championed by **Thailand's** military junta, asking for changes that would make him more powerful. Elections scheduled for this year may be delayed.

Tsai Ing-wen, the president of **Taiwan**, visited Texas and met Ted Cruz, a senator, and Greg Abbott, the governor. China said the meetings would harm relations with America.

Hong Kong's most senior civil servant, Carrie Lam, submitted her resignation. She said she had done so in order to run for the post of chief executive, as the territory's leader is known. The choice will be made in March by a committee stacked with the Communist Party's supporters in Hong Kong.

China said its president, Xi Jinping, would attend the annual World Economic Forum in Davos. Mr Xi will be the first **Chinese president** to attend and he is expected to stress China's openness to international trade.

Murder most foul

Members of a criminal gang at a prison in **Brazil** killed 31 inmates, decapitating most of their victims. This came a week after gang fights at another jail left 56 prisoners dead, most of whom had their limbs chopped off. Another prison riot left four dead.

In **Mexico**, rioting sparked by the government's withdrawal of petrol subsidies as part of its liberalisation of the energy industry left at least six people dead. Petrol prices increased by up to 20% at the start of the year, leading to many knock-on price rises in goods and services. Roads have been blocked and shops looted.

Winning the pools

Switzerland won a lawsuit in the European Court of Human Rights over requiring mixed-sex swimming classes. A Muslim couple sued the state for insisting that their daughters swim with boys as part of the school curriculum. The court found that concerns about integration outweighed the parents' demand for a religious exemption.

The Greek-Cypriot and Turkish-Cypriot leaders opened talks in Geneva to discuss conditions for the reunification of **Cyprus**, such as the division of power and territory. Other European leaders are participating on security issues.

Germany said that 280,000 people seeking asylum arrived in the country last year, a sharp drop from the 890,000 in 2015. The government thinks migrant numbers have fallen because of the closure of a route through the Balkans and the EU's deal with Turkey.

Arlene Foster, **Northern Ireland's** first minister, came under pressure to quit because of a scandal involving subsidies for renewable energy which could cost taxpayers £490m ($600m). Martin McGuinness, the deputy first minister from the opposition Sinn Fein party, resigned, which may force an election. The crisis could affect Brexit. The Supreme Court will soon decide whether approval is needed from the UK's devolved assemblies before starting the process of leaving the EU. The deputy leader of the Scottish nationalists called for the postponement of Brexit negotiations.

Clare Hollingworth, a journalist who reported the "scoop of the century" predicting the outbreak of the second world war, died at the age of 105. Ms Hollingworth spotted German tanks massing on the border with Poland in late August 1939. A long career saw her report from Jerusalem, Cairo, Paris, Beirut and Hong Kong. She was the last person to interview the Shah of Iran.

Business

The **pound** fell sharply after Theresa May reiterated her position that Britain's exit from the EU would be a clean break, frightening investors who want the government to pursue a more nuanced negotiating strategy that prioritises trade deals with Europe. The prime minister has said that she will not provide a running commentary on Brexit; her remarks helped push sterling to a three-month low against the dollar at $1.21.

A limited intervention by Turkey's central bank to halt the slide of the **lira** did little to stop the currency from plunging further. The lira has declined by almost 10% since the start of the year, partly because the political crackdown that followed an attempted coup last July shows little sign of abating amid a wave of violence. This week the central bank increased the supply of dollars to Turkey's financial system and said it would take the "necessary measures" to curb "unhealthy" currency speculation.

The Trump effect

The Mexican **peso** fell to a new low against the dollar after Fiat Chrysler warned it might have to shut factories in Mexico if the new American government imposes tariffs on imported cars. Meanwhile, the share prices of **drug companies** plunged following Donald Trump's comment that they "are getting away with murder" in what they charge the government for medicine. The industry has taken a political battering for what some claim are exorbitant price increases for certain drugs.

Mark Carney told Parliament that **Brexit** is no longer the biggest risk to Britain's financial stability. The governor of the Bank of England said greater risks were posed by high consumer credit and the weak pound, among other things, which a messy Brexit could magnify.

Slowly getting there

The British government reduced its stake in **Lloyds Banking Group** to below 6%, meaning that it is no longer the bank's largest shareholder (that is now BlackRock, a titan in asset management, which holds 6.3% of the shares). The Treasury bailed out Lloyds during the financial crisis in 2008 along with Royal Bank of Scotland, in which it still holds a majority stake. The public's remaining stake in Lloyds is expected to be sold this year.

Volkswagen pleaded guilty to criminal charges in America related to its cheating in emissions tests on diesel cars and a subsequent cover-up, and will pay penalties amounting to $4.3bn. Reinforcing the government's tough stance against VW, six of its executives were charged for their role in the scandal, including the person responsible for the carmaker's compliance with emissions standards in America. He was arrested trying to catch a flight to Germany.

In South Korea, Lee Jae-yong, the vice-chairman of **Samsung Electronics** and heir apparent for the top job, was questioned as a suspect in an influence-peddling scandal that has led to the impeachment of the country's president. Investigators are looking at ties between Korea's *chaebol* and politicians, and at claims that the president ordered the state's pension fund to vote for the merger of two Samsung businesses in which it held shares.

The annual battle for orders between the world's biggest aircraft-makers was won by **Airbus** last year. It chalked up 731 net orders, including 320 in December alone, compared with **Boeing's** 668. The American company bested its European arch-rival in supplying jets to airlines however, delivering 748 aeroplanes to Airbus's 688.

Takeda, a Japanese drugs company, said it was ready to make further global acquisitions, following its $5.2bn agreement to buy Ariad, which is based in Massachusetts and specialises in treatments for cancer. Takeda was founded in 1781 selling traditional Japanese and Chinese remedies. It entered the American market in the 1970s and has situated some of its research in Boston's meditech hub.

Publishers can legally use software to detect if an online reader is using an **adblocker** and can ask them to switch it off, according to a proposed rule in the European Union. Privacy groups have argued that the detection software is illegal and requires readers' consent before being enabled.

Alexa takes the biscuit

The default setting on **Amazon's** Echo, a voice-driven internet-connected device, caused the company some embarrassment. An American news report that a girl had asked Alexa, the device's voice-operated system, to order a doll's house and biscuits. That caused Alexa to go rogue in other households and order the same goods, apparently prompted by the TV presenter repeating the instruction. Amazon has added voice-ordering from restaurants to the Echo's skills, so this might not be the only Alexa incident to make a meal of.

Other economic data and news can be found on pages 80-81

Lifelong learning

It is easy to say that people need to keep learning throughout their careers. The practicalities are daunting

WHEN education fails to keep pace with technology, the result is inequality. Without the skills to stay useful as innovations arrive, workers suffer—and if enough of them fall behind, society starts to fall apart. That fundamental insight seized reformers in the Industrial Revolution, heralding state-funded universal schooling. Later, automation in factories and offices called forth a surge in college graduates. The combination of education and innovation, spread over decades, led to a remarkable flowering of prosperity.

Today robotics and artificial intelligence call for another education revolution. This time, however, working lives are so lengthy and so fast-changing that simply cramming more schooling in at the start is not enough. People must also be able to acquire new skills throughout their careers.

Unfortunately, as our special report in this issue sets out, the lifelong learning that exists today mainly benefits high achievers—and is therefore more likely to exacerbate inequality than diminish it. If 21st-century economies are not to create a massive underclass, policymakers urgently need to work out how to help all their citizens learn while they earn. So far, their ambition has fallen pitifully short.

Machines or learning

The classic model of education—a burst at the start and top-ups through company training—is breaking down. One reason is the need for new, and constantly updated, skills. Manufacturing increasingly calls for brain work rather than metal-bashing (see pages 20-22). The share of the American workforce employed in routine office jobs declined from 25.5% to 21% between 1996 and 2015. The single, stable career has gone the way of the Rolodex.

Pushing people into ever-higher levels of formal education at the start of their lives is not the way to cope. Just 16% of Americans think that a four-year college degree prepares students very well for a good job. Although a vocational education promises that vital first hire, those with specialised training tend to withdraw from the labour force earlier than those with general education—perhaps because they are less adaptable.

At the same time on-the-job training is shrinking. In America and Britain it has fallen by roughly half in the past two decades. Self-employment is spreading, leaving more people to take responsibility for their own skills. Taking time out later in life to pursue a formal qualification is an option, but it costs money and most colleges are geared towards youngsters.

The market is innovating to enable workers to learn and earn in new ways. Providers from General Assembly to Pluralsight are building businesses on the promise of boosting and rebooting careers. Massive open online courses (MOOCs) have veered away from lectures on Plato or black holes in favour of courses that make their students more employable. At Udacity and Coursera self-improvers pay for cheap, short programmes that bestow "microcredentials" and "nanodegrees" in, say, self-driving cars or the Android operating system. By offering degrees online, universities are making it easier for professionals to burnish their skills. A single master's programme from Georgia Tech could expand the annual output of computer-science master's degrees in America by close to 10%.

Such efforts demonstrate how to interleave careers and learning. But left to its own devices, this nascent market will mainly serve those who already have advantages. It is easier to learn later in life if you enjoyed the classroom first time around: about 80% of the learners on Coursera already have degrees. Online learning requires some IT literacy, yet one in four adults in the OECD has no or limited experience of computers. Skills atrophy unless they are used, but many low-end jobs give workers little chance to practise them.

Shampoo technician wanted

If new ways of learning are to help those who need them most, policymakers should be aiming for something far more radical. Because education is a public good whose benefits spill over to all of society, governments have a vital role to play—not just by spending more, but also by spending wisely.

Lifelong learning starts at school. As a rule, education should not be narrowly vocational. The curriculum needs to teach children how to study and think. A focus on "metacognition" will make them better at picking up skills later in life.

But the biggest change is to make adult learning routinely accessible to all. One way is for citizens to receive vouchers that they can use to pay for training. Singapore has such "individual learning accounts"; it has given money to everyone over 25 to spend on any of 500 approved courses. So far each citizen has only a few hundred dollars, but it is early days.

Courses paid for by taxpayers risk being wasteful. But industry can help by steering people towards the skills it wants and by working with MOOCs and colleges to design courses that are relevant. Companies can also encourage their staff to learn. AT&T, a telecoms firm which wants to equip its workforce with digital skills, spends $30m a year on reimbursing employees' tuition costs. Trade unions can play a useful role as organisers of lifelong learning, particularly for those—workers in small firms or the self-employed—for whom company-provided training is unlikely. A union-run training programme in Britain has support from political parties on the right and left.

To make all this training worthwhile, governments need to slash the licensing requirements and other barriers that make it hard for newcomers to enter occupations. Rather than asking for 300 hours' practice to qualify to wash hair, for instance, the state of Tennessee should let hairdressers decide for themselves who is the best person to hire.

Not everyone will successfully navigate the shifting jobs market. Those most at risk of technological disruption are men in blue-collar jobs, many of whom reject taking less "masculine" roles in fast-growing areas such as health care. But to keep the numbers of those left behind to a minimum, all adults must have access to flexible, affordable training. The 19th and 20th centuries saw stunning advances in education. That should be the scale of the ambition today. ■

Trump and the intelligence agencies

Speaking post-truth to power

With his relentless criticism, Donald Trump is destroying trust in the intelligence agencies

DONALD TRUMP doesn't give many press conferences. But when he does, as on January 11th—for the first time since July—they are utterly unlike the press conferences of any other American president-to-be. Speaking without notes, Mr Trump threatened and cajoled Mexico and the pharma industry (its shares tumbled). He boasted about his genius for business (and went some way to reduce his own conflicts of interest—see page 35). He poured scorn on a shocking report that Russian intelligence had dirt on him and had worked with his people during the election (he shouted down a reporter from the news channel that revealed the report's existence). And that was just the highlights. It was such a spectacle (see page 33) and pointed in so many directions at once that you could fail to catch a drumbeat which, for the safety and security of the United States, Mr Trump needs to silence immediately: his continuing hostility towards America's intelligence agencies.

Intel outside

Relations were already rocky. Before the election the agencies let it be known that they had concluded Russia hacked, stole and leaked documents which damaged Hillary Clinton, Mr Trump's opponent. Most of the agencies (but not all) think that Russia's intention was to help Mr Trump win. He responded by mocking them for being wrong before the invasion of Iraq in 2003 about weapons of mass destruction. This week things got uglier, when it was leaked that the agencies had supplied Mr Trump with a summary of the report, whose claims remain unverified, despite plenty of effort by plenty of people. In a tweet, Mr Trump complained that enduring such leaks was like "living in Nazi Germany". And in his press conference he repeatedly suggested that the agencies had done the leaking, casting doubt on their conduct and loyalty.

Mr Trump would hardly be the first president to have scratchy relations with the intelligence services (see page 34). Career officers mutter about Barack Obama's reluctance to stand up to China and Russia and what they saw as his soft line on spy-catching. However, Mr Trump's disputes are in a different class, because they eat away at trust.

The agencies' job is to tell the president about threats and opportunities facing the United States. Even though America's intelligence machine is the world's most formidable, it deals mostly in judgments and informed speculation, not certainties. In speaking truth to power, intelligence officers will sometimes have to bear bad news. They take that risk and the president listens to what they have to say because it makes the United States better prepared for whatever is coming its way.

By ridiculing the agencies for their findings, Mr Trump has signalled that he does not want to hear their bad news. By saying he cannot be bothered with the president's daily briefing, he suggests their work is of little value. By claiming that the agencies have a political agenda, his people are themselves politicising intelligence work. By impugning their motives, he is undermining public confidence, which was already damaged by Edward Snowden (see page 78), and which, as with any institution, is essential if they are to go about their duties.

If he wants America to be safe, Mr Trump must make amends. He took a first step by criticising Russia for the Democratic hack (albeit reluctantly and mildly). Unlike his national security adviser, his nominees as directors of the CIA and of national intelligence enjoy support among spooks. In 90 days, he has said, they will produce a report on hacking: he should follow its advice. As president, he needs to stop criticising the agencies and demonstrate they have his backing. None of that is hard. Except that it is a test of Mr Trump's self-control. ■

Trump and Mexico

Handling a bully

How Mexico should deal with the threat from America's new president

AMERICA'S allies and trading partners await Donald Trump's arrival in the White House on January 20th with trepidation. None is more anxious than Mexico. Mr Trump began his election campaign by damning Mexicans as rapists and killers of American jobs. He has repeatedly threatened carmakers that invest in Mexico with import tariffs. Ford cancelled plans to build a $1.6bn plant there. He renewed his vow to make Mexico pay for his border wall at a press conference on January 11th. "Mexico has taken advantage of the United States," he declared.

If Mr Trump matches his aggressive words with actions, the consequences will be grave. Mexico's economy is closely entwined with that of the United States and Canada under the North American Free-Trade Agreement (NAFTA). The value of bilateral trade with its northern neighbour is equivalent to nearly half of its GDP. America buys three-quarters of Mexico's exports. The 35m people of Mexican origin living in the United States send back $25bn a year in remittances. Mr Trump puts all that in jeopardy.

Already, Mexico is feeling the effects (see page 41). The peso has dropped to a record low against the dollar, weakening Mexico's wan economy. If Mr Trump, who has called NAFTA ▸▸

"the worst trade deal maybe ever signed anywhere", launches a trade war, Mexico will probably fall into a recession. That would worsen a political environment that is already poisonous. Mexico's president, Enrique Peña Nieto, has the lowest approval ratings of any recent leader. He is reviled for failing to control corruption and for allowing crime to surge. On January 1st the government raised petrol prices by up to 20%. Enraged drivers blocked roads, looted shops and occupied petrol stations; six people died in the unrest.

Mexico is due to hold its next presidential election in 2018. The nationalism and misery provoked by Mr Trump could bring to power Andrés Manuel López Obrador, a left-wing populist. Mr Peña's weakness threatens to discredit vital reforms he enacted early in his tenure, including liberalisation of energy and telecoms. A dismantling of NAFTA, which helped create the right conditions for reforms, would doom them.

America would suffer, too. Its trade with Mexico is worth just 3% of its GDP, but some 5m American jobs depend on it. The design, manufacture and servicing of everything from appliances to medical equipment is spread across both borders. Cars made in Mexico are stuffed with parts manufactured in America; some 40% of the value of Mexican exports consists of inputs bought from the United States. If Mexico is not allowed to sell cars, aerospace equipment and fruit to America, it is likely to send more immigrants and drugs.

Accentuate the positive

How should Mexico respond to Mr Trump? First of all, by reminding his administration that the relationship is mutually beneficial. Alongside trade, Mexico has been a partner in controlling illegal immigration. It stops many of the 200,000-300,000 Central Americans and others who try every year to sneak across Mexico into the United States. And Mexico has paid a price to keep relations warm: some 100,000 Mexicans have died since Mexico joined America's war on drugs.

Mexico should also seize on Mr Trump's occasional hints that he is open to renegotiating NAFTA rather than ripping it up. The 23-year-old agreement could usefully be updated to cover new sectors, such as digital commerce and energy.

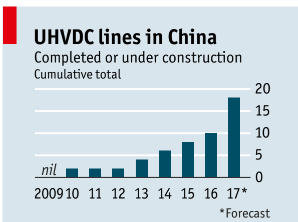
If Mr Trump is really determined to start a trade war, Mexico has few good options. A broad strategy of fighting tariffs with tariffs will hurt its own consumers most, while inflicting only modest damage on America's vast economy. There is scope for artful use of targeted measures within the rules of NAFTA and the World Trade Organisation, an approach that Mexico has wielded adroitly before. In 2009, after America blocked Mexican lorries from operating north of the border—to protect the jobs of American drivers—Mexico imposed tariffs on nearly 100 American products, from Christmas trees to felt-tipped pens, choosing industries with clout in congressional districts whose representatives had a say in the dispute. The American block was eventually lifted.

Mexico's best defence against a bullying neighbour, however, will be to seek freer trade elsewhere and to strengthen its own economy. It needs to build more infrastructure: whereas northern Mexico has good transport links to America and the coasts, the poor south is largely cut off. Most Mexican workers have unproductive informal jobs. Shifting firms into the formal economy will be hard so long as the government fails to curb corruption; many Mexicans are loth to pay taxes they assume will be stolen. Mr Trump's anti-Mexican populism threatens to help usher in a leftist government that will abandon reforms. But it makes those modernising policies more necessary than ever. ■

Renewable energy

A greener grid

China's embrace of a new electricity-transmission technology holds lessons for others



YOU cannot negotiate with nature. From the offshore wind farms of the North Sea to the solar panels glittering in the Atacama desert, renewable energy is often generated in places far from the cities and industrial centres that consume it. To boost renewables and drive down carbon-dioxide emissions, a way must be found to send energy over long distances efficiently.

The technology already exists (see page 71). Most electricity is transmitted today as alternating current (AC), which works well over short and medium distances. But transmission over long distances requires very high voltages, which can be tricky for AC systems. Ultra-high-voltage direct-current (UHVDC) connectors are better suited to such spans. These high-capacity links not only make the grid greener, but also make it more stable by balancing supply. The same UHVDC links that send power from distant hydroelectric plants, say, can be run in reverse when their output is not needed, pumping water back above the turbines.

Boosters of UHVDC lines envisage a supergrid capable of moving energy around the planet. That is wildly premature. But one country has grasped the potential of these high-capacity links. State Grid, China's state-owned electricity utility, is halfway through a plan to spend $88bn on UHVDC lines between 2009 and 2020. It wants 23 lines in operation by 2030.

That China has gone furthest in this direction is no surprise. From railways to cities, China's appetite for big infrastructure projects is legendary (see page 27). China's deepest wells of renewable energy are remote—think of the sun-baked Gobi desert, the windswept plains of Xinjiang and the mountain ranges of Tibet where rivers drop precipitously. Concerns over pollution give the government an additional incentive to locate coal-fired plants away from population centres. But its embrace of the technology holds two big lessons for others. The first is a demonstration effect. China shows that UHVDC lines can be built on a massive scale. The largest, already under construction, will have the capacity to power Greater London almost three times over, and will span more than 3,000km.

The second lesson concerns the co-ordination problems that come with long-distance transmission. UHVDCs are as much about balancing interests as grids. The costs of construction are hefty. Utilities that already sell electricity at high prices are unlikely to welcome competition from suppliers of renewable energy; consumers in renewables-rich areas who buy electricity at low prices may balk at the idea of paying more because power is being exported elsewhere. Reconciling such interests is easier the fewer the utilities involved—and in China, State Grid has a monopoly.

That suggests it will be simpler for some countries than others to follow China's lead. Developing economies that lack an established electricity infrastructure have an advantage. Solar farms on Africa's plains and hydroplants on its powerful rivers can use UHVDC lines to get energy to growing cities. India has two lines on the drawing-board, and should have more.

Things are more complicated in the rich world. Europe's utilities work pretty well together but a cross-border UHVDC grid will require a harmonised regulatory framework. America is the biggest anomaly. It is a continental-sized economy with the wherewithal to finance UHVDCs. It is also horribly fragmented. There are 3,000 utilities, each focused on supplying power to its own customers. Consumers a few states away are not a priority, no matter how much sense it might make to send them electricity. A scheme to connect the three regional grids in America is stuck. The only way that America will create a green national grid will be if the federal government throws its weight behind it.

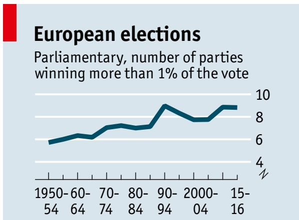
Live wire

Building a UHVDC network does not solve every energy problem. Security of supply remains an issue, even within national borders: any attacker who wants to disrupt the electricity supply to China's east coast will soon have a 3,000km-long cable to strike. Other routes to a cleaner grid are possible, such as distributed solar power and battery storage. But to bring about a zero-carbon grid, UHVDC lines will play a role. China has its foot on the gas. Others should follow. ■

Proliferating parties

Splitters

Too many parties can spoil politics



TO ENTER parliament, a Dutch political party need only win enough votes for one seat. With no minimum threshold, there are lots of parties. Eleven succeeded in 2012, including two liberal parties, three Christian ones and one that cares about animal rights. In the next election, this March, polls suggest the total could rise to 13, with the addition of a pro-immigrant party and an anti-immigrant one (the country's second). As small parties multiply, the large ones are shrinking. In the 1980s governing parties often held 50 seats in the 150-seat parliament; today they are lucky to reach 40.

As with the Netherlands, so with Europe. The ideologies that held together the big political groupings of the 20th century are fraying, and the internet has lowered the barriers to forming new groups. So parties are multiplying (see page 50). Some see this as cause for celebration. A longer menu means that citizens can vote for parties that more closely match their beliefs. This is good in itself and also increases political engagement. Countries with proportional-representation systems, which tend to have more parties, have higher voter turnout than first-past-the-post countries like America and Britain.

Yet excessive fragmentation has drawbacks. As parties subdivide, countries become harder to govern. A coalition of small parties is not obviously more representative than one big-tent party. Big parties are also coalitions of interests and ideologies, but they are usually more disciplined than looser groups, and so more likely to get things done.

Having too many parties is often unwieldy. Coalitions become harder to form and often include strange bedfellows. In Greece the far-left Syriza party governs with the far-right Independent Greeks; in Denmark the centre-right government needs the support of the Liberal Alliance, which wants to cut social spending, and the Danish People's Party, which wants to raise it. Such oddball pairings rarely act decisively and fall apart easily. They also take longer to form, distracting politicians from the business of governing. Spain's recent shift from two major parties to four produced a stand-off that left it without a government for most of last year. Its citizens had more choices when they voted, but then spent ten months under the rule of unelected caretakers—not a clear gain in democracy.

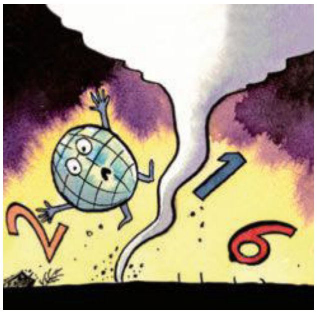
Small parties may render government incoherent by seizing control of the policy areas they care about. In Israel tiny right-wing parties in effect write the rules for West Bank settlements. Splintering can also foster graft. In Brazil politicians form new parties to get public subsidies and then demand more goodies to join coalitions. Far from increasing real choice, multiplying parties can allow politicians to hide the fact that what matters is patronage. Voters may be bewildered when confronted with the People's Front of Judea and the Judean People's Front—or with National Liberals, Democratic Liberals and Liberal Reformists, as they were in Romania in 2014.

What have the Romanians ever done for us?

Sometimes, new policies need new parties to champion them. For all their flaws, the left-wing Podemos party in Spain and the populist, anti-immigrant Sweden Democrats represent voters whose voices were not being heard. But some politicians form new parties for selfish reasons. Candidates who receive a low spot on their party's list may decide to start their own. Others hunger for the subsidies and free broadcasting time that many countries grant to each party.

For all these reasons, thresholds are a good idea. Germany's requirement that parties win 5% of the vote to enter parliament keeps cranks and extremists out without disenfranchising parties that poll strongly, like the new Alternative for Germany. The 5% rule also keeps German coalitions from growing unwieldy. Parties are middlemen between government and voters, organising a multiplicity of policies into a simpler menu of options. That menu can be too short (as in China). But it can also be so long and confusing that voters can't tell what they are ordering—and probably won't get it. ■

The liberal disorder



You stressed one aspect of liberalism's attitude to power and neglected the other two ("The year of living dangerously", December 24th). Liberals believe in protection from undue power, whether the coercive power of the state, the economic power of concentrated wealth or the unfiltered power of popular majorities. By focusing too long on undue state power, free-market liberalism contributed to the political difficulties liberal democracy now faces with the second and third aspects of undue power: an over-concentration of wealth and unanchored popular distrust.

To take only Britain, the liberal founders—Mill, Gladstone, Hobhouse—grasped that what was needed was not less government but better government; not less politics, but better politics. The great liberal achievements of state schools, public works, health and welfare and a world trading order all came about thanks to ambitious thinkers, ambitious politicians and ambitious states.

To liberalism's present travails, your suggested solutions of new gadgets, devolution and deregulation sound by contrast almost magical.

EDMUND FAWCETT
London

The rise of universal free education in the 19th century was, as you note, essential for the growth of commerce and democracy. The decline of the quality and increasingly unequal distribution of that required education is at the source of the challenge faced by democratic societies, from voters unequipped and unable to seek the truth. Thomas Jefferson's counsel that "eternal vigilance is the price of liberty" requires citizens, not just the elite, to desire to seek the truth to be free.

BERTRAND HORWITZ
Asheville, North Carolina

What's on the Brexit table?

It was good to see *The Economist* discuss the options for trade under WTO rules when Britain becomes once again a sovereign customs authority (Free exchange, January 7th). But it was disappointing that you chose to discuss mainly procedural matters and ignored the economic options this gives us. As we have repeatedly emphasised during the referendum campaign and since, the best economic option is for us to open up our markets in food and manufacturing to the world by scrapping the EU's protectionist tariffs and non-tariff barriers on these goods, just as we have always had open markets in services. The gains from this will be much lower prices for our consumers and the reallocation of our resources according to comparative advantage. This prescribed course is entirely consistent with WTO rules, and far from being as complicated as you suggest, reverting to a zero tariff would be straightforward and not subject to anyone else's say-so.

We can follow this up with free-trade agreements around the world on broader issues of investment and property rights. We hope that the EU will follow our lead in this policy of free trade, but if they do not, that is a problem for their consumers and their economies, not ours. If they are stupid enough to impose tariffs on our manufacturers, which average only around 3.5% in any case, we should not be distracted by this from opening up our own markets to free trade. Our manufacturers can easily take these tariffs in their stride, given our highly competitive exchange rate and pro-business policies.

PROFESSOR PATRICK MINFORD
Co-chair
Economists for Brexit
Cardiff

Out with regime change

You pointed out that after the genocide in Rwanda, many countries agreed that they have a responsibility to intervene if a government fails to protect its own people ("The fall of Aleppo", December 17th). But you then said that "The desire to promote freedom and democracy was not far behind." Conflating "the responsibility to protect" with regime change is, in effect, one reason the tragic civil war in Syria is continuing.

Although almost 200 countries have committed to the UN's Responsibility to Protect, which entails the right to use force to intervene in the internal affairs of others, many of them strongly oppose coercive regime change. So when America made it a precondition for negotiating a settlement in Syria that Bashar al-Assad must go, Russia correctly viewed this condition as a threat to the survival of its last ally in the Middle East.

The same issue arose in Libya, where the West first intervened because it held there was a genocide in the making. However, when Muammar Qaddafi offered to negotiate a settlement, the West forcefully insisted on regime change. What followed is another civil war. Since then Russia, China and others have soured on the responsibility to protect. A better policy would be to decouple armed humanitarian intervention from coercive regime change, and promote democracy only by non-lethal means.

AMITAI ETZIONI
Institute for Communitarian Policy Studies
Washington, DC

Store detection

"Following the fashion" (December 24th) looked at what retailers might gain from collecting detailed data on customers' in-store movements. In fact, the competitive advantages (and privacy concerns) for such tracking within physical stores are very similar to those from tracking online browsing behaviour on websites. Such Big Data insights are much richer than those which can be gathered from simply analysing sale data.

Adding concealed cameras and microphones in shops, coupled with machine-learning algorithms, allows retailers to link foot traffic with details of age, gender, ethnicity and the dialect of both the shopper and any shopping companions, including children. All of this will soon be more tightly controlled in the European Union by the General Data Privacy Regulation, which comes into effect in May 2018. From that date, companies with EU customers will be more restricted in their collection and use of personal data, including data that can be linked to a smartphone.

There will still be a rich analysis of foot-traffic statistics, ideally benefiting the customer as well as the retailer, but it will become increasingly imperative that such data are dealt with in ways that both respect the customers' privacy and that shield the retailer from legal and reputational risks.

DAVID STEPHENSON
Chief data scientist
DSI Analytics
Amsterdam

A pack of economists

Further to the letter of Michael Ben-Gad (December 17th) I think the appropriate collective noun for economists should be "a quandary".

COLIN MCALLISTER
St Andrews, Fife

Given the conflicting opinions between economists, I propose "a befuddlement".

DARREN GALPIN
Bristol

The optimum choice must surely be "a surplus of economists".

J. BROOKS SPECTOR
Johannesburg ■

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They don't make 'em like that any more

Manufacturing in the rich world has changed dramatically from the metal-bashing days. So have the jobs that go with it

THE vices are what strike you. The Mercedes AMG factory in Brixworth, a town in England's midlands, is a different world from that of the production line of yore. Engine making was once accompanied by loud noises and the smoke and smells of men and machinery wrestling lumps of metal. Here things are quiet and calm. Skilled mechanics wield high-tech tools amid operating-theatre cleanliness as they work on some of the best racing-car engines in the world. Banks of designers and engineers sit in front of computers nearby. The only vestige of the old world are the vices. There is one on every work bench. At some point, making things of metal requires holding parts still, and nothing better than the vice has come along.

Manufacturing exerts a powerful grip on politicians and policymakers in the rich world. It is central to what they want for their countries, they say; it needs to be brought home from abroad; it must be given renewed primacy at home. This is because it used to provide good jobs of a particular sort—jobs that offered decent and dependable wages for people, particularly men, with modest skills, and would do so throughout their working lives. Such jobs are much more scarce than once they were, and people suffer from the lack of them. In their suffering, they turn to politicians—and can also turn against them.

Hence Donald Trump's promise to create "millions of manufacturing jobs". Hence the vision articulated by George Osborne, Britain's finance minister from 2010 to 2016, of "a Britain carried aloft by the march of the makers", and the central role of making things in the "comprehensive industrial strategy" promised by the current prime minister, Theresa May. Hence calls from the EU for a European industrial revolution and the need for things to be "Made in France" identified by Marine le Pen, leader of the country's National Front.

The problem with such rhetoric is that manufacturing has not really gone away. But nor has it held still. The vice has gone unreplaced, but in almost everything else there has been change aplenty. Some processes that used to be tightly held together are now strung out across the world; some processes that used to be quite separate are now as close as the workers and designers who share the shop floor in Brixworth. Assembling parts into cars, washing machines or aircraft adds less value than once it did; design, supply-chain management, aftercare, servicing and the like add much more.

Ride the carousel

Once you understand what manufacturing now looks like, you come to see that the way it is represented in official statistics understates its health, and that the sector's apparent decline in the rich world is overstated. But that does not solve the politicians' problem. The innovations behind the sector's resilience have changed the number, nature and location of the jobs that it offers. There are still a lot of them; but many of the good jobs for the less skilled are never to return.

Both in terms of employment and innovation manufacturing is worthy of political attention. Manufacturers are more likely to be exporters than businesses in other parts of the economy and, as you would expect given the demands of competing in a broader market, exporting firms tend to be more productive than non-exporting firms. Such firms also tend to be more capital-intensive, because selling into those broader markets allows firms to reduce capital costs per unit sold. And a sector that has higher-than-average productivity and high capital intensity will, other things being equal, be able to offer better wages.

The structure of 20th-century manufacturing helped ensure that those better wages were indeed offered. Factories brought lots of modestly skilled people together with massive capital equipment that cost owners dearly when idled by strikes. Unionisation helped those workers win a large share of the value generated by industry.

In the latter part of the century, though, this system came undone. Better shipping and information technology allowed firms to unbundle the different tasks—from design to assembly to sales—that made up the business of manufacturing. It became possible to co-ordinate longer and more complicated supply chains, and thus for various activities to be moved to other countries, or to other companies, or both. At the same time computers and computer-aided design made automation more capable. High wages gave owners the incentive they needed to take advantage of those opportunities. And while politicians now like the good jobs unionised factories provided, at the time when those unions were flexing their muscles many were happy to see them reined in.

As a result many manufacturing jobs vanished from the rich world (see chart 1). In Britain manufacturing's share of employment had hovered at around a third from the 1840s to the 1960s. Today official data show that around one in ten workers is involved in manufacturing. In the late 1940s manufacturing accounted for one in three non-farm jobs in America. Today's figure is just one in eleven. Even in Germany, the rich country where making things has clung on tightest, only one in five workers is in manufacturing.

The way official figures are put together means that these declines are exaggerated. But tens of millions of jobs did vanish, and as manufacturing became more productive, and prices dropped, its share of GDP fell, too. At the same time the number of people in manufacturing in developing countries exploded, with many of them working, directly or indirectly, for the same firms that were employing fewer people in rich countries. But the jobs that appeared were not, for the most part, simply the old jobs relocated.

Companies were using technology and new practices in ways that made it easier to separate straightforward, well-delineated work from the more complicated bits of the enterprise. The routine work, which was not particularly valuable, was easily moved to poor countries where labour was cheap. (If poor places had had the capacity to take the high-value bits, they would not have been poor.)

This is why promises to bring jobs back ring hollow. Valuable semi-skilled manufacturing jobs are not, for the most part, going to return to America, or anywhere else, because they were not simply shipped abroad. They were destroyed by new ways of boosting productivity and reducing costs which heightened the distinction between routine labour and the rest of manufacturing. There is no vice that can squeeze those genies back into their bottles.

The UN Industrial Development Organisation (UNIDO) reckons that, in 1991, 234m people in developing countries worked in manufacturing. By 2014 the number was 304m—and there were just 63m manufacturing jobs in the rich world. But the sixth of the workers in the rich world added two-thirds of the final value.

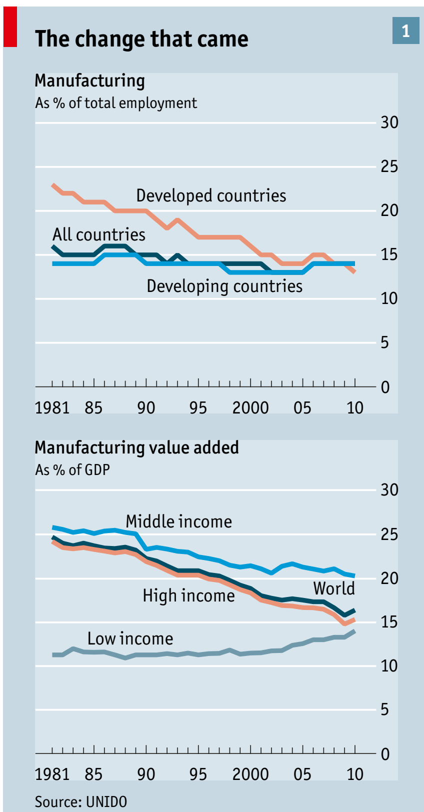
In terms of the perception that manufacturing moved to poor countries lock stock and barrel, it hasn't helped that the low-value work which did go overseas often involved the final stages of assembly. Putting the components that make up a product together looks like the essence of the manufacturing process. But it often adds little to the finished product's value.

Even for as complex and pricey a machine as a passenger jet, assembly is a low-value proposition compared with making the parts that go into it. By some estimates, putting together Airbus airliners in Toulouse accounts for just 5% of the added value of their manufacture—even if ensuring the aircraft were put together in France has been a non-negotiable point of national pride for the French government. Similarly, assembly in China accounted for just 1.6% of the retail cost of early Apple iPads.

Changing corporation names

Most pre-production value added comes from R&D and the design of both the product and the industrial processes required to make it. More is provided by the expert management of the complex supply chains that provide the components for final assembly. After production, taking products to market and after-sales repair and service and, in some cases, disposal all add more value—while stretching the idea of what it is to manufacture something ever further from the factory floor.

Dismantling, for example, is becoming an important part of the manufacturing process. Environmental legislation is forcing companies to take responsibility for their products after they have served their purpose by recycling components or disposing of them. Carmakers have to make sure that the batteries that power electric cars are not thrown away. In some countries white-goods firms are required to pay for recycling fridges, washing machines and other appliances.



At the same time as the value chain has been stretched, other changes have led official statistics to exaggerate the loss of jobs in the sector. In the past, some jobs that would not today be seen as manufacturing were counted as such, inflating the total; today some jobs that seem obviously part of manufacturing are not counted as such, reducing it.

Manufacturing companies increasingly bring in other firms to take care of things like marketing or accounting. Because statisticians generally categorise firms according to what their largest block of employees does this looks like the loss of manufacturing jobs. The replacement of a tea lady with a canteen run by a contractor is statistically indistinguishable from the loss of a factory-floor metal basher (even if the tea lady is still there in the canteen).

But some outsourcing cuts the other way. Jaguar Land Rover (JLR), a British carmaker owned by India's Tata Group, handed over much of the management of its supply-chain logistics to DHL, a delivery giant, in 2009. Not only does DHL deliver parts from suppliers to JLR's factories, it gets them to the exact bit of the assembly line where they are needed; its employees whizz around the shop floor in forklift trucks. It is hard not to see the service they are offering as an integral part of the manufacturing process.

Many aspects of R&D, product design and technical testing are now sometimes looked after by service companies, along with lots of accounting, logistics, cleaning, personnel management and IT services. Production itself can be outsourced, too. Apple and ARM, a British chip company recently acquired by SoftBank of Japan, own no factories of their own. They make all their money from design, distribution and services associated with their products. An OECD committee is currently mulling whether these sorts of firms should still be classified as manufacturers.

A study published in 2015 by the Brookings Institute, an American think-tank, reckoned that the 11.5m American jobs counted as manufacturing work in 2010 were outnumbered almost two to one by jobs in manufacturing-related services, bringing the total to 32.9m. A British study conducted by the Manufacturing Metrics Experts Group in 2016 came to a similar conclusion: that 2.6m production jobs supported another 1m in pre-production activities and 1.3m in post-production jobs.

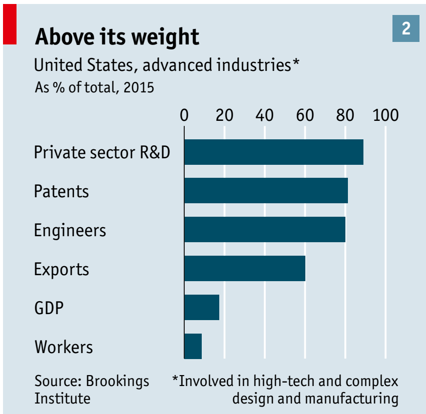
Pinning down the number of manufacturing jobs is sure to get harder. Not only will service providers penetrate ever deeper into manufacturers; some manufacturers also see themselves increasingly as sellers of services.

In the 1980s Rolls-Royce, an engineering giant that makes jet engines, started to push "power by the hour", providing an engine, servicing and maintenance at a fixed cost per hour of flying time. As Andy Neely of the Institute for Manufacturing at Cambridge University points out, this way of turning manufacturing into a service of sorts provides more stable revenues by locking in customers rather than selling them one-off items. Moreover, margins tend to be higher for such services than for the goods themselves.

Industrial machines and the goods they turn out are increasingly packed with internet-connected sensors. Manufacturers are thus able to gather data on how their machines perform out in the world. Their intimacy with the product and the amount of data they accumulate gives them a base from which to sell services which no third party can match. A maker of cars, or wind turbines, or earth movers can use data from every product it has made to work out what is going on with any one of them, and thus increase the value to the user—who is increasingly likely to pay for the service that the manufactured object offers, rather than the object itself. The car industry, for most of the 20th century the archetype of metal bashing, increasingly sees its future in the provision of "mobility services" rather than as a seller of boxes with wheels at the corners. Running their own fleets of cars with which to offer autonomous or shared rides looks to many like the wave of the future—and possibly a very profitable one.

The enthusiasm for moving into services extends well beyond the makers of high-end machinery with whom the trend started. Henrik Adam at Tata Steel in Europe says he has a team of experts able to intervene in a customer's production line and "improve their manufacturing performance and yield by specifying the best type of steel to match processing capability and market ambitions." LafargeHolcim, a cement-maker, says its product can be delivered as a service. Increasingly complicated cement structures require experts to advise on design, use of specialist products and the logistics of pouring a continual stream of the stuff.

This should be comforting to politicians on the lookout for manufacturing jobs. Well-paid tasks could increase in number as services related to manufacturing grow. There are other encouraging trends, too. In some fields innovation and production are increasingly interwoven. Capital-intensive high-tech manufacturing

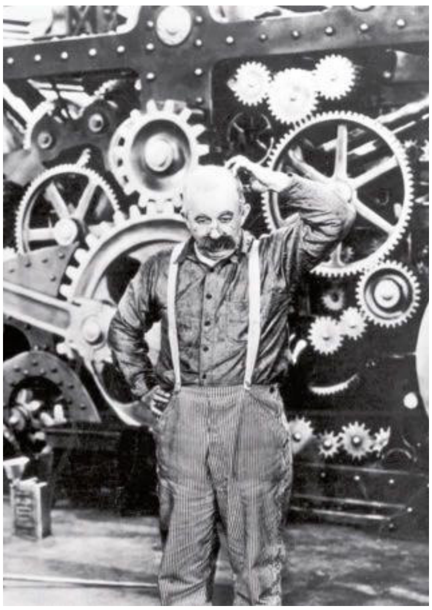


is often better done amid the designers and engineers who thought up the product. Linking the design of both the product and its manufacturing process more closely to production can help improve all three. At the Mercedes AMG engine plant in Brixworth designers are deliberately placed in the middle of production engineers so that they cannot avoid meeting and talking.

The golden future

If being in the same place really helps, technology and redesigned production methods might be used to bring assembly and some other forms of production back to rich countries. 3D printing, though more expensive than traditional mass manufacturing, is being used to make more luxurious and pricier wares, such as motorbikes, in the heart of cities like London and New York, close both to designers and consumers. Using new technologies to keep design and manufacturing tightly coupled can shorten lead times in industries driven by fad and fashion (see page 62).

Some firms recognise that outsourcing production to cheaper locations has eroded innovation, says Ludovico Alcorta at UNIDO. When production is moved elsewhere, opportunities to learn how to do it better are often lost. The development of new products and processes can suffer, as can interactions with research organisations and universities.



What next?

As that suggests, though, the potential for new jobs in manufacturing is not quite the boon politicians would like. Advanced manufacturing provides very good jobs (see chart 2) but they are the jobs of the future, not the past; they need skill and adaptability. They will change a lot over the lifetimes of those who hold them, and they will never provide anything quite like the mass employment of the past.

Governments should "start with modest expectations" for manufacturing, says James Manyika of the McKinsey Global Institute, a think-tank. The policies that might help are mostly fairly obvious. Improve education to ensure that engineers and techies are in good supply. Provide more vocational training, along the lines that Germany uses to support its *Mittelstand*. And develop retraining programmes to refurbish the skills of current or former workers (see this week's special report).

If manufacturing cannot be counted on to bring back good jobs for semi-skilled workers, its history nonetheless suggests a route to providing good work in other sectors. First, workers still tend to do better when they are able to work within profitable companies, rather than as employees of service firms which contract with those companies. Second, workers do better when they are able to improve their bargaining power by means of a union. But neither is easy to implement, or popular across the political board.

A real commitment to helping people find work in and around manufacturing could undoubtedly do good. Simply threatening companies that seek to move jobs overseas and the countries keen to host them, as Mr Trump has, will not. Disrupting the complex cross-border supply chains on which manufacturers rely with tariffs would damage the very sector he purports to champion. Clamping down on migrants with skills that manufacturers cannot find at home will do harm, not good. Policies that favour production-line workers over investment in automation will end up making American industry less competitive.

Industrial manufacturing was never as simple as those far from the shop floor imagined it to be. Today it has become more complex still. There are reasons to help manufacturing; it tends to be more productive, and by some measures more innovative, than the rest of the economy. But doing so requires careful thought, a light touch and managed expectations. The application of brute force will not turn the clock back. It is more likely to break it. ■

Also in this section

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Indian politics

Non-stick PM

DELHI

Narendra Modi has an uncanny ability to shrug off embarrassment

ADDRESSING a conference in his home state of Gujarat on January 10th, Narendra Modi, India's prime minister, exuded confidence. India's economy is the fastest-growing and one of the most open in the world, he declared, reaffirming his government's commitment to reform. The 5,000-strong audience, sprinkled with foreign heads of state and corporate bigwigs, applauded warmly. One multinational's boss drew cheers with a sycophantic call for India to "export" Mr Modi to run his home country, America, too.

The optimism and praise, however, contrasted with sobering economic news. Since November rating agencies have sharply lowered their growth forecasts. Small and medium-sized firms report big lay-offs. Vehicle sales fell in December by 19% compared with the previous December, their steepest drop in 16 years, says a car-industry lobby group. Housing sales in India's eight biggest cities slid by 44% in the last quarter of 2016 compared with the year before, reckons Knight Frank, a global property firm, in a report. "The Indian government's demonetisation move on November 8th brought the market to a complete standstill," it says, alluding to Mr Modi's surprise order to withdraw 86% of the notes used in daily transactions.

There is little doubt that Mr Modi's assault on cash has caused ordinary Indians disruption, annoyance and, particularly for the poorest, severe distress—though the pain is easing now as the government prints more money to replace the scrapped notes. Yet just as would-be foreign investors seem happy to continue boosting Mr Modi, many Indians also still trust and admire the prime minister. Like America's president-elect, Donald Trump, who once claimed he could "shoot somebody" and not lose votes, Mr Modi's support seems oddly unaffected by his flaws. Anecdotal evidence, online polling and informal surveys all suggest that the prime minister's misstep has scarcely dented his standing.

Opinion polls in India have a poor record, and none published since the demonetisation drive has specifically measured Mr Modi's popularity. However, two surveys carried out in December in the state of Uttar Pradesh, India's most populous, suggest that his Bharatiya Janata Party (BJP) remains poised to perform well in imminent state elections. When the results from several rounds of voting are tallied in March, the BJP could be basking in its biggest triumph since Mr Modi won national elections in 2014. The party has not suffered in municipal votes in several states since November and is well positioned in several other looming state polls.

Prior to the demonetisation drive, Mr Modi had handily weathered other storms. Murderous communal riots tarnished his long term as chief minister of Gujarat, for instance. Yet according to Pew, a research firm, the prime minister's popularity in mid-2016, at an enviable 81%, had declined only marginally from a stunning 87% the year before. The liking is personal: Mr Modi regularly scores higher in such polls than either his party or his policies.

Some pundits speak of "Modi magic" to explain his immunity from criticism, but there are more straightforward reasons. One is the prime minister's talent as a politician. Although often dour in countenance, Mr Modi is a pithy speaker in Hindi, with an unerring nose for the class-driven grudges that often guide voter sentiment. In debates over demonetisation, he successfully projected himself as a champion of the common man against currency hoarders and tax evaders. He is also extremely protective of his own image as a man above the fray. Mr Modi's dress, gestures and public appearances are theatrically staid and uniform, punctuated by meaningful looks and silences. He does not hold press conferences, preferring to retain control of his narrative via carefully rehearsed interviews and his monthly "From the Heart" radio address.

Pygmy-slayer

Mr Modi is also lucky. His well-funded, highly disciplined and pan-Indian party faces an unusually divided and uninspiring opposition. Congress, a party that ran India for decades and still commands a nationwide base, is burdened by squabbling and corrupt local branches and a lack of clarity over ideology and the role of the Gandhi dynasty. India's many other parties are all parochial, tied to the interests of one state, caste or other group, and so with little hope of playing a national role. Handed the golden opportunity of Mr Modi's demonetisation fumble, the opposition has failed to mount a united charge.

Other institutions that might check Mr Modi's ambitions, such as the press and the judiciary, are also not as vigilant as in other democracies. Some parts of the media are owned by Mr Modi's friends and ▸▸

supporters; others by business groups with interests that are vulnerable to retribution. Journalists, whistle-blowers and activists are keenly aware that critics of the government often pay a price, whether in the form of "trolling" on the internet, harassment by officials or spurious lawsuits. India's courts, meanwhile, do often clash with the government but are cautious in picking fights: on January 11th India's supreme court airily dismissed a public-interest lawsuit demanding investigation of documents that appear to implicate dozens of officials in bribe-taking.

Even Mr Modi's foes believe his administration is less corrupt than previous ones have been. However, as the banknote debacle revealed, it is not necessarily much more competent. The most iron-clad rule of Indian politics is anti-incumbency. Even the investors vying for Mr Modi's attention may take note that, for all the talk of openness, India still has some of the world's most tangled rules, highest corporate tax rates and most capricious officials. ■

Royal politics in Thailand

Return to sender

BANGKOK

The new king pulls rank

FOR more than two years Thailand's ruling junta, which seized power in a coup in 2014, has been cooking up a constitution which it hopes will keep military men in control even after elections take place. In August the generals won approval for the document in a referendum made farcical by a law which forbade campaigners from criticising the text. Yet on January 10th, only weeks before the charter was due to come into force, the prime minister said his government was tweaking the draft. Prayuth Chan-ocha said changes were necessary because King Vajiralongkorn, the country's constitutional monarch, had declined to give the document royal assent.

There is much to dislike about the proposed constitution, which will keep elected governments beholden to a senate nominated by the junta and to a suite of meddling committees. But Mr Prayuth says the king's objections relate only to "three or four" articles—all of which appear to limit the sovereign's power slightly. The generals say the palace has asked them to amend a rule which requires the monarch to nominate a regent when he leaves the kingdom (probably because King Vajiralongkorn plans to spend much of the year reigning from his residences in Germany). They also say they will revise an article which makes the constitutional court the final arbiter at times of political crisis—a role which had traditionally fallen to the king—as well as an article which introduced a requirement for some royal proclamations to be countersigned by a minister.

Thais have been watching for signs of friction between the armed forces and the monarchy—the country's two biggest sources of political power—since the death in October of Bhumibol Adulyadej, King Vajiralongkorn's long-reigning father. The new king is viewed warily by Bangkok's elites, who have sometimes worried that he sympathises with populist politicians whom the army has twice kicked from power. On the whole relations have looked cordial. King Vajiralongkorn has stacked his privy council with generals plucked straight from the junta's cabinet; the junta has looked to the palace to help adjudicate in a long-running and volatile dispute over who should fill a vacant post at the head of Thai Buddhism, which the military government had appeared ill-equipped to handle alone.

But although the king's right to reject the draft constitution is enshrined in an interim charter which the generals themselves wrote, his decision to interfere remains a surprise. Under King Vajiralongkorn's father the palace preferred to maintain the fiction that Thailand's monarchy holds a symbolic role which is "above politics", even while it meddled energetically behind the scenes. The bluntness of King Vajiralongkorn's intervention—and the determination it reveals to resist relatively small checks on royal power—is both a snub to the junta and a worry for democrats, some of whom had dared hope that the new king might be happy to take a back seat in public life.

The junta says it will make all the requested changes within a few months, and that the new text will not need to be put to a second referendum. But it has clearly been caught by surprise. It says it will first have to revise the interim charter which has been in force since the coup. This document allowed for the king to reject the draft constitution in its entirety but appeared not to provide for the possibility that he might ask to strike out lines he did not like.

Some Thais worry that a lasting power struggle is brewing. Others see a minor spat over language, which will quickly be forgotten. Since the 1930s Thailand has written and torn up 19 constitutions; hardly anyone expects this effort to be the last. The one certainty is that the redrafting will delay by several months the general election that was supposed to be held at the end of this year. Mr Prayuth has implied that elections cannot now be held until after King Vajiralongkorn's coronation, which itself cannot take place until after his father's elaborate cremation, scheduled for October. All this boots the long-promised polls well into 2018. ■

South Korea and Japan

Future tense

SEOUL AND TOKYO

Two neighbours choose a bad time to resume bickering about the past

THE sudden deal struck in late 2015 by the leaders of South Korea and Japan to settle their dispute over "comfort women" was supposed to be "final and irrevocable". But South Korean groups representing the former sex slaves—tens of thousands of whom were pressed into prostitution by Japan's imperial army during the second world war—had fiercely opposed the deal as a sell-out. One year on, a bronze statue of a teenage sex slave (pictured), set up by one of the civic groups last month outside Japan's consulate in Busan, South Korea's second-largest city, threatens to undermine the agreement. The row, in turn, has upset a short-lived detente between neighbours at a treacherous time.

Koreans have long felt that Japan has not properly atoned for its wartime atrocities. Activists have erected 30-odd statues to lament the suffering of the comfort women, including one near the Japanese embassy in Seoul, South Korea's capital.

As part of the deal Shinzo Abe, Japan's prime minister, apologised for the women's ordeal. Japan pledged to pay ¥1bn (just over $8m) into a new South Korean fund to care for the surviving comfort women (there were 46 at the time, but seven have since died). That was something of an about-turn for Mr Abe, who had previously said he doubted the women had been coerced—a view that his many ultranationalist supporters espouse. Japan maintains

Bronze of contention

that the relocation of the statue outside its embassy was part of the deal, and that the erection of the new statue in Busan violates its "spirit". South Korea says that it only agreed to ask civic groups to relocate the statue in Seoul.

Japan has recalled its consul-general in Busan, as well as its ambassador to Seoul, and suspended negotiations over a planned currency-swap agreement. Such huffiness is not unusual: Japan also recalled its ambassador in 2012 after Lee Myung-bak, the South Korean president of the day, visited an islet claimed by both countries. Yet Japan, too, can be accused of violating the spirit of the deal. On December 29th Tomomi Inada, its defence minister, visited the Yasukuni shrine in Tokyo, which commemorates the spirits of 2.5m Japanese war dead, including 14 high-ranking war criminals. The bronze statue in Busan, which local authorities had removed two days before for obstructing a pavement, was allowed to be replaced the day after Ms Inada's visit.

Mr Abe doubtless worries that the deal will collapse: its other signatory, Park Geun-hye, South Korea's deeply unpopular president, was impeached by parliament last month. The constitutional court has yet to rule on her permanent removal. But already presidential hopefuls are vying for votes before an expected early election—and the main opposition party, whose likely candidate is in the lead, last year threatened to ditch the sex-slave deal.

South Korea's acting president, Hwang Kyo-ahn, sensibly said this week that the settlement should be respected by all (34 of the 46 surviving comfort women had given their approval). But he has scant political capital. A professor at Seoul National University who advises the foreign ministry says that no resolution will be found until a new South Korean government is in place. South Korean diplomats are hobbled by the lack of strong leadership; a meeting between the leaders of South Korea, Japan and China was postponed last month. Unlike Mr Abe, the besieged Ms Park was unable to meet Donald Trump before he takes office this month.

The strain on the ties between the two neighbours is all the more alarming at a time when China is increasing pressure on South Korea. It is miffed about the planned deployment this year on South Korean soil of an American anti-missile system called THAAD (Terminal High-Altitude Area Defence). THAAD is intended to repel North Korean attacks, but China says it could be used against it too. It appears to have blocked imports of South Korean cosmetics, barred Korean dramas and pop stars from its screens and turned down a recent request by South Korean airlines for additional flights to China. Joint military events have also been cancelled. Even more worryingly, North Korea's nuclear programme appears to be accelerating. Some now believe it may manage to build a nuclear-tipped missile that can reach America during Mr Trump's presidency.

Barack Obama, America's outgoing president, put a lot of effort into getting South Korea and Japan to make up, in the hope of balancing China's rise and presenting a united front to North Korea. Yet, on the campaign trail at least, Mr Trump has been a destabilising influence, says Scott Snyder of the Council on Foreign Relations, a think-tank. Mr Trump said South Korea should contribute more towards the cost of keeping some 28,500 American troops stationed there (it currently pays about 40% of the total), or he would withdraw them; he also suggested that South Korea and Japan could develop their own nuclear weapons instead of relying on America's nuclear umbrella (he now denies having said that).

An American retrenchment, if it materialises, would add to the unease the two countries feel at China's rise and North Korea's belligerence. In such fraught times, rekindling historic wrangles looks uncommonly unwise. ■

Anti-Chinese protests

Deep water

COLOMBO

Sri Lankans balk at ever-expanding Chinese investment

FOR generations, Priyantha Ananda's family sold *kalu dodol*—a sticky sweet made of coconut milk and rice flour—on the old Tangalle road in Hambantota. The government moved his wayside shop in 2008 to build a sprawling commercial port, financed by Chinese loans. He was one of around 40 street vendors forced to relocate to another neighbourhood, far from their homes, where business is slow. Most distressing of all, the authorities have told them not to erect any permanent buildings. That suggests they might be displaced again, this time for an industrial zone being developed by Chinese investors.

Resentment at such schemes boiled over this week, when thousands demonstrated at the inauguration of the industrial zone. As Ranil Wickremesinghe, the prime minister, and Yi Xianliang, China's ambassador, grinned for the cameras, police beat back stone-throwing protesters with tear gas and water cannons. The Chinese must not have any more land in Hambantota, insists Mr Ananda. The sweet-seller says he will not move again. But some in the area have already received notices of acquisition.

Sri Lankan water torture

The size of the industrial zone is not yet known. A government minister said the Chinese investors have requested 15,000 acres. The prime minister says it will be 1,235. But even the smaller area has not yet been demarcated: the government's chief surveyor says public anger forced his staff to stop work.

The government accuses the opposition, and in particular supporters of Mahinda Rajapaksa, a former president, of stoking discontent in Hambantota with talk of "Chinese colonisation". That is especially ironic, since the development of the port was begun under Mr Rajapaksa, who was criticised at the time for signing uncompetitive contracts for its construction that lumbered Sri Lanka with heavy debts to the Chinese government. The new government plans to grant a state-controlled Chinese firm called CMPort an 80% stake in a 99-year lease of the port, for $1.2bn—a step it says is necessary to defray some of the debt. It also maintains that the industrial park will attract $5bn in investment and create 100,000 jobs.

The signing of the lease on the port has been postponed, however, after Arjuna Ranatunga, the ports and shipping minister, complained to Maithripala Sirisena, the current president, about some of its clauses. One grants CMPort control over internal security; another allows it to claim fees for navigation. Mr Rajapaksa, who used to be the member of parliament for Hambantota and still wields considerable political influence, is railing "against giving the rights of the landlord over the industrial zone to a foreign private company" and raising concerns about "control and sovereignty". That is the height of hypocrisy—but it has clearly struck a nerve.

Banyan | Still just saying no

As drug policies soften in the West, Asia remains wedded to prohibition

"FOR the first few days," explains Aki, a young man who helps run a drug rehabilitation centre on the outskirts of Myitkyina, the capital of Kachin State, in northern Myanmar, "some of them try to run away. So we have to keep them like this." A young man, naked except for a tattered pair of shorts, lies prone on a filthy mattress, one leg locked in a wooden device resembling medieval stocks. He sweats and shakes, like many suffering heroin withdrawal. Dozens of other men mill around the clinic: a dimly lit, mattress-lined, hangar-like building reeking of sweat and foul breath. Beyond the back door is a much smaller, concrete-floored room with a wooden bath, a squat toilet and, next to it, a tiny padlocked cell crammed with four painfully skinny men: they, too, had tried to escape.

The men receive no medication; treatment consists solely of herbal baths and Bible study (many Kachin are Baptist). For the first 15 days of their three-month stay, they receive no counselling because, as Aki explains: "They never tell the truth, because they are addicts." Aki's boss, the Reverend Hsaw Lang Kaw Ye, takes an equally dim view of his region's many opium farmers: he is part of a citizens' group that cuts down their crop. Asked if he provides the farmers with any compensation, he scoffs: "We don't give them anything. We just destroy opium fields."

This attitude is typical of drug policy in much of Asia: needlessly severe and probably ineffective. According to Harm Reduction International, a pressure group, at least 33 countries have capital punishment on the books for drug offences, but only seven are known to have executed drug dealers since 2010. Five are in Asia (the other two are Iran and Saudi Arabia).

Off with their heads

In Singapore, capital punishment is mandatory for people caught with as little as 15 grams of pure heroin. The arrival cards foreign visitors must fill in at Singaporean immigration posts warn, in red block capitals: "DEATH FOR DRUG TRAFFICKERS UNDER SINGAPORE LAW". Singapore may kill fewer people than it used to—between 1994 and 1999 no country executed more people relative to its population—but its executioners are not idle: less than two months ago a Nigerian and a Malaysian were hanged for trafficking cannabis and heroin respectively.

Singapore's neighbours, Malaysia and Indonesia, also execute drug offenders. Indonesia's previous president, Susilo Bambang Yudhoyono, reportedly disliked the death penalty, and imposed an unofficial moratorium on executions from 2008 to 2013. Joko Widodo, his successor, has no such qualms: since taking office in 2014 he has approved the execution of 18 drug traffickers, and has pledged to show "no mercy" to anyone in the business.

The Philippines ended capital punishment in 2006, but its new president, Rodrigo Duterte, has found a workaround: killing people without the bother of a trial. Since taking office six months ago, more than 6,200 suspected drug dealers or users have been killed in his anti-drug campaign. While his bloody drug war has drawn criticism from human-rights activists in the Philippines and abroad, it remains wildly popular among ordinary Filipinos. The ten-member Association of South-East Asian Nations is committed to eradicating drug use, processing and trafficking by 2020—an implausible goal, especially since the Golden Triangle, the region where Laos, Myanmar and Thailand meet, produces a hefty share of the world's opium.

Harsh penalties for drug offences are common across Asia. The sorts of alternatives now favoured in the West, such as diverting addicts to effective treatment programmes instead of trying them and saddling them with criminal records, are virtually nonexistent. Several countries require drug offenders to enter rehabilitation programmes, but these are often like prison. Staff at rehab centres in Vietnam have reportedly beaten inmates and forced them to toil in the fields; guards in Cambodia have reportedly raped female inmates.

Asia's harsh anti-drug policies are falling out of step with the rest of the world. Marijuana for recreational use is now legal in eight American states; 28 have legalised it for medical use. Dozens of countries have decriminalised marijuana consumption. Heroin is available on prescription in several European countries. The rich world increasingly treats addiction as an illness rather than a crime.

These trends have Asia's drug warriors worried. Last April the UN General Assembly convened a special session on drugs. The previous time it did so, in 1998, it vowed to make the world drug-free by 2008. It later moved the target date back to 2019—the year by which Canada now wants to set up a legal market for cannabis for recreational use. At the UN meeting Mexico's president, Enrique Peña Nieto, urged the world to "move beyond prohibition". Kasiviswanathan Shanmugam, Singapore's fearsome law and home-affairs minister, was unmoved: "Show us a model that works better," he told the general assembly, "that delivers a better outcome for citizens, and we will consider changing. If that cannot be done, then don't ask us to change."

Mr Shanmugam has a point: in Singapore, drug consumption is admirably low. But Singapore is small, with secure borders, little corruption, effective anti-drug education and laws that allow warrantless searches and detention without trial. In poorer and less well-run countries the consequences of prohibition have been depressingly predictable: prisons packed with low-level offenders, corruption and thriving black markets. Demand remains strong: between 2008 and 2013 the amount of methamphetamine seized in East Asia, South-East Asia and Oceania quadrupled. Eventually, Asia may reach the same conclusion as much of America, Europe and Latin America: that the costs of prohibition outweigh the benefits. But for now, as Mr Duterte's popularity attests, drug wars are good politics. ■

Railways

The lure of speed

SUZHOU, ANHUI PROVINCE

Bullet trains are reshaping China's economy. Will even more of them help?

"THESE are fields of hope," says Gu Zhen'an, gesturing at a barren scene. A burly chain-smoker, he spent 25 years overseeing road-building crews in central China. But three years ago, when he finished paving a highway to a new high-speed railway station in this quiet corner of Anhui province, he decided it was time to switch industries. The land still looks empty, served by first-rate infrastructure but home to few people and fewer businesses. Mr Gu, however, sees things differently: he expects a city to sprout up around the train station. In anticipation, he has built an old-age home, with plans to expand it into a complex for 5,000 people.

To appreciate the extent of China's high-speed rail ambitions, take Mr Gu's dreams and multiply them many times over. Less than a decade ago China had yet to connect any of its cities by bullet train. Today, it has 20,000km (12,500 miles) of high-speed rail lines, more than the rest of the world combined. It is planning to lay another 15,000km by 2025 (see map). Just as astonishing is urban growth alongside the tracks. At regular intervals—almost wherever there are stations, even if seemingly in the middle of nowhere—thickets of newly built offices and residential blocks rise from the ground.

China's planners hope these will be like the railway towns that sprouted (at a slower pace) in America and Britain in the 19th century. In their rush to build, waste is inevitable. The question is whether gains will outweigh losses. Five years after the busiest bullet trains started running (the Beijing-Shanghai line opened in 2011), a tentative verdict is possible. In the densest parts of China, high-speed rail has been a boon: it is helping to create a deeply connected economy. But further inland, risks are mounting of excessive investment.

In China's three big population centres—the areas around Beijing in the north, Shanghai in the east and Guangzhou, the capital of Guangdong province, in the south—life and work have started to follow the sinews of the high-speed rail system. Trains were previously too infrequent, too slow and too crowded to allow for daily commutes. Now, each of these three mega-cities is developing commuter corridors. Little wonder: house prices in satellite towns and cities tend to be much cheaper. In Kunshan, for example, homes cost about 70% less than in nearby Shanghai. But the bullet train between the two cities takes just 19 minutes and costs a mere 25 yuan ($3.60). And Kunshan is just one of many options for those seeking to escape Shanghai's high costs. There are now about 75m people living within an hour of the city by high-speed rail. ▸▸

Surveys show that more than half of passengers on the busiest lines are "generated traffic"—that is, people making trips that they would not have made before. This is unquestionably good for the economy. It means the trains are expanding the pool of labour and consumers around China's most productive cities, while pushing investment and technology to poorer ones. Xu Xiangshang, a dapper businessman, oversees sales of apartments built next to high-speed railway stations in less well-off parts of Anhui. These are less than half an hour from Nanjing, a prosperous city of 8m that is the capital of Jiangsu province. "Bullet trains are becoming just like buses," he says.

The economic benefits are hard to measure precisely. Traditional analyses focus on the financial performance of high-speed rail lines, plus indirect results such as reduced road congestion (see next story). But bullet trains are more than just a mode of transport. China wants to build a "high-speed rail economy". It is a twist on the theory of urban agglomeration—the idea that the bigger the city, the wealthier and more productive its people tend to be. The idea is to cap the size of mega-cities, but achieve the agglomeration effect with the help of bullet trains. China reckons that the resulting network of large, but not oversize, cities will be easier to manage. The World Bank, for one, is optimistic. In a report published in 2014 it said the benefits of high-speed rail would be "very substantial", potentially boosting the productivity of businesses in China's coastal regions by 10%.

Not all are aboard

But might regular, reliable, fast-enough trains around big cities have been almost as good as high-speed rail, at a fraction of the price? The OECD, a rich-country think-tank, reckons it costs 90% more to build lines for trains that reach 350kph than it does to lay ones that allow speeds of 250kph. For longer lines with more than 100m passengers a year and travel times of five hours or less—such as the one between Beijing and Shanghai—the more expensive type may be justifiable.

It is less so for journeys between commuter towns, during which trains only briefly accelerate to top speeds. For longer journeys serving sparse populations—a description that fits many of the lines in western and northern China—high-speed rail is prohibitively expensive.

The overall bill is already high. China Railway Corporation, the state-owned operator of the train system, has debts of more than 4trn yuan, equal to about 6% of GDP. Strains were evident last year when China Railway Materials, an equipment-maker, was forced to restructure part of its debts. Six lines have started to make operating profits (ie, not counting construction costs), with the Beijing-Shanghai link the world's most profitable bullet train, pulling in 6.6bn yuan last year. But in less populated areas, they are making big losses. A state-run magazine said the line between Guangzhou and the province of Guizhou owes 3bn yuan per year in interest payments—three times more than it makes from ticket sales.

Xi makes the trains run on time

Many had thought China would rein in its ambitions after the fall of Liu Zhijun, a railway minister who was once revered as the father of the bullet-train system. In 2011 he was removed for corruption. Shortly after, a high-speed rail crash caused by a signalling failure killed 40 people. The mighty railway ministry was disbanded and folded into the transport ministry. China slowed its fastest trains down from a world-beating 350kph to a safer 300kph. The bullet trains have run with few glitches since the tragic crash.

But the network expansion now under way is even bolder than Mr Liu had envisaged. China has a four-by-four grid at present: four big north-south and east-west lines. Its new plan is to construct an eight-by-eight grid by 2035. The ultimate goal is to have 45,000km of high-speed track. Zhao Jian of Beijing Jiaotong University, who has long criticised the high-speed push, reckons that only 5,000km of this will be in areas with enough people to justify the cost. "With each new line, the losses will get bigger," he says.

Making matters worse, China has often placed railway stations far from city centres. Bigger cities should eventually grow around their stations, but suburban locations will not produce the same economic dividends as central locations. In smaller cities, prospects are even bleaker. In Xiaogan in Hubei province, the station was built 100km from the city. The decision to base stations so far away reflects the realities of high-speed rail: for trains to run fast, tracks need to be straight. But that limits potential gains from lines as they traverse China. Wang Lan of Tongji University in Shanghai says the government should turn isolated stations into transportation hubs by adding new rail connections to other nearby places. That, though, would be another big expense.

Dangers are all too visible in the city of Suzhou in Anhui province (not to be confused with the successful example of Suzhou in Jiangsu). Its station is 45km from the city centre in the barren landscape where Mr Gu lives in hope. The government thought it would spark development. It paved eight-lane roads to serve a vast industrial park on one side of the station. Investors built clothing, food and pharmaceutical factories. But all are closed, except for a paper mill. Undeterred, the government is building a commercial district on the other side of the station.

Nearby, Mr Gu's old-age home is off to a good start, with help from a local hospital. Down the road there is a drab collection of stores, restaurants and houses. This was meant to be the kernel of the new railway town: people were resettled here to make way for the tracks. Two older residents say they are sure that better days are just around the corner. They have heard that the government will move in 100,000 people from a part of western China plagued by landslides. Suzhou will provide the new arrivals with a place to live and they, in turn, will provide the town with the population it needs to thrive. But it is impossible to confirm the rumour—one more article of hope in what China likes to call its "high-speed rail dream". ■

Infrastructure

Hunting white elephants

HONG KONG

China's mega-projects are less wasteful than you think

CHINA is proud of its infrastructure: its cavernous airports, snaking bridges, wide roads, speedy railways and great wall. This national backbone (minus the wall) bears the weight of the world's second-largest economy and its biggest human migration, as hundreds of millions of people move around the country during the lunar new-year holidays—the rush officially begins on January 13th.

Western leaders often shake their heads in disbelief at the sums China spends on its huge projects. And some analysts question how much of it has been wisely spent. In a widely circulated study published last autumn, Atif Ansar of Oxford University's Saïd Business School and his co-authors say the world's "awe and envy" is misplaced. More than half of China's infrastructure projects have "destroyed economic value", they reckon. Their verdict is based on 65 road and rail projects backed by the Asian Development Bank (ADB) or the World Bank since the mid-1980s. Thanks to the banks' involvement, these projects are well documented.

One example is a 147-km, four-lane toll road in southern Yunnan province, which was built with the help of an ADB loan approved in 1999. The ADB expected the Yuanjiang-Mohei highway (Yuan-Mo for short) to cut travel times, reduce traffic accidents and lower the costs of fuelling and repairing vehicles, adding up to a compelling economic return of 17.4% a year. By 2004, however, traffic was 49% below projections and costs were more than 20% over budget, thanks to unforgiving terrain prone to landslides.

Were such setbacks enough to damn over half of the projects they examined? As a rule, the ADB and World Bank will approve an undertaking only if they expect its broad benefits (the economic gains from reduced travel times, fewer accidents, etc) to exceed its costs by a large margin, leaving ample room for error. Mr Ansar and his co-authors assume this margin is 40%: they posit a ratio of expected benefits to costs of 1.4 for every project. They scoured the banks' review documents for examples of cost overruns and traffic shortfalls. Given these assumptions, a project becomes unviable if costs overrun by more than 40%, traffic undershoots by 29%, or some combination of the two. Of the 65 projects, 55% fell into this category. Yuan-Mo was one.

These projects may not be representative of China's infrastructure-building as a whole. But there is little reason to think they are unusually bad. They are often managed with greater rigour, thanks to the involvement of outside lenders.

The authors' conclusion, however, rests on their assumption about the margin for error built into the projects they looked at. Take Yuan-Mo, for example. Its projected benefits, over its first 20 years of operation, were several times greater than its costs. But as often with roads, the costs arrive early; the benefits are spread thinly over many years. In the time it takes for an investment to pay off, the resources used could have been earning a return elsewhere. So it is necessary to reduce the future payoffs by some annual percentage, known as a "discount rate". The higher this is, the lower the value placed today on tomorrow's gains.

So a lot turns on what rate is chosen. For historical reasons, the ADB adopts a high one of 12%. At that rate, Yuan-Mo's ratio of expected benefits to costs equals 1.5, roughly in line with the authors' assumptions. But at a gentler rate of 9%, the ratio improves to about 2. At a rate of 5.3% (more in line with government borrowing costs) the ratio rises to 3. With these higher margins for error, many fewer elephants turn white. At a ratio of 2, the share falls to 28%. If the ratio is assumed to be 3, the proportion of duds falls to just 8%.

The authors also assume that any traffic shortfall persists throughout its life. That is not always the case. Traffic on Yuan-Mo, for example, has rebounded, according to the road's operator. By 2015 it was 31% higher than the ADB projected back in 1999. Around last year's lunar new-year holiday the road handled record numbers. Some white elephants turn grey with age. ■

Public opinion

Once upon a crime

BEIJING

Public anger over a death in police custody refuses to subside

THE Chinese Communist Party has a formula for responding to crises. In the Mao era it buried unpalatable news. That is harder to pull off when smartphones and social media provide a steady flow of revelations about schools built on toxic soil, tainted foodstuffs, poorly stored vaccines and other scandals. Instead the government tries to manage public sentiment. It releases some information, raises questions and very often launches an investigation. Later, a senior official makes a pronouncement on the issue and a few people are fired. But in most cases almost nothing is done to fix the underlying problem. Sophisticated censorship prevents follow-up reports; public anger fades.

One recent scandal, however, has refused to die. Last May a 29-year-old environmental scientist, Lei Yang, died in police custody in Beijing. Officers said he had a heart attack after being arrested for soliciting a prostitute. Chinese people are used to being bullied by the police. Most victims are poor and cannot fight back. Mr Lei, however, was well-educated and worked at a state-linked think-tank.

Relatives challenged the official version of events. They said that his bloodied, bruised body suggested he had suffered something other than a heart attack. They insisted Mr Lei was going to the airport, not a brothel. A high-profile lawyer sought legal action against the five officers on behalf of the family. "We want our most basic rights to personal safety, civil rights and urban order," former classmates of Mr Lei at the prestigious Renmin University in Beijing wrote in a petition. They said his death was "a tragedy arising from the system".

The government took its familiar steps to quell the outcry. President Xi Jinping said the police should behave better, a comment that *People's Daily*, a Communist Party mouthpiece, directly linked to Mr Lei's case. An autopsy in June corrected the cause of death to choking. The police involved were put under investigation. And censorship was stepped up: online searches for Mr Lei's name were blocked.

But anger grew again in December when prosecutors dropped charges against the police. They said "inappropriate professional conduct" by the officers had caused his death, but the wrongdoing was "minor" (Mr Lei, after all, had resisted arrest). The family acquiesced, citing exhaustion and "great pressure". Mr Lei's remains were cremated on January 6th.

But the public continues to fume, circulating petitions and online articles decrying the verdict. The decision not to press charges was "extremely evil", one microblogger wrote. Another said that even if Mr Lei had hired a prostitute, he would have been right to run away because the penalty for such an offence was so high—"steal a dog and get your hand cut off," as the author put it. Mr Lei's case was widely touted as evidence that the rule of law, which Mr Xi says he wants, has yet to materialise.

State media, however, have dismissed such complaints as sensationalism and rumour-mongering. The clamour spooks the government, which is keen to keep the middle class onside. Particularly chilling for the authorities is the involvement of graduates of Renmin University, who have kept up their efforts to draw public attention to the case. Thousands of them belong to discussion groups on WeChat, a popular social-media service. The party has been terrified of student-led movements since it crushed pro-democracy protests in Tiananmen Square and elsewhere in 1989. It has now shut down many of these online conversations. In the days after the decision not to charge the officers, censorship on Weibo, a microblogging site, rose to a three-month high, according to Weiboscope, which tracks such things. The party's old habits die hard. ■

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Donald Trump and his critics

Where there's brass

WASHINGTON, DC

The president-elect against the muckrakers

NINE days before Donald Trump's inauguration as the 45th president, it was as if he was still fighting for election. In a press conference on January 11th, his first for six months, Mr Trump was as thin-skinned, loose-lipped and scrappy as he has ever been. He taunted his rivals and critics, real and suspected; he compared America's intelligence agencies to Germany's Nazi regime. He bragged continually ("Nobody has ever had crowds like Trump has had"), scrambling the fact-checkers of media outlets, some of whom he also decried. He called CNN a pedlar of "fake news". Mr Trump's fans said they wanted a different kind of leader. America is about to get one.

That Mr Trump seemed exercised was understandable. The previous day CNN reported that the agencies had attached a summary of some unsubstantiated allegations about the president-elect to an intelligence briefing on Russian hacking, which they delivered to Barack Obama and him. Among the allegations, which were reportedly furnished by a British intelligence company working for opponents of Mr Trump, were claims that the Russians held compromising financial and personal information about him, and that members of his campaign team had been in contact with Russian officials.

Mr Trump denounced the claims. Unable to refrain from addressing some of their spicier details, which were published separately online, he claimed that he was too canny to misbehave, as had been luridly alleged, in a foreign hotel room. "In those rooms, you have cameras in the strangest places, cameras that are so small with modern technology." Anyway, he added, "I'm also very much a germaphobe." Whether the allegations, which had been circulating among journalists, should have been attached to the intelligence briefing is hard to say. The agencies apparently considered the British source credible; though one or two of its milder claims were swiftly disproved.

Mr Trump's fulminating against CNN was part of a pattern. Journalists can expect to be lambasted by the next president whenever their reports displease him. In the past few weeks, he has gone after America's spies, rubbishing the agencies' conclusion that Russian hackers worked to hurt Hillary Clinton's chances and boost his, during the election. He also questioned the spooks' credibility: "These are the same people who said Saddam Hussein had weapons of mass destruction".

It never looked wise for Mr Trump to lambast proud institutions he will soon preside over. The same could be said of his attacks on judges, generals and environmental regulators. It is tempting to see *CNN*'s leaked story as an early sign of the backlash such attacks have invited. In his press conference, he was more conciliatory. He said for the first time that he believed Russia was behind the hacking—but, he added, "it could have been others also".

Mr Trump has made his reputation by stirring conflict. It was his damn-your-eyes style, as much as any policy proposal, that chimed with the anti-establishment sentiment of his keenest supporters. This was not only posturing; he appears to view life, whether in business, politics or trade negotiations, as a series of fights from which only the winner emerges with credit. His victory, naturally, has not changed that. Asked to justify his claim that Americans are not bothered by his, highly irregular, refusal to release his tax returns, despite polling to suggest that they are bothered, Mr Trump replied simply: "I won." Beneath the bluster, however, he has offered hints of greater pragmatism.

For example, he maintains that he will honour his signature campaign promise, to build a wall along America's southern border, and make Mexico carry the cost. But he suggests that will not be in terms of "payment". Perhaps he has in mind the proceeds of another campaign promise, to levy a "major border tax on these companies that are leaving". In the absence of further details, Republican congressmen will hope this turns out to be less protectionist than it sounds. Some are lobbying Mr Trump's team to consider a possible alternative arrangement to tariffs, known as border adjustment, designed to incentivise exports. It would involve firms losing the right to deduct the cost of imports from their taxable profits; at the same time, they would no longer be taxed on foreign earnings. It is possible to imagine Mr Trump earmarking Mexico-related revenues from border adjustment to pay for whatever wall, or fence, he ended up building.

To the consternation of some Republican hardliners, he has also weighed in on their efforts to scrap Mr Obama's health-care reform. As *The Economist* went to press, Republicans in the Senate were expected to pass a budget plan that would allow them to evade the filibuster and start dismantling Obamacare. Mr Trump says he wants it repealed pronto. But to minimise the disruption this would cause, he also says the reform must be replaced by an alternative arrangement "essentially simultaneously". That is sensible, even if the time-frame is unrealistic; neither Mr Trump nor his party has settled on an alternative to Obamacare. The issue may prove to be the first test of the accommodation Republican congressmen have made with a leader few supported in the primary.

There was also potential for discord over the Senate confirmation hearings that took place this week for several of Mr Trump's cabinet picks. One of the most eagerly-awaited, for Senator Jeff Sessions, in fact passed off fairly smoothly. A hardliner on criminal justice and immigration, dogged by historic allegations of racism, Mr Sessions was treated pretty gently by his fellow senators. The putative next secretary of state, Rex Tillerson, former boss of Exxon Mobil, got tougher questions, especially over his former closeness to the Russian government. Mr Tillerson appeared to struggle over Exxon's past lobbying against possible sanctions on Russia and when asked to condemn President Vladimir Putin as a war criminal.

This was a reminder that concerns about Mr Trump's strange fondness for Mr Putin go beyond salacious, unverified allegations. It is not clear why the next president seems reluctant to condemn Mr Putin's excesses or fully accept the conclusion on Russian hacking reached by America's own spy agencies. That is troubling. ■

Intelligence agencies and the presidency

Burn before reading

Donald Trump may dispense with intelligence that other presidents have relied on

THE meeting on January 6th between Donald Trump and America's four most senior intelligence officials was never going to be easy. For months, Mr Trump had poured scorn on the conclusion of America's intelligence agencies that Russia had launched a hacking operation aimed at subverting the presidential election. Mr Trump was even more miffed by the recent allegation that the hacking had been intended to secure his victory. Although no view had been expressed by the intelligence agencies as to whether the Kremlin's efforts had affected the outcome of the election, Mr Trump suspected a ploy to undermine his legitimacy. Worse still, the agency heads had also decided to apprise Mr Trump of serious but unsubstantiated allegations that Russia had compromising material on the president-elect and on Russian contacts with his campaign team.

Unhelpfully, Mr Trump's choice of national security adviser (NSA), Lieutenant-General Mike Flynn, was fired from his job as head of the Pentagon's Defence Intelligence Agency (DIA) by one of the spy chiefs in the room, Lieutenant-General James Clapper, the director of national intelligence, and had entered into a losing turf war with another, John Brennan, the director of the CIA. Mr Flynn had been a respected intelligence officer, helping special forces in Iraq and Afghanistan. But once picked by Mr Clapper to gee up the 16,000-strong DIA bureaucracy, he struggled as a manager and clashed with other intelligence agencies, particularly over Islamist extremism, which he felt they were underplaying. He had a point, but in the two years after leaving the DIA his views have become stridently Islamophobic. Another hobby horse, not shared by many other intelligence officers, is that Russia can be an ally in restraining Iran and fighting jihadists. Given this history, Mr Flynn is not the person to ease his master's suspicions of America's spooks.

Circle of trust

Since the time of John F. Kennedy, presidents and their closest defence and foreign-policy advisers have received a six- to eight-page daily brief (known as the PDB or "the daily book of secrets"), now put together by the director of national intelligence's office but drawing on all America's vast intelligence resources. According to David Priess, a former senior CIA presidential briefer who has written a history of the PDB, at its best it provides presidents with unique insights into foreign leaders' thinking and emerging threats.

The only president who declined to receive the PDB was Richard Nixon, who believed (without any evidence) that the supposedly liberal-leaning CIA had sabotaged his 1960 election campaign by providing exaggerated estimates of a "missile gap" with the Soviet Union that Kennedy was able to exploit. But unlike Mr Trump, after eight years as vice-president Nixon was a genuine foreign-policy expert. As Mr Priess points out, he also had the formidable Henry Kissinger as his NSA. Mr Trump has already suggested that he will not want to see the PDB every day.

General Michael Hayden, a former director of the National Security Agency and George W. Bush's last director of the CIA, says that intelligence briefers have the same challenge with any new president: "There's the fact [intel] guy and the vision guy; one's a pessimist, the other's an optimist. The intel guy has to find a way to get into the head of the president while not forgetting what got him into office." However, Mr Hayden admits that Mr Trump represents that challenge in a particularly extreme form.

Mr Hayden wonders whether someone who has so much confidence in his instincts and doesn't read much will take on board what the spies are telling him. His advice for the new head of the CIA, Mike Pompeo, is that his people cannot allow this to affect their work. He believes that the way to "break in" will be through the vice-president-elect, Mike Pence. The PDB will also go to Generals Jim Mattis at the Pentagon and John Kelly at Homeland Security, both of whom know how to absorb intelligence (he thinks the same should be true of Rex Tillerson, the former boss of Exxon Mobil, who has been nominated to be secretary of state).

The intelligence agencies will do their best to adapt to a Trump presidency. But the chances of finding a workable compromise with the new president are not helped by the presence of Mr Flynn, who sees himself as a provocateur rather than someone like Brent Scowcroft or Stephen Hadley (two NSAs under Republican presidents) who viewed their job as making every element of the foreign policy and national security machine hum on behalf of the president. As one person who knows and used to admire Mr Flynn puts it: "You might not want him to be the one shooting pool with this president." ■

Conflicts of interest

Two out of four

NEW YORK

Mr Trump's new plan to put his firm at arms length doesn't go far enough

THE president-elect's press conference on January 11th touched on fake news, the F-35 combat jet, beautiful military bands, the incredible smallness of hidden cameras in hotel rooms, Jack Ma, a Chinese tycoon, the Miss Universe contest, a very, very, very amazing property developer in Dubai, and Rhona, his personal assistant, among other things. Buried in there was also Donald Trump's proposal to deal with a problem that could ruin his presidency: the potential for conflicts of interest between his business interests and his public office. Unfortunately, Mr Trump's new plan only gets half marks.

Under a quirk in American law the president is exempt from the normal rules that police politicians' conflicts. Mr Trump's sternest critics argue that the only remedy is for him to sell the Trump Organisation, a mediocre, medium-sized property firm whose commercial clout is exaggerated by both Mr Trump and his enemies. But that is both impractical and unfair. A full disposal or initial public offering of a portfolio worth some $4bn could take a year or more. And it does not seem reasonable that entrepreneurs involved in public life should have to liquidate their business. Instead, Mr Trump needs to show that he has put his firm at arms length.

To be convincing there are four tests that any plan has to meet. First, Mr Trump's business interests need to be gathered into one holding company. At the moment the Trump Disorganisation would be an accurate name for his activities, which sprawl over about 500 legal entities, most of them zombies and most held by him directly. The proposal passes this first test: by January 20th, his lawyers promise, all his assets will be folded into a single trust.

The second test is that the Trump Organisation should stop seeking out new investments and instead run its existing operations as cash cows and distribute any profits. Here the plan only gets half-marks. Mr Trump has ruled out new foreign investments. New deals at home will be subject to "severe restrictions" and vetted by ethics experts, but not banned.

Third, the business must be transparent to the public. It should publish consolidated accounts that reveal its operations and finances in detail. Again, the plan scores only half marks, here. Mr Trump's lawyers say it will publish only simplified financial statements. Their logic is that this will prevent Mr Trump from having detailed knowledge of what is happening and thus make conflicts less likely. It's a silly argument: Mr Trump is already intimately familiar with his own firm. Much better to put everything out in the open.

Lastly, to be at arms length from the presidency, the business would need to be run by an independent board and management. Under the proposals Mr Trump's eldest sons, Donald junior and Eric, will run the firm, along with Allen Weisselberg, a long-standing Trump executive. There are circumstances in which relatives of politicians can run companies without raising ethical problems. But Mr Trump's two sons were closely involved in his political campaign and have established no separate business identities or serious credentials of their own. They aren't independent of him. So the plan fails the fourth test.

Perhaps Mr Trump and his lawyers will further improve the plan. If they don't Mr Trump may find that his presidency is dogged by allegations of corruption. They have until January 20th to come up with something a bit better. ■

Shakers

Not too shaken

SABBATHDAY LAKE, MAINE

The death of one of the last Shakers may not mean the community's demise

"I'M GLAD I am a Shaker", sang some 300 people in the chapel of the dwelling house of the last active Shaker settlement in the world. They clapped and stamped their feet on the wooden floors during the hymn's chorus. "O Brethren Ain't Ye Happy?" is an old Shaker song and one of the few "motion songs" still in the Shakers' repertoire. But only two people in the packed chapel were actual Shakers. The rest had come to the Sabbathday Lake, a Shaker village about 25 miles from Portland, Maine, to say goodbye to Sister Frances Carr (pictured), the last lifelong Shaker, who died on January 2nd. But since the two remaining Shakers, Brother Arnold Hadd and Sister June Carpenter, are aged 60 and 78 respectively, some wondered aloud whether this was a prelude to a funeral for the entire sect.

Frances Carr, last in a long line

At their height in the mid-19th century, Shakers numbered about 6,000, with 19 settlements, mainly in New England, New York and Kentucky. An offshoot of Quakers, the Shakers began in England in the 1740s. Seeking religious freedom, they left for the colonies on the eve of the American Revolution. Their rise coincided with a religious fervour sweeping the frontier. Decades before emancipation and 150 years before women had the vote, Shakers practised social, gender and racial equality for all members.

Shakers believe in the three "C's", celibacy, communal living and confession. They do not marry, so must rely on conversion to fill their ranks. Men and women live as brothers and sisters. Recruits must give up their families, property and worldly ties. Stephen Stein, author of "The Shaker Experience in America" compares them to a monastic group. In many ways theirs is an American creed. Shakers value hard work, seeing labour as a form of prayer. They strive for perfection, which earned them a reputation for well-made simple furniture. Shakers dress plainly and might be mistaken for Amish, but they do not shun society. Since the sect's earliest days, members sold goods to outsiders and shared oxen and other equipment. They also like technology: the Sabbathday Lake Shakers are on Facebook.

In Sabbathday Lake as in other former Shaker villages, Friends of the Shakers raise money to preserve archives and buildings. Many Friends attend Sunday services, but few opt to join the faith. Presumably they will want to continue worshipping even after the last Shaker is gone. In the meantime, the Shakers continue to look for recruits. Over the past 40 years, a few dozen have joined, but only a handful stayed. A decade ago there was a fourth Shaker at Sabbathday Lake, but he left when he fell in love with a visiting journalist. More recently, a young man joined, but left after a year. The Shakers pray for new movers.

Jeff Sessions

Past and prologue

ATLANTA

The nominee for attorney-general has some troubling ideas about justice

SOME were on the right side from the beginning. Other white southern gentlemen of Jeff Sessions's vintage—the incoming attorney-general is 70—changed their views on race and society after moments of epiphany. Still others made crab-like accommodations with reality, considering themselves free from prejudice on the grounds that they opposed its violent manifestations. Where Mr Sessions belongs on this spectrum of conscience was an implicit theme of his confirmation hearing this week before the Senate Judiciary Committee. Given the powers of his new office, it is more than an arcane question.

His career in public service began in Mobile, Alabama—as, in a sense, did Donald Trump's campaign, at an encouragingly big rally that Mr Sessions attended. His long spell as a federal attorney there, before a short one as the state's attorney-general, also gave rise to allegations that derailed his nomination to a federal judgeship in 1986. Then the judiciary committee—on which, as senator, he later sat—heard accounts of racially insensitive comments, such as a disparaging reference to the NAACP, a joke about the Ku Klux Klan and an accusation that he addressed a black underling as "boy". A crux then, revisited this week, was a trial in 1985 in which Mr Sessions oversaw the prosecution for vote-tampering of three civil-rights activists, one a former associate of Martin Luther King, a case seen by some as a selective bid to intimidate black voters.

"Damnably false charges," Mr Sessions insisted. "I abhor the Klan," he protested, invoking his role in the capital conviction of a Klansman for a murder in 1981. In a submission to the committee he also highlighted cases he pursued involving voting rights and school desegregation. (In a tetchy exchange, Senator Al Franken quoted lawyers who say Mr Sessions exaggerated his part in some of those.) Old friends in Mobile, where he still lives, vouch for his fair-mindedness. Charles Hale, his pastor, has "never seen one iota of racial prejudice", adding that Mr Sessions and his wife have "humble hearts" and modest tastes: "they live by their faith". "I don't believe anything they have accused him of," says Billy Bedsole, in whose law practice Mr Sessions worked for two stints.

Wayne Flynt, a historian, suggests Mr Sessions's outlook on race should be judged less on contested remarks than by his actions, or lack of them. By his own admission, as a young man at a segregated school and then a Methodist college, he was no civil-rights hero; rather, as Mr Flynt puts it, he "moved with the culture", in which overt racism was declining. How to judge this history, and the statute of limitations on old mistakes, might seem moot debates—except, say Mr Sessions's critics, these episodes are connected to his latter-day policy views, together casting doubt on his ability to do his new job fairly.

Take voting rights. He spoke this week of upholding the "integrity of the electoral process," again raising wildly overblown fears of fraudulent voting and justifying voter-ID laws, some of which federal judges have found discriminatory. Under Barack Obama, the Department of Justice has helped to bring complaints against such laws, in particular after the Supreme Court neutralised the bit of the Voting Rights Act that required some states (including Alabama) to clear new voting rules in advance. Mr Sessions applauded that damaging judgment; how keenly he will defend voting rights is unclear. So is the strength of his commitment to gay rights, given his opposition to extending various legal protections on the basis of sexuality.

Next, policing. The outgoing administration has investigated and enforced reform in police departments such as Ferguson, Missouri's, which have forfeited the trust of their communities. Mr Sessions has voiced scepticism about that process and might curtail it; he worried this week that police officers have been "unfairly maligned". Inimai Chettiar of the Brennan Centre for Justice predicts that a hands-off approach could create a perception among police that there is "no oversight", emboldening miscreants and in turn heightening tensions between officers and minorities.

A long career can be hard to assess definitively not only because norms evolve and memories fade, but since it is liable to be complex, even contradictory. On the racially charged question of criminal justice, for example, Mr Sessions's record has wrinkles. He pushed to reduce the disparity in punishments for crack and powder cocaine offences. On the other hand, he resisted reforms embraced by most Republicans, cleaving to mandatory minimum sentences. His views on drugs are ominously antiquated. "Good people don't smoke marijuana," he said last year.

Throw away the key

At the committee he tweaked his prior stance on waterboarding, which he now accepts is illegal. In the classic manner of those who prefer a small state except when they like it big, he had previously rebutted criticism of interrogation techniques, as well as favouring broad powers of electronic surveillance. (Likewise he approves of civil asset forfeiture, whereby property allegedly linked to crime can be seized.) At least on immigration, the issue that brought him and Mr Trump together, he is consistent. He has opposed reform, as well as executive actions that forestalled some deportations. Now, after his confirmation, he is set to oversee the immigration courts.

Mr Sessions's mantra was that the law was sacrosanct even if he disagreed with it, as he does on issues such as abortion and same-sex marriage. In that vein he repudiated not only waterboarding but an outright ban on Muslim immigration, another of the president-elect's erstwhile notions. He also said he would recuse himself from any decisions on investigating Hillary Clinton. "This country does not punish its political enemies," he averred. Those who think him a threat to America's rights and freedoms may not be entirely reassured. ■

A change is going to come

National parks

An Ear-full

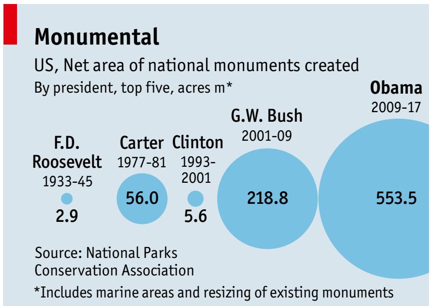
BEARS EARS, UTAH, AND GOLD BUTTE, NEVADA

Conservationists are delighted by President Obama's two new monument designations. Conservatives are irate

ETCHED into the sandstone of "Newspaper Rock" in Gold Butte, Nevada—an area of vividly coloured desert punctuated by Joshua trees and sublime rock formations—are more than 650 depictions of tortoises, feet and cradleboards chiselled by native Americans as long as 2,000 years ago. On December 28th, Barack Obama designated Gold Butte as a national monument, using the Antiquities Act of 1906. The same day he also granted the same status to Bears Ears in south-eastern Utah. During his eight years as president, Mr Obama has designated 553m acres as national monuments—more than twice as much as any other president.

Gold Butte, where he set aside 300,000 acres of Nevada desert, and Bears Ears, where he protected 1.35m acres surrounding twin buttes that jut upwards from the landscape like ears from a bear's head, are the final additions. The celebrations and uproar sparked by the new monument designations are a proxy for a long-running debate over federal land, which makes up more than half the territory of the 13 states west of Texas. During the 1970s and 1980s, Sagebrush Rebels, named after the sagebrush steppe that covers much of the rural West, fought for increased local control of public lands, if not the outright transfer of them to states. The fracking booms enjoyed by other states rich in wide-open spaces have given fresh impetus to those who dream that the desert West might be a gold mine, if only the feds would get out of the way.

The recognition of Bears Ears as a national monument is particularly controversial. The most strident calls for its protection came from a coalition of five native American tribes for whom the area is sacred. The tribes have occupied the land for centuries—many Navajos sought refuge there to avoid the guns of Kit Carson, an American soldier and frontiersman, and forced relocation by federal government in the 1860s. The area remains rich in stone carvings and ruins of Navajo dwellings. "The way that we live is finally being acknowledged," says Jonah Yellowman, a Navajo spiritual leader, at his home overlooking the buttes of Monument Valley.



Other Utahns are less excited. Tim Young, a pharmacist and the mayor of Monticello, a town of 2,000 that abuts Bears Ears, has adorned his pharmacy's windows with stickers that read "NO MONUMENT" inside the outline of a black bear. He is not against a monument in general but he says that the size—nearly twice that of Utah's five national parks combined—is a prime example of federal overreach. He has explored the area at length on his dirt bike and says that while there are certainly bits worthy of protection, some of the new national monument land is "just sand and rock". He adds: "Whoever says otherwise hasn't visited."

The designations might not stick. A president has not rescinded a previous president's monument designation since the Antiquities Act was introduced. An attorney-general's opinion from 1938 suggests doing so might be legally thorny. But no law clearly prohibits such an action. Mr Trump has vowed to reverse all of his predecessor's executive orders on his first day in office; Jason Chaffetz and Rob Bishop, two of Utah's congressmen, hope that includes Mr Obama's "midnight" monument proclamations.

The two collaborated on legislation last year that aimed to balance conservation and development in the Bears Ears area. (The bill failed to pass before Congress adjourned for the winter holidays.) "The president elected to do what the radical environmentalists wanted him to do without taking into consideration economic development, energy development and all the things that should have been taken into consideration," Mr Chaffetz complains. If Mr Trump does not reverse it, he and Mr Bishop plan to push for a legislative reversal. The transfer of federal lands to state hands was included in the Republican Party's platform at last July's convention. Congressional rules passed on January 3rd, the first day of the House's new session, included a provision drawn up by Mr Bishop that will make such transfers easier by assuming they would have no impact on the federal budget.

Those who think the federal government should remain in charge fear state ownership would result in reduced public access for activities such as hiking, hunting and fishing, or that land would be flogged to private buyers. It is expensive and complicated to manage; federal-land advocates worry that states might acquire land only to be forced to sell it to balance their budgets. A report by the Wilderness Society, an advocacy group, reveals that Idaho has sold 40% of its land since statehood. A poll by the Colorado College State of the Rockies Project suggests most westerners oppose transferring control of public lands to the states.

Mr Trump's past statements and cabinet selections suggest that even if he sides with Mr Bishop when it comes to Bears Ears, he might resist a push to give states control of public lands. His pick for interior secretary, Ryan Zinke, stepped down from his position as a Republican convention delegate last year because he disagreed with the position on federal-land transfers. In a conversation with *Field & Stream* magazine last January, Mr Trump said: "I don't like the idea because I want to keep the lands great, and you don't know what the state is going to do…Are they going to sell if they get into a little bit of trouble? And I don't think it's something that should be sold. We have to be great stewards of this land. This is magnificent land." ■

Lexington | How to use superpowers

The incoming foreign-policy team has in mind a revolution in great-power relations

"THE world is a mess," observed Madeleine Albright this week at a gathering of men and women who have, between them, witnessed every crisis to buffet American national security for 40 years. That crisp summary by the former secretary of state prompted bipartisan agreement at a "Passing the Baton" conference organised by the United States Institute of Peace (USIP) in Washington, DC, on January 9th and 10th.

The meeting featured future leaders of Donald Trump's national security team, their predecessors from the Obama government and—gamely emerging from post-election seclusion—folk who would have filled some of the same posts under Hillary Clinton. However, once participants began to ponder the ways in which the world is messy, agreement gave way to revealing divisions. On one side stood Republican and Democratic ex-ambassadors, officials, generals and academics who do not cheer a world in disarray. They see the rise of iron-fisted nationalists in China, Russia and Turkey, and fear that democracy's post-cold-war march is over. They contemplate the fragility of international pacts, organisations and alliances and wonder if the rules-based order founded by America after the second world war will survive. On the other stand leading members of Team Trump, who call today's global turbulence an exciting chance to reshape international relations to suit America.

The first group make the American-led, rules-based order sound precious but brittle. Susan Rice, the national security adviser to Barack Obama, called the global security landscape "as unsettled as any in recent memory". She listed some threats that worry Mr Trump as much as her boss, from North Korea's nuclear ambitions to attacks by transnational terrorist groups. But then she ran through more divisive problems—areas of vulnerability which, in her telling, cry out for patient American attention. Ms Rice would have America lead global action on climate change, and prop up a Europe that feels buffeted by refugee flows from the Middle East, by the Brexit vote and by "Russian aggression", including deliberate campaigns by Russia to meddle in elections across the West. Ms Rice lamented her boss's fruitless efforts to ratify a trade pact with Asia-Pacific nations, the Trans-Pacific Partnership (TPP). "If we don't define these rules of the road, others will," she declared. "Failure to move forward on TPP is eroding American regional leadership and credibility, with China standing to gain strategically and economically."

Jacob Sullivan, a close adviser to Mrs Clinton, cited the deal to curb Iran's nuclear ambitions and the Paris agreement on climate change as examples of imperilled co-operation. Stephen Hadley, who held Ms Rice's job under President George W. Bush, expressed concerns that the American-led international order itself is "under assault". He imagined a conversation in which President Vladimir Putin of Russia and President Xi Jinping of China agree that America is a menace peddling hostile ideas of democracy from Ukraine to Hong Kong.

Trump aides, by contrast, are impatient with talk of fragility and complexity. Though they worry about terrorism and rogue states with nukes, they also see a world in a thrillingly plastic state. It is anyone's guess where Mr Trump's foreign policies will end up—he shunned details on the campaign trail and has appointed figures with clashing views to some top jobs. But supporters of Team Trump express confidence that curbing the menace of Iran, for instance, requires more pressure and sanctions, not concessions to strengthen pragmatists within the regime. They scoff at the idea that the natural environment is fragile enough to need a climate-change pact—and indeed hail cheap American oil and gas as a source of global leverage.

As for nationalism and populism, they are not a menace: they are how Mr Trump won. Stephen Bannon, Mr Trump's chief strategist, has told visitors to Trump Tower, with relish, that he thinks an anti-establishment revolt will sweep the far right to power in France and topple Chancellor Angela Merkel in Germany. Mr Bannon would like America to unwind sanctions against Russia, imposed after the annexation of Crimea, in order to secure Russian help in constraining Iran, Islamic terrorism and even China.

Other people's nationalists

A retired general, Mike Flynn, chosen as Mr Trump's national security adviser, spoke freely in 2016 about his hopes that Russia and America could join forces against their "common enemy", Islamist extremism. Now, amid a furore about Russian meddling in the American presidential election, as detailed in a report issued by Mr Obama's spy chiefs, Mr Flynn contented himself with discreet hints that Mr Trump would "examine and potentially re-baseline our relationships around the globe".

Mr Flynn's deputy in the NSC will be K.T. McFarland, a veteran Republican hawk. She described a world where tectonic plates are moving, offering once-in-a-generation opportunities to exert leverage and realign policies. Where once Ronald Reagan promoted human rights in the Soviet Union, Ms McFarland chides America for "constantly" telling other countries "how they should think". She sees Mr Trump gaining global strength, above all, from the breadth and intensity of his domestic support, after he drew in voters who had tuned out of politics. Such disaffected citizens feel "back in the game", she says. That makes their country not just indispensable—the old claim made for America by Bill Clinton—but "unstoppable".

Team Trump is making a bet on assertive nationalism as a way of imposing America's will on a world that can stand a bit of arm-twisting. Peace through strength, they call it, reviving a Reagan-era slogan. But other countries have assertive populations, too. In the absence of clear global rules, Mr Trump may find himself pitting his populist mandate to "make America great again" against Chinese nationalism, say. Could get messy. ■

Mexico and the United States

Bracing for impact

PUEBLA

Dealing with the consequences of Donald Trump

WHEN an asteroid hit Earth 66m years ago, wiping out the dinosaurs and 75% of plant and animal species, it hurt Mexico first. Donald Trump's inauguration is far less frightening, but Mexicans can talk of little else.

Outside a massive Volkswagen (VW) factory in Puebla, two hours' drive from Mexico City, workers fret about Mr Trump's threats to whack big tariffs on cars made in Mexico. One American carmaker—Ford—cancelled plans to build a $1.6bn plant in San Luis Potosí, some five hours farther north. It may have had other reasons for doing so, but workers in Puebla are not reassured.

"We're frustrated," says Ricardo Méndez, an equipment repairman who works for one of VW's suppliers. He had expected his employer to send him to work at the new Ford plant. Between bites of spicy chicken taco, Santiago Nuñez, who works for another VW supplier, vows to boycott the American carmaker.

The anger and bewilderment in Puebla is felt across Mexico. Mr Trump's promises to make Mexico pay for a border wall, deport millions of illegal immigrants and rip up the North American Free-Trade Agreement (NAFTA) were among the few consistent policies in his largely substance-free election campaign. He has not lost his taste for Mexico-bashing. In a press conference on January 11th, his first since July, Mr Trump repeated his claim that Mexico is "taking advantage" of the United States. Mexicans can only wait and wonder how he intends to act on that misguided notion.

The Trump presidency streaking toward Mexico is already causing problems. Inflation has started rising in response to the devaluation of the peso caused by his election. The central bank raised interest rates five times in 2016; it will probably have to continue tightening. After a sharp rise in public debt as a share of GDP over the past several years, the government must curb spending.

Over the past few months economists have lowered their forecasts for GDP growth in 2017, from an average of 2.3% to 1.4%. On January 1st the government cut a popular subsidy by raising petrol prices by up to 20%. Six people died in the ensuing protests.

If Mr Trump declares economic war, things could get much worse. The economy could stumble into recession, just as Mexico is preparing for a presidential election in 2018. Mr Trump's pugilism increases the chances that Andrés Manuel López Obrador, a left-wing populist, will win. He would probably counter American protectionism with the sort of self-destructive economic nationalism to which Mexico has disastrously resorted in the past. Vital reforms of energy, telecoms and education, enacted under Mexico's current president, Enrique Peña Nieto, might be reversed.

Mexican officials think the Trump presidency poses two main dangers. The first is that the United States will renounce NAFTA, which it can do after six months' notice, or simply shred it by putting up trade barriers. The second is that, as a way of forcing Mexico to pay for the wall, Mr Trump will carry out his threat to block remittances from immigrants in the United States. These inject some $25bn a year into Mexico's economy.

The president-elect's other big anti-Mexican idea, to dump millions of illegal immigrants on Mexico's northern border, is seen as a lesser threat. Under Barack Obama, the United States deported some 175,000 Mexicans a year; Mr Trump will find it hard to increase that number. Republican plans to tax imports as part of a reform of corporate income tax would hit Mexico hard. The government sees that as a problem to be addressed by the United States' trading partners in concert, rather than by Mexico alone.

It's Donald. Duck!

Mr Peña's instinct is to act as if Mr Trump is more reasonable than he seems. He showed his conciliatory side when he invited Mr Trump to Mexico City in August during the election campaign. The ersatz summit, at which Mr Peña failed to tell Mr Trump publicly that Mexico would not pay for his wall, so enraged Mexicans that Luis Videgaray, the finance minister who had suggested the meeting, was forced to quit. Now Mr Peña has brought him back, as foreign minister. But his tone has become tougher. Mr Peña now rejects Mr Trump's attempts to influence investment "on the basis of fear or threats".

To some, the rehiring of Mr Videgaray looks like a smart move. He is thought to be friendly with Jared Kushner, Mr Trump's son-in-law, who is to become an adviser in the White House (on trade, among other ▸▸

things). Mr Trump himself praised Mr Videgaray after his sacking as a "brilliant finance minister and wonderful man".

But Mexicans regard him with disdain. In turning to a member of his inner circle to manage Mexico's relationship with the United States, Mr Peña missed a chance to hire someone with fresh ideas. Mr Videgaray "can have lunch at the White House", notes Shannon O'Neil of the Council on Foreign Relations in New York, but she worries that his focus "will just be on the Oval Office". To press its case that the United States has more to gain from working with Mexico than from walloping it, the government must talk to congressmen, state politicians and business leaders. It should also mobilise the 35m people of Mexican origin living in the United States.

Mexico thinks it has killer arguments for building on the partnership rather than destroying it. Some 5m American jobs depend on trade with Mexico; when Mexico ships goods north, 40% of their value comes from inputs bought from the United States. Officials hope that the new administration will opt for the fluffiest versions of Trumpism. Instead of repealing NAFTA, perhaps Mr Trump will renegotiate it, incorporating new standards for protecting intellectual property and the environment. Another tactic under consideration is to boost imports from Mexico's NAFTA partners. The thinking is that reducing Mexico's trade surplus with the United States, about $59bn last year, would give Mr Trump a victory he could sell to his protectionist supporters.

If conciliation fails, Mexico has few attractive options. In a trade war, it would suffer horribly. Raising its own tariffs would hurt its own consumers. Yet that does not mean that Mexico is defenceless. In 2009 it imposed tariffs on nearly 100 American products, including strawberries and Christmas trees, after the United States barred Mexican lorries from its roads to protect the jobs of American drivers. That got the attention of American politicians: the pro-trade lobby prevailed.

Mexican analysts are thinking about how the country might fight the next skirmish. Maize, grown mainly in states that voted for Mr Trump, will be a tempting target. The United States sold about $2.5bn-worth to Mexico in 2016. Faced with the loss of their biggest market, American maize farmers might press the White House to relent. On January 6th 16 American farming groups warned in a letter to Mr Trump and Mike Pence, the vice-president-elect, that disrupting trade with Mexico and other countries would have "devastating consequences" for farmers, who are already suffering from low prices.

For now, Mexicans are praying that Mr Trump will prove more temperate in office than during his meteoric rise. There is little evidence that will happen. ■

Transport in Toronto

Laggard on the lake

TORONTO

A mayor's plans may run into roadblocks

FEW cities these days have the cachet of Toronto. It ranks high on lists of the world's most "liveable" cities (the Economist Intelligence Unit, a sister company of *The Economist*, put it fourth last year). Drake, a popular rapper, is an enthusiast for his home town. Lovers of diversity are attracted to Canada's biggest metropolis. Yet native Torontonians who have moved away are strangely resistant to returning home. John Tory, the city's mayor, who tries to lure them back, says they give two main reasons for saying no. The first is that the jobs are better in places like London and Hong Kong. The second is that Toronto's public transport is much worse.

Toronto's subway system has changed little since 1966, the year an east-west line was added to a U-shaped north-south track. In a ranking of subway systems in 46 cities by the OECD, a club of mostly rich countries, Toronto placed 43rd, with just 19km (12 miles) of track per square km of territory in 2003. The situation has not improved since then, while the population has grown. The last big extension of the network of buses, streetcars and surface rail opened more than a decade ago.

The city has been no more successful at building roads. Ambitious plans to build expressways into the city centre were cancelled or only partially realised, because they either went over budget or faced public opposition. Jane Jacobs, an urbanist, and Marshall McLuhan, a media theorist, led a protest against the Spadina Expressway, which was cancelled in 1971. The result is more traffic jams. According to the TomTom traffic index, Toronto was among the ten most congested cities in North America in 2015.

Mr Tory is the latest in a long line of mayors who has promised to get the city moving again. His plan, dubbed SmartTrack, calls for building a new light-rail line (modelled on London's Crossrail) and adding six stations to existing commuter rail lines. He wants to help pay for that (and other transport projects) by charging tolls on two highways that funnel traffic downtown. That would raise C$200m ($152m) a year. The federal and provincial governments would put up most of the money.

The toll proposal is bold. Earlier mayors have refused to put forward plans to finance transport schemes. None has dared take on suburban car owners so directly. Rob Ford, a crack-smoking mayor who died in 2016, was a fierce foe of any measure that could be construed as waging "war on the car". The city council backed Mr Tory's toll scheme on December 13th. He now awaits approval from Ontario, Toronto's province.

But history suggests that SmartTrack and the toll could falter. Earlier schemes failed when provinces refused to pay for them or newly elected city councils tossed them out. In 1995 a new provincial government abruptly stopped construction of a subway line and filled in the hole. Kathleen Wynne, Ontario's premier, may be reluctant to approve a charge on drivers. She faces a tough re-election fight next year.

Transport infrastructure is plagued by three problems of governance. The first is that the municipality of Toronto does not have a party system. In the 45-member city council the mayor is merely first among equals. His proposals must muster a majority from his council colleagues, each fighting for the interests of his or her ward. Without party discipline, support for projects can expire with each election.

The second problem is that responsibility for transit is shared among the city, the province and a provincial agency called Metrolinx, which runs commuter trains. They do not co-ordinate enough with one another, says Matti Siemiatycki of the University of Toronto. Finally, there is the role of the federal government, whose offers of money tempt cities to embark on silly projects. Critics point to federal backing for a proposed 6km subway extension that will cost C$3.2bn and have just one station.

Mr Tory cannot solve these problems himself. His ambition is more modest: a second term as mayor starting next year that would allow him to see through SmartTrack and his proposed road toll. That will not solve Toronto's transport problems, but it might persuade ex-Torontonians to give their city a second chance. ■

Joining an underground movement

The Economist

SPECIAL REPORT

LIFELONG EDUCATION

January 14th 2017

Learning and earning

Learning and earning

Technological change demands stronger and more continuous connections between education and employment, says Andrew Palmer. The faint outlines of such a system are now emerging

THE RECEPTION AREA contains a segment of a decommissioned Underground train carriage, where visitors wait to be collected. The surfaces are wood and glass. In each room the talk is of code, web development and data science. At first sight the London office of General Assembly looks like that of any other tech startup. But there is one big difference: whereas most firms use technology to sell their products online, General Assembly uses the physical world to teach technology. Its office is also a campus. The rooms are full of students learning and practising code, many of whom have quit their jobs to come here. Full-time participants have paid between £8,000 and £10,000 ($9,900-12,400) to learn the lingua franca of the digital economy in a programme lasting 10-12 weeks.

General Assembly, with campuses in 20 cities from Seattle to Sydney, has an alumni body of around 35,000 graduates. Most of those who enroll for full-time courses expect them to lead to new careers. The company's curriculum is based on conversations with employers about the skills they are critically short of. It holds "meet and hire" events where firms can see the coding work done by its students. Career advisers help students with their presentation and interview techniques. General Assembly measures its success by how many of its graduates get a paid, permanent, full-time job in their desired field. Of its 2014-15 crop, three-quarters used the firm's career-advisory services, and 99% of those were hired within 180 days of beginning their job hunt.

The company's founder, Jake Schwartz, was inspired to start the company by two personal experiences: a spell of drifting after he realised that his degree from Yale conferred no practical skills, and a two-year MBA that he felt had cost too much time and money: "I wanted to change the return-on-investment equation in education by bringing down the costs and providing the skills that employers were desperate for." ▸▸

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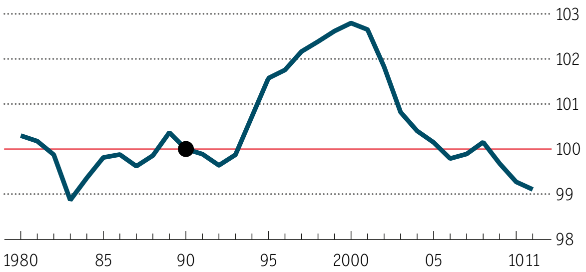
Economist.com/specialreports

Brain drain

US, average cognitive intensity of tasks done by employed college graduates
1990=100



Source: "The Great Reversal in the Demand for Skill and Cognitive Tasks", by P. Beaudry, D. Green & B. Sand, NBER Working Paper 18901

In rich countries the link between learning and earning has tended to follow a simple rule: get as much formal education as you can early in life, and reap corresponding rewards for the rest of your career. The literature suggests that each additional year of schooling is associated with an 8-13% rise in hourly earnings. In the period since the financial crisis, the costs of leaving school early have become even clearer. In America, the unemployment rate steadily drops as you go up the educational ladder.

Many believe that technological change only strengthens the case for more formal education. Jobs made up of routine tasks that are easy to automate or offshore have been in decline. The usual flipside of that observation is that the number of jobs requiring greater cognitive skill has been growing. The labour market is forking, and those with college degrees will naturally shift into the lane that leads to higher-paying jobs.

The reality seems to be more complex. The returns to education, even for the high-skilled, have become less clear-cut. Between 1982 and 2001 the average wages earned by American workers with a bachelor's degree rose by 31%, whereas those of high-school graduates did not budge, according to the New York Federal Reserve. But in the following 12 years the wages of college graduates fell by more than those of their less educated peers. Meanwhile, tuition costs at universities have been rising.

A question of degree, and then some

The decision to go to college still makes sense for most, but the idea of a mechanistic relationship between education and wages has taken a knock. A recent survey conducted by the Pew Research Centre showed that a mere 16% of Americans think that a four-year degree course prepares students very well for a high-paying job in the modern economy. Some of this may be a cyclical effect of the financial crisis and its economic aftermath. Some of it may be simply a matter of supply: as more people hold college degrees, the associated premium goes down. But technology also seems to be complicating the picture.

A paper published in 2013 by a trio of Canadian economists, Paul Beaudry, David Green and Benjamin Sand, questions optimistic assumptions about demand for non-routine work. In the two decades prior to 2000, demand for cognitive skills soared as the basic infrastructure of the IT age (computers, servers, base stations and fibre-optic cables) was being built; now that the technology is largely in place, this demand has waned, say the authors. They show that since 2000 the share of employment accounted for by high-skilled jobs in America has been falling. As a result, college-educated workers are taking on jobs that are cognitively less demanding (see chart), displacing less educated workers.

This analysis buttresses the view that technology is already playing havoc with employment. Skilled and unskilled workers alike are in trouble. Those with a better education are still more likely to find work, but there is now a fair chance that it will be unenjoyable. Those who never made it to college face being squeezed out of the workforce altogether. This is the argument of the techno-pessimists, exemplified by the projections of Carl-Benedikt Frey and Michael Osborne, of Oxford University, who in 2013 famously calculated that 47% of existing jobs in America are susceptible to automation.

There is another, less apocalyptic possibility. James Bessen, an economist at Boston University, has worked out the effects of automation on specific professions and finds that since 1980 employment has been growing faster in occupations that use computers than in those that do not. That is because automation tends to affect tasks within an occupation rather than wiping out jobs in their entirety. Partial automation can actually increase demand by reducing costs: despite the introduction of the barcode scanner in supermarkets and the ATM in banks, for example, the number of cashiers and bank tellers has grown.

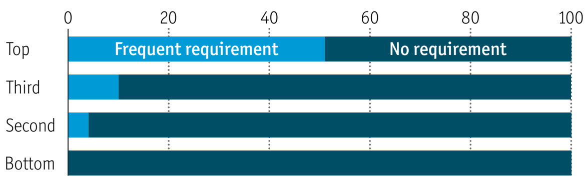
But even though technology may not destroy jobs in aggregate, it does force change upon many people. Between 1996 and 2015 the share of the American workforce employed in routine office jobs declined from 25.5% to 21%, eliminating 7m jobs. According to research by Pascual Restrepo of the Massachusetts Institute of Technology (MIT), the 2007-08 financial crisis made things worse: between 2007 and 2015 job openings for unskilled routine work suffered a 55% decline relative to other jobs.

In many occupations it has become essential to acquire new skills as established ones become obsolete. Burning Glass Technologies, a Boston-based startup that analyses labour markets by scraping data from online job advertisements, finds that the biggest demand is for new combinations of skills—what its boss, Matt Sigelman, calls "hybrid jobs". Coding skills, for example, are now being required well beyond the technology sector. In America, 49% of postings in the quartile of occupations with the highest pay are for jobs that frequently ask for coding skills (see chart). The composition of new jobs is also changing rapidly. Over the past five years, demand for data analysts has grown by 372%; within that segment, demand for data-visualisation skills has shot up by 2,574%.

A college degree at the start of a working career does not answer the need for the continuous acquisition of new skills, especially as career spans are lengthening. Vocational training is good at giving people job-specific skills, but those, too, will need to be updated over and over again during a career lasting decades. "Germany is often lauded for its apprenticeships, but the economy has failed to adapt to the knowledge economy," says Andreas Schleicher, head of the education directorate of the OECD, a club of mostly rich countries. "Vocational training has a role, but training someone early to do one thing all their lives is not the answer to lifelong learning."

Code to riches

US, % of online job postings requiring coding skills, by income quartile, 2015



Source: Burning Glass Technologies

Such specific expertise is meant to be acquired on the job, but employers seem to have become less willing to invest in training their workforces. In its 2015 Economic Report of the President, America's Council of Economic Advisers found that the share of the country's workers receiving either paid-for or on-the-job training had fallen steadily between 1996 and 2008. In Britain the average amount of training received by workers almost halved between 1997 and 2009, to just 0.69 hours a week.

Perhaps employers themselves are not sure what kind of expertise they need. But it could also be that training budgets are particularly vulnerable to cuts when the pressure is on. Changes in labour-market patterns may play a part too: companies now have a broader range of options for getting the job done, from automation and offshoring to using self-employed workers and crowdsourcing. "Organisations have moved from creating talent to consuming work," says Jonas Prising, the boss of Manpower, an employment consultancy.

Add all of this up, and it becomes clear that times have got tougher for workers of all kinds. A college degree is still a prerequisite for many jobs, but employers often do not trust it enough to hire workers just on the strength of that, without experience. In many occupations workers on company payrolls face the prospect that their existing skills will become obsolete, yet it is often not obvious how they can gain new ones. "It is now reasonable to ask a marketing professional to be able to develop algorithms," says Mr Sigelman, "but a linear career in marketing doesn't offer an opportunity to acquire those skills." And a growing number of people are self-employed. In America the share of temporary workers, contractors and freelancers in the workforce rose from 10.1% in 2005 to 15.8% in 2015.

Reboot camp

The answer seems obvious. To remain competitive, and to give low- and high-skilled workers alike the best chance of success, economies need to offer training and career-focused education throughout people's working lives. This special report will chart some of the efforts being made to connect education and employment in new ways, both by smoothing entry into the labour force and by enabling people to learn new skills throughout their careers. Many of these initiatives are still embryonic, but they offer a glimpse into the future and a guide to the problems raised by lifelong reskilling.

Quite a lot is already happening on the ground. General Assembly, for example, is just one of a number of coding-bootcamp providers. Massive open online courses (MOOCs) offered by companies such as Coursera and Udacity, feted at the start of this decade and then dismissed as hype within a couple of years, have embraced new employment-focused business models. LinkedIn, a professional-networking site, bought an online training business, Lynda, in 2015 and is now offering courses through a service called LinkedIn Learning. Pluralsight has a library of on-demand training videos and a valuation in unicorn territory. Amazon's cloud-computing division also has an education arm.

Universities are embracing online and modular learning more vigorously. Places like Singapore are investing heavily in providing their citizens with learning credits that they can draw on throughout their working lives. Individuals, too, increasingly seem to accept the need for continuous rebooting. According to the Pew survey, 54% of all working Americans think it will be essential to develop new skills throughout their working lives; among adults under 30 the number goes up to 61%. Another survey, conducted by Manpower in 2016, found that 93% of millennials were willing to spend their own money on further training. Meanwhile, employers are putting increasing emphasis on learning as a skill in its own right. ■

The role of employers

Cognition switch

Companies are embracing learning as a core skill

A STRANGE-LOOKING SMALL room full of vintage furniture—an armchair, a chest of drawers, a table—was being built in the middle of Infosys's Palo Alto offices when your correspondent visited in November. Tweed jackets hung from a clothes rack; a piano was due to be delivered shortly. The structure was rough and unfinished. And that, according to Sanjay Rajagopalan, was largely the point.

Mr Rajagopalan is head of research and design at the Indian business-services firm. He is a disciple of "design thinking", a problem-solving methodology rooted in observation of successful innovators. His goal is an ambitious one: to turn a firm that built a global offshoring business by following client specifications into one that can set the terms of its projects for itself.

Design thinking emphasises action over planning and encourages its followers to look at problems through the eyes of the people affected. Around 100,000 Infosys employees have gone through a series of workshops on it. The first such workshop sets the participants a task: for example, to improve the experience of digital photography. That involves moving from the idea of making a better camera to considering why people value photographs in the first place, as a way of capturing memories. As ideas flow, people taking part in the workshops immediately start producing prototypes with simple materials like cardboard and paper. "The tendency is to plan at length before building," says Mr Rajagopalan. "Our approach is to build, build, build, test and then plan."

That baffling structure in Palo Alto was another teaching tool. Mr Rajagopalan had charged a small team with reimagining the digital retail experience. Instead of coming up with yet another e-commerce site, they were experimenting with technologies to liven up a physical space. (If a weary shopper sat in the chair, say, a pot of tea on an adjacent table would automatically brew up.) The construction of the shop prototype in Infosys's offices was being documented so that employees could see design thinking in action.

Infosys is grappling with a vital question: what do people need to be good at to succeed in their work? Whatever the job, the answer is always going to involve some technical and specific skills, based on knowledge and experience of a particular industry. But with design thinking, Infosys is focusing on "foundational skills" like creativity, problem-solving and empathy. When machines can put humans to shame in performing the routine job-specific tasks that Infosys once took offshore, it makes sense to think about the skills that computers find harder to learn.

David Deming of Harvard University has shown that the labour market is already rewarding people in occupations that require social skills. Since 1980 growth in employment and pay has been fastest in professions across the income scale that put a high premium on social skills (see chart, next page).

Social skills are important for a wide range of jobs, not just for healthcare workers, therapists and others who are close to their customers. Mr Deming thinks their main value lies in the relationship between colleagues: people who can divide up tasks quickly and effectively between them form more productive teams. If work in future will increasingly be done by contractors and freelancers, that capacity for co-operation will become even more important. Even geeks have to learn these skills. Ryan Roslansky, who oversees LinkedIn's push into online education, notes that many software engineers are taking management and communications courses on the site in order to round themselves out.

Old dogs, new tricks

As people age, the brain changes in both good ways and bad

IF YOU ARE over 20, look away now. Your cognitive performance is probably already on the wane. The speed with which people can process information declines at a steady rate from as early as their 20s.

A common test of processing speed is the "digit symbol substitution test", in which a range of symbols are paired with a set of numbers in a code. Participants are shown the code, given a row of symbols and then asked to write down the corresponding number in the box below within a set period. There is nothing cognitively challenging about the task; levels of education make no difference to performance. But age does. Speed consistently declines as people get older.

Why this should be is still a matter of hypothesis, but a range of tentative explanations has been put forward. One points the finger at myelin, a white, fatty substance that coats axons, the tendrils that carry signals from one neuron to another. Steady reductions in myelin as people age may be slowing down these connections. Another possibility, says Timothy Salthouse, director of the Cognitive Ageing Laboratory at the University of Virginia, is depletion of a chemical called dopamine, receptor sites for which decline in number with advancing age.

Fortunately, there is some good news to go with the bad. Psychologists distinguish between "fluid intelligence", which is the ability to solve new problems, and "crystallised intelligence", which roughly equates to an individual's stock of accumulated knowledge. These reserves of knowledge continue to increase with age: people's performance on vocabulary and general-knowledge tests keeps improving into their 70s. And experience can often compensate for cognitive decline. In an old but instructive study of typists ranging in age from 19 to 72, older workers typed just as fast as younger ones, even though their tapping speed was slower. They achieved this by looking further ahead in the text, which allowed them to keep going more smoothly.

What does all this mean for a lifetime of continuous learning? It is encouraging so long as people are learning new tricks in familiar fields. "If learning can be assimilated into an existing knowledge base, advantage tilts to the old," says Mr Salthouse. But moving older workers into an entirely new area of knowledge is less likely to go well.

Building a better learner

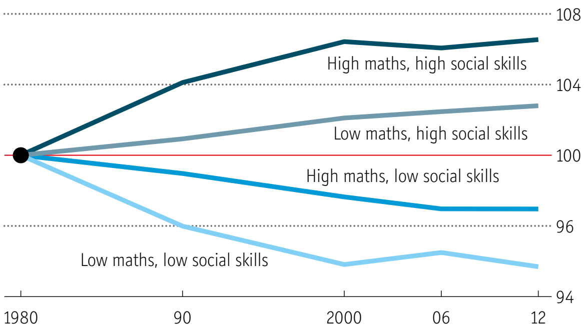
Another skill that increasingly matters in finding and keeping a job is the ability to keep learning. When technology is changing in unpredictable ways, and jobs are hybridising, humans need to be able to pick up new skills. At Infosys, Mr Rajagopalan emphasises "learning velocity"—the process of going from a question to a good idea in a matter of days or weeks. Eric Schmidt, now executive chairman of Alphabet, a tech holding company in which Google is the biggest component, has talked of Google's recruitment focus on "learning animals". Mark Zuckerberg, one of Facebook's founders, sets himself new personal learning goals each year.

An emphasis on learning has long been a hallmark of United Technologies (UTC), a conglomerate whose businesses include Pratt & Whitney, a maker of aircraft engines, and Otis, a lift manufacturer. Since 1996 UTC has been running a programme under which its employees can take part-time degrees and have tuition fees of up to $12,000 a year paid for them, no strings attached. Employers often balk at training staff because they might leave for rivals, taking their expensively gained skills with them. But Gail Jackson, the firm's vice-president of human resources, takes a different view. "We want people who are intellectually curious," she says. "It is better to train and have them leave than not to train and have them stay."

Such attitudes are becoming more common. When Satya Nadella took over as boss of Microsoft in 2014, he drew on the work of Carol Dweck, a psychology professor at Stanford University, to push the firm's culture in a new direction. Ms Dweck divides students into two camps: those who think that ability is innate and fixed (dampening motivation to learn) and those who believe that abilities can be improved through learning. This "growth mindset" is what the firm is trying to encourage. It has

Getting along and getting on

US, change in employment share by skills required, 1980=100



Source: "The Growing Importance of Social Skills in the Labor Market", by David Deming, Aug 2016

amended its performance-review criteria to include an appraisal of how employees have learned from others and then applied that knowledge. It has also set up an internal portal that integrates Lynda, the training provider bought by LinkedIn (which Microsoft itself is now buying).

AT&T, a telecoms and media firm with around 300,000 employees, faces two big workforce problems: rapidly changing skills requirements in an era of big data and cloud computing, and constant employee churn that leaves the company having to fill 50,000 jobs a year. Recruiting from outside is difficult, expensive and liable to cause ill-feeling among existing staff. The firm's answer is an ambitious plan to reskill its own people.

Employees each have a career profile that they maintain themselves, which contains a record of their skills and training. They also have access to a database called "career intelligence", which shows them the jobs on offer within the company, what skills they require and how much demand there is for them. The firm has developed short courses called nanodegrees with Udacity, the MOOC provider, and is also working with universities on developing course curriculums. Employees work in their own time to build their skills. But AT&T applies both carrot and stick to encourage them, by way of generous help with tuition fees (totalling $30m in 2015) for those who take courses and negative appraisal ratings for those who show no interest.

As continued learning becomes a corporate priority, two questions arise. First, is it possible for firms to screen candidates and employees on the basis of curiosity, or what psychologists call "need for cognition"? Getting through university is one very rough proxy for this sort of foundational skill, which helps explain why so many employers stipulate degrees for jobs which on the face of it do not require them.

Curiouser and curiouser

More data-driven approaches are also being tried. Manpower, a human-resources consultancy, is currently running trials on an app that will score individuals on their "learnability". Knack, a startup, offers a series of apps that are, in effect, gamified psychological tests. In Dashi Dash, for example, participants play the part of waiters and are asked to take the orders of customers on the basis of (often hard to read) expressions. As more and more customers arrive, the job of managing the workflow gets tougher. Every decision and every minute change in strategy is captured as a data point and sent to the cloud, where machine-learning algorithms analyse players' aptitudes against a reference population of 25,000 people. An ability to read expressions wins points for empathy; a decision always to serve customers in the order in which they arrive in the game, for example, might serve as an indicator of integrity. Intellectual curiosity is one of the traits that Knack tests for.

The second question is whether it is possible to train people to learn. Imaging techniques are helping unlock what goes on in the mind of someone who is curious. In a study published in 2014 in *Neuron*, a neuroscience journal, participants were first asked to rate their curiosity to learn the answers to various questions. Later they were shown answers to those questions, as well as a picture of a stranger's face; finally, they were tested on their recall of the answers and given a face-recognition test. Greater curiosity led to better retention on both tests; brain scans showed increased activity in the mesolimbic dopamine system, a reward pathway, and in the hippocampus, a region that matters for forming new memories.

It is too early to know whether traits such as curiosity can be taught. But it is becoming easier to turn individuals into more effective learners by making them more aware of their own thought processes. Hypotheses about what works in education and learning have become easier to test because of the rise of online learning. MIT has launched an initiative to conduct interdisciplinary research into the mechanics of learning and to apply the conclusions to its own teaching, both online and offline. It uses its own online platforms, including a MOOC co-founded with Harvard University called edX, to test ideas. When MOOC participants were required to write down their plans for undertaking a course, for example, they were 29% more likely to complete the course than a control group who did not have to do so.

Information about effective learning strategies can be personalised, too. The Open University, a British distance-learning institution, already uses dashboards to monitor individual students' online behaviour and performance. Knewton, whose platform captures data on 10m current American students, recommends personalised content to them. Helping people to be more aware of their own thought processes when they learn makes it more likely they can acquire new skills later in life. ■

Upstarts and incumbents

The return of the MOOC

Alternative providers of education must solve the problems of cost and credentials

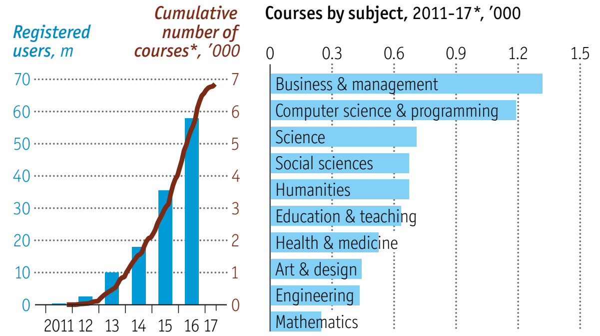
THE HYPE OVER MOOCs peaked in 2012. Salman Khan, an investment analyst who had begun teaching bite-sized lessons to his cousin in New Orleans over the internet and turned that activity into a wildly popular educational resource called the Khan Academy, was splashed on the cover of *Forbes*. Sebastian Thrun, the founder of another MOOC called Udacity, predicted in an interview in *Wired* magazine that within 50 years the number of universities would collapse to just ten worldwide. The *New York Times* declared it the year of the MOOC.

The sheer numbers of people flocking to some of the initial courses seemed to suggest that an entirely new model of open-access, free university education was within reach. Now MOOC sceptics are more numerous than believers. Although lots of people still sign up, drop-out rates are sky-high.

Nonetheless, the MOOCs are on to something. Education, like health care, is a complex and fragmented industry, which

Learning curve

Massive open online courses, main international providers



Source: Class Central

*By start date

makes it hard to gain scale. Despite those drop-out rates, the MOOCs have shown it can be done quickly and comparatively cheaply. The Khan Academy has 14m-15m users who conduct at least one learning activity with it each month; Coursera has 22m registered learners. Those numbers are only going to grow. FutureLearn, a MOOC owned by Britain's Open University, has big plans. Oxford University announced in November that it would be producing its first MOOC on the edX platform.

In their search for a business model, some platforms are now focusing much more squarely on employment (though others, like the Khan Academy, are not for profit). Udacity has launched a series of nanodegrees in tech-focused courses that range from the basic to the cutting-edge. It has done so, moreover, in partnership with employers. A course on Android was developed with Google; a nanodegree in self-driving cars uses instructors from Mercedes-Benz, Nvidia and others. Students pay $199-299 a month for as long as it takes them to finish the course (typically six to nine months) and get a 50% rebate if they complete it within a year. Udacity also offers a souped-up version of its nanodegree for an extra $100 a month, along with a money-back guarantee if graduates do not find a job within six months.

Coursera's content comes largely from universities, not specialist instructors; its range is much broader; and it is offering full degrees (one in computer science, the other an MBA) as well as shorter courses. But it, too, has shifted its emphasis to employability. Its boss, Rick Levin, a former president of Yale University, cites research showing that half of its learners took courses in order to advance their careers. Although its materials are available without charge, learners pay for assessment and accreditation at the end of the course ($300-400 for a four-course sequence that Coursera calls a "specialisation"). It has found that when money is changing hands, completion rates rise from 10% to 60% . It is increasingly working with companies, too. Firms can now integrate Coursera into their own learning portals, track employees' participation and provide their desired menu of courses.

These are still early days. Coursera does not give out figures on its paying learners; Udacity says it has 13,000 people doing its nanodegrees. Whatever the arithmetic, the reinvented MOOCs matter because they are solving two problems they share with every provider of later-life education.

The first of these is the cost of learning, not just in money but also in time. Formal education rests on the idea of qualifications that take a set period to complete. In America the entrenched notion of "seat time", the amount of time that students spend with school teachers or university professors, dates back to Andrew Carnegie. It was originally intended as an eligibility requirement for teachers to draw a pension from the industrialist's nascent pension scheme for college faculty. Students in their early 20s can more easily afford a lengthy time commitment because they are less likely to have other responsibilities. Although millions of people do manage part-time or distance learning in later life—one-third of all working students currently enrolled in America are 30-54 years old, according to the Georgetown University Centre on Education and the Workforce—balancing learning, working and family life can cause enormous pressures.

Moreover, the world of work increasingly demands a quick response from the education system to provide people with the desired qualifications. To take one example from Burning Glass, in 2014 just under 50,000 American job-vacancy ads asked for a CISSP cyber-security certificate. Since only 65,000 people in America hold such a certificate and it takes five years of experience to earn one, that requirement will be hard to meet. Less demanding professions also put up huge barriers to entry. If you want to become a licensed cosmetologist in New Hampshire, you will need to have racked up 1,500 hours of training.

In response, the MOOCs have tried to make their content as digestible and flexible as possible. Degrees are broken into modules; modules into courses; courses into short segments. The MOOCs test for optimal length to ensure people complete the course; six minutes is thought to be the sweet spot for online video and four weeks for a course.

Scott DeRue, the dean of the Ross School of Business at the University of Michigan, says the unbundling of educational content into smaller components reminds him of another industry: music. Songs used to be bundled into albums before being disaggregated by iTunes and streaming services such as Spotify. In Mr DeRue's analogy, the degree is the album, the course content that is freely available on MOOCs is the free streaming radio service, and a "microcredential" like the nanodegree or the specialisation is paid-for iTunes.

How should universities respond to that kind of disruption? For his answer, Mr DeRue again draws on the lessons of the music industry. Faced with the disruption caused by the internet, it turned to live concerts, which provided a premium experience that cannot be replicated online. The on-campus degree also needs to mark itself out as a premium experience, he says.

Another answer is for universities to make their own products more accessible by doing more teaching online. This is beginning to happen. When Georgia Tech decided to offer an online version of its masters in computer science at low cost, many were shocked: it seemed to risk cannibalising its campus degree. But according to Joshua Goodman of Harvard University, who has studied the programme, the decision was proved right. The campus degree continued to recruit students in their early 20s whereas the online degree attracted people with a median age of 34 who did not want to leave their jobs. Mr Goodman reckons this one programme could boost the numbers of computer-science masters produced in America each year by 7-8%. Chip Paucek, the boss of 2U, a firm that creates online degree programmes for conventional universities, reports that additional marketing efforts to lure online students also boost on-campus enrolments.

Educational Lego

Universities can become more modular, too. Edx has a micromasters in supply-chain management that can either be taken on its own or count towards a full masters at MIT. The University of Wisconsin-Extension has set up a site called the University Learning Store, which offers slivers of online content on practical subjects such as project management and business writing. Enthusiasts talk of a world of "stackable credentials" in which qualifications can be fitted together like bits of Lego.

Just how far and fast universities will go in this direction is unclear, however. Degrees are still highly regarded, and increased emphasis on critical thinking and social skills raises their value in many ways. "The model of campuses, tenured faculty and so on does not work that well for short courses," adds Jake Schwartz, General Assembly's boss. "The economics of covering fixed costs forces them to go longer."

Academic institutions also struggle to deliver really fast-moving content. Pluralsight uses a model similar to that of book publishing by employing a network of 1,000 experts to produce and refresh its library of videos on IT and creative skills. These experts get royalties based on how often their content is viewed; its highest earner pulled in $2m last year, according to Aaron Skonnard, the firm's boss. Such rewards provide an incentive for authors to keep updating their content. University faculty have other priorities.

Beside costs, the second problem for MOOCs to solve is credentials. Close colleagues know each other's abilities, but modern labour markets do not work on the basis of such relationships. They need widely understood signals of experience and expertise, like a university degree or a baccalaureate, however imperfect they may be. In their own fields, vocational qualifications do the same job. The MOOCs' answer is to offer microcredentials like nanodegrees and specialisations.

But employers still need to be confident that the skills these credentials vouchsafe are for real. LinkedIn's "endorsements" feature, for example, was routinely used by members to hand out compliments to people they did not know for skills they did not possess, in the hope of a reciprocal recommendation. In 2016 the firm tightened things up, but getting the balance right is hard. Credentials require just the right amount of friction: enough to be trusted, not so much as to block career transitions.

People are more likely to invest in training if it confers a qualification that others will recognise. But they also need to know which skills are useful in the first place

Universities have no trouble winning trust: many of them can call on centuries of experience and name recognition. Coursera relies on universities and business schools for most of its content; their names sit proudly on the certificates that the firm issues. Some employers, too, may have enough kudos to play a role in authenticating credentials. The involvement of Google in the Android nanodegree has helped persuade Flipkart, an Indian e-commerce platform, to hire Udacity graduates sight unseen.

Wherever the content comes from, students' work usually needs to be validated properly for a credential to be trusted. When student numbers are limited, the marking can be done by the teacher. But in the world of MOOCs those numbers can spiral, making it impractical for the instructors to do all the assessments. Automation can help, but does not work for complex assignments and subjects. Udacity gets its students to submit their coding projects via GitHub, a hosting site, to a network of machine-learning graduates who give feedback within hours.

Even if these problems can be overcome, however, there is something faintly regressive about the world of microcredentials. Like a university degree, it still involves a stamp of approval from a recognised provider after a proprietary process. Yet lots of learning happens in informal and experiential settings, and lots of workplace skills cannot be acquired in a course.

Gold stars for good behaviour

One way of dealing with that is to divide the currency of knowledge into smaller denominations by issuing "digital badges" to recognise less formal achievements. RMIT University, Australia's largest tertiary-education institution, is working with Credly, a credentialling platform, to issue badges for the skills that are not tested in exams but that firms nevertheless value. Belinda Tynan, RMIT's vice-president, cites a project carried out by engineering students to build an electric car, enter it into races and win sponsors as an example.

The trouble with digital badges is that they tend to proliferate. Illinois State University alone created 110 badges when it launched a programme with Credly in 2016. Add in MOOC certificates, LinkedIn Learning courses, competency-based education, General Assembly and the like, and the idea of creating new currencies of knowledge starts to look more like a recipe for hyperinflation.

David Blake, the founder of Degreed, a startup, aspires to resolve that problem by acting as the central bank of credentials. He wants to issue a standardised assessment of skill levels, irrespective of how people got there. The plan is to create a network of subject-matter experts to assess employees' skills (copy-editing, say, or credit analysis), and a standardised grading language that means the same thing to everyone, everywhere.

Pluralsight is heading in a similar direction in its field. A diagnostic tool uses a technique called item response theory to work out users' skill levels in areas such as coding, giving them a rating. The system helps determine what individuals should learn next, but also gives companies a standardised way to evaluate people's skills.

A system of standardised skills measures has its own problems, however. Using experts to grade ability raises recursive questions about the credentials of those experts. And it is hard for item response theory to assess subjective skills, such as an ability to construct an argument. Specific, measurable skills in areas such as IT are more amenable to this approach.

So amenable, indeed, that they can be tested directly. As an adolescent in Armenia, Tigran Sloyan used to compete in mathematical Olympiads. That experience helped him win a place at MIT and also inspired him to found a startup called CodeFights in San Francisco. The site offers free gamified challenges to 500,000 users as a way of helping programmers learn. When they know enough, they are funnelled towards employers, which pay the firm 15% of a successful candidate's starting salary. Sqore, a startup in Stockholm, also uses competitions to screen job applicants on behalf of its clients.

However it is done, the credentialling problem has to be solved. People are much more likely to invest in training if it confers a qualification that others will recognise. But they also need to know which skills are useful in the first place. ■

Career planning

Pathway dependency

How to turn a qualification into a salary

UNIVERSITY EDUCATION IS designed to act as a slipway, launching students into the wider world in the expectation that the currents will guide them into a job. In practice, many people get stuck in the doldrums because employers demand evidence of specific experience even from entry-level candidates. Whether this counts as a skills gap is a matter of debate. "If I cannot find a powerful, fuel-efficient, easy-to-park car for $15,000, that doesn't mean there is a car shortage," says Peter Cappelli of the Wharton School of the University of Pennsylvania. But whether the fault lies with the educators or the employers, there is a need for pathways that lead individuals into jobs.

Sometimes those pathways are clearly defined, as in medicine and the law. Vocational education combines classroom and work-based learning to prepare young people for specific trades. In many European countries, one-third to half of later-stage secondary schoolgoers are on a vocational path (see chart). Britain is due to introduce an apprenticeship levy in April.

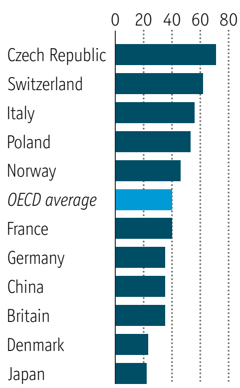
But pathways are needed to smooth transitions in other countries (America, for example, lacks a tradition of vocational education); in less structured occupations; and when formal education has come to an end. The nanodegree is an example of such a pathway, as is General Assembly's bootcamp model. Both rely heavily on input from employers to create content; both use jobs rather than credentials as a measure of success.

That is particularly important in the early stages of people's careers, which is not just when they lack experience but also when earnings grow fastest. An analysis of American wage growth by economists at the New York Federal Reserve showed that the bulk of earnings growth took place between the ages of 25 and 35; on average, after the age of 45 only the top 2% of lifetime earners see any earnings growth. So it is vital for people to move quickly into work once qualified, and to hold on to jobs once they get them.

That is the insight behind LearnUp, a startup that works with applicants without college degrees for entry-level positions. Users applying for a job online can click on a link and take a one-hour online training session on how to be a cashier, sales clerk or whatever they are after. Employers pay LearnUp a fixed fee to improve the pool of candidates. Recruitment and retention rates have risen.

Practical types

Students* enrolled in vocational programmes, as % of total
2014



Source: OECD *15- to 19-year-olds

Generation, a philanthropically funded programme run by the McKinsey Social Initiative, a not-for-profit arm of the consultancy, uses a bootcamp approach and some typically McKinsey-esque thinking to train people from difficult backgrounds for middle-skilled positions in industries like retailing and health care. The programme starts by going into workplaces and identifying key events (how an IT helpdesk handles a call from an irate customer, for example) that distinguish high performers from the rest.

Curriculum designers then use that analysis to create a full-time training programme lasting between four and 12 weeks that covers both technical knowledge and behavioural skills. The programme has gone live in America, Spain, India, Kenya and Mexico. By the end of 2016 it had 10,000 graduates, for whom it claims an employment rate of 90% and much higher retention rates than usual. The trainees pay nothing; the hope is that employers will fund the programme, or embed it in their own training programmes, when they see how useful it is.

A little help from your friends

Such experiments use training to take people into specific jobs. In the past, an initial shove might have been all the help they needed. But as middle-skilled roles disappear, some rungs on the job ladder have gone missing. And in a world of continuous reskilling and greater self-employment, people may need help with repeatedly moving from one type of job to another. Vocational education is good at getting school-leavers into work, but does nothing to help people adapt to changes in the world of work. Indeed, a cross-country study in 2015 by researchers at the Hoover Institution suggests that people with a vocational education are more likely than those with a general education to withdraw from the labour force as they age. The pattern is particularly marked in countries that rely heavily on apprenticeships, such as Denmark, Germany and Switzerland.

Large companies may have the scale to offer their employees internal pathways to improve their skills, as companies like AT&T do. But many workers will need outside help in deciding which routes to take. That suggests a big opportunity for firms that can act, in effect, as careers advisers. Some are better placed than others to see where the jobs market is going. Manpower, which supplies temporary workers to many industries, last year launched a programme called MyPath that is based on the idea of an iterative process of learning and working. It allows Manpower's army of temporary workers in America to earn a degree from Western International University at no financial cost to them. The degree is structured as a series of three or four episodes of education followed by periods in work, in the expectation that Manpower has a good overview of the skills leading to well-paid jobs.

LinkedIn is another organisation with a decent understanding of wider trends. The professional-networking site likes to call the data it sits on "the economic graph", a digital map of the global economy. Its candidate data, and its recruitment platform, give it information on where demand from employers is greatest and what skills jobseekers need. And with LinkedIn Learning it can now also deliver training itself.

The firm can already tell candidates how well their qualifications for any advertised job stack up against those of other applicants. In time, its data might be used to give "investment advice", counselling its members on the financial return to specific skills and on how long they are likely to be useful; or to show members how other people have got into desirable positions.

The difficulty with offering mass-market careers advice is finding a business model that will pay for it. LinkedIn solves this problem by aiming itself primarily at professionals who either pay for services themselves or who are of interest to recruiters. But that raises a much bigger question. "There is no shortage of options for folks of means," says Adam Newman of Tyton Partners, an education consultancy. "But what about LinkedIn for the linked-out?" ■

Low-skilled workers

The elephant in the truck

The emerging system of lifelong learning will do little to reduce inequality

IMAGINE YOU ARE a 45-year-old long-distance lorry driver. You never enjoyed school and left as soon as you could, with a smattering of qualifications and no great love of learning. The job is tiring and solitary, but it does at least seem to offer decent job security: driver shortages are a perennial complaint in the industry, and the average age of the workforce is high (48 in Britain), so the shortfalls are likely to get worse. America's Bureau of Labour Statistics (BLS) says there were 1.8m truckers in 2014 and expects a 5% rise in their number by 2024. "As the economy grows, the demand for goods will increase and more truck drivers will be needed to keep supply chains moving," predicts the BLS website, chirpily.

But the future might unfold very differently. For all the excitement over self-driving passenger cars, the freight industry is likely to adopt autonomous vehicles even faster. And according to a report in 2014 by Morgan Stanley, a bank, full automation might reduce the pool of American truck drivers by two-thirds. Those projections came hedged with caveats, and rightly so. The pace of adoption may be slowed by regulation. Drivers may still be needed to deal with unforeseen problems; if such jobs require more technical knowledge, they may even pay better. Employment in other sectors may grow as freight costs come down. But there is a chance that in the not too distant future a very large number of truckers will find themselves redundant. The implications are immense.

Knowing when to jump is one problem. For people with decades of working life still ahead of them, it is too early to quit but it is also risky to assume that nothing will change. Matthew Robb of Parthenon-EY, a consultancy, thinks that governments should be talking to industry bodies about the potential for mass redundancies and identifying trigger points, such as the installation of sensors on motorways, that might prompt retraining. "This is a boiling-frog problem," he says. "It is not thought about."

For lower-skilled workers of this sort the world of MOOCs, General Assembly and LinkedIn is a million miles away. Around 80% of Coursera's learners have university degrees. The costs of reskilling, in terms of time and money, are easiest to bear for people who have savings, can control their working hours or work for companies that are committed to upgrading their workforce. And motivation is an issue: the tremendous learning opportunities offered by the internet simply do not appeal to everyone.

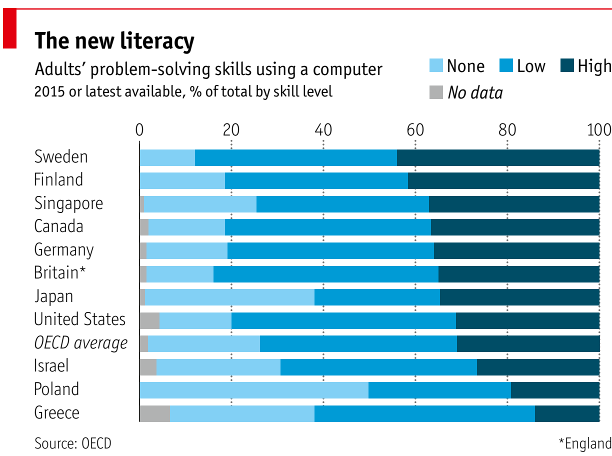
Whosoever hath not

The rewards of retraining are highest for computing skills, but there is no natural pathway from trucker to coder. And even if there were, many of those already in the workforce lack both the confidence and the capability to make the switch. In its Programme for the International Assessment of Adult Competencies, the OECD presents a bleak picture of skills levels in 33 member countries (see chart). One in five adults, on average, has poor reading and numeracy skills. One in four has little or no experience of computers. On a measure of problem-solving ability using technology, most adults are at or below the lowest level of proficiency.

Moreover, learning is most effective when people are able to practise their new skills. Yet many jobs, including lorry-driving, afford little such opportunity, and some of them are being deskilled further. Research by Tom Higgins of Cardiff University suggests that the numeracy requirements for retail assistants and care-home workers in Britain went down between 1997 and 2012. The head of one of the world's biggest banks worries that a back-office operation in India has disaggregated its work into separate tasks so effectively that employees are no longer able to understand the processes as a whole, let alone make useful suggestions for improving them.

So the truckers' dilemma will be very hard to solve. "It's difficult when you don't have a good answer even in an ideal world," says Jesper Roine, an economist who sat on a Swedish commission to examine the future of work. But as a thought experiment it highlights some of the problems involved in upgrading the stock of low-skilled and mid-skilled workers. Any decent answer will need a co-ordinated effort to bring together individuals, employers and providers of education. That suggests a role for two entities in particular.

One is trade unions. They have an industry-wide view of trends that may not be available to smaller employers. They can also accompany people throughout their working lives, which ▸▸



may become increasingly important in a world of rising self-employment. Denmark's tripartite system, for example, binds together employers, government and unions. Firms and unions get together to identify skills needs; collective-bargaining agreements enshrine rights to paid leave for training. The country's famed "flexicurity" system offers unemployed workers a list of 258 vocational-training programmes.

In Britain a well-regarded programme called UnionLearn uses union representatives both to inform workers about training options and to liaise with employers on workers' requests for training. Employees seem more likely to discuss shortfalls in basic skills with union representatives than with managers. An analysis by academics at Leeds University Business School shows that between 2001 and 2013 union members in Britain were a third more likely to have received training than non-unionised workers.

The second entity is government. There is much talk about lifelong learning, though few countries are doing much about it. The Nordics fall into this less populated camp. But it is Singapore that can lay claim to the most joined-up approach with its SkillsFuture initiative. Employers in the city-state are asked to spell out the changes, industry by industry, that they expect to happen over the next three to five years, and to identify the skills they will need. Their answers are used to create "industry transformation maps" designed to guide individuals on where to head.

Since January 2016 every Singaporean above the age of 25 has been given a S$500 ($345) credit that can be freely used to pay for any training courses provided by 500 approved providers, including universities and MOOCs. Generous subsidies, of up to 90% for Singaporeans aged 40 and over, are available on top of this credit. The programme currently has a budget of S$600m a year, which is due to rise to S$1 billion within three years. According to Ng Cher Pong, SkillsFuture's chief executive, the returns on that spending matter less than changing the mindset around continuous reskilling.

Some programmes cater to the needs of those who lack basic skills. Tripartite agreements between unions, employers and government lay out career and skills ladders for those who are trapped in low-wage occupations. Professional-conversion programmes offer subsidised training to people switching to new careers in areas such as health care.

Given Singapore's size and political system, this approach is not easily replicated in many other countries, but lessons can still be drawn. It makes sense for employers, particularly smaller ones, to club together to signal their skills needs to the workforce at large. Individual learning accounts have a somewhat chequered history—fraudulent training providers helped scupper a British experiment in the early 2000s—but if well designed, they can offer workers educational opportunities without being overly prescriptive.

The outlines of a new ecosystem for connecting employment and education are becoming discernible

Any fool can know

In June 2016, this newspaper surveyed the realm of artificial intelligence and the adjustments it would require workers to make as jobs changed. "That will mean making education and training flexible enough to teach new skills quickly and efficiently," we concluded. "It will require a greater emphasis on lifelong learning and on-the-job training, and wider use of online learning and video-game-style simulation."

The uncertainties around the pace and extent of technological change are enormous. Some fear a future of mass unemployment. Others are sanguine that people will have time to adapt. Companies have to want to adopt new technologies, after all, and regulators may impede their take-up. What is not in doubt is the need for new and more efficient ways to develop and add workplace skills.

The faint outlines of a new ecosystem for connecting employment and education are becoming discernible. Employers are putting greater emphasis on adaptability, curiosity and learning as desirable attributes for employees. They are working with universities and alternative providers to create and improve their own supply of talent. Shorter courses, lower costs and online delivery are making it easier for people to combine work and training. New credentials are being created to signal skills.

At the same time, new technologies should make learning more effective as well as more necessary. Virtual and augmented reality could radically improve professional training. Big data offer the chance for more personalised education. Platforms make it easier to connect people of differing levels of knowledge, allowing peer-to-peer teaching and mentoring. "Education is becoming flexible, modular, accessible and affordable," says Simon Nelson, the boss of FutureLearn, the Open University MOOC.

But for now this nascent ecosystem is disproportionately likely to benefit those who least need help. It concentrates on advanced technological skills, which offer the clearest returns and are relatively easy to measure. And it assumes that people have the money, time, motivation and basic skills to retrain.

Thanks to examples like Singapore's, it is possible to imagine ways in which continuous education can be made more accessible and affordable for the mass of citizens. But it is as easy—indeed, easier—to imagine a future in which the emerging infrastructure of lifelong learning reinforces existing advantages. Far from alleviating the impact of technological upheaval, that would risk exacerbating inequality and the social and economic tensions it brings in its wake. ■

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Startups in the Arab world

Set them free

CAIRO

It's hard to build a startup culture when bankrupts face jail

"COULD Beirut become the Silicon Valley of the Middle East?" So asked a Lebanese news website in 2015. With an educated population, relatively liberal culture and large banking system, Beirut, the capital of Lebanon, seemed well-placed to become a hub for internet startups in the region. But there was at least one glaring problem. "Let's face it—the internet in Lebanon [is] abysmally bad!" wrote Tony Fadell, the Lebanese-American co-creator of the iPod, in November. Due to government mismanagement, the country has some of the slowest download speeds in the world.

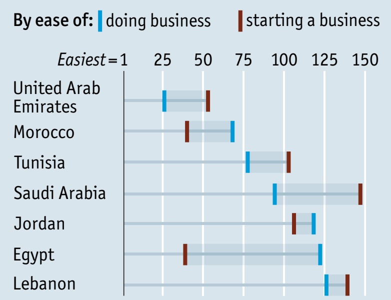
Across the Middle East in recent years, young men and women have created new products, started new companies and inspired hopeful talk of replicating the startup scenes in America and Europe. These entrepreneurs are a potential boon to the region's economies, which suffer from slow growth and high unemployment, especially among the young. A pity, then, that so many obstacles stand in their way—and that so many are put there by governments. No place in the Arab world comes close to Silicon Valley in terms of dynamism. But, slowly, progress is being made, say entrepreneurs.

To understand what startups in the region are up against, consider that most of them will fail. That is true throughout the world, but in a country like Egypt, with no bankruptcy law, failure can mean a prison term if debts are not paid on time. Closing a company can take five to ten years and reams of paperwork. Those that stay in business must navigate outdated legal and regulatory systems that make it difficult to do things that are routine for startups elsewhere, such as paying employees with stock options. This is on top of the challenges that affect all Egyptian firms, such as rising prices and predatory officials.

Elsewhere the story is much the same. In countries such as Jordan and Lebanon, which claim to be startup-friendly, it is actually quite difficult to start up (see chart). Across the region, labour laws tend to make it hard to hire and fire workers, especially foreigners, even though schools fail to equip many locals with desirable skills, such as coding. Tax authorities are often confounded by startups, says Con O'Donnell, who started Sarmady, an Egyptian online-media company, which he sold to Vodafone in 2008. "They don't understand the Amazon model," says Mr O'Donnell, referring to the e-commerce giant, which lost money but grew quickly during its first two decades.

Not so easy

Ranking*, selected countries, 2016



Source: World Bank *Out of 190 countries

Amazon is thought to be in talks to buy Souq, a large online retailer based in the United Arab Emirates (UAE). Founded in 2005, Souq is often touted as a success story by investors in the region. But Souq apart, high barriers to trade have prevented e-commerce more generally from taking off. Getting goods through customs can be a bureaucratic nightmare, made worse by high tariffs, varying regulations and fluctuating currencies. "People talk about the region as if it is 200m people, but try to ship to these people," says Louis Lebbos, the founder of AstroLabs, a hub for tech startups in Dubai. Several well-funded ventures have tried—and failed. Souq, which anyway ships mostly to the six countries in the Gulf Co-operation Council, a customs union, is the rare exception.

E-commerce is one of several industries in which startups could do much more to fill market needs. Others include financial technology, as most Arabs do not have bank accounts or credit cards; and health care, with rates of obesity and other diseases rising across the region. But firms in these industries often have to seek approval from slow-moving government agencies. This can add years to a business plan. "In more developed systems, startups are more willing to jump ahead of regulation ▸▸

and the regulation catches up," says Mr Lebbos. "But here the axe falls on those who jump ahead."

For decades, the region's socialist-minded governments showed little interest in encouraging private enterprise. Many leaders are wary of empowering young people, who may also seek more political freedom. But as the region's economies struggle, there is pressure on governments to improve their handling of startups—and to keep up with each other. In November, when Mr Fadell tweeted about Lebanon's slow internet, Saad Hariri, the prime minister, quickly responded: "I am listening Tony, it's on top of our future government agenda." In Egypt the cabinet has just approved the country's first bankruptcy law, one of several economic reforms aimed at encouraging investment.

Several governments have also injected money into the system and guaranteed some of the risk involved in backing startups. Most notably, Lebanon launched a $400m package four years ago to encourage lending from banks. Such outlays, paired with the relatively small number of worthy startups in the region, have led to fears of a bubble. But more recent investments have been smaller and more organic. Last year, for example, Morocco received some $50m from the World Bank to create two new venture-capital funds, part of a plan to cultivate its growing startup scene, while international investors poured $275m into Souq and $350m into Careem, a ride-hailing app based in the UAE.

In most countries there are now clusters of startups, brought together by co-working spaces like Astrolabs in Dubai or Cogite in Tunisia, which have connections to accelerators, incubators and investors. Collaboration is common. Last month the Greek Campus, a hub for startups in downtown Cairo, hosted the Rise-Up summit, one of the largest gatherings of entrepreneurs in the region. Many young geeks aim to do good as well as make money. Abdelhameed Sharara, who started the event in 2013, says he was motivated by the failures of the Arab spring. "I felt there was another way to make it happen." Many in attendance share his sense of purpose. "We are figuring out how to feed people better, how to empower women, how to educate children," says Waleed Abd El Rahman, the founder of Mumm, a home-cooking delivery service in Cairo.

Unfortunately, the difficulty of doing business in the region, and the repressive nature of most governments, have caused many of the brightest minds to move abroad. But these challenges also force those who remain to think creatively about how to work around the system. And this makes for better companies, say many entrepreneurs. "If you can succeed in a country like Egypt, everywhere else is easy," says Mr Sharara. ■

The death of Akbar Hashemi Rafsanjani

The ayatollah's long shadow

A pragmatic ex-president passes away

THEY came to praise him and to bury him. The eminent former butts of his criticism filled the front rows of his funeral and showered him with accolades. Ayatollah Akbar Hashemi Rafsanjani was the architect of Iran's revolution, they said, who protected it during the Iran-Iraq war, and rescued it from economic siege afterwards. Ayatollah Ali Khamenei, Iran's supreme leader, with whom he spent two decades sparring, tweeted that he was "his old friend and comrade", and read the last rites. Fellow clerics organised the biggest funeral since Ayatollah Khomeini's, assigned him a golden tomb next to the revolution's founder, and promised to name a street after him. They closed schools and broadcast the ceremony live. Over 2m Iranians attended, said the authorities.

The hardliners now hope that at last Mr Khamenei can be truly supreme. Already rejoicing in friendly Russia's growing presence in the region, and the prospect of victory in Syria, the hardliners will finally also gain control of the powerful Expediency Council that Mr Rafsanjani led for 28 years, a recurrent thorn in their sides. Helpfully, the security forces have ensured that the late Mr Rafsanjani had no one to pass his mantle to. Mir Hossein Mousavi and Mehdi Karroubi, the two presidential candidates he backed against the anti-Westernising Mahmoud Ahmadinejad, are safely under house arrest.

After the tears, the protests?

They have also silenced Muhammad Khatami, his reformist successor as president, banned his name from the media, and barred him from attending the funeral. Hassan Rouhani, though the current president and also a protégé, is too cautious and, as a former intelligence officer, too much a plodding functionary, to defy the establishment alone. Under Mr Khamenei's watchful eye, he will now be a safe bet for re-election in May.

Still, Mr Rafsanjani's appearances always had an uncomfortable habit of veering off-message. From the covered courtyard of Tehran University in 2009, he challenged the authorities to heed the people's voice, when they massaged the vote to award Mr Ahmadinejad a second term and opened fire on protesters. "We need an open society in which people can say what they want," he preached. "We should not imprison people."

Eight years later, even though he now lay in a casket, his supporters took up the refrain. From the back of the same courtyard came the cries of dissent. Some donned green wristbands and T-shirts, sporting the colour of the protest movement, and chanted "Hail, Khatami". Others replaced the hardliners' mantra of "Death to America" with "Death to Russia", just as they had in 2009 when Russia's president had been the first foreign leader to congratulate Mr Ahmadinejad on his re-election. Eventually the sound technicians drowned out the dissenters with mourning music.

In a sense both requiems were right. Ayatollah Rafsanjani was both a pillar of Iran's theocratic establishment and its prime critic. He both fuelled criticism and harnessed it within acceptable parameters. But for his manoeuvring, many more disgruntled Iranians might have abandoned the doctored electoral process and sought other means to voice dissent. The merchant classes would have despaired of the possibility of normal trade with the West. And the clerics in the holy city of Qom, who shy from mixing Islam and politics, would more vociferously have questioned the legitimacy of the Islamic Republic. "We thought that he would be the one who could secure the transition to a more moderate pro-Western regime," says a young mourner in shock at his passing.

For a moment this week, Mr Rafsanjani brought Iran's contradictory forces together. All thronged to his funeral, and—remarkably in the Middle East—kept it peaceful. But maintaining that common ground without the centrist may be harder. Rulers and ruled will have fewer restraints. Protesters could increase their demands for the release of opposition leaders; hardliners might sense a freer hand to suppress them. The wounds that Mr Rafsanjani helped bind while alive risk being reopened. ■

Botswana

Between rocks and hard places

GABORONE

A sparkling performer falls on rough times

IN PHAKALANE, an affluent suburb of Botswana's sleepy capital Gaborone, a modern assembly line spits out thousands of batteries destined for southern African cars. Whether in glitzy Bentleys beloved of the South African elite or the beaten-up Toyotas swerving to avoid Harare's potholes, the devices made by employees of Chloride Exide keep the region moving.

Yet trouble is brewing just beyond the factory gates. Less than 25 miles (40km) away in South Africa, the company's largest export market, a slowdown has crippled demand. In the past year some 30,000 fewer batteries than usual were shipped across the border. To make things worse, sales to Zimbabwe, once a big buyer, have been hit by import restrictions.

In September Botswana exported just $54m to South Africa, according to government figures, and imported $371m worth of goods from its big neighbour. Local businessmen grumble that South African firms with operations in Botswana do not spend enough locally. Business Botswana, a lobby group, is calling on South African supermarket chains to boost local procurement above 10%.

Ian Khama, Botswana's president, has repeatedly criticised his neighbours. In September he renewed a feud with Robert Mugabe, the ailing autocrat who has impoverished Zimbabwe, again urging him to step down. He has also chided Jacob Zuma, South Africa's beleaguered president. In June Mr Khama accused South Africa of stifling industrialisation in the region by branding itself as a "regional gateway" for investment, and argued that it was treating its neighbours as little more than a marketplace for exports.

Mr Khama is undiplomatic perhaps because he is anxious. The diamonds that propelled Botswana's exceptional growth and paid for impressive infrastructure could be exhausted before 2050. In 2014 Russia overtook Botswana as the world's biggest producer. Global rough-diamond sales to cutters fell by some 30% between 2014 and 2015, leaving Botswana with its first budget deficit in four years.

The government is taking note. In February it launched a fiscal stimulus programme to tackle unemployment, estimated at around 19% in a population of 2m. Government investment promoters in swanky premises in downtown Gaborone talk up Botswana's potential as a hub for tech firms or green energy. But it ranks 108th in the International Telecommunication Union's ICT Development Index, with only 27.5% of its people online.

A more realistic strategy to diversify away from diamonds is to attract more tourists. But instead much of the government's focus has been on deepening its dependence on the shiny stones by trying to become a global centre for cutting and polishing them. Its flagship policy involved strong-arming De Beers, the world's biggest diamond firm (of which it owns 15%), to bring its sales and sorting operations over from London.

For Mr Khama, the diversification plans have gained renewed urgency. His Botswana Democratic Party (BDP), which has held power since independence in 1966, is facing its first real challenge at the ballot box. The BDP's share of the vote dipped below 50% for the first time in the 2014 general election, amid frustration with unemployment and with water and power shortages. Like South Africa's African National Congress, the BDP is nervously looking ahead to an election in 2019. ■

Ivory Coast

Mutiny for a bounty

Trouble in one of Africa's strongest economies

WAR, said Carl von Clausewitz, is politics by other means. In Ivory Coast, the country at the heart of Francophone West Africa, so too is mutiny. On January 6th soldiers seized Bouaké, the second-largest city in the country. Over the weekend they briefly kidnapped the country's defence minister and shooting was heard in Abidjan, the commercial capital.

Purportedly, the dispute was about soldiers' pay. On January 8th, having been promised generous bonuses, the soldiers returned to their barracks. Alassane Ouattara, the president, sacked the army and police chiefs. However, many Ivorians found the timing of the mutiny suspicious. It came a few days before Mr Ouattara dissolved his government in anticipation of implementing a new constitution.

In economic terms, Ivory Coast has in recent years been one of Africa's star performers. Between 2012 and 2015 its GDP grew at an average rate of 8.5% per year. Abidjan's crumbling 1970s brutalist skyline has been transformed by a wave of foreign projects. New offices, malls, a Heineken brewery and various factories have sprouted. This is largely thanks to the policies of Mr Ouattara, an American-educated economist who came to power in 2011. He has prioritised infrastructure investment and attracting money into the country.

Barrack o' drama

Yet while Mr Ouattara's economic record is commendable, his political one is less so. Most of the soldiers leaving their barracks were former rebels, integrated into the national army after the end of the short war which brought Mr Ouattara to power. Their demands, apparently including a call for $8,000 each (five times annual GDP per head), date back to promises allegedly made during that conflict, which started when Laurent Gbagbo, the previous president, refused to leave office after losing an election in 2010. For most of the decade before then, Ivory Coast was embroiled in a longer civil war and divided into two parts: a rebel-held, mostly Muslim north, and the government-held more Christian coast. Much of the country's recent rapid growth has involved catching up after that lost decade of strife.

Soldiers are not the only people to feel aggrieved: teachers and civil servants have also gone on strike recently, notes Mamadou Diallo, a consultant in Abidjan. Plenty of Ivorians feel left out of the economic boom, he says. The army, which also mutinied in 2014, remains an unruly alternative source of power in a country with weak institutions. Many Ivorians suspect that the mutineers were actually incited into action by politicians who want to make sure that they are included in the new government that Mr Ouattara was expected to announce as *The Economist* went to press. This is part of a process of implementing a new constitution, which passed in a referendum in October.

Ivory Coast's recent relative stability should not be taken for granted. So far, foreign investors have remained calm. An al-Qaeda attack that killed 19 people in March last year at Grand Bassam, a pretty resort town that was once the French colonial capital, did little to ruffle them. A return to full-blown war is extremely unlikely. But if investors suspect it is even possible, they may close their wallets. ■

Congo

The sound of politics

KINSHASA

Congo's pop stars and politicians have a strangely symbiotic relationship

IN THE Democratic Republic of Congo there are three ways to make it big, says Lexxus Legal, a rapper (pictured). Standing in his house in Kinshasa, the capital, underneath a mural of Congo's first prime minister, Patrice Lumumba, he lists them. First, you can become a politician. Second, you can join the army ("but you need to be at the top: a general, not a footsoldier"). Finally, you can set up a church. "That is what you call having power," he says. Noticeably, he rules out his own profession. "The musicians in this country are beggars," he says. "They are obliged to sing and dance to please politicians and businessmen. If you sing as I do, controversially, you really have no chance."

Music is probably Congo's most influential export, though nowhere near as lucrative as copper or gold. Whereas in the West the country's name inspires pictures of child soldiers fighting bloody battles, in most of Africa it is associated with "rumba Lingala" (Lingala is the language of the Kinshasa street). This upbeat music has become genuinely pan-African in the 60 years since Congolese musicians were first inspired by Cubans. It can now be heard from Abidjan to Dar es Salaam; in Congo, its home, it is practically a religion.

Alas, like the country itself, Congolese music is blighted by corruption. Since Congo has few producers or studios, only a tiny market for sales and a population who almost all live on a few dollars a day, Congolese musicians have to survive from patronage, like Mozart in 18th-century Vienna but with even more flamboyant clothes.

The politicians are happy with this arrangement. In a country where almost nobody reads newspapers and everyone has a radio, music is the easiest way for them to reach potential supporters. Music and politics in Congo are thus entwined. And with an election looming in 2017, the relationship will only grow closer.

On a plump sofa, Tshala Muana, a singer, explains how she began as a dancer in the 1970s. Under Congo's then dictator, Mobutu Sese Seko, she wasn't allowed to sing. As part of his effort to create a single national identity (a policy he called *authenticité*), songs in Lingala were favoured and those in other local languages—such as Tshiluba, in which Ms Muana sings—were discouraged. Her luck turned in 1997, when Mobutu fell and was replaced by Laurent Kabila. He invited Ms Muana, who had moved to West Africa, back to Kinshasa. "Musicians should live in their own country," she recounts him telling her. "So he became my sponsor."

Now, Ms Muana sings for his son, Joseph Kabila, who became president in 2001 when his father was assassinated. Her songs in Lingala and French include such hits as "Votez Joseph Kabila" and "Kabila tres fort". When she met your correspondent, a few days before the end of Mr Kabila's second (and supposedly final) term in office, many wealthy residents had fled, fearing riots. Ms Muana says she isn't worried by her association with the president. "I may sing for the president, but even the opposition listen to my songs at their rallies," she says, nonchalantly.

Beggars with attitude

And indeed, the expectation that musicians will be mercenary is universal. On radio stations across Congo, it is common to hear the names of politicians punctuating songs. This is known as "Libanga" (literally, "small stone", of the sort that a child might throw to attract attention). It is not done out of ideological conviction. Werrason, one of Congo's most famous musicians, once produced a song in which he named 110 different people, many of whom would have paid for the privilege. Only breweries and mobile-phone companies, with their big marketing budgets, can match politicians' largesse.

Does it matter that Congo's music, its biggest cultural export, is polluted by politics? David Van Reybrouck, the author of an excellent history of Congo, says close ties have "always existed between music and politics". The country's first hit was the song "Independence Cha-Cha", which was first performed in January 1960, a few months before Congo won independence from Belgium.

> Independence *cha-cha* declared
> Oh Freedom *cha-cha* we've conquered
> At the Round Table they won
> Oh Liberty *cha-cha* we've conquered!

Mobutuism was supported by Franco Luambo, one of the original rumba stars. Even the launch of the Congolese franc, which replaced the hyperinflated zaire in 1997, was supported by a musical propaganda campaign.

Yet Mr Legal, who raps in French about war and corruption, thinks it is a problem. "Everything that we Congolese do is driven by music," he says. "But in music it is difficult to explain 10,000 dead people. We keep dancing instead of answering the real questions." Congolese living abroad tend to agree. Before the elections of 2006 and 2011, musicians associated with the government were boycotted by Congolese in Europe. Werrason was assaulted twice in restaurants in Brussels and Paris because of his support for Mr Kabila.

This year, Congo is meant to hold elections to replace Mr Kabila, under a deal struck with the opposition on New Year's Eve. Already, music naming politicians is filling the airwaves on Kinshasa's Lingala radio stations. "It is nothing but politics now," says Ms Muana. If Mr Kabila does indeed step down, the ensuing rush for jobs will spark a festival of patronage. Sadly, few think Mr Kabila, who has already overstayed his mandate, plans to give up the job. And after 16 years in which their lives have not improved much, few people support him. If he does intend to stay in power, he will need more than a few songs. ■

Links to some of the artists mentioned are available at www.economist.com

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The French left

Battling for survival

EVRY

Facing a grim year, the Socialists could pick a surprise presidential candidate

STROLL through Evry, a suburb south of Paris crammed with tower blocks and fresh construction, and you will find Manuel Valls a popular man. Mr Valls was mayor here for 11 years, before he became interior minister and then prime minister, and did much to improve a run-down neighbourhood. On his way to the mosque, Abdoulaye Sambe, an immigrant from Senegal, calls Mr Valls a "good leader"; he credits him for the neighbourhood's congenial inter-ethnic relations. The proprietor of a juice stand in a shopping centre praises him for getting more surveillance cameras installed. Students lounging in the foyer of a university laud him for sprucing up the area.

But as Mr Valls competes for the Socialist nomination in this year's presidential election, he faces a problem: none of these denizens of Evry plans to vote for him. A series of televised debates between the seven candidates in the Socialist primary began on January 12th, to be followed by the primary's first round on January 22nd and a run-off on the 29th. The polls show Mr Valls in the lead, but in fact the race is wide open. As in the Republican primary in November, when the candidate in third place, François Fillon, stormed to a win, there is every likelihood of an upset.

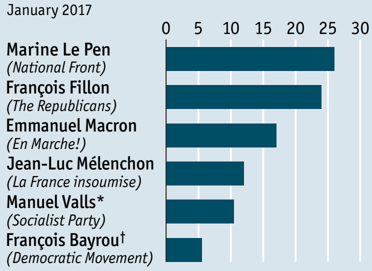
One of Mr Valls's disadvantages is incumbency. Before resigning in December to campaign for the presidency, he was the prime minister of François Hollande, a president whose popularity has sunk to historic lows and who last month became the first French president not to seek re-election since the founding of the Fifth Republic in 1958. His leading role in an unpopular government will force him to squirm in debates, deciding how much of his record to disavow. Rivals such as Vincent Peillon, a former education minister, will relish the chance to skewer him.

A related problem is ideology. Mr Valls, a Blairite who once called for his party to drop the name "socialist", has pushed for looser labour laws and takes a hard line on security and integration. But many Socialist primary voters want a French version of Bernie Sanders or Jeremy Corbyn. Mr Valls is trying to recast himself as acceptable to radicals. He spoke this month of creating more government jobs, new welfare for the poor and young, and opposing rule by executive decrees (which he routinely used in office). Few are convinced.

Voter pour qui?

France, support for candidates in the first round of the presidential elections, % polled

January 2017



*Current party primary frontrunner
†Currently undeclared

Source: Ifop

One serious rival is Arnaud Montebourg, a statist who was forced to resign as industry minister in 2014 after opposing Mr Hollande's increasingly liberal policies. In the Socialists' first primary in 2011, he won 17.2% support to Mr Valls's 5.6%. Perhaps a bigger threat is the populist Benoît Hamon, another ex-minister who resigned in 2014. Voters like his proposal for a universal basic income. Whoever reaches the second round has a good chance of toppling Mr Valls, especially if turnout is high.

No matter whom the Socialists nominate, their chances of winning the presidential election in May are slim. But the Socialist nominee will influence the chances of other candidates on the left. Two other figures on the left have already declared that they are running as independents. One is Jean-Luc Mélenchon, a hard-left member of the European Parliament. Another is Emmanuel Macron, an economic and social liberal and former economy minister. Many bigwigs and financiers are quietly backing him. He will siphon away many of the young, educated, internationally minded voters on whom the Socialists would normally depend (see chart).

"The left is a mess," says Laurent Bouvet of Versailles University. He thinks only 40% of voters would consider backing any ▸▸

left-leaning candidate. If the leftist contenders split their share of the vote close to evenly, none has a chance of winning 20-25%, which is probably the minimum to make the run-off in May. But if the Socialists pick a hard-left candidate this month, it could leave the way open for a centrist like Mr Macron. Bookmakers give him the best odds of any on the left. Yet he is still a long shot, says Philippe Marlière, a political scientist at University College London.

The longer-term future of the Socialists looks precarious. Marine Le Pen of the National Front is appealing to blue-collar voters worried by globalisation and immigration. On the centre-right Mr Fillon, who trumpets his Catholic identity, is winning over small-town voters who might once have voted Socialist but are uneasy about liberal moves such as France's legalisation of gay marriage. Muslim voters, meanwhile, mistrust the left's dedication to the strict French secularism known as *laïcité*.

After the presidential election, the Socialists risk a mauling in legislative elections in June. They have been here before: in 1993 they won just 57 of the 577 seats in the National Assembly. But the months ahead are set to be the gloomiest they have seen in many years. ■

The European Parliament

Opposites attract

For about five minutes

GUY VERHOFSTADT, leader of the liberal ALDE grouping in the European Parliament, once dismissed Italy's upstart Five Star Movement (M5S) as "incompatible" with his pro-Europeanism. Beppe Grillo, its leader, called Mr Verhofstadt "unpresentable". Since then Mr Verhofstadt, a former Belgian prime minister whose answer to every problem is a rousing cry of "More Europe!", has positioned himself as a bulwark against the anti-European populism ravaging the EU—precisely the sort of thing Mr Grillo has made his stock-in-trade. So when plans for a parliamentary alliance between the two men emerged on January 9th, pundits scratched their heads. ALDE and M5S vote against each other as often as not (see chart). Most of ALDE's 69 MEPS were horrified at the prospect of joining forces with a party that stood for everything they detested. Before the day was out they had squashed the plan.

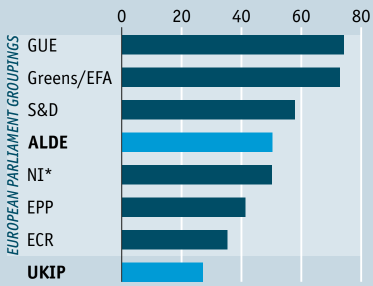
Mr Grillo's excuse was that Brexit was going to make his existing partnership with UKIP, an anti-EU British party, defunct. Mr Verhofstadt's motives are harder to divine. One explanation might be the fact that he is running for the presidency of the European Parliament (the incumbent, Martin Schulz, is leaving to rejoin German politics). The chamber votes on January 17th, and M5S's 17 MEPS would have helped the ALDE leader in his bid. But his candidacy was always a long shot. ALDE is dwarfed by the parliament's centre-left and centre-right groupings, one of which will almost certainly provide the next president.


A liberal interpretation

An expanded group would also have been eligible for more funding. But whatever the reason for Mr Verhofstadt's gambit, it backfired spectacularly. His tactics compounded the sin. Many of his MEPS heard about the proposal in the press, fuelling their fury. Some gave him an earful at a closed-door party meeting. One suggests his "idiotic hubris" means his days as ALDE leader are now numbered. So in short order Mr Verhofstadt infuriated his allies, destroyed his bid for the presidency and exhibited precisely the sort of political cynicism he claims to stand against. Not a bad day's work.

All over the map

Share of votes in the European Parliament where the Five Star Movement's vote matched those of other political groups, 2014-16, %



Source: VoteWatch *Non-attached MEPs

Italy's populists

Five Star mystery

ROME

What does Beppe Grillo's party believe?

IF AN election were held in Italy today, according to the latest polls, the winner would be Beppe Grillo's Five Star Movement (M5S). Termometro Politico, a website that averages poll results, currently puts it fractionally ahead of the governing Democratic Party (PD). But what—if anything—does the M5S stand for? The movement claims to be neither right nor left; its positions on issues are often contradictory. And after the most humiliating setback in the M5S's brief history, the answer is less clear than ever.

M5S's activists argue for a revolutionary, internet-based form of direct democracy. They despise mainstream parties. They inveigh against the Transatlantic Trade and Investment Partnership (TTIP). They dislike the European Union's sanctions against Russia. And while many of Mr Grillo's followers are less hostile than he is to the EU itself, the Movement's demands include a consultative referendum on leaving the euro.

Yet on January 8th Mr Grillo proposed on his blog that M5S's representatives in the European Parliament should leave Europe of Freedom and Direct Democracy (EFDD), the Eurosceptic parliamentary group to which they have belonged since first winning seats in 2014, and join the Alliance of Liberals and Democrats for Europe (ALDE), a centrist group that disagrees with the M5S on all of the points above—and many besides.

Some analysts speculated that Mr Grillo was trying to woo moderate, pro-European voters. Others plumped for cynical opportunism. The EFDD's biggest member is the UK Independence Party (UKIP), which will depart when Britain leaves the EU. That will leave the EFDD with fewer members than it needs to form a parliamentary group and strip its remaining constituent parties of funding and administrative support. The M5S stands to lose an estimated €340,000 ($362,000) a year.

The morning after Mr Grillo's unexpected announcement, an online poll of the Movement's registered members was held. His plan for the most unlikely marriage since Kermit the Frog and Miss Piggy won a 79% endorsement. Soon afterwards, Mr Grillo published a farewell letter to Nigel Farage, the EFDD president. But by then (see box) a revolt was brewing in the ALDE and the plans were cancelled.

Mr Grillo's mishandling of the affair led to scathing criticism from rank-and-file members on his blog. But the effect on the broader electorate could prove more damaging. The M5S has always insisted that, by ignoring ideology, it can cherry-pick policies that work. The European Parliament fiasco suggests that it simply lacks principles. It also sheds a disturbing light on the ability of Mr Grillo (pictured) to mesmerise his acolytes into backing contradictory positions. The percentage voting for an alliance with ALDE was almost identical to that three years earlier for cosying up to the radicals of the EFDD.

The M5S has nevertheless shown a remarkable capacity for survival. And because of a Constitutional Court decision on January 11th, it is unlikely to face the electorate soon. The judges stymied a referendum aimed at nullifying the centrepiece of a 2014 employment law—the main structural reform of the previous government, led by Matteo Renzi. Mr Renzi, who resigned after losing an earlier referendum on constitutional reform, continues to head the PD. The government of his successor, Paolo Gentiloni (also of the PD), had indicated that, rather than face a vote that might have nullified Mr Renzi's proudest achievement, the government would join calls to dissolve parliament and hold elections, which would have postponed the referendum for a year.

Two other labour issues will be put to a national vote in the spring, but ministers are expected to deal with both of them before then. Sergio Mattarella, Italy's president, is reluctant to call an election before the country has a new election law. Since such laws are notoriously hard to agree on, Mr Gentiloni could be prime minister for longer than either he or Mr Renzi expected. If, that is, his health holds. He underwent heart surgery after feeling unwell on his return from Paris on January 10th. ■

A man of many principles

The Yugoslavia and Kosovo tribunals

Better than nothing

THE HAGUE

As one war-crimes court shuts down, another starts up

IT WAS a historic day for international justice, but it did not look like it. On December 15th Ratko Mladic sat in the dock at the UN's Yugoslavia war-crimes tribunal in The Hague, grumbling and reading a newspaper. When the prosecutor accused him of organising the massacre of more than 7,000 Bosniak Muslim men and boys after the town of Srebrenica fell to his Bosnian Serb forces in 1995, he wagged his finger in denial. It was the last day of his trial, though the verdict could be a year in coming. Verdicts about the court itself, meanwhile, are already being handed down.

The case against Mr Mladic brings to an end the trials of the important figures indicted by the tribunal. (Appeals are being dealt with by another body.) In the Balkans, there is widespread disappointment at the role it has played. Meanwhile, as one tribunal shuts down, a new one for Kosovo was launched in the Netherlands on January 1st. Later this year it should begin issuing indictments for Kosovars accused of crimes committed between 1998 and 2000.

Created in 1993 by the UN Security Council, the Yugoslavia tribunal ultimately indicted 161 people and sentenced 83 of them. "Its greatest success," says Eric Gordy, the author of a book on war crimes in the Balkans, "is that it did anything at all." Judge Carmel Agius, the president of the tribunal, admits it has been "a troubled journey" but is proud of its achievements.

The tribunal's biggest failure was its inability to convince people in the former Yugoslavia that it was impartial. Many in the region saw it as a foreign imposition. It was created by outsiders at a moment when the world had the will to demand justice for war crimes wherever they were committed. But trials have dragged on for years, and judges and lawyers are paid handsomely. People in the former Yugoslavia, Mr Agius says, suffer from a habit of "blaming foreigners or someone else" for their disappointments. But, he says, "not a single mass grave would have been excavated" if the tribunal had not existed.

Mirko Klarin, a journalist who urged the court's creation in an article in 1991, says one success was expanding the definition of war crimes. Yet this, he thinks, may have been the court's downfall. Starting in 2012, several acquittals called into question the court's "command responsibility" precedents, which held leaders culpable for war crimes committed in operations they had ordered but not directly led. Many observers believed that powerful Western countries worried that such standards might be applied to their own armed forces or politicians, and used their influence to turn the tide.

The suspicion that war-crimes tribunals are an alien imposition also afflicts the new Kosovo court. In fact the court is not a UN body. It is a tribunal set up under Kosovo law, with foreign judges, funded mostly by the EU and in response to allegations made in a Council of Europe report in 2011. (One was that several prisoners held by what was then the Kosovo Liberation Army were murdered for their organs.) Florina Duli, who runs the Kosovar Stability Initiative, a think-tank, says many of her compatriots are convinced that the new tribunal is a tool of "big countries and the European Union". They think the threat of indictments will be used to blackmail Kosovar leaders to do what the Europeans want, such as keeping the EU-sponsored dialogue with Serbia going.

David Schwendiman, the prosecutor, concedes that the aims of the new tribunal are more modest than in decades past. His work may not deter fighters from committing crimes in Syria. Still, he sees a duty to build a body of law with which to try such criminals when the political will to do so returns. In the meantime, the tribunals "[help] people learn what happened, but not be consumed by it." As an effort to record history, the Yugoslavia tribunal with its archive of millions of pages is an undisputed success. That, and the convictions it has achieved, says Mr Gordy, are "definitely better than nothing—and most conflicts get nothing." ■

Political fragmentation

Going to bits

Europeans are splitting their votes among ever more parties

AFTER two months and three failed rounds of negotiations, Iceland has a government at last. On January 10th Bjarni Benediktsson, leader of the Independence Party, announced that he had struck a deal with two other centre-right groups. Yet his tenure as prime minister may be short. Opposition politicians are already calling for a vote of no confidence and fresh elections. And even if the coalition survives for the moment, with a measly one-seat majority, it is unlikely to last long.

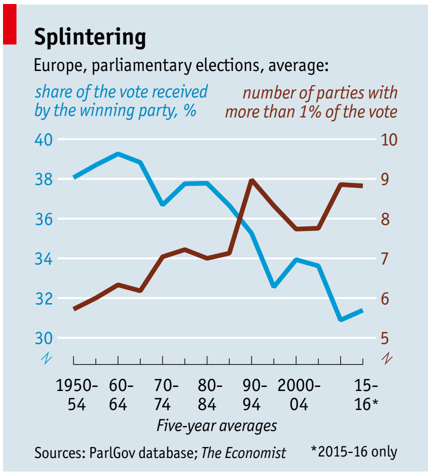
Iceland is not alone in its coalition-building woes. Across Europe politics is becoming more fragmented and governments harder to form. Smaller parties, among them populists and single-issue outfits, are popping up and stealing support from the traditional powers. In the early 1980s the average number of parties winning more than 1% of the vote at each election was seven. Now it is nine. Meanwhile the share of the electorate that the winner claims has fallen from 37% to 31%, on average (see chart).

Party up

In many ways, a greater diversity of parties is a good thing. It allows more voices to be heard, and can increase citizens' engagement with politics. But it also has drawbacks. The most obvious is time-consuming coalition wrangling. Irish lawmakers took 63 days to strike a deal after an election last March. In October Spain's Popular Party cobbled together a minority government following ten months of political deadlock and two elections. After a 2010 ballot Belgians went a record 589 days without a government.

Such awkward coalition governments tend to be shorter-lived than those with fewer parties and clearer mandates. Since 1970 single-party majority governments in rich European countries have lasted around 1,100 days. Minority coalitions made it less than half that time.

In addition, coalitions made up of widely disparate parties struggle to pass laws. Finland's current government, made up of two centre-right parties and the True Finns, a populist, nationalist outfit, came to blows in 2015 over a proposed health-care reform. After more than a year of negotiations and the prime minister threatening to dissolve the parliament, a deal was finally struck in December 2016. Studies suggest that this fits a pattern: the more parties there are in a coalition or the farther apart



they sit on the political spectrum, the fewer laws they will pass.

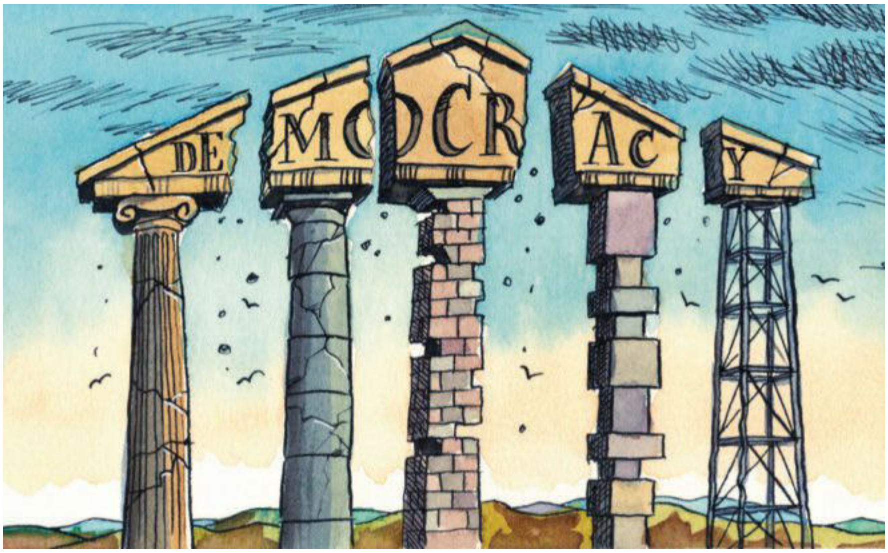
Because coalition governments have more mouths to feed, they can be expensive. One paper by Kathleen Bawn and Frances Rosenbluth, both political scientists, looked at public-sector expenditure across 17 European countries from 1970 to 1998. It found that adding a party to a coalition increased spending by 0.5% of GDP. For countries with strong economies and low debt, such as the Netherlands, this may not be a problem; for countries like Greece and Italy it is.

One reason for rising fragmentation is growing inequality, explains Simon Hix of the London School of Economics. Between the mid-1980s and 2008 the disposable income of Europe's richest 10% grew almost three times faster than that of the poorest 10%, according to the OECD, a club of mostly rich countries. As wages became more dispersed, voters' preferences grew more polarised, with the rich supporting the status quo and the poor opposing it. Polarisation among the public begets fragmentation in parliament. At the same time the values of urbanites increasingly diverged from those of rural folk. Such splintering creates distinct pockets of voters to which smaller parties can appeal.

Another factor is plummeting party loyalty. In the 1960s roughly 10% of Britons were members of a political party. Today a mere 1% are. A similar pattern holds across Europe. Mainstream media organs once tended to support one of the two main political powers and cover only a handful of curated topics. Today politics can be more personal. An ardent green voter might read only environmental news, sharing it with like-minded souls on social media.

Some electoral systems are designed to keep smaller parties out of power, thus discouraging fragmentation. But these mechanisms are less effective than they used to be. Greece awards a 50-seat bonus to the winning party. Yet Syriza, the ruling left-wing outfit, still failed to secure a parliamentary majority after the latest election in 2015. Even Britain, which has a first-past-the-post system, was forced into coalition government after the 2010 election.

One strategy for coping with fragmentation is to form so-called "grand coalitions" of parties across the left-right divide. Such coalitions currently govern in Germany, Austria and the Netherlands. Yet this often reinforces the dynamic: voters become frustrated by the colourless centrism of such governments, and drift further to the extremes. On the bright side, this brings even more political diversity. As for the dark side of political fragmentation, Europe may simply have to live with it. ■



Charlemagne | The cruel sea

The Mediterranean will be at the heart of Malta's EU presidency—for all the wrong reasons

"ALL that concerns the Mediterranean is of the deepest interest to civilised man," wrote Edward Forbes, a 19th-century naturalist. Europe's great sea will loom large as Malta, the European Union's smallest member, takes up the rotating presidency of its Council of Ministers for the first half of 2017. That is fitting, for the Mediterranean has defined the destiny of this speck south of Sicily. The Great Siege Road, which runs along the northern edge of Valletta, Malta's handsome capital, recalls the island's repulsion of Ottoman invaders in 1565, an act of defiance that resonated across Christian Europe. A covetous Napoleon said conquering the strategically located island was "worth any price". Centuries later a bull-headed Maltese prime minister shoehorned a chapter on Mediterranean security into the Helsinki Accords, a cold-war compact between the West and the Soviet bloc.

Yet Malta's fellow Europeans have not always been so interested in the Mediterranean. The accession of Malta and Cyprus to the EU in 2004 marked the end of the club's expansion in the region. An ill-fated "European Neighbourhood Policy" failed to draw the littoral states to the east and the south closer to the EU. In 2008 Nicolas Sarkozy, then France's president, launched a 43-country "Union for the Mediterranean" to much fanfare but zero effect. Since then the menace of Russia and the plight of Ukraine have drawn European attention eastwards. To the south, the EU has merely watched helplessly as the promises of the 2011 Arab uprisings were swallowed by counter-revolution and civil war.

Today the Mediterranean may be back, but not for happy reasons. If, in the words of David Abulafia, a historian, the sea was once "the most vigorous place of interaction between different societies on the face of the planet", for Europe it now represents only danger and instability. Malta's presidency plan draws attention to the Mediterranean's "ongoing conflict, socioeconomic challenges, terrorism, radicalisation and human-rights violations". Analysts warn of a "wall of poverty" to Europe's south.

Chief among the concerns, of course, is migration. This is nothing new for Malta; between 2002 and 2012 thousands of refugees fleeing war-torn African states like Somalia and Eritrea threatened to overwhelm the tiny island. Utterly unprepared for the arrivals, the Maltese shoved them into grim detention centres, which remain open today. Malta's bid for solidarity from its EU partners went nowhere. Its relationship with Italy soured in rows over responsibility for migrants picked up at sea.

How things have changed. Thanks, say some, to a mysterious deal between Italy and Malta not acknowledged by either side, few irregular migrants now disembark in Malta; the Central Mediterranean route runs almost exclusively between Libya and Italy. More importantly, a separate crisis in the Eastern Mediterranean jerked migration to the top of Europeans' concerns. The refugee crisis of 2015-16, when over 1m migrants hopped from Turkey to Greece and thence towards Europe's heart, so traumatised Europe's leaders that they have turned to the Central Mediterranean route with renewed vigour. Here the numbers have edged rather than rocketed up: 181,000 reached Italy in 2016. The difference is that they now have Europe's attention.

Perhaps the trickiest task of Malta's presidency will be an internal one: brokering agreement among the EU's governments on how to share the burden of irregular migration. But Joseph Muscat, the prime minister, has bigger ideas. He wants the EU to strike deals with African countries similar to that agreed with Turkey in March 2016, which drastically slowed the flow of migrants to Greece. Details are unclear, but Mr Muscat mentions joint naval patrols of North African waters. Others have revived an old notion of offshore asylum-processing centres in Egypt and Tunisia. "I'm aware these are controversial ideas," says Mr Muscat. "But there is no other option." He will advance his arguments at an EU summit in Malta next month.

The prime minister says most EU leaders agree with him. But the Turkey deal offers few lessons for Africa. Almost half of the migrants in Greece last year fled the civil war in Syria. But most of the migrants in the Central Mediterranean are seeking better wages, not fleeing war, which means their asylum bids are likely to fail. Failed asylum-seekers are devilishly difficult to deport, as countries like Germany have been learning. And where Turkey is well governed (if increasingly despotic), Libya is in chaos. This week Italy reopened its embassy in Tripoli and signed a migration and security agreement with one of Libya's two governments. But such is the volatility in Libya, says Mark Micallef, a Maltese Libya-watcher, that there is no guarantee Italy will have any partner at all in a few months.

The thick blue line

The Mediterranean is not without hope. Against the odds Tunisia, just 300 miles from Malta, is consolidating its post-revolutionary democracy. The EU seems determined to buttress Libya's notional government, if only to have a partner to help it stem the migrant flows. To Malta's east, hopes are high that 2017 may finally bring an end to the decades-long division of Cyprus (reunification talks were being held as *The Economist* went to press). A Cypriot deal could improve the EU's relations with Turkey, unlock oil and gas supplies in the eastern Mediterranean and smooth the burgeoning relationship between the EU and NATO.

But the EU has cleaved the sea in two. "Club Med" may have struggled inside the euro, but EU membership has consolidated democracy in Portugal, Spain and Greece. Malta itself is economically thriving and a far more relaxed place than the hidebound country that joined the EU in 2004. Outside the union, to the south and east, the Mediterranean is a sea of troubles. Malta's politicians have often warned that if the EU fails to export stability to its southern neighbourhood it will find itself importing instability instead. So far, they have been proved right. ■

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Northern Ireland

Into the unknown

BELFAST

Amid simmering frustration with the political settlement, a sudden resignation pitches the region into crisis

HOARSE of voice and frail in demeanour, the Martin McGuinness who announced his resignation from Northern Ireland's government on January 9th was a different figure to the strapping Irish Republican Army (IRA) commander that the public once knew. Mr McGuinness's transformation over the past few decades, from a member of a terrorist organisation to the region's second-most senior politician, exemplifies the change that Northern Ireland has undergone. Now his resignation from office—and, perhaps, permanent withdrawal from politics—has created a crisis in the region at a time when it already faces grave threats to its stability.

The departure of Mr McGuinness, a member of Sinn Fein, was provoked by what he called "the most crude and crass bigotry" of the Democratic Unionist Party (DUP), with which Sinn Fein shares power. In one year as first minister the DUP's leader, Arlene Foster, has proved to be a flinty head of government who, nationalists complain, shows little flexibility in her dealings with Mr McGuinness and others.

The final straw came when it emerged that a green-energy initiative she organised as enterprise minister in 2012 would cost breathtaking sums of money. Businesses received large subsidies to keep wood-fired boilers going—even to heat empty sheds—in what has been dubbed the "cash for ash" or "burn to earn" affair. The scheme could eventually cost the region £490m ($600m). Mrs Foster initially said she could not be expected to scrutinise "every single jot and tittle" in her department. But later she admitted there had been "a catalogue of mistakes". She has accepted that an investigation should go ahead, but maintains she did no wrong and thus need not stand aside. Facing a barrage of criticism, she declared: "There's a lot of it personal…a lot of it, sadly, misogynistic as well."

Voters may soon get the chance to deliver their own verdict. Mr McGuinness's resignation as deputy first minister has brought the operation of Belfast's devolved administration to a shuddering halt, since its rules demand that it be jointly headed by a unionist and a republican. The British government is holding talks to patch things up between Sinn Fein and the DUP. If those efforts fail—as most believe they will—a new election is on the cards.

Such a contest would be "brutal", Mrs Foster has said. Both the DUP and Sinn Fein would face challenges from smaller opposition parties. But in Northern Ireland, where old voting habits die hard, the DUP and Sinn Fein would be favourites to emerge again as the main forces. The number of seats in the Assembly at Stormont is due to fall from 108 to 90 in a cost-saving exercise. Small parties are likely to lose out.

Whatever the outcome of any election or inquiry, republicans are already insisting that they will not agree to a return to the politics of the past year, which they say exposed Mrs Foster's opposition to the principle of "parity of esteem" in which the parties are supposed to hold each other. In recent years there have been signs of deepening disillusion with the Assembly in the republican strongholds of Belfast and south Armagh. Although Sinn Fein leaders, among them Mr McGuinness, have been willing to keep trying in the Assembly, many at the grassroots have concluded that Stormont is a waste of time.

A key moment came in December when one of Mrs Foster's ministers cut £50,000 in funding for teaching the Irish language, which republicans regard as a touchstone issue. A curt e-mail to teachers announced: "Because of efficiency savings, the department will not be providing the Liofa bursary scheme in 2017. Happy Christmas and Happy New Year." On January 12th the move was reversed, but by then the damage had been done.

As the government in London works to steady Northern Ireland's political settlement with one hand, it is rocking it with the other. The vote last year to leave the European Union—in which the Northern Irish voted to remain—presents several problems. The Good Friday Agreement of 1998, which established Northern Ireland's devolved government, was signed on the assumption of Britain and Ireland's shared EU membership. The Supreme Court is currently considering whether Northern Ireland's Assembly should therefore be consulted before the government can trigger Article 50, the legal route to Brexit. If the court rules in favour, elections in Northern Ireland could delay the process.

Nor does anyone in London yet have a good answer to the question of what will happen to the open border with Ireland in the event that the United Kingdom opts out of the free movement of people to and ▸▸

from the EU (see next story). A harder border, including checks on people and goods, could rattle both Northern Ireland's economy and its political settlement.

It would be a bad time to lose Mr McGuinness from politics. He will not say what explains his sudden poor health, nor whether he will fight the next election. During ten years as deputy first minister his authority and charisma have been valuable in assuring republicans that it is worth keeping Stormont going. And he has built bridges with unionists, too. Talking to the queen last year he asked about her health and she was overheard replying: "Well, I'm still alive anyway." His friendly relationship with the queen, a second cousin of whom was murdered four decades ago by the IRA, shows how far things have come—and how much is at stake. ■

European migrants and business

Labour pains

Businesses will have to adapt quickly to survive the expected loss of workers from Europe. Some are already doing so

BY RIGHTS, the general manager of the Royal Lancaster shouldn't have much to worry about. With sweeping views over Hyde Park and a glitzy history of hosting footballers and pop stars, the posh central London hotel has ticked along nicely since it opened in 1967. Now, however, Sally Beck has a headache: Brexit. And, specifically, how she will keep going if that means losing unfettered access to workers from the European Union.

Like many hotels and restaurants, the Royal Lancaster depends on migrants. About half its staff, including a third of its managers, were born in continental Europe. These proportions are common in the capital, and even in the regions can be as high as 40%, says Ufi Ibrahim, the head of the British Hospitality Association, a lobby group. Overall, the hospitality industry—the country's fourth-largest by income—employs 4.5m people, of whom at least 700,000 are from the EU.

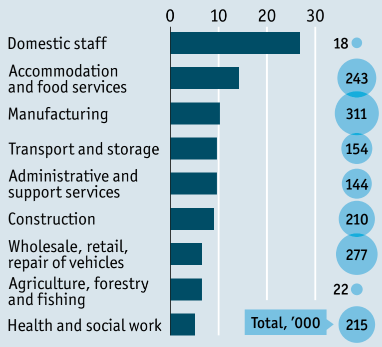
Other industries are similarly reliant on EU workers (see chart). Jack Semple of the Road Haulage Association, an industry group, estimates that Britain has 600,000 licensed lorry drivers, of whom at least 10% are from the EU, mostly the eastern part. In agriculture the proportion of EU workers rises in the summer, to pick fruit and vegetables. There are also large numbers working in health and social care. Overall the total of EU citizens in Britain more than trebled, from 0.9m in 1995 to 3.3m in 2015, following the accession of 13 new countries to the EU after 2004.

For some industries it is thus the free movement of labour that is the most prized advantage of being in the EU—more even than membership of the single market. Yet Theresa May, the prime minister, has indicated that controlling immigration from Europe will be central to her approach to Brexit. And on January 10th Jeremy Corbyn, Labour's leader, said he was no longer "wedded" to the free movement of EU workers. Even if those Europeans already employed in Britain are granted the right to stay after Brexit, as seems likely, the flow of new migrants could reduce to a trickle in just a couple of years. Bosses are therefore being compelled to rethink their employment practices. The options before them are not enticing, but they could change the way that Britain does business.

All work and no stay

EU nationals working in Britain by industry

Q2 2016, % of all workers



Source: Labour Force Survey

The employers' main problem is a tight labour market. Employment is at a record high. Most studies agree that, in general, EU migrants have not displaced many British workers, nor put much downward pressure on wages. Rather, Britain's relatively fast-growing economy has created millions of jobs. Equally, argues Jonathan Wadsworth of the London School of Economics, immigrants' need for housing, food and transport has created more opportunities. So it is idle to presume that there is an army of frustrated, unemployed British workers ready to pick up the spanners of departing Polish plumbers.

Still, this does not mean that businesses cannot do more to recruit in Britain. Take road haulage. Hauliers already face a shortage of drivers. With the 13% fall in the value of the pound since the referendum, a good number of Polish drivers have not bothered to return to Britain after the Christmas break. In this sense, argues Mr Semple, Brexit has come early. So his organisation is trying to rebrand the industry to attract school-leavers. Driving a lorry was seen as dull, smelly and underpaid; now, apparently, it's an IT-driven essential service.

Another option is to widen Britons' participation in the labour market. The Resolution Foundation, a think-tank, estimates that a further 2.6m people, including the elderly and disabled, could join the workforce by 2020. The question is how to tempt them in. Higher pay could help: the minimum wage is due to rise to £9 per hour by 2020. Yet businesses may struggle to foot these extra costs. From April any firm with an annual wage bill of more than £3m will face a new "apprenticeship levy". Businesses are also grappling with a new requirement automatically to enroll employees in pension schemes. An idea floated by the immigration minister on January 11th, to charge businesses £1,000 a year for every skilled EU worker that they employ post-Brexit, got a cool reception and was hastily withdrawn.

An alternative would be to invest in labour-saving technology. Some Brexiteers see this as a bonus of leaving the EU: deprived of cheap labour, companies would be forced to become more efficient, and Britain's low rates of productivity would improve. Ms Beck, for example, says that Brexit is speeding up her plans to phase in automated minibars at the Royal Lancaster. The ordinary sort take many man-hours to check and restock, whereas automated ones have sensors that tell reception when a guest is raiding the brandy. The Agriculture and Horticulture Development Board, a quango helping farmers to modernise, is funding experiments in automated broccoli-harvesting. Brexit has given such tests an added urgency.

Yet there are limits to how easily manpower can be replaced by machines. Broccoli is pretty robust, but picking soft fruit like raspberries will probably have to be done by hand for the foreseeable future. So farmers are hoping that, if free movement does come to an end, the government will reinstitute the Seasonal Agricultural Workers Scheme, abolished in 2013. Ministers have dropped hints that such visa schemes could be established in farming and other industries. At least, maybe.

If they are not, and if recruiting Britons or robots to do the work turns out to be too difficult or expensive, firms have another option: to up sticks and move to another country with a good supply of labour. The hotel business, by its nature, can't do this. But industries such as food manufacturing could. If Britain's firms cannot import enough workers, the country may simply export their jobs. ■

Bagehot | Staying airborne

Britain's globetrotting chancellor ponders the country's post-Brexit economic model

TO FLY in one of the Royal Air Force planes that ferry ministers about the world is to experience a corner of old, imperial Britain. Under a framed black-and-white picture of Balmoral Castle, uniformed pursers serve afternoon tea. A neat pile of tweed blankets sits in a basket, the seats and carpet are a faded royal blue and the wooden trim bears the queen's cipher ("EIIR") in swirly letters. A photo of the plane somewhere in the Middle East illustrates the safety leaflets. Like the inside of Downing Street, it has the grand-shabby air of a posh hotel that has seen better days. The jet shudders and creaks through the air: Downton Abbey with jet engines attached.

Such were Bagehot's impressions on January 9th when he accompanied Philip Hammond, the chancellor of the exchequer, back from a visit to Dublin. Another was the plane's symbolism of Britain's reinvention over the past four decades; its shaping of the remnants of empire into a new economic role. Remnants like its merchant banks and insurance houses, universities, language, vast soft power and trusted legal system, which it successfully parlayed into specialisations in services and high-end manufacturing. From Margaret Thatcher onwards, governments of left and right strived for the right conditions: an open and flexible labour market, low inflation, a liberal regulatory regime, modest taxes and tariffs. Britain's prosperity was built on imperial traces, memories and networks that live on, and span the globe.

Of that Mr Hammond has more experience than most. Before entering politics he exported medical equipment and consulting services to Asia, Latin America and Africa. He has been foreign secretary. As chancellor he is travelling the world proclaiming that Britain's liberal business model can survive Brexit. Visiting Kuwait, Qatar and the United Arab Emirates recently, he says he found investors still enticed by its legal, financial, business and professional services, as well as plain familiarity: "They know the UK, they've got homes here, they feel comfortable."

Brexit, he says, demands two main things from policymakers. First: limit the damage. In a rebuke to his more gung-ho cabinet colleagues he warns: "If our businesses are cut off from those [European] supply chains, it isn't necessarily the case that tomorrow they'll stop producing axle parts and start making, I don't know, high-end suitcases for the Korean market." Building new markets is slow, hard work. "You don't just wake up one morning and say: 'I think I'll take the Chinese market today.' You build. You build your product's presence, your business presence, your networks, your distribution capability, confidence in your brand. It all takes time." Hence the urgent need for clarity about Brexit. He compares British firms to patients in hospital: whether the news is good or bad, they want to know it. Hence, too, his fiscal policy. In November he ditched a plan to reach a surplus by 2020, giving himself room to cushion any shocks (though not this year, he says, if GDP growth hits the projected 1.4%).

Fasten your seat belts

So far, so "Spreadsheet Phil" (the chancellor has a reputation for dour competence). But he becomes exuberant on turning to the government's second Brexit-related job: building new sources of growth. He says Britain is better than Germany at moving fast to grab new opportunities—"We accept that things can change quickly"—citing London's success since 2002 at luring international firms put off New York by the Sarbanes-Oxley Act, which tightened America's corporate governance rules. What would a similar British coup look like now? Here he waxes optimistic about biotechnology, synthetic technology (creating new industrial materials) and "fintech" (where Britain's deep capital markets give it an edge even over Silicon Valley, he argues). He is sceptical about the claim by Andy Haldane, the Bank of England's chief economist, that 15m British jobs could be lost to robots. The costs of capital may rise, making human labour more competitive; firms and individuals adapt and find new work ("Didn't we have this discussion…20 years ago about shorthand typists?"). In any case, "If anywhere in Europe is going to get [a Google-type technology giant], culturally the UK is in the best position."

Your columnist was struck by the contrast with Theresa May. Ask the prime minister to name the country's economic strengths and she will probably mention the same things as her chancellor. But the two differ drastically on the costs they attach to them. For Mrs May, the dislocation caused by a freewheeling labour market, the excesses associated with deregulation, the rift between services-rich boomtowns and forgotten, post-industrial regions put their very legitimacy and sustainability in question. In a speech on January 8th she argued that the Brexit vote was about much more than EU membership: it was a rejection of "laissez-faire liberalism". Mr Hammond recognises no such crux: "Where's the evidence for the assertion that the Brexit vote was saying something about this or that or the other? It was saying something about Britain's membership of the European Union." For him, those costs can be fixed with the right policies, like better skills provision and the economic integration of two London-sized agglomerations: the English north and the Midlands.

This gap is about more than the differences between the job of chancellor and that of prime minister. It is part of a grand debate that Britain is having, without noticing, on the basic transaction at the heart of its post-imperial business model: more disruption (industrial, cultural, social) in return for more prosperity. Current arguments over immigration, integration, student visas, industrial policy, high pay (the Labour Party is flirting with the idea of a maximum wage) and, of course, Brexit are all ways of probing this. Perhaps it would help to acknowledge this fact more openly. Because one day, in spring 2019, Britain is due formally to leave the EU. It will have Brexited. The question, about which Mr Hammond has clearly thought more than most, will be: what now? ■

The Guantánamo conundrum

A legal quagmire that still stinks

GUANTÁNAMO

A stain on America's reputation is unlikely to be wiped clean soon

IT IS always twilight in the circular passage where the guards keep watch around the clock through wide windows, eyeing the "forever detainees" in Camp Six at America's naval base at Guantánamo. These are the men who are deemed too dangerous ever to be set free but whose jihadist activities were apparently too shadowy to provide enough evidence to secure convictions in court. The passage is murkily lit so that the guards—and the rare visiting journalist—can peer through one-way glass unobserved by the detainees.

The official mantra is that the detainees' treatment must be "safe, humane, legal, transparent". But to anyone who believes in innocence until proof of guilt, visiting is a discomfiting experience. These men, however heinous their alleged crimes, have been detained without trial, most of them for more than a decade. They have had little prospect of freedom, or even of facing trial in America. Though the Caribbean laps against the shore nearby, none of them ever sees it.

In each walled-off section, ten prisoners or so mill around in a communal area with steel tables bolted down. Some lounge in chairs or on a sofa. A few read. Five times a day they line up and prostrate themselves in prayer, with arrows painted on the floor helpfully pointing towards Mecca. Air-conditioning keeps the place cool, even cold, inside; some of the detainees prefer to loaf outside, where noon-day temperatures nudge 38°C. Occasionally a prisoner gesticulates towards the window. A guard puts on a plastic visor against what the authorities call "splashing", meaning spitting at a jailer or, in past years when prisoners were sometimes "non-compliant", throwing excrement or vomit. The guard opens a door, exposing a narrow chain-linked limbo between the guards' and prisoners' sections, and asks in sign language what is wanted. Usually it is a request, readily met, for toilet paper or soap.

When your correspondent visited, one prisoner, somehow sensing the journalists peering through the one-way window, had propped up a painting of a white question-mark on a grey background, with a padlock at the bottom instead of a dot. The most plausible interpretation was that it expressed uncertainty about the inmates' future after January 20th, when Donald Trump assumes the American presidency.

By January 11th 55 prisoners remained in Guantánamo, all but one said to be "highly compliant". Yemen had the most citizens still detained (23), followed by Pakistan and Saudi Arabia (six each) and Afghanistan (five). Apart from 22 in Camp Six, another 15 (including the five accused of orchestrating the attack on the World Trade Centre on September 11th 2001) are held in Camp Seven, the most hidden and highly guarded block. The remaining 18 have been cleared for transfer to third countries. According to the *New York Times* on December 19th, the governments of Italy, Oman, Saudi Arabia and the United Arab Emirates were willing immediately to accept 17 or 18 of those cleared to go; four had gone by January 11th. So 41 or 42 may be left in Guantánamo by the time Mr Trump moves into the White House.

Lock up some more

Whereas Barack Obama had promised to empty the place and close it down, during the election campaign Mr Trump said the opposite. "We're gonna load it up with some bad dudes, believe me, we're gonna load it up," he said in February. If he keeps his word, the remaining prisoners are likely to stay there, perhaps for life. Conceivably they could be joined by Islamic State fighters captured in Iraq and Syria. The camp commanders say they can close the prison forthwith if so instructed, or conversely make room for another 70-100 detainees. A cell block being renovated could soon cater for 200 more. At its zenith Guantánamo held around 684; up to 780 have passed through it. At least seven are known ▸▸

to have committed suicide.

When the first al-Qaeda suspects were flown to the naval base in 2002, members of George Bush's administration advanced several reasons for holding them there. If they were jihadists determined to wage war on Americans and other Westerners, they should be held for the duration of hostilities to prevent them from returning to the battlefield, like prisoners-of-war in any conflict. While incarcerated, they might provide useful intelligence, helping to prevent further terrorist atrocities.

However, as "unlawful enemy combatants" who followed none of the laws of war, Mr Bush's lawyers reasoned, they were not entitled to all the protections of the Geneva Conventions, such as the rights not to be interrogated, and to correspond with families. And since they were being held outside America, they fell outside the jurisdiction of American courts. Moreover, so the argument ran, since al-Qaeda views its war against the West as eternal, it may never formally end, so its captured adherents could be held indefinitely.

Starting with Camp X-Ray, where the spectacle of shackled and blindfolded detainees in cages appalled people worldwide, including many who had sympathised with America after September 11th, the camps rapidly filled up. Nearly all the prisoners had been handed to the Americans by allies in Pakistan, Afghanistan and elsewhere, often with the lure of bounties. Many turned out to be marginal figures who had tenuous, if any, links to al-Qaeda.

For the first few years the camps were ill-run and the inmates mistreated. According to Clive Stafford Smith, a British lawyer who has defended a clutch of prisoners from the beginning, for four years all were held incommunicado; no one even knew their names. After 2006 a new batch of supposedly high-value prisoners, including the alleged planners of September 11th, arrived, having been tortured by CIA agents, among others, in secret "black sites", in contempt of international law and America's own values of justice.

As unease mounted at home and especially abroad, Mr Bush sought to create the semblance of a judicial system by getting Congress to pass a law creating "military commissions" where some of the prisoners could be tried. The Supreme Court began to nudge the camps towards at least partially deferring to American law, declaring that detainees had the right to petition for habeas corpus to challenge the reasons for their confinement. Later Mr Bush himself began to call for the camps' closure. By the time Mr Obama took office, saying that he would close them within a year, the tally of detainees had fallen to around 242. Since March 2008 no more have arrived.

Virtually all human-rights lawyers consider the commissions, in the recent words of Human Rights Watch, a New York-based monitor, to have been "an absolute disaster". Defence lawyers describe them as a "legal black hole". A senior man in the International Committee of the Red Cross describes Guantánamo as "a Kafkaesque legal conundrum".

The accused have much weaker rights than in a federal court. Instead of a randomly selected jury of civilians, the "convening authority" in the person of the presiding military judge chooses fellow officers. "Many of the protections in normal courts are stripped away," says David Nevin, defence lawyer for Khalid Shaikh Mohammad, the alleged chief planner of the September 11th attacks, known widely as KSM. "There is no requirement for the accused to be brought speedily to trial [as under the constitution's sixth amendment]. He was taken into custody in 2003 and held incommunicado for three-and-a-half years. He had no lawyer until 2008. The prosecution did not start until 2012. There is no right to exclude coerced statements; no exclusion of evidence derived from torture; no ban on hearsay evidence." The list of shortcomings could go on.

The trial proper has yet to begin. The irony, as another lawyer puts it, is that "if KSM had been tried before a grand jury in New York the trial would have been over years ago"—and would probably have led to a conviction. He was recorded on Al Jazeera, a Qatar-owned television channel, boasting of masterminding the September 11th attack. His lawyers' best approach is probably to stress the CIA's admission that it had tortured him for several years.

A further indictment of the commissions is that, ten years after they were set up, they have achieved only eight convictions, of which four have been wholly or partly overturned. Only ten detainees in Guantánamo are currently facing trial or awaiting sentencing. The rest are simply detained without trial.

But the prosecutor in the two biggest cases, Brigadier-General Mark Martins, a former Rhodes Scholar with a stellar academic record at Oxford and Harvard, says you cannot compare the commissions with a federal court. The commission oversees a "sharply adversarial process" where, since the reforming act of 2009, "much greater weight is given to the defence." The accused, he insists, are given a fair trial. Court-martials, he avers, have a higher acquittal rate than civilian courts. The accused in Guantánamo, he claims, have sturdier legal defences than those at Nuremberg after the second world war.

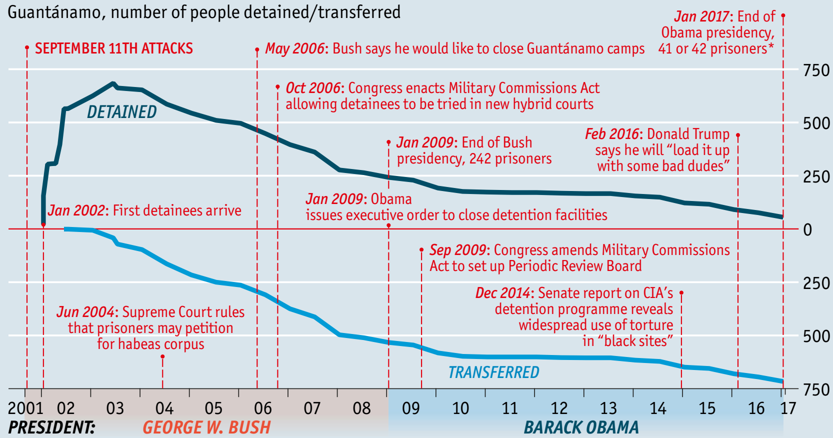
Looking for the key

Perhaps the biggest puzzle is why Mr Obama has failed to fulfil his promise to close the place down. Plainly he found it much harder than he had expected. At first, according to some in his inner circle, he was persuaded to keep it open temporarily as a bargaining chip with Congress in his quest to enact contentious domestic reforms, for instance in health care. Soon after he came to office, he did manage to improve the commissions, getting Congress to pass an act that gave detainees a wider scope for defence and brought in review boards that allowed prisoners every six months to argue for release. He also appointed "special envoys for Guantánamo closure". These speeded up transfers of detainees to third countries, more than 40 of which (including such strange bedfellows as Albania, Cape Verde, Estonia, Kazakhstan, Palau and Uruguay) have agreed to receive some of those set free. Recently Oman, Saudi Arabia and the United Arab Emirates have been the most willing.

But as relations with Congress worsened and he lost control to the Republicans after 2010, Mr Obama found himself blocked on virtually every front. Even though a number of leading Republicans, such as Senator John McCain, had called for Guantánamo to be closed, it became an article of faith for most of Mr Obama's opponents and many Democrats that it

Offloading them

Guantánamo, number of people detained/transferred



Sources: *New York Times*; *The Economist*

*Predicted

should stay open. Hillary Clinton, among others, began to wobble, though she had previously declared that Guantánamo recruited more terrorists than it kept off the battlefield and had suggested holding trials, perhaps including military commissions, in mainland America.

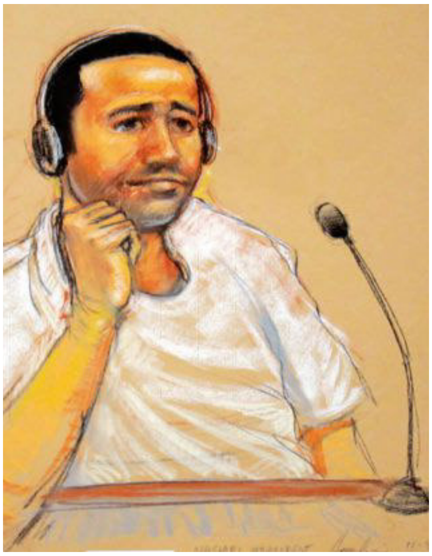
Mr Obama, too, had at first hoped to bring the alleged planners of September 11th to trial before a federal court in New York. But when a wave of emotion was stirred up by the president's foes against the idea that the mass-murderers could ever set foot on American soil, he quailed. And when he campaigned for re-election in 2012, some of his most influential advisers were adamant that if detainees were brought to the mainland and tried in federal courts or even before the new military commissions, he would lose his job.

The Department of Justice and the Pentagon encouraged Congress to be obstructive, citing, among other things, an analysis of the freed detainees. A report from the director of National Intelligence concluded that of 647 former detainees under scrutiny, 18% have definitely reverted to *jihad* and 11% are suspected of doing so. But of those released since Mr Obama came to office, the recidivism rate has dropped sharply; only nine, according to the National Security Council, have definitely "re-engaged" with *jihad*. Yet, says Brigadier-General Martins, "By letting them go you could be sentencing someone else to death." Among Mr Trump's picks, General James Mattis as secretary for defence and General John Kelly at homeland security are said strongly to support keeping Guantánamo open. Mr Trump, by the by, has said torture is sometimes necessary.

Missing the early boat

Yet Mr Obama repeatedly declared his intention to close the place—and admitted last year that he should have done so on his first day. "He had absolute executive authority to do so," says Mr Nevin. So why didn't he? "He could've done it before the politics metastasised," says Richard Kammen, who is defending another of the prisoners facing the death penalty (see next article). "He made great speeches but not much else," he adds, lamenting Mr Obama's inability to persuade the agencies that have been supposedly under his control to do his bidding. "If Bush had been president and had wanted to close Guantánamo, it would have been closed, because he knew how to deal with the agencies," surmises Mr Kammen.

Whatever the reason, not closing Guantánamo is one of Mr Obama's most painful failures, putting an enduring stain on America's human-rights record. Mr Obama sounds ashamed as well as frustrated. Asked in 2015 what he wished he had done differently as president, he cited Guantánamo. "It's not who we are." ■



A military trial

Through a glass, silently

GUANTÁNAMO MILITARY COMMISSION

The endless wait of an alleged al-Qaeda killer, tortured by the CIA

THE accused, Abd al-Rahim al-Nashiri, a diminutive, clean-shaven Saudi aged 52, looks innocuous as he shuffles into court between two burly guards, a blue-gloved hand on each of his shoulders. A young paralegal in his defence team embraces him. If found guilty by a jury of handpicked uniformed officers, he faces the death penalty.

Mr Nashiri is one of Guantánamo's 15 most "high-value" prisoners, kept in a special jail known as Camp Seven whose location has never been made public. He is charged with masterminding an attack by two suicide-bombers who steered an explosives-laden skiff into the side of an American naval destroyer, the USS Cole, in Aden harbour in 2000, killing 17 American sailors and wounding many more.

Nowadays he is what officials at Guantánamo call "highly compliant". He politely declines an offer made by the judge, an air-force colonel, of prayer-breaks. He sits patiently, often looking bored, sometimes quizzical, occasionally adjusting the headphones through which he listens to simultaneous translation into Arabic, as arguments are batted laboriously back and forth between prosecution and defence. What evidence may be admissible when the trial proper begins? How much secret intelligence may be divulged? What medical details may be aired? Who may be called as witnesses, seeing that most of the key ones were interviewed about 15 years ago in Yemen by the FBI, under a brutal government long since overthrown?

Was he truly the mastermind or just a foot soldier within al-Qaeda? Above all, may the fact that he was tortured, admitted by the CIA, be used in his defence? What about the videos of his interrogation, which may have been destroyed? "You need to hear from the torturers themselves," says Richard Kammen, Mr Nashiri's chief lawyer, who for decades has defended, with notable success, Americans facing the death penalty.

The court feels not at all martial, more like a conference room in a dreary hotel. The six rows of desks allocated to the accused are furnished with computer screens; the five defendants in the September 11th case are being charged together in the same room. The only clue that this is no ordinary forum are the shackles, unused in Mr Nashiri's case, screwed into the grey carpet beside each of the defendants' seats. Behind a window is a soundproofed gallery for 50-odd visitors, including family members of the victims of the accused. There are curtains they may draw, should they wish to weep. The audio transmission has a 40-second lag so that the judge can switch off any mention of classified information. Mr Nashiri's lawyers repeatedly ask for information to be aired that the prosecution claims would jeopardise national security.

It is more than a decade since Mr Nashiri, having been nabbed in Dubai in 2002, was waterboarded in one of the CIA's "black sites" (secret interrogation cells in places such as Poland or Thailand). He was probably first held in Afghanistan. A recent memoir by a CIA interrogator ("Enhanced Interrogation" by James E. Mitchell) describes how Mr Nashiri kept slipping off the contraption he was tied to, because he was too slight for the straps holding him down when he was immersed in water.

It is public knowledge that, over the course of several years, he was subjected to a string of other mistreatments by the CIA, including force-feeding through the rectum, sleep deprivation, extremes of temperature, screeching noises and being jammed for long periods in stress positions. All this is admitted in a report of the American Senate's Select Committee on Intelligence controversially released in 2014, widely known as "the torture report". Mr Kammen says that Sondra Crosby, an American psychiatric expert on the after-effects of torture, reckons he is "one of the most damaged victims of torture" she has ever examined.

It was at least four years after his capture that Mr Nashiri first saw a lawyer and nine before pre-trial hearings began. It may be another two before his trial proper begins. In a federal court in the United States, his long wait behind bars and his acknowledged torture would probably mean the case being thrown out. But not in the legal penumbra of Guantánamo. ■

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Formula One

Nifty manoeuvres

A controversial transaction sits at the heart of Liberty Media's takeover

ON JANUARY 17th shareholders of Liberty Media Corporation, an American firm controlled by John Malone, a billionaire, are expected to approve a transaction that many hail as the sports deal of the decade. In September 2016 Liberty agreed to buy the Formula One (F1) motor-racing franchise from CVC, a private-equity group, for $8bn. F1, which generates annual revenue of $1.8bn, is now central to Liberty's global plans: in a sign of the importance he attaches to the deal, Mr Malone has installed Chase Carey, a former president of Rupert Murdoch's 21st Century Fox, as F1 chairman. The main Liberty subsidiary is to be renamed Formula One Group.

The deal has lots of attractions. For F1 it offers a potential solution to the problem of who will take over from Bernie Ecclestone, its 86-year-old impresario. There was no credible succession plan for the man whose wheeling and dealing has long held together the sport and its fractious collection of racing teams. With Mr Carey leading the search, there could be.

As for Liberty, F1 offers the sort of live, exclusive content it needs to lock in audiences that are peeling off to on-demand streaming services such as Amazon and Netflix. The American firm has big plans for F1, including selling race-naming rights, turning each event into "the equivalent of the Super Bowl" and helping F1 overcome its two big challenges: its weak presence in America and its lack of almost any online presence. Liberty will use digital platforms to deepen viewers' engagement with the sport. The virtual-reality possibilities look particularly enticing.

But F1 may bring Liberty grief as well as glamour. The day after its own shareholders' vote, the Fédération Internationale de l'Automobile (FIA), the racing sport's governing body, is expected to give its approval to the deal. That is perhaps unsurprising: Liberty is a reputable buyer. But even if it were not, the FIA has an incentive to give the transaction the green light because of a cut-price share transfer signed in 2013, which gave it a 1% stake in F1 that can only be monetised if F1 is sold.

The transfer all but guaranteed the governing body a big payout in the event of a sale of F1. It puts the FIA at risk of a conflict of interest. And its timing raises questions about whether it was used by F1's owners as an inducement for the governing body to approve a change of ownership, regardless of who emerged as a buyer. Formula One Management (FOM), F1's commercial-rights holder, denies any impropriety. The FIA denies any conflict of interest. Liberty refused to comment.

The stake appears to breach an agreement with Brussels that was struck in 2001 when the European Commission closed a two-year antitrust probe into F1. In return for the file being closed, the FIA, whose grand headquarters are on Paris's Place de la Concorde, undertook to "modify its rules to bring them into line with EU law". These changes included limiting its role to that of a regulator, "with no commercial conflicts of interest". To prevent such conflicts, the FIA sold all its rights in the Formula One world championship.

Max Mosley, who ran the FIA from 1993 to 2009, said last year he had queried its purchase of the 1% stake, which he described as "problematic" and "arguably contrary" to the 2001 undertaking. He said the FIA argued the stake was in keeping with the agreement because it was too small to be considered material. He said he was surprised by that argument, because the stake's value was equivalent to a year's turnover when he ran the FIA, "and I didn't see that as 'de minimis'."

The transaction is already attracting official attention. Anneliese Dodds, a member of the European Parliament for south-east England (home to several F1-related businesses) has written to the commission several times to air concerns about the sport's structure and arrangements. Her latest letter, sent last September, called for closer scrutiny of the sale to Liberty in light of the FIA's stake.

In the rear-view mirror

Some insiders reckon that Liberty has paid a lot for F1 without really understanding it. Greg Maffei, Liberty's CEO, has admitted he didn't know F1's business at all until they started negotiating. The acquisition could cause legal headaches down the road. "They definitely don't understand the legal and reputational risks," says one ▸▸

seasoned observer.

CVC—which had itself taken over F1 in 2006—had originally wanted to exit via a stockmarket flotation of Delta Topco, F1's Jersey-based parent company. But that plan came unstuck thanks to market turmoil following the global financial crisis. The final nail in the coffin was the disclosure in July 2013 that Mr Ecclestone had been indicted by a German court on charges of paying part of a bribe to steer the sale of a 47% stake in F1 to CVC. (Mr Ecclestone settled the case in 2014 for $100m, with no ruling on guilt or innocence.)

It is hard to imagine a successful flotation of a company whose boss faces possible imprisonment. The indictment therefore left CVC with the prospect of having to divest F1 through a sale. This, unlike a flotation, would have required the FIA's consent. The approval process involves, among other things, performing "fit-and-proper" tests on the suitor.

A document seen by *The Economist* shows that on July 22nd 2013—just a few days after the IPO-killing indictment of Mr Ecclestone was announced—F1 signed a deal to grant the FIA options on a 1% stake in Delta Topco. These were duly exercised towards the end of that year. A striking feature of this transaction—apart from the timing—was its price. The FIA was being offered a stake with a value of $72m for a mere $458,197.

Crucially, this attractive offer came with a catch: the FIA could only monetise its stake in the event of CVC selling its controlling stake. For the governing body to get its money, a buyer would have to be found, and the FIA would have to approve it. (Liberty plans to buy out all existing shareholders.) This gave the FIA a clear financial incentive to wave through any takeover it was tasked with vetting—and in the process also unlock $3bn for CVC through the sale of its controlling stake. The FIA's own code of ethics requires all of its "Parties" (including the FIA itself) to "endeavour to avoid any conflict of interest".

The combination of the timing of the 1% sale and the stipulation that the FIA can only cash out in the event of a takeover requiring its approval also raises questions for CVC and Delta Topco. To some it could look like inducement. Liberty, as a reputable international media firm, was always likely to pass a fit-and-proper test with flying colours. But it wasn't in the picture in July 2013; it didn't contact the sellers until later that year. At the time, it wasn't clear who would emerge as a possible buyer. What if it was a borderline case when it came to vetting—say, an oligarch with a chequered past? Might F1's owners have seen giving away a 1% option grant for just $458,197 as a price worth paying to increase the odds of approval?

They deny this. In response to questions sent to CVC, FOM confirmed that the share transfer was completed on the terms stated in the document we have seen. However, it says the transfer was "not a deal to 'sell' a stake to the FIA at market value, but rather part of a wider deal to obtain the FIA's commitment to deliver and implement its Concorde obligations through to 2030 in return for a package of financial measures to help the FIA with its overheads, which had increased significantly. The shares awarded to it were from a pool of unissued shares that had been reserved for this kind of transaction, and they were issued to the FIA at the same price as had been paid by other parties awarded shares from this pool, including the executives that are members of Delta Topco's management equity plan." ("Concorde" refers to a tripartite agreement—between the FIA, F1 and the teams—setting out the basis for participation in the championship.)

As for the suggestion that the transfer was an inducement to the FIA to approve a sale to a corporate buyer, FOM says "there can be no inference" that this was the case; "no such transaction was contemplated" at the time because Delta Topco was still "contemplating and preparing for an IPO". It says that the timing of the July 2013 options grant was unconnected to the indictment of Mr Ecclestone. Rather, the deal was "the result of a 12-month negotiation" over renewing the Concorde Agreement.

The FIA said in a statement that there is no conflict of interest on its part with regard to the potential change of control at F1, that it "would naturally be happy to demonstrate this to any competent authority that may so request", and that its sole concern is the "best interests" of the sport.

Nonetheless, the risk of a conflict of interest at the FIA is something that might concern competition authorities and other regulators. The Liberty takeover was reviewed by a number of national authorities, but was not notified to the European Commission, apparently because it fell below EU merger-review thresholds.

The commission says it is assessing a complaint about alleged breaches of competition law brought by two F1 teams, though this is not specifically related to the takeover. It won't comment on the undertakings made in 2001 by F1 and the FIA, but it is believed to consider them "unilateral" and the agreement not legally binding—even though it had earlier identified practices it believed to be out of line with EU law. It has noted that a number of sports governing bodies hold stakes in competitions or manage them and that this is not necessarily "problematic from a competition point of view".

Tussles with Brussels

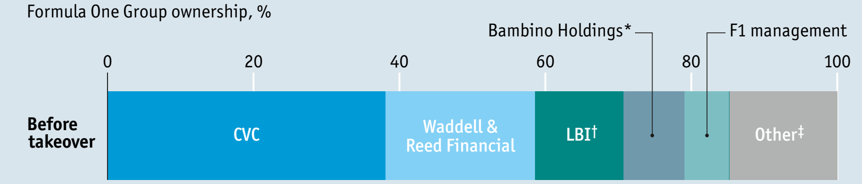
But there are differences between the typical sport and governing body set-up and the FIA's relationship with F1. For one thing, the combination of the FIA's required consent and its potential payoff leave it particularly at risk of bias. Furthermore, it oversees not only F1 but other motorsport competitions too—and it is supposed to treat them neutrally. A commercial interest in F1 gives it an incentive to favour the sport over rival race series, including proposed new competitions that could take business away from F1. This was one of the issues the agreement with Brussels was supposed to deal with.

The commission's shrugging of shoulders over the FIA's apparent flouting of its rules stands in contrast to its generally tough stance on such agreements. One possible explanation is that its earlier tangles with F1 in the late 1990s were scarring, evolving into the sort of bruising encounter it may be loth to repeat. At one point the commission was forced to apologise publicly after the FIA's indefatigable lawyers exposed it as having leaked warning letters to the press. The commission now argues that "governance issues" involving the FIA are best delegated to arbitration bodies and national courts—which have no reason to care about breaches of EU law.

It remains to be seen how much any of this will trouble Liberty, which is zooming ahead with its takeover of a sports franchise it calls "iconic" and "unique". The media firm has repeatedly disclosed that its takeover needs FIA approval, but has not highlighted the fact that the FIA has a stake in the sport it regulates. An investor presentation listing F1's shareholders lumps all those holding less than management, with 6.1%, in the "Other" category. It is unclear whether the Nasdaq-listed firm had an obligation to disclose this. (Liberty declined to comment.) Its shareholders will have no reason to kick up a fuss if the takeover goes well. But they will surely start asking more questions if it spins off the track. ■

The old formula

Formula One Group ownership, %



Source: Liberty Media *Ecclestone family trust †Lehman Brothers Inc. ‡Includes FIA 1%

Intellectual property

Blockchain of command

The technology underlying bitcoin may be in for a patent war

FOR fans of bitcoin, a digital currency, the year got off to a volatile start. On January 5th one bitcoin changed hands for nearly $1,150—almost as much as the record set three years ago. It has since dropped by 33%. Elsewhere in the land of monetary bits, things move more slowly but trouble is brewing: a potential patent war looms over the blockchain, a distributed ledger that authenticates and records every bitcoin transaction.

Heated fights over intellectual property are nothing new in promising technology markets. But given that the blockchain is expected to shake up everything from the way precious diamonds are safeguarded to the way shares are traded, the legal fights could be especially fierce.

On the face of it, the blockchain does not lend itself easily to staking out intellectual-property claims. Bitcoin's creator, known only by his pseudonym, Satoshi Nakamoto, published a paper about his invention, coded the first implementation and then disappeared—meaning that the core of the technology is now part of the public domain and only important additions and variations could be patented. And the blockchain's components are widely known. In America court decisions as well as a new law on the granting of patents make it difficult to claim ownership for such financial innovations.

This hasn't stopped firms from trying to get patent protection on meaningful improvements to the blockchain, including security and encryption techniques, says Colette Reiner Mayer of Morrison & Foerster, a law firm. Applications are now becoming public, because America's patent office must release them 18 months after they are filed. A search of Espacenet, a global database, yields 36 hits; hundreds more are said to be in the pipeline.

Financial firms are among the most assiduous filers: MasterCard, for instance, is seeking four payment-related patents; Goldman Sachs has put in for one outlining a distributed ledger that can process foreign-exchange transactions. Startups, including Coinbase, Chain and 21 Inc, have been busy, too. And then there is Craig Wright, an Australian who claims to be Mr Nakamoto but has failed to provide conclusive proof. He has filed, via an Antigua-registered entity called EITC Holdings, for 73 patents in Britain.

Only a very few patents have been issued so far. And known applicants all say that they intend to use patents only "defensively", meaning to protect themselves against lawsuits. Still, legal battles look likely: incumbent banks may go after newcomers, and "non-practising entities" (also known as "patent trolls") may attempt to shake down other firms. It could slow the pace of innovation, warns Brian Behlendorf of Hyperledger, an umbrella group for several blockchain-related projects.

To limit such fights, several startups are opening up their IP. Chain, Digital Asset Holdings and Hyperledger have made their software open-source, so that the underlying recipe is freely available, which also makes it more attractive to users and developers. Some programs even come with a licence that makes it impossible to enforce patents against those who use the organisation's code. Blockstream, another startup, has signed a "patent pledge", vowing not to sue others—as long as they don't

Uber for kids

Baby, you can drive in my car

SAN FRANCISCO

Will ride-hailing for children grow up into something big?

"HELICOPTER parent" may sound like an insult, but given the chance, most parents would probably opt for the help of a chopper to zoom little ones between school, football practice and piano lessons. Getting children where they need to go is a huge hassle and expense, especially in homes where both parents work. Hailing rides through firms like Uber and Lyft has made life more convenient for adults. But drivers are not supposed to pick up unaccompanied minors (although some are known to bend the rules).

Youngsters represent a fresh-faced opportunity. Ride-hailing for kids could be a market worth at least $50bn in America, hopes Ritu Narayan, the founder of Zum, one of the startups pursuing the prize. These services are similar to Uber's, except they allow parents to schedule rides for their children in advance. Children are given a code word to ensure they find the right driver, and parents receive alerts about the pick-up and ride, including the car's speed. These services promise more rigorous background checks, fingerprinting and training than typical ride-hailing companies.

Annette Yolas, who works in sales at AT&T, a wireless and pay-TV giant, reckons she spends around $200 a month on HopSkipDrive, a service that operates in several markets in California, for her three kids to get to the school bus on time and to ballet practice, and says it has been a "life-saver" by allowing her to work longer hours. Meanwhile, kids avoid the embarrassment of a relative pulling up at school blaring mom rock.

But ride-hailing firms for kids may end up like the children in Neverland, and never mature. They face several challenges. One is finding enough drivers. All users need rides during the same limited set of hours: before and after school, which makes it hard to offer drivers enough work. It can also be challenging to lure parents, who have drilled it into children never to get in a stranger's car.

And while ride-sharing companies can irk adult passengers by cancelling or being late, when children are involved such behaviour can be disastrous. Shuddle, an early entrant in the taxis-for-kids business, which shut down in 2016, had only two out of five stars on Yelp for that reason, and reams of negative reviews from parents. It had made money on rides mainly by raising prices ever higher.

Its demise has not deterred Uber itself, which is expected soon to launch a pilot programme for teenagers under 18. Parents may be happier to use services they are familiar with. But Uber's entrance is likely further to dim the prospects of child-focused ride-hailing businesses as they compete for customers and new funds. Already, the mood in Silicon Valley has soured against tiny startups that provide services on demand, such as taxis, massage therapy and meals. According to Sean Behr, an entrepreneur who runs an on-demand parking startup named Stratim, "saying you're the Uber of x category is not a pitch that will get you funded by venture capitalists today." Grown-ups can be so boring.

use their own patents offensively.

There are also discussions over forming a patent pool, much like the Open Invention Network, created in 2005 to protect member firms against suits for using Linux, the popular open-source operating system. The OIN acquires patents and then licenses them freely to members, which agree not to assert their own patents.

Whether this strategy of mutual disarmament is sufficient to avoid another patent war will be clear only when and if blockchains have become a multi-billion dollar business. This week DTCC, a provider of clearing and settlement services, announced that it will base the next generation of its trade-information system on a blockchain, and SWIFT, a payments network, said it was exploring the technology. That might prompt more applications. ■

Iron ore in Guinea

A pig of a project

Africa's largest iron-ore deposit has tainted all who have touched it

ON THE flanks of the Simandou mountains in south-eastern Guinea live remote colonies of West African chimpanzees. They alone should be grinning over the fate of those who have sought to turn their tropical habitat into Africa's biggest iron-ore mine. No one else is laughing. Rarely has such a group of billionaires, hedge-fund barons, mining firms, government officials and go-betweens been snagged in such a woeful saga.

In theory, the prospect of digging up 2bn tonnes of ore from a country that is among the poorest on Earth should be encouraging, if corruption is kept in check. The government of Alpha Condé promised to do so upon taking office in 2010. But in reality the line between paying go-betweens to help win concessions and lining officials' pockets is so blurry that it can cause mining firms endless trouble.

In recent months the plotline has shifted. During the past half-decade the businessman painted as the saga's pantomime villain has been Beny Steinmetz, a globe-trotting Israeli diamond merchant, worth billions, whose lurid battles over Simandou with Rio Tinto, one of the world's biggest mining companies, have involved volleys of accusations about bribery.

Mr Steinmetz was briefly put under house arrest in Israel on December 19th last year in connection with the Guinea case. He denies wrongdoing. His backers allege that a "conspiracy" robbed him of his rights to Simandou. His office in London, as well as having a picture of Simandou's red-streaked mountain top in the lobby, has a sign saying "All bullshit stories" that is lit up when a journalist visits.

But now Rio Tinto is also on the back foot. In November it sacked two of its top executives upon discovering a payment to a go-between in Guinea from 2011 that it says failed to meet its code-of-conduct standards. Jean-Sébastien Jacques, the firm's new chief executive, appears to be in a hurry to draw a line under the whole affair, which is proving difficult.

It was two decades ago that Rio Tinto won a concession to explore the world's largest untapped iron-ore deposit in Simandou. At the time, Guinea was ruled by a dictatorship that, in 2008, suddenly stripped Rio of half its blocks and transferred them to the Guinean arm of BSGR, a foundation whose main beneficiary is Mr Steinmetz. BSGR then sold a 51% stake in the blocks to Vale, Rio's Brazilian rival, which incensed Rio.

Then Rio recovered its footing somewhat. In 2011, after Guinea's first democratic elections, the new Condé government granted it the right to develop its remaining blocks in partnership with Chinalco, China's state-owned aluminium firm, in return for a (disclosed) $700m payment. Even sweeter for Rio, in 2014 the Condé government stripped BSGR/Vale of their Simandou assets, alleging they had been obtained through bribery. Rio then sought (unsuccessfully) to sue BSGR and Vale in America on racketeering charges.

The backdrop for this battle was the high price of iron ore as China hungered for steel. The irrational exuberance of the times helps explain why Rio incorporated into the $20bn development plan for its blocks the construction of a trans-Guinean railway to ship the ore, as well as Guinea's first deepwater port. These ideas came a cropper once the price of iron ore crashed.

As a result, the allure of the project for Mr Jacques has waned. He had sought to wash his hands of it by agreeing to transfer Rio's Simandou stake to Chinalco last October for a song. But it was the following month that the board sacked its two officials, including Alan Davies, its minerals chief, after leaked e-mails revealed a $10.5m payment to a French consultant who was close to President Condé and helped guarantee Rio's mineral rights at Simandou. Rio also handed over a trove of related e-mails and other data to authorities in America, Britain and Australia.

Rio pointed out that the sackings did not prejudge the results of any investigation, but they jolted many employees, some of whom thought them overhasty. Mr Davies said his dismissal lacked due process and vowed to fight it. Some suspected the draconian measures reflected Mr Jacques's impatience to put Simandou quickly behind him and move on.

But that has proved tough. Mr Steinmetz has seized on the dismissals to make two accusations: that Rio paid a "facilitation fee/bribe" which contributed to the withdrawal of BSGR's mining rights in Guinea; and that it launched a public-relations campaign that criticised the firm. Last month BSGR threatened legal action unless Rio settles a damages claim first. Both sides expect Rio to respond in the coming weeks. For all except the Chinese (and the chimps), the fallout from Simandou persists. And it has yet to produce an ounce of commercial iron ore for any of them. ■

Now everyone sees red

Advanced manufacturing

The new manufacturing footprint

Adidas prepares a high-tech plant to bring production of trainers back to Germany

BEHIND closed doors in the Bavarian town of Ansbach a new factory is taking shape. That it will use robots and novel production techniques such as additive manufacturing (known as 3D printing) is not surprising for Germany, which has maintained its manufacturing base through innovative engineering. What is unique about this factory is that it will not be making cars, aircraft or electronics but trainers and other sports shoes—an $80bn-a-year industry that has been offshored largely to China, Indonesia and Vietnam. By bringing production home, this factory is out to reinvent an industry.

The Speedfactory, as the Ansbach plant is called, belongs to Adidas, a giant German sports-goods firm, and is being built with Oechsler Motion, a local firm that makes manufacturing equipment. Production is due to begin in mid-2017, slowly at first and then ramping up to 500,000 pairs of trainers a year. Adidas is constructing a second Speedfactory near Atlanta for the American market. If all goes well, they will spring up elsewhere, too.

The numbers are tiny for a company that makes some 300m pairs of sports shoes each year. Yet Adidas is convinced the Speedfactory will help it to transform the way trainers are created. The techniques it picks up from the project can then be rolled out to other new factories as well as to existing ones, including in Asia—where demand for sports and casual wear is rising along with consumer wealth.

Currently, trainers are made mostly by hand in giant factories, often in Asian countries, with people assembling components or shaping, bonding and sewing materials. Rising prosperity in the region means the cost of manual work outsourced to the region is rising. Labour shortages loom. Certain jobs require craft skills which are becoming rarer; many people now have the wherewithal to avoid tasks that can be dirty or monotonous.

Adidas's motivation for its Speedfactories, however, goes well beyond labour cost. People want fashionable shoes immediately, but the supply chain struggles to keep up. "The way our business operates is probably the opposite of what consumers desire," says Gerd Manz, the company's head of technology innovation.

From the first sketch of a completely new pair of trainers to making and testing prototypes, ordering materials, sending samples back and forth, retooling a factory, working up production and eventually shipping the finished goods to the shops can take the industry as long as 18 months. Yet some three-quarters of new trainers are now on sale for less than a year. An order to replenish an existing, in-demand design—the latest edition of the NMD R1, say, a popular trainer in 2015-16—can take two or three months to reach the shelves, unless the shoes travel not in a shipping container but at huge cost in the hold of an aircraft.

Impossible is nothing

On your marks...

The Speedfactory's main strength is to shorten the supply chain, and so the time to shops, to less than a week, perhaps even to a day, once the trainer design is complete. The design process itself is increasingly done digitally. The trainers are not just styled on a computer screen but can also be tested by the computer for things like fit and performance. To enhance the process, the Speedfactory will also have a digital twin: a virtual computer model in which production of the new trainers can be simulated. Once all is well, the digital product will then move to the physical production system.

Adidas claims its new production system is extremely fast and highly flexible. The details are being kept secret for now. What is known, however, is that instead of ordering components that will be assembled into a new pair of trainers, the Speedfactory will instead make most of the parts itself from raw materials, such as plastics, fibres and other basic substances.

The machines carrying out this work will be highly automated and use processes such as computerised knitting, robotic cutting and additive manufacturing, which involves building up shapes layer by layer. Industrial 3D printing machines are appearing in many different forms and are capable of handling an increasing variety of materials. Driven by software, the robots, knitting machines and 3D printers take their instructions directly from the computer-design program, so they can switch from making one thing to another quickly, without having to stop production for what can amount to several days in order to retool conventional machines and instruct manual workers.

Not every job in the Speedfactory will be automated. Robots can be slower and less precise at some tasks, such as the final shaping of a shoe. So each Speedfactory will create 160 production jobs, compared with a thousand or more in a typical factory in Asia. The new functions will also be more highly skilled. Adidas wants the new plants to complement the Asian operations, not to compete with them. But as advanced manufacturing expands, the need for armies of manual workers in Asian factories will surely diminish.

Sneakerheads are likely to approve. "This will lead to products that will look and perform differently," says Mr Manz. Leaving behind manual production methods will allow Adidas to come up with novel shapes and finishes. One new material the firm has already experimented with is Biosteel, a synthetic silk made by AMSilk, a German biotech company. Production will also become more customised, perhaps even with bespoke trainers fashioned from a computer scan of how a person walks or runs.

In such a competitive and trend-driven market, one thing is certain: Adidas's arch-rival Nike will not just sit on the touchline. The American company faces similar cost increases in Asia and is equally keen to shorten the time it takes to get new products to market.

One of its initiatives is a form of computerised knitting to make the upper parts of a range of trainers it calls Flyknit, much like the way a sock is knitted. Nike has also set up what it calls an Advanced Product Creation Centre at its headquarters in Beaverton, Oregon, to explore other automated production methods, including 3D printing. The company has already employed these techniques to produce customised shoes for some top athletes. The race between the world's biggest sports-shoe makers is about to become much more fleet of foot. ■

Schumpeter | They've lost that loving feeling

Foreign firms were lukewarm on America long before Donald Trump

WHICH is it? The home of free speech, the rule of law and the rich world's most dynamic economy? Or a land of social decay, septic politics and the rich world's worst roads and schools? America divides foreign observers. It divides foreign firms, too. Some bosses fall head over heels for its insatiable consumers and dazzling technology. Other executives are put off by its insufferable lawyers and hypocritical protectionism. Donald Trump promises to give foreign firms a rude awakening when he reaches the White House: this month he beat up Toyota for making cars in Mexico and selling them north of the border. But in truth many foreign firms fell out of love with America years ago.

The conventional view is that foreign companies are irresistibly attracted to the place. If one affair ends in tears, there is always a new paramour in the wings. In the 1970s British buccaneers, led by Sir James Goldsmith, picked up neglected firms. In the 1980s Japanese firms lost their financial virginity by paying too much for Hollywood studios and Californian skyscrapers. A decade later continental European firms rushed across the pond, culminating in Daimler's doomed tryst with Chrysler, a rival carmaker. By this account, Chinese firms are the latest to get the love bug, with China's richest man, Wang Jianlin, in the role of the besotted tycoon, having paid a blockbuster $4bn to assemble a chain of mature American cinemas since 2012.

But this narrative is hopelessly out of date. The most accurate metaphor for foreign firms in America today is of disappointed hopes. Their share of private output has been flat at about 6% since 2000. The share of sales that European firms make in America has declined from 20% in 2003 to 17% now, according to Morgan Stanley, a bank. Foreign firms' profits in America fell from $134bn in 2006 to $123bn in 2014, the latest year for which figures are available. Their return on equity fell to 6%, compared with 11% in 2006. American multinationals make 12% on their home turf.

This souring romance reflects three deep shifts in America's economy. First, technology has a greater importance than it used to. At the same time the gap between Silicon Valley's giants and their peers abroad has grown wider. A generation ago Europe and Japan had real contenders in the technology industry, such as Nokia and Sony. Now they have no answer to the likes of Apple, Google and Uber.

Second, waves of mergers and acquisitions have made the economy more concentrated. That has raised the barriers to entry for outsiders. If you split the world's companies into 68 industries, American firms are the largest in two-thirds of them. Foreign companies in America are often subscale and too small to buy the leading firms in their sector. So they try to grow organically or buy weaklings instead. In 2013 SoftBank, a Japanese technology group, paid $22bn to buy a struggling mobile-phone operator, Sprint, which is now losing a billion dollars a year. The most profitable investment in living memory by a foreign firm in America was not a gutsy triumph but a passive stake in a domestic oligopoly: Vodafone's 45% share of Verizon Wireless, which it sold for $130bn in 2014.

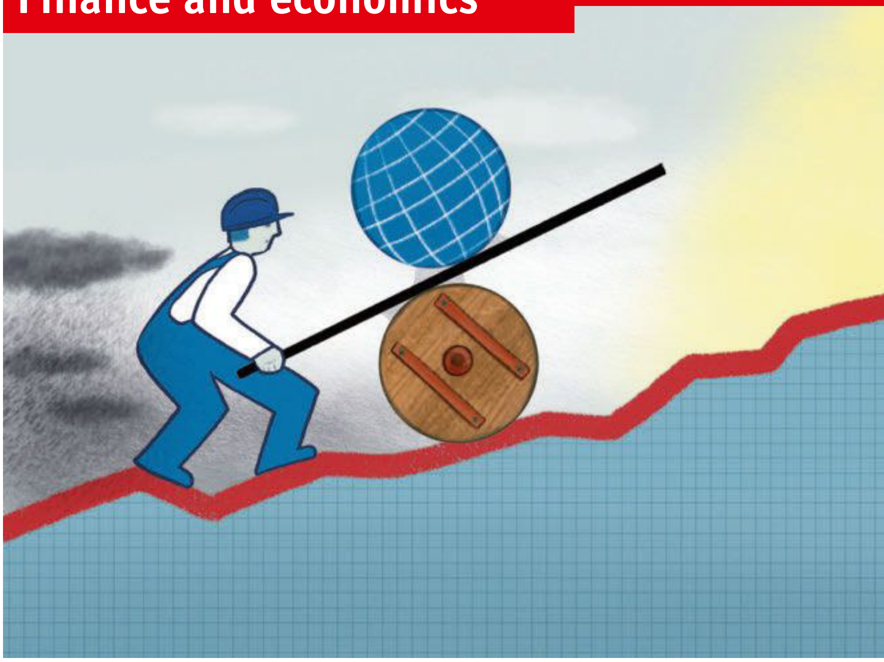
The third reason for foreign firms' discontent is the growth in lobbying, litigation and regulatory action in America. Foreign companies feel they are at a competitive disadvantage. In the most regulated sector of all—banks—their market share has fallen to 14% from 18% in the past 24 months, partly, they argue, owing to onerous new rules. Most fines involve lots of official discretion. In carmaking and energy, Volkswagen and BP have admitted their respective responsibilities for fake emissions tests and the Deepwater Horizon oil spill. But many European bosses believe that the cumulative $70bn of legal costs and penalties they have paid or currently face far exceed those that General Motors and ExxonMobil paid for similarly grave mistakes. In December Barclays vowed to fight a $5bn-odd fine for mortgage mis-selling, which it argues is harsher than those faced by American banks.

The Trump administration could well awaken a protectionist impulse at big domestic firms that lies not far beneath the surface, reckon the most pessimistic of all. Jamie Dimon's latest letter to the shareholders of JPMorgan Chase warns that American banks' dominance could be threatened by Chinese rivals. A report on semiconductors for the White House this month, written by a body that includes the bosses of Google, Qualcomm and Northrop Grumman, recommends protecting the chip industry from Chinese competition. America's airlines constantly complain about unfair competition from Emirates and other rivals.

Takeovers or makeovers

A more populist America may require fresh tactics from foreigners. Some are working on their connections. Masayoshi Son, boss of SoftBank, pledged to invest $50bn in America after meeting Mr Trump in December. The head of Anbang Insurance, a Chinese firm that is no stranger to relationship-based capitalism at home, dined with Mr Trump's son-in-law, Jared Kushner, in November. Anbang owns the Waldorf Astoria, among other American assets. Another approach is to buy a well-placed oligopoly. InBev's purchase in 2008 of Anheuser-Busch, maker of Budweiser Beer, has become a model for winning in America. Other deals in 2016 echoed it. Bayer agreed to buy Monsanto, which dominates the agricultural-seed business, and BAT is bidding for Reynolds American, which has a big share of the tobacco market.

A last option is for foreign firms to assume a more American identity. In sensitive sectors, they already try to take on a local character. BAE Systems, a defence concern, has a separate American board stacked with former brass hats. After the trade spats of the 1980s, Asian car firms localised their production and management. Rupert Murdoch shifted his media empire's domicile from Australia to America in 2004. As any dating-website veteran will tell you, if you can't find love, change your appearance. ■



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Inflation

A welcome revival

After two years of unduly low inflation in the rich world, things are picking up

IT WAS telling that Germany, a country with a phobia of rising prices, in the first week of 2017 reported a jump in inflation. Its headline rate rose from 0.8% to 1.7% in December. After two years of unusually low price pressures, inflation across the rich world is set to revive this year. Much of this is because of the oil price, which fell below $30 a barrel in the early months of 2016 but has recently risen above $50 (see chart). Underlying inflation, too, seems poised to drift up. That is good news. The story for 2017 is not of inflation running too hot but rather of a welcome easing of fears of deflation.

To understand why, consider the three big drivers of inflation in the rich world: the price of imports, capacity pressures in the domestic economy and the public's expectations. Start with imported inflation. A year ago, global goods prices were falling because of a slide in aggregate demand and a seemingly endless glut of basic commodities and manufactures. China's economy wobbled. Emerging markets in general were in a funk; two of the largest, Brazil and Russia, were deep in recession.

Things look perkier now. Emerging markets still have plenty of trouble spots, but the bigger economies are stabilising. After falling for 54 months, producer prices in China are climbing at last. Prices at the factory gate rose by 5.5% in the year to December. China's supply glut, though still vast, is shrinking. An improving demand climate is reflected in upbeat surveys of manufacturing purchasing managers across Asia and in the rich world. It is also visible in a revival in commodity prices.

So rich countries are importing a bit more globally made inflation. How big an impact that has depends on the exchange rate. And in much of the rich world, currency markets are proving helpful. In America, where underlying inflation is close to 2%, the Federal Reserve's goal, the dollar has risen. In Japan and the euro area, where underlying inflation is lower (see chart), the yen and euro have weakened.

The second big influence on inflation is the amount of slack (or spare capacity) in the domestic economy. The unemployment rate, measuring labour-market slack, is often a convenient gauge. On that basis, America's economy, with unemployment at 4.7%, is close to full capacity. Average wages rose by 2.9% in the year to December, the highest rate since 2009. Assuming that trend productivity growth is around 1%, then wage growth of around 3% is consistent with a 2% rise in unit-wage costs, in line with the Fed's inflation target.

The picture is cloudier in other parts of the rich world. Euro-area jobs markets are more rigid and run into bottlenecks more readily than America's. Even so, the euro-area economy has far greater slack. The unemployment rate is 9.8%. The big southern euro-zone economies, such as Italy and Spain, have ample spare capacity. So if inflation is to get back to the European Central Bank's target of close to 2%, it will require other economies, notably Germany, to generate inflation rates well above 2%. ▸▸

Many happy returns!

Sources: Thomson Reuters; *The Economist*

*Excluding food and energy †Personal-consumption expenditure prices ‡Excluding effects of consumption tax

Awards: Tom Easton, our American finance editor, was named journalist of the year by the CFA Society of the UK in a ceremony on January 11th. *The Economist* was named publication of the year.

That is not as implausible as the form book suggests. Germany has a tight labour market. The unemployment rate is just 4.1% and the workforce has shrunk as the population ages. And after a decade or more of restraint, wages have picked up a bit. Compensation per employee has risen at an average annual rate of 2.5% since 2010, according to the OECD, a rich-country think-tank. That is faster than in any other G7 country, but still not enough to drive German inflation up to the sorts of levels needed to push euro-zone inflation close to 2%. Faster wage growth has not fed through to higher consumer-price inflation, notes Ralf Preusser of Bank of America Merrill Lynch. Average core inflation has been around 1.1% since 2010. German firms have absorbed rising wage costs without increasing prices. In Japan, where the jobs market is even tighter, wage growth has struggled to reach even 1%.

That wages have not risen faster owes much to the third big determinant of inflation—expectations. Firms will feel freer to push up prices, and employees to bargain for bigger wage rises, if they expect higher inflation. In theory expectations are in the gift of central banks. If they can convince the public that they have the tools to regulate aggregate demand, and thus the level of slack, expectations should converge on the central bank's inflation target, usually 2% in rich countries. But expectations are also influenced by what inflation has been recently. In rich countries, it has fallen short. Inflation expectations in financial markets have recently perked up, but in the euro area are still well shy of the target (see chart on previous page). In Japan, two decades of deflation have taught firms and wage-earners to expect a lot less than 2%.

Put the pieces of the jigsaw together and the following picture emerges. Headline inflation in the rich world is likely to

Buttonwood | Franc discussions

What will markets do if Marine Le Pen becomes the French president?

HOW do you solve a problem like Marine? Ms Le Pen, leader of France's far-right National Front, has indicated that she hopes to reintroduce a national currency if she is elected president in May. In a recent speech, she suggested that government bonds would be redenominated in francs instead of euros.

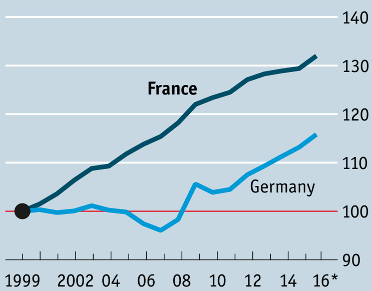
The proposal was dressed up in technicalities. The franc would be revived as a "parallel" currency for official transactions and used alongside the euro in a version of the systems (the snake and the exchange-rate mechanism) that existed in the 1970s and 1980s. Such schemes tied European currencies together but were subject to regular crises, with France periodically devaluing the franc.

Investors would pretty quickly see through the façade. There is not much point in bringing back a national currency unless you want the right to devalue it. And there is not much point in redenominating government bonds in francs unless you want to pay creditors back less than they expected. (This might technically count as a default, according to Moody's, a rating agency; it depends on the exact circumstances.) If that happened, it could trigger an enormous financial crisis in Europe. After all, if France were to devalue, what would stop the Italians or the Greeks from following suit?

It all makes for a tricky calculation for investors, multiplying the probability of a Le Pen victory against the potential decline in the value of French bonds if it occurs. The consensus is that, even if Ms Le Pen makes it through to the second round of the presidential election, she will be defeated easily. That is what happened to her father in 2002, when voters united around the conservative Jacques Chirac. Gamblers put the odds of a Le Pen victory at around 30%.

Pay pressure

Unit labour costs, 1999=100



Source: OECD *Q3 2016

Even if she wins, she might not be able to implement the policy she favours. Reintroducing a national currency could involve leaving the EU. That would be a huge step; only a fifth of French people think it will happen in the next ten years.

Still, in the wake of the Brexit and Trump votes last year, some investors will be nervous about another surprise. "I'm not certain that we should be quite as comfortable as the polls suggest given the history of the past four to five years," says Simon Derrick, a strategist at BNY Mellon, a bank. If Ms Le Pen is pitted against François Fillon, a Thatcherite conservative, in the second round, left-wing voters might stay at home.

To understand the scale of the potential decline, think back to the late 1990s and the era of the "convergence trade". As the introduction of the euro approached, investors realised that the currency risk of owning European bonds would disappear. So it became much cheaper for many European countries to borrow. In the early 1990s Italy often had to pay four percentage points more than Germany to borrow, and France more than one percentage point.

Were currency risk to return, then spreads would widen again. That happened during the euro crisis of 2011 and 2012 and it took determined action by the European Central Bank (ECB) to bring them back down. There are already some signs of French yields edging up, relative to those in Germany, with the spread at a three-year high because of political risk.

If currencies were to float again after such a long period, a big adjustment would be needed. Since 1999, unit labour costs have risen by 32% in France but by just 15% in Germany (see chart). Making French workers competitive again could require a 12% devaluation.

Even if that figure is too large, imagine what would happen if the Le Pen plan were implemented. Investors would flock to the safety of German government bonds. They would be happy to accept negative yields of 1-2%, given the scope for much larger losses from holding French assets. The revived franc would come under immediate selling pressure as investors hedged their risk.

Countering that selling pressure would involve one of three things. First, the French government could sell euro assets and buy its own bonds. But it doesn't have enough reserves to sustain that policy. Second, the French could raise interest rates to attract capital. But that would damage the economy, hardly the outcome Ms Le Pen is seeking. Or, third, the ECB could step in to buy French bonds. But it wouldn't do so if France seemed to be heading out of the euro.

It would all be an enormous mess. So long as the probability of a Le Pen victory is still low, markets won't shift much. But if her victory chances rise to 40% or so, prepare for a turbulent spring.

Economist.com/blogs/buttonwood

rise quickly in early 2017, thanks largely to rising oil prices and a generally firmer global backdrop. Underlying inflation will grind up more slowly as above-trend growth eats away at available slack. A burst of stronger headline inflation this year might drive up inflation expectations and set the stage for bolder wage claims in northern Europe and Japan in 2018.

Analysts at JPMorgan Chase expect higher inflation to add one percentage point to global nominal GDP in 2017, spurring a revival in profits and setting the scene for a recovery in capital spending (even without tax cuts in America). Forecasters often now look for extreme outcomes, but rich-world inflation this year may turn out to be a tale of moderation: enough to grease the wheels, but not enough to upset the cart. ■

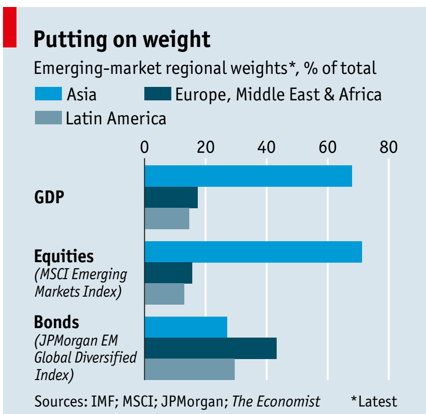
Emerging markets

Back from the frontier

One of the original emerging markets returns to the fold

EMERGING markets have not been the same without Argentina, a country that embodies the promise and peril, the romance and the rockiness of the asset class. In 1988 it was one of the ten original members of the most popular emerging-market equity index, introduced by MSCI. In the late 1990s it was also the biggest member of the benchmark-bond indices compiled by JPMorgan Chase. But once it defaulted at the end of 2001, Argentina was exiled from global debt markets. And after it subsequently imposed capital controls on "hot money", its shares suffered a similar banishment, ejected from MSCI's index in 2009. It became a remote "frontier market", like countries such as Bangladesh.

Since Mauricio Macri succeeded Cristina Fernández de Kirchner as president at the end of 2015, Argentina has been finding its way back from the financial periphery. It has floated its currency and lifted capital controls, recently abolishing a remaining requirement that foreign investors keep their money in the country for at least 120 days. In April the government sold $16.5bn of dollar bonds to international investors in a single day (a record for an emerging market). Later this year, MSCI will decide whether to welcome Argentina's shares back into its emerging-market index, starting with companies with an overseas listing, such as Adecoagro, which farms sugar and soyabeans, among other things. And on January 5th, JPMorgan Chase said it would admit Argentina's peso bonds into its widely tracked benchmark indices, probably from February.



The emerging-market asset class has not lacked drama in Argentina's absence. The introduction of quantitative easing (QE) after the financial crisis inspired a rush into higher-yielding emerging-market bonds. Talk of "tapering" QE in 2013 prompted a partial reversal. As a borrowing currency, the dollar has waned in significance relative to local currencies such as the rupiah or real. Dollar-denominated bonds have been a better buy for investors in recent years, but less popular among government issuers. The share of hard-currency debt declined from roughly half on average in 2000 to about a quarter in 2014, according to Moody's, a rating agency.

Much of this evolution has passed Argentina by. Until 2016 its government had to sell most of its bonds to fellow Argentines, including the country's banks and its public-pension reserve fund. But although it was mostly sold to locals, the debt was chiefly denominated in dollars. Over 70% of the government's debt is still denominated in foreign currencies, according to the ministry of finance. The high inflation and capricious currency policies of the post-default years meant Argentines did not trust the peso to hold its value. So for all of the nationalist fire of Ms Kirchner and her husband, her predecessor as president, their policies left them heavily reliant on the greenback to attract creditors.

Argentina's expulsion from global debt markets came within days of China's entry into the World Trade Organisation. Asia now accounts for about 70% of emerging-market GDP and a similar share of MSCI's emerging-market equity benchmark (see chart). The bond indices, in contrast, remain far more evenly balanced between the regions. JPMorgan Chase's most popular local-currency version still excludes China's vast market altogether.

That may not last. In the past year China, too, has eased the capital controls that fenced off its debt markets. China may thus follow Argentina into the benchmark indices in due course. Emerging markets have not been the same without Argentina. But nor have they stayed the same. ■

Supply-chain finance

Every little helps

How fintech helps the small fry get paid

GROWING up on a sugar-cane farm in Australia, Lex Greensill had a front-seat view of the strains suppliers suffer as they wait to be paid. After harvesting his crops, Mr Greensill's father had to wait a year or more to receive payment. Across industries, buyers are eager to conserve their cash. Delaying payment is one way to do it: among the most important for some, such as big retailers, says Mr Greensill. Many buyers expect their suppliers to accept payment months after delivery. Even so, many still pay late—47% of suppliers surveyed by Taulia, a fintech firm, said they had this problem. In 2011 Mr Greensill founded Greensill Capital, one of a cluster of new fintech firms overhauling how supply chains are financed.

The details vary but their basic approach is to take advantage of buyers' low credit risk to pay suppliers' invoices promptly. The buyer—a large supermarket chain, say—approves a supplier's invoice and transmits it to the fintech lender. (The lender can raise money in different ways: Greensill raises funds in the capital markets.) The lender pays the supplier on the agreed date or, if requested, earlier, less a small discount. With interest rates at present low, the period of finance short and the credit risk that of the supermarket chain rather than the supplier itself, the

Still waiting for the invoice approval

discount may be so low as to be almost unnoticeable. The lender later collects the full value of the invoice from the buyer. This improves the cashflow for suppliers without shortening payment terms for buyers, freeing up working capital for both parties and creating a healthier, more secure supply chain.

In America and Britain, government initiatives have encouraged supply-chain financing as a means for corporations to support small businesses and meet social-responsibility goals. The more integrated approach also means buyer and supplier are not pitted against each other, squabbling over when the cash will be forthcoming. According to Mr Greensill, his clients have enjoyed improved relationships with their suppliers.

Though banks have offered this form of financing since the 1990s, it remained a bit of a backwater until the financial crisis. As revenues fell stagnant, companies tried to squeeze the most from their internal resources by improving the management of their working capital and extending payment terms, says Richard Hite, director of supply-chain finance at Barclays, a big British bank. This further compounded the plight of suppliers, many of them small and medium-sized enterprises already struggling to stay afloat. The crisis created an acute need for a better system to strengthen supply chains. It helped galvanise an inchoate industry.

Mr Hite sees the market for supply-chain finance expanding as more companies start to understand its benefits. It has tended to cater to manufacturing and retail businesses; now it is taking off in other industries such as oil and gas, where lower oil prices prompted companies to cut costs. In 2004 no one knew what supply-chain finance was, says John Monaghan, who runs Citigroup's programme. Now companies come to the bank asking for it.

Best factor award

But much of the growth is being driven not by banks but by fintech firms. Old-fashioned "factoring" to turn invoices into cash was time-consuming, laden with paper work and an expensive form of credit—the resort to which was sometimes seen as a sign of financial stress. Fintech firms offer new technologies that make early payments possible at the click of a button. They can quickly set suppliers up on their platform. Banks' early-payment programmes have also typically been reserved for the largest suppliers. But fintechs have made supply-chain finance available to the tiddlers, too.

The market was also ripe for innovation in other ways. Globalisation has made supply chains longer and more complex. For every buyer there are an increasing number of suppliers, many of them now in Asia, which lags behind other regions in working-capital efficiency. A survey by KPMG, a consultancy, suggested that more than 70% of businesses worldwide still lack a supply-chain financing programme. A report by McKinsey, a consultancy, shows market penetration has remained very low: only about one-tenth of the potential global market for supply-chain finance has been captured, it reckons.

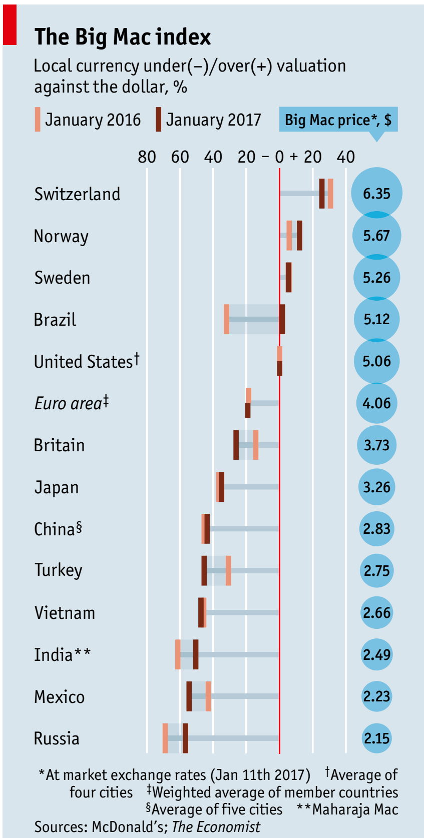
Fintech firms are not taking business from banks so much as expanding the market, says Prabhat Vira of Tungsten, a supply-chain financier. Of the suppliers Tungsten serves, 80% are small or medium-sized enterprises. Fintech firms may be more nimble, but banks have greater resources. Both sides talk up the benefits of working in partnership. As they gather more data, it may become possible to start paying suppliers even before invoices are approved. That, says Ganaka Herath, a partner at McKinsey, "is the holy grail". ■

The Big Mac index

The all-meaty dollar

Burgernomics gets to grips with a strong greenback

IT IS perhaps not surprising that the worst-performing major currency in the world this year is the Turkish lira. Many emerging-market currencies have taken a battering since the election in November of Donald Trump raised expectations of faster monetary tightening in America and sent the dollar soaring. But the lira has many other troubles to contend with, too: terrorist bombings, an economic slowdown, alarm over plans by the president, Recep Tayyip Erdogan, to strengthen his powers, and a central bank reluctant to raise interest rates to defend the currency. It has plunged to record lows. According to the Big Mac index, our patty-powered currency guide, it is now undervalued by 45.7% against the dollar.



The Big Mac index is built on the idea of purchasing-power parity, the theory that in the long run currencies will converge until the same amount of money buys the same amount of goods and services in every country. A Big Mac currently costs $5.06 in America but just 10.75 lira ($2.75) in Turkey, implying that the lira is undervalued.

However, other currencies are even cheaper. In Big Mac terms, the Mexican peso is undervalued by a whacking 55.9% against the greenback. This week it also plumbed a record low as Mr Trump reiterated some of his campaign threats against Mexico. The peso has lost a tenth of its value against the dollar since November. Of big countries, only Russia offers a cheaper Big Mac, in dollar terms, even though the rouble has strengthened over the past year.

The euro zone is also prey to political uncertainty. Elections are scheduled this year in the Netherlands, France and Germany, and possible in Italy. The euro recently fell to its lowest level since 2003. Britain's Brexit vote has had an even bigger effect on the pound, which has fallen to $1.21, a 31-year low. According to the Big Mac index, the euro and the pound are undervalued against the dollar by 19.7% and 26.3%, respectively.

One of the drawbacks of the Big Mac index is that it takes no account of labour costs. It should surprise no one that a Big Mac costs less in Shanghai than it does in San Francisco, since Chinese workers earn far less than their American counterparts. So in a slightly more sophisticated version of the Big Mac index, we take account of a country's average income.

Historically, this adjustment has tended to raise currencies' valuations against the ▸▸

dollar, so emerging-market currencies tend to look more reasonably priced. The Chinese yuan, for example, is 44% undervalued against the dollar according to our baseline Big Mac index, but only 7% according to the adjusted one. The deluxe Big Mac index has typically made rich-world currencies look more expensive. Because western Europeans have higher costs of living and lower incomes than Americans, the euro has traded at around a 25% premium against the dollar in income-adjusted burger terms since the euro's inception.

But what once seemed to be an immutable axiom of burgernomics is true no longer. So strong is the dollar that even the adjusted Big Mac index finds the euro undervalued. The dollar is now trading at a 14-year high in trade-weighted terms. Emerging-world economies may struggle to pay off dollar-denominated debts. American firms may find themselves at a disadvantage against foreign competition. And American tourists will get more burgers for their buck in Europe. ■

Japanese tuna

Bluefinger

Tokyo's showy fish auctions do not augur economic growth

KIYOSHI KIMURA does not like to lose. For the past six years he has outbid all comers for the first bluefin tuna of the year sold by Tokyo's famed Tsukiji fish market. Last week Mr Kimura, who owns a chain of sushi shops, paid ¥74.2m ($642,000) to win the first fish. That nets out to some $3,000 per kilogram.

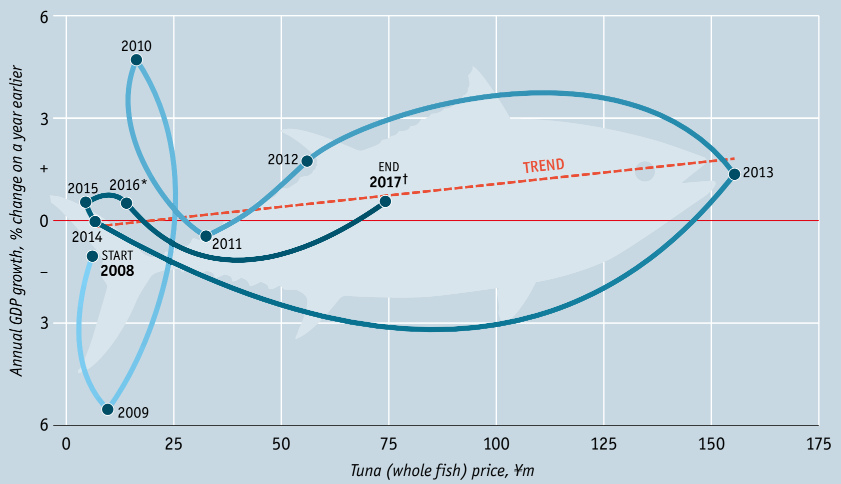
Folk wisdom has it that high tuna-auction prices signal future economic buoyancy. Mr Kimura has said that he pays the exorbitant prices to "encourage Japan". But that rationale seems fishy.

After a rival Hong Kong bidder baited him, Mr Kimura paid three times as much for the Tsukiji tuna in 2013 as in the previous year—a record-high ¥155.4m. GDP growth did not replicate that rise, however, sinking from 1.7% to 1.4%. In fact, Japan's economic fortunes and Tokyo's season-opening tuna prices seem to float rather erratically (see chart). A deep dive by *The Economist* suggests that tuna prices explain only 6% of the fluctuation in GDP. The correlation is a red herring.

Environmentalists, meanwhile, are gutted. Bluefin tuna are endangered; stocks have plunged by 97% from their peak, according to one estimate. The annual Tsukiji auction always spawns protest, even if sushi lovers remain hooked. Roughly 80% of all bluefin fished is eaten in Japan. A single piece of *o-toro*, the fattiest of bluefin slices, can be sold to finicky buyers for as much as $24. To break even, Mr Kimura would need to bring in $85 a piece; they go for $3.40 in his shops. A raw deal.

Economy of scales

Tsukiji market, first tuna prices v Japan GDP growth, 2008-17



Sources: IMF; press reports *GDP estimate †GDP forecast

Fintech in Singapore

Out of the box

SINGAPORE

A financial hub confronts the job-shredding potential of fintech

IN AN era when architectural masterpieces curve and bloom (Zaha Hadid), or shimmy and fold (Frank Gehry), designers of central-bank buildings remain reassuringly fond of right angles. The Monetary Authority of Singapore (MAS), the city-state's central bank and financial regulator, is housed in a boxy tower just south of the central business district. But tucked into one corner is a room called "Looking-Glass@MAS" that desperately wants to be Silicon Valley: witness the scruffily dressed young men, whiteboards on wheels covered in buzzwords and the kitchen along one wall.

This is the MAS's fintech lab, where Singapore is trying to put its own twist on the technologies disrupting the financial sector. A report from Citigroup published in 2016 warned that as fintech lets customers do more online and cuts into banks' lending and payments activities, European and American banks could lose almost 2m jobs in the next ten years. Similar fears stalk Singapore, home to more than 200 banks, and dependent on finance for 12.6% of GDP.

In London, Berlin and San Francisco, many fintech innovators are betting against the big banks. Singapore, typically, is trying to play both sides of that bet. It wants a thriving fintech industry that supports, rather than undermines, incumbent big banks. The MAS has vowed to invest S$225m ($158m) in fintech by the end of 2020. Sopnendu Mohanty, its fintech guru, says he wants to attract fewer "disrupters" than "enablers". He hopes fintech can help banks by cutting expenses and opening up new sources of revenue, through products that can slot into banks' front- or back-office systems. The idea is to combine the cost-effective nimbleness of fintech with the trust, solidity and customer base of mainstream banks. Translation: even if you can beat them, join them.

One attraction of Singapore for fintech entrepreneurs is what Mr Mohanty calls the "sandbox": a relaxation of some regulatory requirements to allow small-scale experiments. This lets firms test ideas in secure, rich, low-risk Singapore before exporting them to bigger markets. Singapore also makes much of its efforts in "regtech"—software helping banks comply with increasingly complex regulations.

But Mr Mohanty stresses that, although the MAS has eased regulation for small fintech experiments, "there is no compromise on principles" : ie, cyber-security must be flawless. Having been caught up in Malaysia's sprawling 1MDB scandal, Singapore has also been ranked by Oxfam, a charity, as the world's fifth-biggest corporate-tax haven ("inaccurate", said the government). So the employment-destroying peril of fintech is not the only threat to the health of its financial sector: Singapore may also be worried about its reputation. ■

China's currency

Squeezed to life

SHANGHAI

The yuan defies predictions of gloom with a strong start to the year

THE omens for the Chinese yuan seemed bad heading into 2017. The capital account looked as porous as ever, making a mockery of the government's attempts to fix the leaks. The new year, when residents received fresh allowances for buying foreign currency, was due to bring even more pressure. Analysts braced for a stampede for the exits from China. The yuan had fallen sharply at the beginning of 2016, catching them by surprise. This time, they were ready.

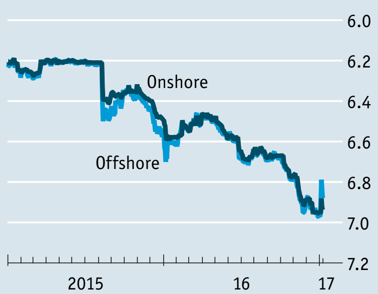
Instead, the yuan began the year as one of the world's star performers. This was particularly so in the offshore market, where foreigners trade it most freely. It gained 2.5% against the dollar over two days in the first week of 2017, its biggest two-day increase since 2010, when trading began in Hong Kong, its main offshore hub. Within China itself, price increases were more subdued, but the yuan still climbed to a one-month high.

Currency markets are notoriously fickle, so it is dangerous to read too much into a few days of price swings. But in China the government has always had a tight grip on the yuan. So the currency's strength raised the question of whether it was simply being propped up—or whether the yuan's prospects were in fact improving.

The Hong Kong rally has the Chinese central bank's fingerprints all over it. The proximate cause was a shortage of yuan in Hong Kong. As its residents have turned away from the Chinese currency, deposits there have fallen to just over 600bn yuan ($86.7bn), their lowest level since early 2013. That has led to periodic liquidity squeezes, making the cost of borrowing yuan in Hong Kong prohibitive: the overnight rate soared to 61% at the start of 2017.

Pop-up currency

Chinese yuan per $, inverted scale



Source: Thomson Reuters

In normal circumstances, central banks would be expected to inject money to ease such shortages. But the Chinese authorities did little to stem the cash crunch, pleased to see it hurt those betting against the yuan. To make money by "shorting" a currency, investors borrow it, sell it and then hope to buy it back after its value has fallen. With borrowing rates so high, this becomes all but untenable. As the liquidity squeeze has abated in recent days, the offshore yuan has pared its earlier gains.

China's success in defending the yuan suggests that, as the government tightens capital controls, they are having more effect. In the past two months it has started reviewing all transfers abroad by companies worth $5m or more. Transfers by individuals will also soon face more scrutiny. The controls should slow the erosion of China's foreign-exchange reserves, which are down to $3trn from $4trn in 2014.

Most important, the Chinese economy is sounder than it was two years ago, when the yuan's gradual descent began. A property boom has breathed life into heavy industry. Producer-price inflation is running at its fastest in more than half a decade. The central bank is tightening monetary conditions, however gingerly. As China's economic and policy cycles more closely track those in America, there is less scope for runaway strength in the dollar, which in turn takes pressure off the yuan.

Even so, many of the factors remain that led the yuan to drop by 7% last year, its steepest fall on record. The broad money supply is still growing at a double-digit rate. Chinese companies and households still have a ravenous appetite for foreign assets. Most analysts expect the yuan soon to start falling again, though that consensus is no longer rock-solid. China's central bank has long said that it wants to make the yuan more volatile and less predictable. On that score, it has surely succeeded. ■

Chinese tax

Making China great again

A tycoon shatters the country's reputation for low-cost manufacturing

WHEN China was gripped by political turmoil in the 1960s and 1970s, Cao Dewang cut his teeth as an entrepreneur. Mao's chaotic rule forced him out of school and he took to the street, a scrappy teenager selling fruit and cigarettes. Looking back, Mr Cao has said that it was actually a good time to do business: the government was too busy waging ideological campaigns to enforce its regulations. Mr Cao went on to become a billionaire, as China's biggest manufacturer of automotive glass. Last month he sparked controversy by complaining that life was tough for businesses in China. There are, he said, far too many regulations—especially taxes and fees. These days the government is much more effective in enforcing them.

Mr Cao hit a nerve with his claim that it was more costly to run a business in China than in America. He should know. His company, Fuyao Glass, bought an old General Motors factory in Ohio in 2014 and announced plans to invest $200m there. Mr Cao claimed that the overall tax on manufacturers is 35% higher in China than in America. Once China's higher land and energy costs are factored in, the advantages of its lower labour costs disappear, he said.

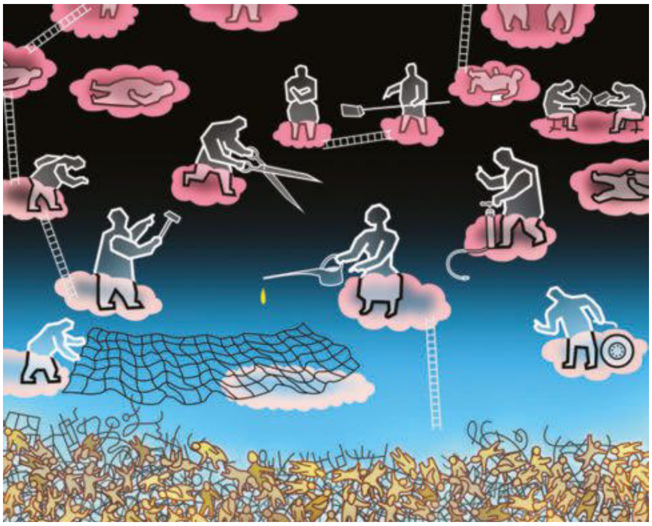
The State Administration of Taxation tried to refute the claims. It noted that overall tax revenues as a percentage of GDP are just 30% in China, lower than the average of 42.8% in developed countries and 33.4% in developing ones. But Mr Cao's complaints do have some merit. In its annual "Doing Business" rankings, the World Bank estimates that China's total tax rate as a percentage of profits is 68%, roughly two-thirds more than in high-income countries.

This points to bigger flaws in China's taxation system: an overreliance on indirect taxes and poor design of direct taxes. According to a 2015 analysis by W. Raphael Lam and Philippe Wingender of the IMF, taxes on corporate and personal incomes account for just a small fraction of China's tax revenues. Instead, more than half of revenues come from indirect taxes on goods and services. As for direct taxes, they are deeply regressive: social-security contributions account for 90% of tax liabilities for most households.

China is slowly tackling some of these issues. Reform of the value-added tax system (which has replaced a cruder tax on revenues) will lower the government's take of indirect taxes. It has eased the burden of social-security payments for its poorest citizens. Richard Bao, a partner with Grant Thornton, an accounting firm, says that China is making the tax-filing process simpler for companies, at the same time as it is tightening the net around those who dodge it. And Mr Cao's criticism suggests that China might also be making progress in another respect. Like all rich countries, it, too, now has tycoons who threaten to invest abroad if the government does not cut their tax bills.

Free exchange | Get off of my cloud

Trying to stay above politics, economists risk being not just wrong, but irrelevant



EVERY January more than 10,000 economists meet for the annual conference of the American Economic Association (AEA). This year, the shindig was in balmy Chicago, a stone's throw from its second-tallest building, the name TRUMP stamped in extra-large letters across its base. Most papers had been written months in advance; few sessions tackled the electoral earthquake in November. Yet there was no mistaking the renewed sense, following its failure to foresee the 2007-08 financial crisis, of an academic field in a crisis of its own. The election was seen as a defeat for liberalisation and globalisation, and hence for an economics profession that had championed them. If economists wish to remain relevant and useful, the modest hand-wringing at this year's meetings will need to yield to much deeper self-reflection.

Their theories had always shown that globalisation would produce losers as well as winners. But too many economists worried that emphasising these costs might undermine support for liberal policies. A "circle the wagons" approach to criticism of globalisation weakened the case for mitigating policies that might have protected it from a Trumpian backlash. Perhaps the greatest omissions were the questions not asked at all. Most dismal scientists exclude politics from their models altogether. As Joseph Stiglitz, a Nobel laureate, put it on one star-studded AEA panel, economists need to pay attention not just to what is theoretically feasible but also to "what is likely to happen given how the political system works".

Researchers on topics of political relevance—from the global effects of dollar appreciation to the economics of the production of fake news—promised in Chicago to produce more timely research. One recent example: just after the election, David Autor, of the Massachusetts Institute for Technology, and others published a short paper comparing congressional-district election results against data they had previously gathered assessing local-area exposure to Chinese imports. Similarly, Anne Case and Angus Deaton of Princeton University were able to compare their results on recent increases in mortality rates in parts of America with voting patterns.

In a keynote address, Robert Shiller—a Nobel prizewinner, habitual freethinker and outgoing AEA president—suggested that economists should think more broadly about the factors that affect human behaviour. Narratives matter, he argued. Powerful ideas, captured in memorable stories, can spread like epidemics, wreaking economic havoc as they go.

Views such as these, however, are notable for their rarity. Economists in Chicago debated the likely effect of the fiscal expansion expected under the Trump presidency, just as they had in past years debated the need for more of a fiscal boost during the outgoing Obama administration. Hardly discussed at all, however, was why deficit spending that seemed politically impossible then is on the political agenda now. A few years ago it might have boosted an American economy struggling to overcome weak growth and near-zero inflation; now the unemployment rate is just 4.7% and both growth and inflation are accelerating.

Economists seem to feel that such political questions are outside their area of concern. Yet politics helps determine the value of economic-policy recommendations. Many aspects of the stimulus plan passed early in Barack Obama's tenure, such as the money provided to states to plug budget holes and protect public services from large spending cuts, were chosen because they were judged to have a high multiplier effect—ie, each dollar in new government debt generated a more-than-equivalent rise in output. But the spending remained largely invisible to voters, who had little idea as a result whether (or how) they had benefited from it. That, in turn, made stimulus easy to demonise, hindering subsequent attempts to boost fiscal spending and harming labour markets. Policies that look effective in the absence of political constraints can prove anything but in the real world.

Similarly, economists are rightly beginning to wrestle with the threat artificial intelligence could pose to jobs. But they are doing so in almost purely economic terms, when it is the political impact that may prove most interesting and important. Besides modelling an economy where machines do 100% of the work, it might be worth thinking through the potential political effects of a world in which, say, 20% of working-class adults are deprived of good, meaningful work. Long before the last human worker clears his desk, protectionist or Luddite reactions might anyway have destroyed the path to this brave new world.

It's the politics, stupid

Many economists shy away from such questions, happy to treat politics, like physics, as something that is economically important but fundamentally the business of other fields. But when ignoring those fields makes economic-policy recommendations irrelevant, broadening the scope of inquiry within the profession becomes essential. Some justifiably worry that taking more account of politics could destroy what credibility economists have left as impartial, apolitical experts. Yet politics-free models are no insulation from political pressures—just ask a climate scientist—and nothing would boost economists' reputations more than results which match, and even predict, critical outcomes.

Political and social institutions are much harder to model and quantify than commodity or labour markets. But a qualitative approach might actually be far more scientific than equations offering little guide to how the future will unfold. Donald Trump campaigned (and may well govern) by castigating the uselessness of experts. To prepare for a time when expertise comes back into fashion, economists should renew their commitment to generating knowledge that matters. ■

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Power transmission

Rise of the supergrid

Electricity now flows across continents, courtesy of direct current

THE winds of the Oklahoma panhandle have a bad reputation. In the 1930s they whipped its over-tilled topsoil up into the billowing black blizzards of the Dust Bowl. The winds drove people, Steinbeck's dispossessed, away from their livelihoods and west, to California.

Today, the panhandle's steady winds are a force for creation, not destruction. Wind turbines can generate electricity from them at rock-bottom prices. Unfortunately, the local electrical grid does not serve enough people to match this potential supply. The towns and cities which could use it are far away.

So Oklahoma's wind electricity is to be exported. Later this year, lawsuits permitting, work will begin on a special cable, 1,100km (700 miles) long, between the panhandle and the western tip of Tennessee. There, it will connect with the Tennessee Valley Authority and its 9m electricity customers. The Plains and Eastern Line, as it is to be known, will carry 4,000MW. That is almost enough electricity to power Greater London. It will do so using direct current (DC), rather than the alternating current (AC) that electricity grids usually employ. And it will run at a higher voltage than such grids use—600,000 volts, rather than 400,000.

This long-distance ultra-high-voltage direct-current (UHVDC) connector will be the first of its kind in America. But the problem it helps with is pressing everywhere. Fossil fuels can be carried to power stations far from mines and wells, if necessary, but where wind, solar and hydroelectric power are generated is not negotiable. And even though fossil fuels can be moved, doing so is not desirable. Coal, in particular, is costly to transport. It is better to burn it at the pithead and transport the electricity thus generated instead.

Transmitting power over thousands of kilometres, though, requires a different sort of technology from the AC now used to transmit it tens or hundreds of kilometres through local grids. And in China, Europe and Brazil, as well as in Oklahoma, a new kind of electrical infrastructure is being built to do this. Some refer to the results as DC "supergrids".

Higher voltage

AC's ubiquity dates from the so-called "war of the currents" that accompanied electrification in the 1880s and 1890s. When electricity flows down a line as AC, energy travels as a wave. When it flows as direct current, there is no oscillation. Both work well, but the deciding factor in AC's favour in the 19th century was the transformer. This allows AC voltages to be increased after generation, for more efficient transmission over longish distances, and then decreased again at the other end of the line, to supply customers' homes and businesses. At the time, direct current had had no such breakthrough.

When one eventually came, in the 1920s, in the form of the mercury arc valve, AC was entrenched. Even the solid-state thyristor, a cousin of the transistor invented in the 1950s, offered no great advantages over the tens or hundreds of kilometres that power grids tended to span. Some high-voltage DC lines were built, such as that under the English Channel, linking Britain and France. But these were justified by special circumstances. In the case of the Channel link, for example, running an AC line through water creates electromagnetic interactions that dissipate a lot of power.

Over transcontinental distances the balance of advantage shifts. As voltages go up, to push the current farther, AC employs (and thus wastes) an ever-increasing amount of energy in the task of squeezing its alternations through the line. Direct current does not have this problem. Long-distance DC electrical lines are also cheaper to build. In particular, the footprint of their pylons is smaller, because each DC cable can carry far more power than an equivalent AC cable. Admittedly, thyristors are expensive—the thyristor-packed converter stations that raise and lower the voltage of the Plains and Eastern line will cost about $1bn, which is two-fifths of the project's total bill. But the ultra-high voltages required for transcontinental transmission are still best achieved with direct current. ▸▸

For all the excitement surrounding the Plains and Eastern Line, however, America is a Johnny-come-lately to the world of UHVDC. Asian countries are way ahead—China in particular. As the map on the previous page shows, the construction of UHVDC lines is booming there. That boom is driven by geography. Three-quarters of China's coal is in the far north and north-west of the country. Four-fifths of its hydroelectric power is in the south-west. Most of the country's people, though, are in the east, 2,000km or more from these sources of energy.

China's use of UHVDC began in 2010, with the completion of an 800,000-volt line from Xiangjiaba dam, in Yunnan province, to Shanghai. This has a capacity of 6,400MW (equivalent to the average power consumption of Romania). The Jinping-Sunan line, completed in 2013, carries 7,200MW from hydroelectric plants on the Yalong river in Sichuan province to Jiangsu province on the coast. The largest connector under construction, the Changji-Guquan link, will carry 12,000MW (half the average power use of Spain) over 3,400km, from the coal- and wind-rich region of Xinjiang, in the far north-west, to Anhui province in the east. This journey is so long that it requires 1.1m volts to push the current to its destination.

China's UHVDC boom has been so successful that State Grid, the country's monopolistic electricity utility, which is behind it, has started building elsewhere. In 2015 State Grid won a contract to build a 2,500km line in Brazil, from the Belo Monte hydropower plant on the Xingu River, a tributary of the Amazon, to Rio de Janeiro.

China's neighbour India is following suit—though its lines are being built by European and American companies, namely ABB, Siemens and General Electric. The 1,700km North-East Agra link carries hydroelectric power from Assam to Uttar Pradesh, one of the country's most densely populated areas. When finished, and operating at peak capacity, it will transmit 6,000MW. At existing levels of demand, that is enough for 90m Indians. The country's other line, also 6,000MW, carries electricity 1,400km from coal-fired power stations near Champa, in Chhattisgarh, to Kurukshetra, in Haryana, passing Delhi on the way.

Overdose

Valuable though they are, transcontinental links like those in China, Brazil and India are not the only use for UHVDC. Electricity is not described as a "current" for nothing. It does behave quite a lot like a fluid—including fanning out through multiple channels if given the chance. This tendency to fan out is another reason it is hard to corral power over long distances through AC grids—for, being grids, they are made of multiple, interconnected lines. Despite UHVDC connectors being referred to as supergrids, they are rarely actual networks. Rather, they tend to be point-to-point links, from which fanning out is impossible. Some utilities are therefore looking at them to move power over relatively short distances, as well as longer ones.

One such is 50Hertz, which operates the grid in north-east Germany. Almost half the power it ships comes from renewable sources, particularly wind. The firm would like to send much of this to Germany's populous south, and on into Austria, but any extra power it puts into its own grid ends up spreading into the neighbouring Polish and Czech grids—to the annoyance of everyone.

50Hertz is getting around this with a new UHVDC line, commissioned in partnership with Germany's other grid operators. This line, *SuedOstLink*, will plug into the Meitingen substation in Bavaria, replacing the power from decommissioned south-German nuclear plants. And Boris Schucht, 50Hertz's boss, has bigger plans than that. He says that within ten years UHVDC will stretch from the north of Sweden down to Bavaria. After this, he foresees the development of a true UHVDC grid in Europe—one in which the lines actually interconnect with each other.

That will require new technology—special circuit-breakers to isolate faulty cables, and new switch gear—to manage flows of current that are not simply running from A to B. But, if it can be achieved, it would make the use of renewable-energy sources much easier. When the wind blows strongly in Germany, but there is little demand for the electricity thus produced (at night, for instance), UHVDC lines could send it to Scandinavian hydroelectric plants, to pump water uphill above the turbines. That will store the electricity as potential energy, ready to be released when needed. Just as sources of renewable energy are often inconveniently located, so, too are the best energy-storage facilities. UHVDC permits generators and stores to be wired together, creating a network of renewable resources and hydroelectric "batteries".

In Asia, something similar may emerge on a grander scale. State Grid plans to have 23 point-to-point UHVDC links operating by 2030. But it wants to go bigger. In March 2016 it signed a memorandum of understanding with a Russian firm, Rosseti, a Japanese one, SoftBank, and a Korean one, KEPCO, agreeing to the long-term development of an Asian supergrid designed to move electricity from windswept Siberia to the megalopolis of Seoul.

This project is reminiscent of a failed European one, Desertec, that had similar goals. But Desertec started from the top down, with the grand vision of exporting the Sahara's near-limitless solar-power supply to Europe. Today's ideas for Asian and European supergrids are driven by the real needs of grid operators.

Such projects—which are transnational as well as transcontinental—carry risks beyond the merely technological. To outsource a significant proportion of your electricity generation to a neighbour is to invest huge trust in that neighbour's political stability and good faith. The lack of such trust was, indeed, one reason Desertec failed. But if trust can be established, the benefits would be great. Earth's wind-blasted and sun-scorched deserts can, if suitably wired up, provide humanity with a lot of clean, cheap power. The technology to do so is there. Whether the political will exists is the question. ■

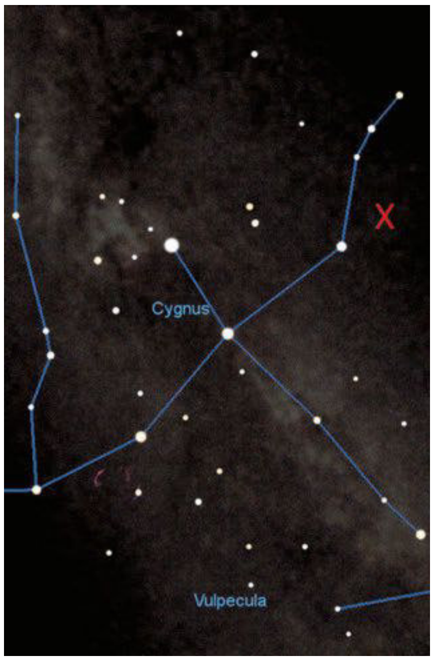
Astronomy

De Nova Stella

Astronomers predict a stellar explosion will happen in five years' time

AMATEUR astronomers have a new date for their diaries. In 2022, in the constellation of Cygnus, they will be treated to the sight of a nova, or "new star". By themselves, novas are not particularly noteworthy. Several dozen a year happen in Earth's home galaxy, the Milky Way, alone. But this one will be special for two reasons.

One is its intensity: provided you are somewhere reasonably dark (in the countryside, in other words, rather than a big city) it will be bright enough to be seen by the naked eye. The second is that it will be the first nova whose existence was predict-



X marks the spot

ed before the fact. Assuming everything goes according to schedule, the credit for that will belong to Lawrence Molnar, an astronomer at Calvin College, in Michigan, and his team, who have set out their predictions in a paper to be published soon in the *Astrophysical Journal*.

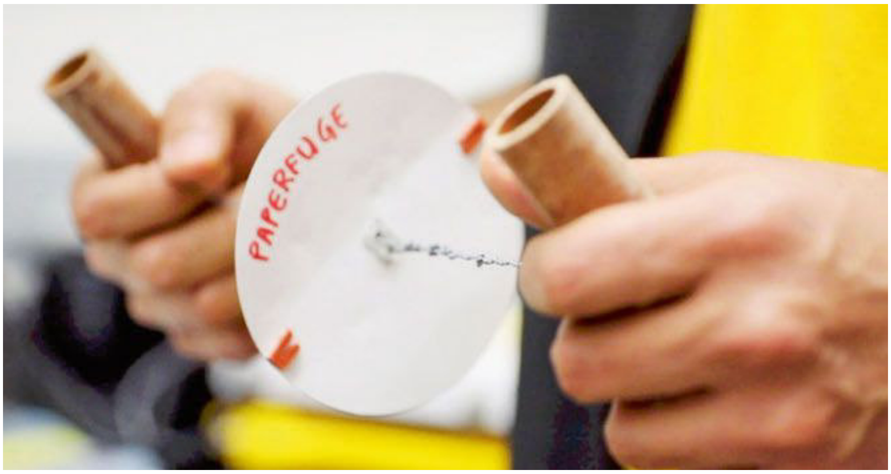
It is a tale of scientific serendipity. "Nova", which is Latin for "new", comes from the title of a book (also the title of this article) published in 1573 by Tycho Brahe, a Danish astronomer. This recorded what would now be called a supernova that had happened the year before. By proving that the "new star" in question was a very great distance away—at the least, further than the Moon—Brahe dealt a mortal blow to the Aristotelian belief, widespread in Europe at the time, that the heavens were perfect and unchanging.

But the name is a misnomer. Novas are not new stars. Rather, they are explosions that take place on existing ones, drastically but temporarily increasing their brightness. There are several kinds, but Dr Molnar's nova will be caused when one member of a two-star system collides with the other, causing an enormous and violent outpouring of energy.

Dr Molnar's interest was piqued at a conference in 2013, when Karen Kinemuchi, another astronomer, presented some puzzling findings on a particular star seen by *Kepler*, a space telescope designed chiefly to hunt for exoplanets. When Dr Molnar and his team observed the star—named KIC9832227—they discovered that it was a "contact binary", a pair of stars so close together that the smaller orbits within the atmosphere of the larger.

They also found that the smaller star was orbiting more quickly—and thus closer to its bigger companion—than it had been when Dr Kinemuchi made her measurements. Further observations confirmed that the smaller star was indeed spiralling towards its companion. Based on observations of another contact binary, V1309 Scorpii, which became a nova in 2008, the researchers were able to offer a prediction of the time of impact that, they hope, should be accurate to within about seven months. (The most likely date is a fifth of the way through 2022—ie, mid-March.)

Successfully predicting a nova will be of interest to more than just amateur skywatchers. Astronomers have built mathematical models to describe what happens during such events, but testing them against reality is hard. All previous novas have been detected after the fact. Anyone wanting to study what happens before the explosion must therefore sift back through old observations, hoping that some information about the pre-nova star will have been recorded by chance. Armed with Dr Molnar's prediction, though, astronomers will be able to watch the build-up as well as the denouement. ■



Medical diagnostics

String-driven thing

A cheap centrifuge that separates blood cells from plasma in minutes

TAKE a cardboard disc and punch two holes in it, on either side of its centre. Thread a piece of string through each hole. Now, pull on each end of the strings and the disc will spin frenetically in one direction as the strings wind around each other, and then in the other, as they unwind.

Versions of this children's whirligig have been found in archaeological digs across the world, from the Indus Valley to the Americas, with the oldest dating back to 3,300BC. Now Manu Prakash and his colleagues at Stanford University have, with a few nifty modifications, turned the toy into a cheap, lightweight medical centrifuge. They report their work this week in *Nature Biomedical Engineering*.

What goes around...

Centrifuges' many uses include the separation of medical samples (of blood, urine, sputum and stool) for analysis. Tests to spot HIV, malaria and tuberculosis, in particular, require samples to be spun to clear them of cellular debris. Commercial centrifuges, however, are heavy and require power to run. That makes them impractical for general use by health-care workers in poor countries, who may need to carry out diagnostic tests in the field without access to electricity. They also cost hundreds—often thousands—of dollars.

Dr Prakash's device, which he calls a "paperfuge", costs 20 cents and weighs just two grams. The standard version (pictured above) consists of two cardboard discs, each 10cm across. One of the discs has two 4cm-long pieces of drinking straw glued to it, along opposing radii. These straws, which have had their outer ends sealed with glue, act as receptacles for small tubes that contain the blood to be centrifuged.

Once the straws have been loaded, the two discs are attached face to face with Velcro, sandwiching the tubes between them. For string, Dr Prakash uses lengths of fishing line, tied at each end around wooden or plastic handles that the spinner holds.

The result, which spins at over 300 revolutions per second (rps) and generates a centrifugal force 10,000 times that of gravity, is able to separate blood into corpuscles and plasma in less than two minutes. This is a rate comparable to that of electrical centrifuges. Spinning samples for longer (about 15 minutes is ideal, though that is a lot of effort for a single spinner) can even separate red corpuscles, which may be infected by malarial parasites, from white ones, which cannot be so infected. The team is now trying the system out for real, to find out what works best, by conducting blood tests for malaria in Madagascar.

Once samples have been separated, they still need to be analysed. Fortunately, the paperfuge is not the first cheap laboratory instrument Dr Prakash has invented. In 2014 he unveiled the "foldscope", a microscope made from a sheet of paper and a small spherical lens. The foldscope goes on sale this year, but his laboratory has already distributed more than 50,000 of them to people in 135 countries, courtesy of a charitable donation that paid for them. He plans to ship a million more by the end of 2017. Putting this together with a paperfuge means it is now possible to separate biological samples and analyse them under a microscope using equipment that costs less than a couple of dollars. ■

The evolution of the menopause

A whale of a tale

Intergenerational conflict may explain loss of female fertility with age

THE menopause is a puzzle. Why do women, unlike most female mammals, stop reproducing decades before they die? Analysing birth and death records shows that the assistance they give in bringing up grandchildren does have a measurable effect on those grandchildren's survival. But that does not prove such assistance is more valuable in evolutionary terms than continued fertility would be.

Two other mammals undergo a menopause, however. These are killer whales and short-finned pilot whales. And a long-term analysis of killer-whale populations, by Darren Croft of the University of Exeter, in England, and his colleagues, just published in *Current Biology*, suggests the missing part of the explanation may be that the menopause not only frees a female to help raise the grandoffspring, but also reduces competition between her and her gravid and nursing daughters.

Dr Croft's killer whales swim off the coasts of British Columbia, in Canada, and its southern neighbour, the American state of Washington. They have been monitored by marine biologists every year since 1973. They live in pods of 20-40 animals and are now so well known that individual animals can be identified by the shapes of their fins, the patterns of their saddle patches and from scratches that they have picked up in the rough and tumble of oceanic life. Their sexes are known, too. Though killer whales' genitalia are not visible from the outside, distinctive pigmentation patterns around their genital slits distinguish males from females. And which calves belong to which mothers can be deduced by seeing who spends most time with whom.

The data thus collected let Dr Croft analyse the lives of 525 calves born into three of the pods. He found that if an elderly female gave birth at around the same time as a youngster, her calf was, on average, 1.7 times more likely to die before the age of 15 than the youngster's was. This was not caused directly by the mother's age. In the absence of such coincidence of birth, the calves of elderly mothers were just as likely to live to 15 as those of young mothers. But when it came to head-to-head arrogation of resources for offspring, the youngsters outcompeted their elders, and their offspring reaped the benefits.

Plugging these numbers into his model, Dr Croft showed that the diminution of fecundity in elderly females that this intergenerational competition creates, combined with the fact that the youngsters an elderly female is competing with are often her own daughters (so it is her grandoffspring that are benefiting), means it is better for her posterity if she gives up breeding altogether, and concentrates her efforts on helping those daughters. Whether women once gained the same sorts of benefits from the menopause as killer whales do remains to be determined. But it is surely a reasonable hypothesis. ■

Hurry up, Grandma

Underwater drones

One that didn't get away

A submersible drone to help anglers

MOST pastimes nowadays involve lots of high-tech gadgets. For fishermen these range from electronic bite alarms to carbon-fibre rods, specialised clothing and tackle boxes stuffed with various odd and ends. There is so much clobber that some anglers use trolleys to lug around their gear. Now the ultimate piece of kit has arrived: a fishing drone.

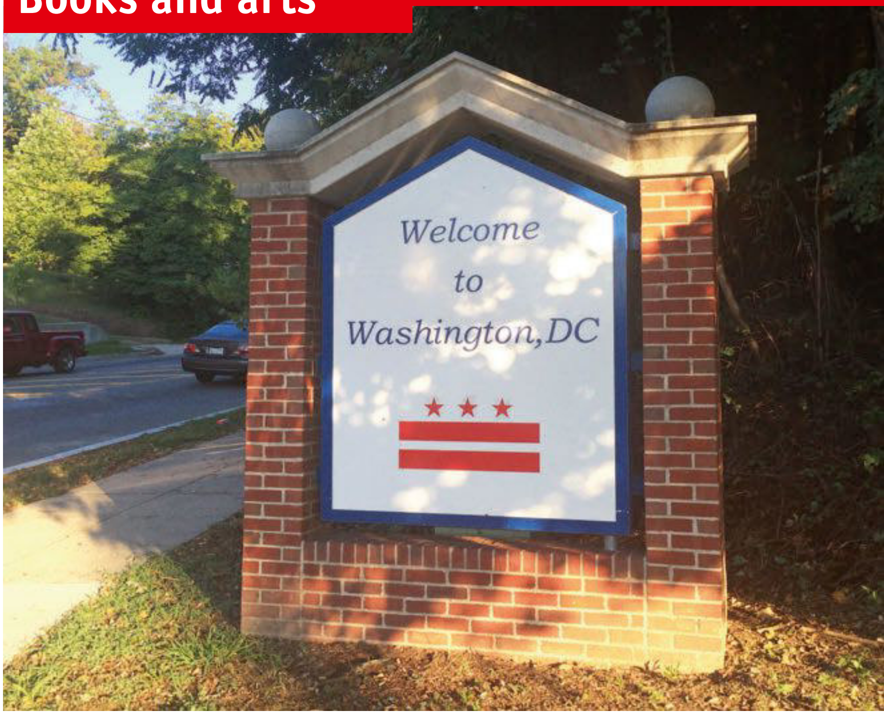
The device, called PowerRay, comes from PowerVision, a dronemaker in Beijing. It is a submersible that carries a video camera to send images of Neptune's kingdom back to the angler on the bank or boat above. These pictures, either still or video, can be viewed on the screen of the hand-held unit that controls the drone, or on a smartphone. Those who really want to get into the swim can don a pair of virtual-reality goggles to watch them.

PowerRay is equipped with a fish detector. This uses sonar, sending out sound waves and picking up the reflections that bounce off nearby objects. PowerVision claims that the system can distinguish between species, permitting the angler to identify the target he wants. The drone can then be used to carry a baited hook to the spot, and let it go. Just for good measure, it can also emit an alluring hue of blue light which is supposed to attract fish.

The PowerRay caused something of a buzz among excitable geeks at CES, a consumer-electronics show held in Las Vegas, where it was unveiled this week. But most failed to spot something. Flying drones communicate using radio waves, but, whereas sound travels well in water, radio waves do not—especially through seawater, which is highly conductive and thus readily absorbs radio signals. This is why submarines usually need to surface to use their radios. The clue to how PowerRay gets around this problem can be found in a suspicious-looking plug socket amidships.

The drone has, in fact, to be tethered to its operator by plugging in a 30-metre-long umbilical cord. PowerVision explains that this cord serves two purposes. One is to cope with the "challenging transmission environment", by relaying commands and video data through the cable. The other is rescue, for if a big fish came along and snatched the bait the drone was carrying, the device might be dragged down to Davy Jones's locker. The cord lets the angler haul the drone in manually, with or without the offending whopper still holding on.

The company hopes to offer future versions of the PowerRay without a cord, probably using low-frequency systems which could provide limited range in fresh water. These would be intended for underwater photography. For the fishermen, it is also looking at how to deliver a baited hook directly to a specific destination on the river bed or sea floor, and then settle down to keep a watch over it. Anglers will thus have direct video evidence of the one that got away.



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A walk across Washington

District line

WASHINGTON, DC

A day's stroll from one end of America's federal capital reveals how the culture and topography of the city are evolving

"WELCOME to Washington, DC", says the solid, red, white and blue sign on the corner of Branch and Southern Avenues, in this leafy entry to the nation's capital. A stream of traffic is carrying in mostly African-American commuters from Maryland's Prince George's County. It is eight o'clock on a clear blue morning: a perfect day for a walk across Washington.

The distance from one end of the District of Columbia to the other is only about 11 miles (18km). Today's zigzag route (see map, next page) is perhaps 17 miles. The eyes of the world will be on Washington on January 20th, the day of Donald Trump's inauguration as America's 45th president. The idea of walking across it is to do a double dissection of the city: a geographical one (a leisurely look at its contrasts, from the poorer south-east to the prosperous north-west, where your correspondent lived in the mid-1990s); and a historical and cultural one (a sense of how the place has changed). On both dimensions, big surprises lay ahead.

A tale of two cities

Washington is known to be deeply divided—not just between warring Democrats and Republicans but also between the relatively affluent and diverse city west of the Anacostia river and the largely black and long-neglected one east of it. A recent study of the census tracts within a mile's radius of one of the bridges across the river gives an idea of the gulf: unemployment of 6.6% and child poverty of 20% on the western side; 20.7% jobless and 53% child poverty to the east. The median value of an owner-occupied home in the west was two-and-a-half times that in the east.

A quarter of a century ago Washington was known as the "murder capital" of America, a result of a crack-cocaine epidemic (and the illicit market it gave rise to) from the mid-1980s. The number of murders peaked at 482 in 1991, falling to below 100 in 2012. Despite the dip, crime remains uncomfortably common: Washington ranks only just outside the ten worst large cities in the country for violent crime, and in 2015 it experienced a nasty uptick in murders. In 2016 it had 135 homicides.

A disproportionate share of the killing happens east of the river. The typical victim is "a 24-year-old black man in the south-east, who most likely knew their killer," says Jennifer Swift, the editor of *D.C. Witness*, which monitors every murder. People who live on the other side of town tend to venture east of the Anacostia with a degree of wariness, if at all.

So the first surprise along gently undulating Branch Avenue is how pleasant and peaceful it is—all wood-clad and brick colonial homes with their porches, set back amid trees and lawns: the suburban American dream. A short detour leads to the Francis A. Gregory Library, built in 2012 by David Adjaye, the Ghanaian-British architect who has just been knighted by the queen and who made his name in America designing the newly opened National Museum of African-American History & Culture, the latest addition to the Smithsonian. If anything, the local library, an elegant mix of glass and diamond-shaped plywood, is the more pleasing of the two.

On the morning stretch your correspondent is accompanied by a friend from his time as *The Economist*'s Washington bureau chief in the 1990s, and by Mark Puryear, an ethnomusicologist and native Washingtonian. An hour into the walk the friend, Alissa Stern from Bethesda, Maryland, confesses to being "shocked" by how nice this area is.

True, Mr Puryear has planned our route into Anacostia with care. It meanders past civil-war defences with commanding views over the city and across the Potomac river into Virginia. It includes the Anacostia Community Museum, a branch of the Smithsonian where a recent exhibition, "Twelve Years that Shook and Shaped Washington: 1963-1975", covered an earlier period of dramatic change for the city, including the riots that erupted after the assassination of Martin Luther King in 1968 and the redevelopment that pushed many African-American families into public housing in Anacostia. Farther down, we reach the Anacostia home of Frederick Douglass, a 19th-century abolitionist and orator. The site is now run by the National Park Service; the visitors there are among ►►

the few white faces we see this morning.

Mr Puryear notes an abundance of one thing and a scarcity of another. The abundance is of churches. In front of the modest Kingdom Hall of Jehovah's Witnesses, a smartly dressed Mary Ushbry is picking bits of litter off the street in preparation for a service this morning which, she says, is going to "bring some good news". The grander Our Lady of Perpetual Help enjoys a stunning view over the city.

The scarcity is of shops. Only three supermarkets serve all of Wards 7 and 8, the administrative districts east of the river that, together, are home to about 140,000 people. "It's a classic food desert," says Mr Puryear. Nam's Market, a small blue-fronted store near the Frederick Douglass house, keeps most of its wares—including cup noodles, tinned stew, Frooties—securely behind a glass partition and a bolted door. There is nothing fresh in sight.

Yet vegetables are sprouting a couple of blocks away on spare land between buildings in the centre of Anacostia, in 80 raised beds, thanks to volunteers from Union Temple Baptist Church. And Martha's Table, a 37-year-old charity supporting access to healthy food, is moving its headquarters from the west of town to the east, where the need is greatest. Its "Joyful Food Markets" distribute fruit and vegetables to schools; by 2018 it aims to have such monthly markets in every elementary school in Wards 7 and 8.

A river runs through it

Such projects are part of this morning's second surprise: the energy and imagination of the efforts under way to improve lives east of the river. Existing initiatives are being expanded: THEARC, a large centre for arts, recreation and education, opened in 2005 and is now planning to add a third building. The Department for Homeland Security is consolidating its headquarters in the Anacostia area. The District has thrown its support behind a $65m project for a practice facility for the Washington Wizards basketball team and an arena for the women's team, the Mystics.

In a former Woolworths building on Good Hope Road, the Anacostia Arts Centre houses exhibitions, a restaurant, a small theatre and a few boutiques. Downstairs, it provides a home for (mainly African-American) start-ups and charities. Its head, Duane Gautier, says the area lacks the disposable income to attract the amenities that regeneration needs; his idea is to bring visitors from outside, using the arts to revitalise Anacostia's historic district.

The centre, which opened in 2013, seems to be having some modest success. It is drawing in people: some 26,000 visitors in 2015. A juice bar has opened around the corner on Martin Luther King Jr Avenue, as have a couple of sit-down restaurants and a radio station. A trendy Busboys and Poets restaurant—in Washington, a leading indicator of a community on the up—is coming soon.

But the idea that could have the most dramatic impact on Anacostia is the 11th Street Bridge Park. This aims to use the pillars from a disused road bridge across the river to create a recreation space that would help to unite the two sides of the city. About the length of three American-football fields, the bridge would have lawns, waterfalls, an amphitheatre and a picnic garden.

The concept has something of New York's High Line about it. "It will be a destination—more a place than a path," says Scott Kratz, the project's director, over a freshly made sandwich at the Anacostia Arts Centre's café. The river has divided Washington for generations, he says; now it can bring together "people who wouldn't normally cross paths". Pre-construction work has started, and he hopes the park will open in late 2019.

Mr Kratz is busy not just raising the $45m needed for the bridge, but working on ways to avoid its most feared side-effect: gentrification. His "Equitable Development Plan" includes leveraging the project to encourage small businesses, and a homebuyers' club so locals can capture some of the rising equity that is coming their way.

Boomtown, USA

To see what gentrification looks like, you have only to cross the river. Already from the bridge, massive building development starts to come into view. The third surprise of the walk is the scale of the boom that is under way in many parts of the city.

Yards Park, next to the Navy Yards, is a good example. Washington was founded on the confluence of the Anacostia and Potomac rivers, but it had largely turned its back on the Anacostia, heavily polluted and lined with industrial buildings and parking lots. Now it is clearing these away; a boardwalk, jetties, park facilities and apartment blocks with river views are coming. A sign by a building site even announces an imminent "District Winery".

"People forget, we're a water city," says Charles Allen, the council member for Ward 6, which straddles all four quadrants of the city. The river is not only becoming more accessible again, it is gradually being cleaned up. Mr Allen points across to a pontoon where ospreys have been nesting. Bald-eagle chicks have been spotted, too. It still would not be wise to eat fish caught in the Anacostia, but a group is out on a boat fishing this afternoon.

Two decades ago the District was a potholed basket-case that was losing people to the suburbs. Now its finances are healthy and it is gaining about 1,100 newcomers a month. Being home to the federal government helped Washington weather the financial crisis with relative ease. More remarkably, what was once just a staid federal city is attracting young entrepreneurs and becoming hip—a place of cycle lanes, fancy coffee shops, communal library boxes and yoga mats.

The population has grown by some 100,000 over the past 15 years, to 670,000. The ethnic mix is changing, too. In 1980, 70% of the population was black; this has dipped below 50%.

"There's no question, the city is going through a complete reshaping," says Mr Allen. "We are in the middle of that." Two groups in particular are moving in, he explains. One are 25- to 35-year-olds, starting out on their careers. The other are 55- to 65-year-olds, empty-nesters from the baby-boom generation, who want arts, culture and restaurants within walkable reach. The worry in many parts of town has switched from coping with crime to coping with the soaring house prices that come with gentrification.

Shaw, once down-at-heel, is very trendy. NoMa, as the area "North of Massachusetts Avenue" is now branded, has similar aspirations. The "H Street corridor" boasts cool restaurants and a lively theatre: "It's not up and coming, it's come," marvels a visitor from another part of town. It is the same story around Union Market ("This was a war zone," says another visitor). Streets near Eastern Market are lined with restaurants; a nearby resident has counted 45 of them within a short walk from his home. Eateries and bars have moved into parts of town, like 14th Street, where you used to trip over needles and condoms.

In 1994 your correspondent reported on a twice-weekly evening "orange hat" patrol around the Lincoln Park area east of the Capitol that sought to keep the neighbourhood safe. One of those orange-hatters, who moved out when his wife had their first child as this seemed no place to raise a family, is stunned by the change he sees when he returns. As we revisit the area the day before the walk across the city, we come across a young couple with their three-year-old daughter from northern Virginia. They are here to view a house. They are drawn by the free pre-school—and it's two blocks from Lincoln Park, "and you can't get much better than that."

Centre of attention

The next part of the walk—skirting by the Capitol Building, down the National Mall towards the Washington Monument—is a reminder of Pierre L'Enfant's vision in designing America's capital on such a grand scale in the 1790s. Hence the majestic vista across the crowds and flags to the Lincoln memorial two miles away that will greet President Trump on his inauguration. No one could invent a better backdrop for "making America great again".

Yet, until recently, America's "front yard" was in danger of becoming a symbol of national decline. Its lawns, a much-trodden carpet for 24m visitors a year, were looking the worse for wear, and the Mall and its monuments were badly in need of maintenance after decades of neglect. The Washington Monument, an emblem of American aspiration, reopened in 2014 after $15m of repairs for damage it suffered in an earthquake in 2011, but its lift broke down last August and it will remain closed to visitors until 2019. Still, fresh investment has been coming in, along with new attractions.

Two recent additions in the heart of the capital are drawing attention. The first is the National Museum of African-American History & Culture, approved in 2003 by President George W. Bush and opened, fittingly, by President Barack Obama on September 24th. It is intended to be the last of the buildings on the Mall. When tickets were released for the three months to the end of the year, they were snapped up in 42 minutes. The place is packed. The visitors, mostly African-Americans, seem totally absorbed: quietly contemplative or softly sharing their responses ("They wouldn't serve me at the counter"). Starting in subterranean exhibits on the slave trade, the civil war, segregation and civil rights, the crowd moves up into the light towards floors devoted to communities and culture. This would justify a full day's walk of its own.

The second is the five-star Trump International Hotel, which opened on September 12th in the Old Post Office building. Today there is even a glimpse of the Donald himself—though only on the four large television screens behind the bar. The staff are friendly, but the central court feels cavernous and lacks atmosphere, a missed opportunity to do something more imaginative with a grand space. Already the hotel, with its "Presidential Ballroom", has proved to be a magnet for receptions and (thanks to its name and ownership) for controversy.

From here it is a short walk to the White House. The ability to drive past it along Pennsylvania Avenue ended, for security reasons, in 1995. Walking by it is still a thrill. But Washingtonians now shudder at the thought of its next occupant: 90% of their votes in November were for Hillary Clinton, just 4% for Mr Trump.

A block away, on 17th Street, are the offices of Holland and Knight, a law firm with another superb view across town. Whayne Quin, a lawyer with long experience of development in the District, spreads out a giant, multicoloured map of Washington's "Comprehensive Plan", which shows the city's ambitions for the use of its 61 square miles of land and seven square miles of water. The green areas of the extensive park system at its core stand out amid ample amounts of yellow ("low-density residential") and pockets of red ("high-density commercial"). Mr Quin points out that the development across the city has happened despite significant constraints, notably on building height (skyscrapers are conspicuous by their absence here). The planners have been flexible, though, allowing taller buildings provided certain obligations are met, for example on mixed use and social housing.

A pragmatic approach to planning is one of several factors that have combined to change Washington's fortunes, in Mr Quin's view. Sensible financial management is another: the city has balanced its budget since Congress imposed a Financial Control Board from 1995 to 2001 to stop the rot. A third is diversification beyond the core industry of government. The Washington area has become a hub for technology, and for the services that

So much on offer

techies demand. Young newcomers are putting down roots, reinforcing a cultural change, especially on race. "It's now a very diversified, progressive and forward-thinking city," says Mr Quin, "but that wasn't so when I came here in 1964."

Half an hour's walk beyond, across Rock Creek, the loveliest of all the many green spaces in Washington, lies Georgetown, which has long been upscale, but if anything now seems more so. There's time for a quick peek at an addition to the capital's embassy scene—the world's youngest country, South Sudan, flies its flag in an alleyway down from the Chesapeake and Ohio Canal—then it's a long uphill march along Wisconsin Avenue towards the final destination.

The home stretch

Across the city, posters calling for statehood for the District have been a reminder that its lack of full representation in Congress remains an issue. In a telephone conversation at the start of the day, Anthony Williams, the former mayor who oversaw the recovery from Washington's nadir in the 1990s, says that one strategy for the future is to keep drawing attention to Washington the city rather than Washington the federal capital. The District has leveraged the presence of the national government well, he says, but since federal spending is likely to remain flat further diversification will be essential. He describes the state of the city succinctly: "It's improved, but there's still a very great divide."

Indeed, in some respects, the contrast between the morning walk and the last stretch couldn't be greater. Most of the faces are now white. Instead of a food desert, there is a cornucopia of Safeways, Giants and Whole Foods Markets. Recreational spaces abound: boys are playing after-school softball and a group of girls are starting rugby practice.

Moreover, unlike Anacostia, where change is in the air, this part of north-west Washington seems almost exactly as your correspondent left it 20 years ago. The flower store is still there. Our old house on Van Ness Street, a picture-book redbrick colonial, is just the same as ever—except, of course, for its value, which according to Zillow, an online property database, has risen more than threefold since we left it.

And yet in another respect these two ends of town are remarkably similar—and that is the final surprise of this walk across Washington. The houses in the two neighbourhoods look interchangeable. The landscaping is the same. The evening tranquillity in the north-west, amid the greenery and the birdsong, feels much like the morning peace in the south-east. It's seven o'clock and getting dark at the yellow-bordered sign on Massachusetts Avenue saying "Maryland welcomes you", and it feels almost as if the walk has come full circle. ■

Spying in America

The Snowden operation

How America Lost Its Secrets: Edward Snowden, the Man and the Theft. By Edward Jay Epstein. *Knopf; 350 pages; $27.95*

THE effects of Edward Snowden's heist of secrets from America's National Security Agency (NSA) in 2013 can be divided into the good, the bad and the ugly, writes Edward Jay Epstein in a meticulous and devastating account of the worst intelligence disaster in the country's history, "How America Lost Its Secrets".

Even that categorisation is contentious. Mr Snowden's fans do not believe he did anything wrong at all: he simply lifted the lid on a rogue agency, risking his liberty on behalf of privacy everywhere. For their part, his foes believe his actions lack any justification: he is a traitor masquerading as a whistle-blower, who exposed no wrongdoing but did colossal damage.

These stances rest more on faith than facts. Their adherents regard as secondary the details of Mr Snowden's career, and the means by which he took millions of pieces of top-secret information from the NSA's computers. More important for such people is whether you trust American and other Western institutions, or regard them as inherently corrupt and oppressive.

Mr Snowden's fans believe that the authorities, especially intelligence agencies, lie about everything. Nothing they say about the case can be believed. Any peculiarities—such as inconsistencies in Mr Snowden's public statements, or the fact that he now lives in Moscow as a guest of Russia's security service, the FSB, are mere side-issues, easily explicable by exigency and urgency. For his foes, nothing Mr Snowden says is trustworthy, whereas statements made by officials are true.

Mr Epstein is a formidable investigative journalist and his quarry is worthy of his talents. He has unearthed many new details and assembles them, with the publicly known information, into a coherent and largely damning account.

The first part of the book examines Mr Snowden's rather patchy professional career. He was neither (as many believe, and he has claimed) a successful and senior intelligence officer, nor was he a computer wizard. Mysteriously, possibly through his family's extensive connections with the spy world, he joined the CIA, but proved untrustworthy and incompetent. On leaving, he kept his security clearance, making him eligible for a good job in the private sector, where computer-literate ex-spooks are at a premium. But secrecy rules meant that nobody could check on his past.

The author agrees that Mr Snowden performed a "salutary service in alerting both the public and the government to the potential danger of a surveillance leviathan". The "bureaucratic mission creep", he argues, "badly needed to be brought under closer oversight by Congress". He also notes that Mr Snowden inadvertently highlighted the security consequences of "contractorisation"—outsourcing spook work to the private sector.

But he also shows that the vast majority of stolen documents had nothing to do with Mr Snowden's purported concerns about privacy and government surveillance. He switched jobs in order to have access to much bigger secrets. He gave away American technical capabilities—such as the ability to snoop on computers that are not connected to the internet—which are of real value in tracking criminals, terrorists and enemies. To believe that was justified, you have to regard America as being no better than Russia, China or al-Qaeda. He also stoked an ugly, misplaced cynicism about the trustworthiness of government.

Mr Epstein is cautious on the biggest question: whether Mr Snowden was acting alone, or under the control of Russian intelligence. The crucial evidence, he says, is Mr Snowden's contact with digital-privacy activists such as Glenn Greenwald. No Russian handler would allow a well-placed and valuable spy to make such a risky move, Mr Epstein argues. Better to keep him in place, to steal yet more secrets.

That may be too categorical. The intelligence world is full of bluffs and double-bluffs—and errors. Agents misbehave. Aims change over time. But certainly nobody reading this book will easily retain faith in the Hollywood fable of Mr Snowden's bravery and brilliance. ■

Economic and financial indicators

Economic data

% change on year ago

	Gross domestic product			Industrial production	Consumer prices		Unemployment	Current-account balance		Budget balance	Interest rates, %	Currency units, per $	
	latest	qtr*	2016†	latest	latest	2016†	rate, %	latest 12 months, $bn	% of GDP 2016†	% of GDP 2016†	10-year gov't bonds, latest	Jan 11th	year ago
United States	+1.7 Q3	+3.5	+1.6	-0.6 Nov	+1.7 Nov	+1.4	4.7 Dec	-476.5 Q3	-2.6	-3.2	2.38	-	-
China	+6.7 Q3	+7.4	+6.7	+6.2 Nov	+2.1 Dec	+2.0	4.0 Q3§	+264.6 Q3	+2.3	-3.8	2.96§§	6.93	6.58
Japan	+1.1 Q3	+1.3	+0.9	+4.6 Nov	+0.5 Nov	-0.2	3.1 Nov	+189.1 Nov	+3.7	-5.6	0.06	117	117
Britain	+2.2 Q3	+2.3	+2.0	+1.9 Nov	+1.2 Nov	+0.7	4.8 Sep††	-138.1 Q3	-5.6	-3.7	1.40	0.83	0.69
Canada	+1.3 Q3	+3.5	+1.2	+1.6 Oct	+1.2 Nov	+1.5	6.9 Dec	-53.6 Q3	-3.5	-2.5	1.68	1.33	1.42
Euro area	+1.7 Q3	+1.4	+1.6	+0.6 Oct	+1.1 Dec	+0.3	9.8 Nov	+380.4 Oct	+3.3	-1.8	0.25	0.96	0.92
Austria	+1.2 Q3	+2.4	+1.5	+0.2 Oct	+1.3 Nov	+1.0	5.8 Nov	+8.0 Q3	+2.2	-0.9	0.54	0.96	0.92
Belgium	+1.3 Q3	+0.7	+1.2	+2.8 Oct	+2.0 Dec	+1.9	7.6 Nov	+3.4 Sep	+0.9	-2.8	0.74	0.96	0.92
France	+1.0 Q3	+1.0	+1.2	+1.8 Nov	+0.6 Dec	+0.3	9.5 Nov	-28.6 Nov‡	-1.2	-3.3	0.81	0.96	0.92
Germany	+1.7 Q3	+0.8	+1.8	+2.1 Nov	+1.7 Dec	+0.4	6.0 Dec	+296.9 Nov	+8.8	+1.0	0.25	0.96	0.92
Greece	+1.6 Q3	+3.1	+0.4	+2.3 Nov	nil Dec	nil	23.1 Sep	-1.0 Oct	-0.3	-7.7	6.89	0.96	0.92
Italy	+1.0 Q3	+1.0	+0.9	+1.3 Oct	+0.5 Dec	-0.1	11.9 Nov	+49.5 Oct	+2.4	-2.6	1.86	0.96	0.92
Netherlands	+2.4 Q3	+3.1	+2.1	+2.9 Nov	+1.0 Dec	+0.2	6.6 Nov	+57.1 Q3	+8.6	-1.1	0.44	0.96	0.92
Spain	+3.2 Q3	+2.9	+3.2	+4.6 Nov	+1.6 Dec	-0.3	19.2 Nov	+23.0 Oct	+1.7	-4.6	1.47	0.96	0.92
Czech Republic	+1.6 Q3	+0.9	+2.4	+7.1 Nov	+2.0 Dec	+0.6	5.2 Dec§	+3.7 Q3	+1.5	nil	0.37	25.8	24.9
Denmark	+1.1 Q3	+1.5	+1.0	+13.3 Nov	+0.5 Dec	+0.6	4.2 Nov	+23.9 Nov	+7.5	-1.0	0.36	7.10	6.87
Norway	-0.9 Q3	-1.9	+0.6	+2.6 Nov	+3.5 Dec	+3.5	4.8 Oct‡‡	+18.0 Q3	+4.4	+3.5	1.62	8.65	8.95
Poland	+2.0 Q3	+0.8	+2.6	+3.3 Nov	+0.8 Dec	-0.7	8.3 Dec§	-2.4 Oct	-0.5	-2.7	3.56	4.17	4.02
Russia	-0.4 Q3	na	-0.5	+2.6 Nov	+5.4 Dec	+7.0	5.4 Nov§	+29.0 Q3	+2.3	-3.7	8.31	60.4	76.0
Sweden	+2.8 Q3	+2.0	+3.1	+0.1 Nov	+1.4 Nov	+1.0	6.2 Nov§	+22.2 Q3	+4.9	-0.3	0.59	9.12	8.54
Switzerland	+1.3 Q3	+0.2	+1.4	+0.4 Q3	nil Dec	-0.5	3.3 Dec	+68.2 Q3	+9.4	+0.2	-0.17	1.02	1.00
Turkey	-1.8 Q3	na	+2.7	+4.6 Nov	+8.5 Dec	+7.8	11.3 Sep§	-33.7 Nov	-4.7	-1.8	11.81	3.91	3.03
Australia	+1.8 Q3	-1.9	+2.4	-0.2 Q3	+1.3 Q3	+1.3	5.7 Nov	-47.9 Q3	-3.2	-2.1	2.73	1.36	1.43
Hong Kong	+1.9 Q3	+2.5	+1.6	-0.1 Q3	+1.3 Nov	+2.4	3.3 Nov‡‡	+13.3 Q3	+2.9	+1.6	1.73	7.76	7.76
India	+7.3 Q3	+8.3	+7.0	-1.9 Oct	+3.6 Nov	+4.9	5.0 2015	-11.1 Q3	-0.6	-3.8	6.39	68.3	66.8
Indonesia	+5.0 Q3	na	+5.0	-2.3 Nov	+3.0 Dec	+3.5	5.6 Q3§	-19.2 Q3	-2.1	-2.3	7.56	13,329	13,875
Malaysia	+4.3 Q3	na	+4.3	+6.2 Nov	+1.8 Nov	+1.9	3.5 Oct§	+5.6 Q3	+1.8	-3.4	4.27	4.47	4.38
Pakistan	+5.7 2016**	na	+5.7	+2.3 Oct	+3.7 Dec	+3.8	5.9 2015	-4.1 Q3	-1.4	-4.6	8.20†††	105	105
Philippines	+7.1 Q3	+4.9	+6.9	+14.6 Nov	+2.6 Dec	+1.8	4.7 Q4§	+3.1 Sep	+0.9	-1.0	4.98	49.6	47.3
Singapore	+1.1 Q3	+9.1	+1.3	+11.9 Nov	nil Nov	-0.6	2.1 Q3	+63.0 Q3	+21.5	+0.7	2.39	1.44	1.43
South Korea	+2.6 Q3	+2.5	+2.7	+4.8 Nov	+1.3 Dec	+1.0	3.2 Dec§	+99.0 Nov	+7.2	-1.3	2.13	1,196	1,210
Taiwan	+2.0 Q3	+3.9	+1.0	+8.8 Nov	+1.7 Dec	+1.3	3.8 Nov	+74.7 Q3	+14.4	-0.5	1.18	31.9	33.4
Thailand	+3.2 Q3	+2.2	+3.2	+3.8 Nov	+1.1 Dec	+0.2	1.0 Nov§	+47.9 Q3	+11.8	-2.3	2.64	35.6	36.3
Argentina	-3.8 Q3	-0.9	-2.1	-2.5 Oct	— ***	–	8.5 Q3§	-15.7 Q3	-2.6	-5.3	na	15.9	13.9
Brazil	-2.9 Q3	-3.3	-3.4	-1.1 Nov	+6.3 Dec	+8.4	11.9 Nov§	-20.3 Nov	-1.2	-6.3	11.09	3.22	4.05
Chile	+1.6 Q3	+2.5	+1.8	-1.4 Nov	+2.7 Dec	+3.8	6.2 Nov§‡‡	-4.8 Q3	-1.9	-2.7	4.13	673	732
Colombia	+1.2 Q3	+1.3	+1.6	+0.4 Oct	+5.7 Dec	+7.5	7.5 Nov§	-13.7 Q3	-4.8	-3.7	6.83	2,995	3,267
Mexico	+2.0 Q3	+4.0	+2.1	+1.3 Nov	+3.4 Dec	+2.9	3.6 Nov	-30.6 Q3	-2.8	-3.0	7.69	21.9	17.9
Venezuela	-8.8 Q4~	-6.2	-13.7	na	na	+424	7.3 Apr§	-17.8 Q3~	-2.9	-24.3	10.43	9.99	6.31
Egypt	+4.5 Q2	na	+4.3	-4.9 Oct	+23.3 Dec	+13.2	12.6 Q3§	-20.8 Q3	-6.8	-12.2	na	18.7	7.83
Israel	+5.1 Q3	+3.4	+3.3	-0.8 Oct	-0.3 Nov	-0.5	4.5 Nov	+13.3 Q3	+2.8	-2.4	2.28	3.86	3.94
Saudi Arabia	+1.4 2016	na	+1.4	na	+2.3 Nov	+3.6	5.6 2015	-46.8 Q3	-5.5	-11.2	na	3.75	3.76
South Africa	+0.7 Q3	+0.2	+0.5	-1.3 Oct	+6.6 Nov	+6.3	27.1 Q3§	-12.3 Q3	-3.9	-3.4	8.82	13.9	16.7

Source: Haver Analytics. *% change on previous quarter, annual rate. †*The Economist* poll or Economist Intelligence Unit estimate/forecast. §Not seasonally adjusted. ‡New series. ~2014 **Year ending June. ††Latest 3 months. ‡‡3-month moving average. §§5-year yield. ***Official number not yet proved to be reliable; The State Street PriceStats Inflation Index, Nov 35.38%; year ago 25.30% †††Dollar-denominated bonds.

Markets

	Index	% change on		
			Dec 31st 2015	
	Jan 11th	one week	in local currency	in $ terms
United States (DJIA)	19,954.3	+0.1	+14.5	+14.5
China (SSEA)	3,284.4	-0.7	-11.3	-16.9
Japan (Nikkei 225)	19,364.7	-1.2	+1.7	+4.9
Britain (FTSE 100)	7,290.5	+1.4	+16.8	-4.4
Canada (S&P TSX)	15,491.5	-0.2	+19.1	+24.7
Euro area (FTSE Euro 100)	1,119.1	-0.2	+2.3	-1.5
Euro area (EURO STOXX 50)	3,307.9	-0.3	+1.2	-2.4
Austria (ATX)	2,669.5	-0.5	+11.4	+7.3
Belgium (Bel 20)	3,619.5	-1.3	-2.2	-5.7
France (CAC 40)	4,888.7	-0.2	+5.4	+1.6
Germany (DAX)*	11,646.2	+0.5	+8.4	+4.5
Greece (Athex Comp)	663.4	+0.9	+5.1	+1.3
Italy (FTSE/MIB)	19,486.9	-0.7	-9.0	-12.3
Netherlands (AEX)	486.6	-0.2	+10.1	+6.1
Spain (Madrid SE)	949.4	-0.7	-1.6	-5.2
Czech Republic (PX)	927.9	-0.7	-3.0	-6.5
Denmark (OMXCB)	810.6	+0.6	-10.6	-13.5
Hungary (BUX)	32,972.2	+1.0	+37.8	+36.1
Norway (OSEAX)	774.6	+0.3	+19.4	+22.2
Poland (WIG)	53,709.3	+1.8	+15.6	+9.4
Russia (RTS, $ terms)	1,155.5	-1.8	+26.3	+52.6
Sweden (OMXS30)	1,511.9	-1.2	+4.5	-3.5
Switzerland (SMI)	8,427.2	+0.9	-4.4	-6.5
Turkey (BIST)	77,666.6	+2.0	+8.3	-19.2
Australia (All Ord.)	5,823.7	+0.6	+9.0	+11.4
Hong Kong (Hang Seng)	22,935.4	+3.6	+4.7	+4.6
India (BSE)	27,140.4	+1.9	+3.9	+0.6
Indonesia (JSX)	5,301.2	nil	+15.4	+19.4
Malaysia (KLSE)	1,675.2	+1.7	-1.0	-5.0
Pakistan (KSE)	49,371.6	+1.4	+50.4	+50.4
Singapore (STI)	3,000.9	+2.7	+4.1	+2.6
South Korea (KOSPI)	2,075.2	+1.4	+5.8	+3.7
Taiwan (TWI)	9,345.7	+0.6	+12.1	+15.4
Thailand (SET)	1,572.9	+0.6	+22.1	+23.5
Argentina (MERV)	18,467.8	+1.8	+58.2	+29.1
Brazil (BVSP)	62,446.3	+1.4	+44.1	+76.8
Chile (IGPA)	20,995.5	+0.9	+15.7	+21.8
Colombia (IGBC)	10,286.1	nil	+20.3	+27.6
Mexico (IPC)	45,933.7	-1.4	+6.9	-15.9
Venezuela (IBC)	32,736.7	+2.8	+124	na
Egypt (EGX 30)	13,089.1	+3.8	+86.8	-22.1
Israel (TA-100)	1,276.4	-0.9	-2.9	-2.0
Saudi Arabia (Tadawul)	6,894.7	-4.2	-0.2	-0.2
South Africa (JSE AS)	52,437.9	+3.3	+3.4	+14.9

The Economist poll of forecasters, January averages (previous month's, if changed)

	Real GDP, % change				Consumer prices % change		Current account % of GDP	
	Low/high range		average					
	2016	2017	2016	2017	2016	2017	2016	2017
Australia	2.1/2.9	2.1/3.0	2.4 (2.9)	2.6 (2.8)	1.3	2.1	-3.2 (-3.5)	-2.3 (-3.0)
Brazil	-3.6/-3.2	0.5/1.5	-3.4	0.9	8.4 (8.3)	5.2 (5.3)	-1.2 (-1.1)	-1.4 (-1.3)
Britain	1.9/2.1	0.6/1.5	2.0	1.2 (1.1)	0.7 (0.6)	2.5	-5.6 (-5.7)	-4.7 (-4.4)
Canada	1.0/1.4	1.2/2.3	1.2	1.8 (1.9)	1.5	1.9 (2.0)	-3.5	-2.9
China	6.6/6.8	6.2/6.8	6.7	6.4	2.0	2.2 (2.1)	2.3 (2.5)	2.1 (2.2)
France	1.1/1.3	1.0/1.6	1.2	1.2	0.3	1.2 (1.1)	-1.2 (-1.1)	-1.2 (-1.1)
Germany	1.7/1.9	1.2/2.3	1.8	1.5 (1.4)	0.4	1.6 (1.5)	8.8	8.2 (8.1)
India	6.0/7.6	6.9/8.4	7.0 (7.2)	7.4 (7.5)	4.9	4.8 (4.9)	-0.6 (-0.9)	-0.9 (-1.0)
Italy	0.7/1.0	0.4/1.3	0.9 (0.8)	0.8	-0.1	1.0 (0.9)	2.4	2.2
Japan	0.5/1.0	0.7/1.5	0.9 (0.7)	1.1 (1.0)	-0.2	0.7 (0.6)	3.7	3.5
Russia	-0.7/-0.2	0.6/2.6	-0.5	1.3 (1.2)	7.0	5.0 (5.2)	2.3 (2.4)	2.8
Spain	2.9/3.3	2.0/2.6	3.2	2.3	-0.3 (-0.4)	1.5 (1.4)	1.7 (1.6)	1.5 (1.4)
United States	1.5/1.9	1.9/2.8	1.6	2.3 (2.2)	1.4 (1.3)	2.4 (2.3)	-2.6	-2.5 (-2.8)
Euro area	1.6/1.7	1.2/2.5	1.6	1.4 (1.3)	0.3 (0.2)	1.4 (1.3)	3.3 (3.2)	3.0

Sources: Bank of America, Barclays, BNP Paribas, Citigroup, Commerzbank, Credit Suisse, Decision Economics, Deutsche Bank, EIU, Goldman Sachs, HSBC Securities, ING, Itaú BBA, JPMorgan, Morgan Stanley, Nomura, RBS, Royal Bank of Canada, Schroders, Scotiabank, Société Générale, Standard Chartered, UBS. For more countries, go to: Economist.com/markets

Other markets

	Index	% change on		
			Dec 31st 2015	
	Jan 11th	one week	in local currency	in $ terms
United States (S&P 500)	2,275.3	+0.2	+11.3	+11.3
United States (NAScomp)	5,563.7	+1.6	+11.1	+11.1
China (SSEB, $ terms)	342.4	-0.7	-14.3	-19.7
Japan (Topix)	1,550.4	-0.3	+0.2	+3.3
Europe (FTSEurofirst 300)	1,443.2	nil	+0.4	-3.3
World, dev'd (MSCI)	1,778.2	+0.2	+6.9	+6.9
Emerging markets (MSCI)	886.7	+1.8	+11.7	+11.7
World, all (MSCI)	428.9	+0.4	+7.4	+7.4
World bonds (Citigroup)	879.2	+0.2	+1.1	+1.1
EMBI+ (JPMorgan)	778.1	+0.3	+10.5	+10.5
Hedge funds (HFRX)	1,208.1§	nil	+2.9	+2.9
Volatility, US (VIX)	11.3	+11.9	+18.2	(levels)
CDSs, Eur (iTRAXX)†	69.1	+1.7	-10.5	-13.7
CDSs, N Am (CDX)†	66.2	+4.3	-25.1	-25.1
Carbon trading (EU ETS) €	5.6	+4.7	-33.8	-36.2

Sources: Markit; Thomson Reuters. *Total return index.
†Credit-default-swap spreads, basis points. §Jan10th.

Indicators for more countries and additional series, go to: **Economist.com/indicators**

The Economist commodity-price index

2005=100

	Jan 3rd	Jan 10th*	% change on one month	one year
Dollar Index				
All Items	141.9	144.7	+0.3	+18.3
Food	154.8	157.0	+1.3	+8.7
Industrials				
All	128.5	131.9	-0.9	+32.9
Nfa†	138.1	142.1	+1.2	+33.7
Metals	124.4	127.6	-1.9	+32.6
Sterling Index				
All items	210.8	216.1	+4.4	+39.6
Euro Index				
All items	169.9	169.9	+0.7	+21.0
Gold				
$ per oz	1,156.1	1,188.1	+2.4	+9.0
West Texas Intermediate				
$ per barrel	52.3	50.8	-4.1	+66.1

Sources: Bloomberg; CME Group; Cotlook; Darmenn & Curl; FT; ICCO; ICO; ISO; Live Rice Index; LME; NZ Wool Services; Thompson Lloyd & Ewart; Thomson Reuters; Urner Barry; WSJ. *Provisional
†Non-food agriculturals.

Shark of Persia

Ayatollah Akbar Hashemi Rafsanjani, an Iranian politician, died on January 8th, aged 82

IN DEATH as in life, Akbar Hashemi Rafsanjani defied categorisation. He was a stalwart of a regime dubbed an exporter of terror and heresy. Yet regional arch-foes such as Bahrain and Saudi Arabia mourned his passing, as did the Great Satan itself, via a State Department press briefing. At home, embattled reformists felt they had lost their prime protector.

Ruthless guile was his hallmark. During his early years in power, the death penalty was applied freely to dissidents, communists, Kurds and Bahais. Foreign countries blamed Mr Rafsanjani for ordering murders of émigrés in Paris, Berlin and Geneva, and terrorist attacks on a Jewish cultural centre in Buenos Aires in 1994 and on American forces in Saudi Arabia in 1996.

Though a pragmatist to the point of cynicism, his career was rooted in zealotry. His greatest political asset was his friendship with Ayatollah Khomeini, the instigator of the Islamic revolution of 1979. As memories of that upheaval faded, his ability to assert confidently what the great man would have thought became ever-handier.

Other credentials were shakier. He had studied at the great seminary in Qom, but he was no theologian; nor was he able to wear the black turban reserved for the Prophet's direct descendants. His family were prosperous pistachio farmers, and his power base was as much the bazaar as the mosque. He was dubbed *kooseh*, the shark, partly for hidden menace, but also mockingly: his smooth skin sprouted only a wispy beard, rather than the monumental growths of the heavyweight theocrats.

Arrested ten times under the shah's American-backed regime, jailed for a total of more than four years (and on one winter's day, he said, tortured from dusk to dawn) he was not anti-Western on principle. Indeed, he sniped at those who were: "if people believe we can live behind a closed door, they are mistaken. We are in need of friends and allies around the world." Unlike his colleagues, he had travelled widely in America and elsewhere and spoke, in private, excellent English.

Those colleagues were often fuelled by rage. He was driven by frustration: with Iran's backwardness, isolation and outsiders' bullying. His aim was to fortify the regime, not consume its strength in pointless fights at home and abroad.

As the first speaker of the Majlis (parliament), he shaped the Islamic Republic's constitution, reconciling limited electoral mandates with divine inspiration: a balancing act which few Muslim countries manage. He helped make his old ally, Ayatollah Ali Khamenei, Supreme Leader. It was a rare mistake: the two men spent the next 30 years tussling for power.

He ended the war with Iraq, first gaining the military advantage, and then arm-twisting his colleagues to accept a UN-brokered ceasefire. He restored diplomatic ties with most Sunni Muslim countries: notably, he was the only senior Iranian figure on cordial terms with the Saudi leadership.

He decisively backed Iran's nuclear agreement with the West—outfacing those who thought that any dealing with the enemy was weakness or treason. The "world of tomorrow is one of negotiations, not the world of missiles", he tweeted in March.

Interests of state

Earlier. he was embroiled in the Iran-Contra affair, in which Ronald Reagan's administration illegally sold Iran American weapons, in exchange for help in freeing hostages and financing (also illegally) Nicaraguan anti-communist insurgents. When his role was revealed, he had the source, Mehdi Hashemi, jailed, while, characteristically, escaping opprobrium himself.

At home he eschewed sloganeering (he pressed for "Death to America" chants to be dropped from Friday prayers) and decried fanaticism, calling it "Islamic fascism". Instead, he promoted economic change: liberalisation, privatisation, cutting subsidies and building infrastructure.

His political hero was Amir Kabir, a 19th-century reformist chief, of whom he wrote an appreciative biography. He was also a leading critic of the austere sexual and social mores of the Islamic Republic. It was wrong, he said, to criminalise youngsters for following their God-given and natural instincts.

His own instincts were finely tuned. As the occasion required, he could be steely, charming, witty or lachrymose (especially in response to his own rhetoric). He held court in lavish public buildings, while living in the same house as before the revolution. His family thrived: a business empire reputedly included the second-biggest airline, a near-monopoly on the pistachio trade and the largest private university. In 2003 *Forbes* magazine put his personal wealth at over $1 billion. Lies, said his fans. An underestimate, said his foes.

His biggest political setback was in 2005, when he failed to win a third presidential term: hard-up Iranians voted crossly for the puritanical, doctrinaire Mahmoud Ahmadinajad. Yet Mr Rasfanjani held on to power as head of the Expediency Council, a previously obscure power-broking body which links Iran's theocratic and civil institutions. Lately, he tacked towards reformism, backing political and media freedoms in a speech in 2009, and supporting President Hassan Rouhani's campaign for re-election. Was it sincere? Anyone who knew him, or Iranian politics, knew better than to ask. ■