

The Economist

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Vestager v the Valley

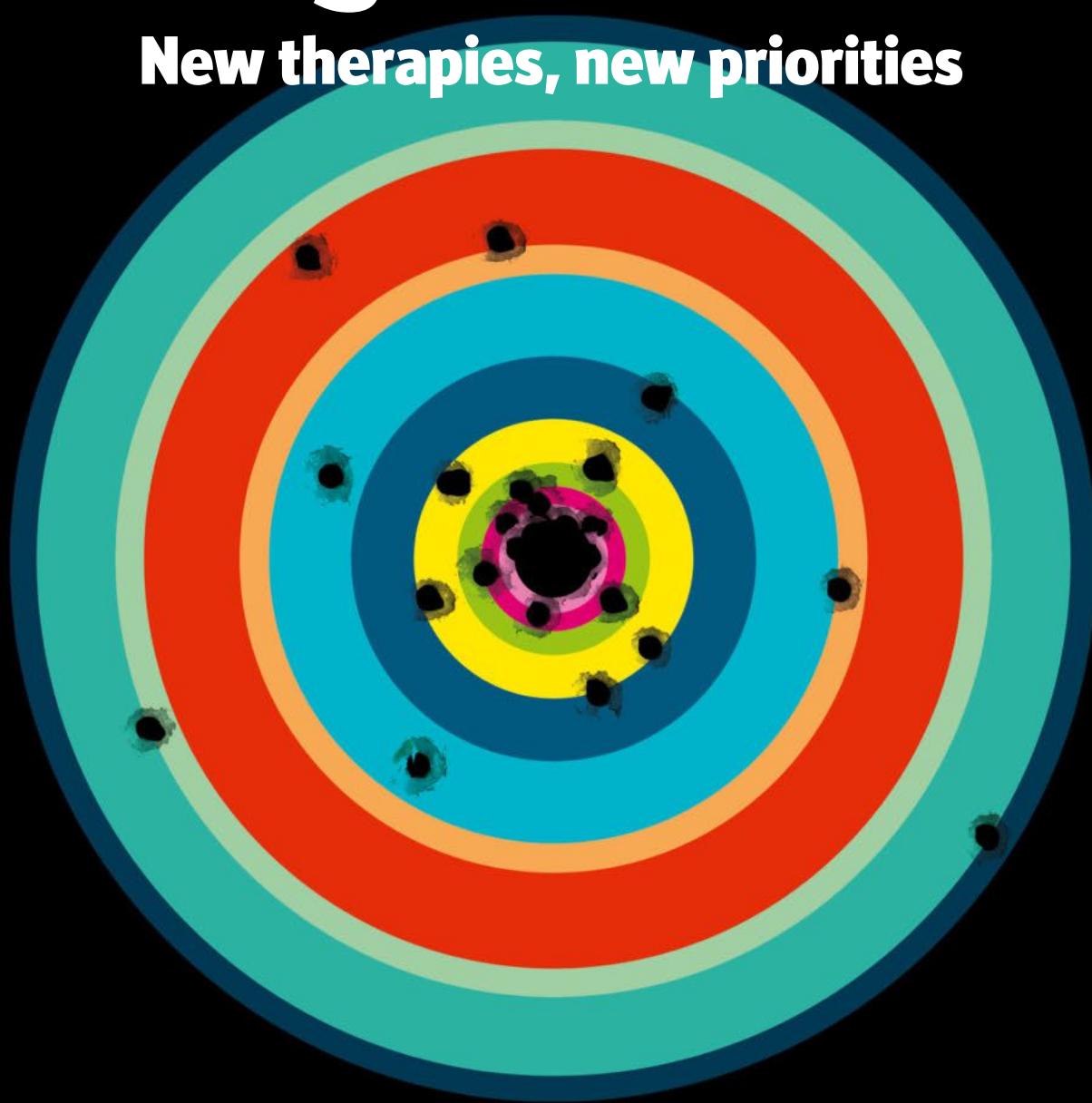
America's incoherence on Iran

The case for reappointing Janet Yellen

Seed capital: the sperm-bank business

Closing in on cancer

New therapies, new priorities



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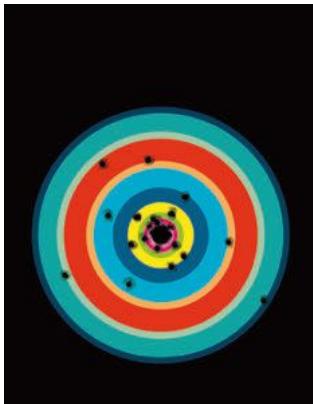
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Politics



Hurricane Irma wreaked havoc in 13 Caribbean countries, killing scores of islanders and leaving thousands homeless. Nearly all the buildings on Barbuda were destroyed, as were two-thirds on St Martin. Some islands suffered from food shortages and looting. Many governments pledged aid, but Unicef said it would not be enough without private donations. In Florida, 6.5m people were ordered to leave their homes. Over 30 people died in America, including eight in a nursing home when the storm knocked out the building's air conditioning.

An earthquake of magnitude 8.1 hit **Mexico**. Centred off the coast of the state of Chiapas, it killed at least 96 people.

Guatemala's congress passed legislation that reduces the punishment for campaign-finance crimes and protects lawmakers from prosecution. They said the vote was a matter of "national urgency", and postponed votes on school meals and other issues. Congress also voted to retain President Jimmy Morales's immunity from prosecution. An inquiry into his party over illegal campaign financing will go ahead, but must refrain from examining his role.

Venezuela's government announced that elections for governor in 23 states, which were cancelled last year, would be held on October 15th. Candidates from the opposition will probably beat rivals from President Nicolás Maduro's socialist party, if the elections are free and fair.

A supreme-court judge in **Brazil** authorised a second investigation into corruption allegations against President Michel Temer. Federal police say he signed a decree regulating ports in return for bribes.

Dancing on the ceiling

Donald Trump signed a stop-gap spending bill that keeps the **federal government** running until December 8th. The act permitted the Treasury to start borrowing again after months of using "extraordinary measures" to stop the government from defaulting. With the debt ceiling suspended, the government's total gross debt passed \$20trn for the first time.

The Democratic leadership in Congress said it had reached an agreement with Mr Trump to stop many undocumented **immigrants** who came to America as children from being deported. The president has said that he wants to end the programme that gives the "Dreamers" legal protections.

Showdown

The European Commission announced that **Poland** had failed to address concerns over reforms of the judiciary. In a final warning, the commission gave Polish authorities a month to make the necessary changes or face legal action.

Sweden, one of the last neutral states in Europe, launched its biggest military exercise in more than 20 years. Joined by troops from America and other NATO countries, the drills took place just as Russia carried out its biggest war games in the Baltic region since 2013.

The centre-right government coalition in **Norway** defeated the centre-left opposition by a small margin in an election. Erna Solberg will become the first conservative prime minister to win two consecutive terms since 1985.

In **Britain** the European Union withdrawal bill, a significant piece of legislation in the Brexit process, passed its first parliamentary hurdle by 326 votes to

290. The bill will repeal the 1972 European Communities Act. Opposition parties, and some in the government, want to add over 100 amendments amid fears that, while rejigging EU law to fit British law, ministers could make changes without consulting Parliament.



Tens of thousands of people marched across **France** to protest against labour reforms. It is the first big public challenge to Emmanuel Macron, the French president; he says he will continue with the reforms.

Spoiling his party

Opposition MPs in **Kenya** boycotted the opening of parliament by President Uhuru Kenyatta, the winner of last month's disputed election. The supreme court annulled that result and a new election is being held on October 17th. The court's judges, who usually attend the opening of parliament, were conspicuous by their absence from the event.

Protests continued in **Togo** against the 50-year rule of the Gnassingbé family. Police fired tear gas and beat demonstrators in the capital, Lomé. The country's opposition pushed parliament to debate a bill that would restore the constitution from 1992 and reinstate term limits on the president.

A row in **South Africa** over the independence of the central bank escalated when it submitted an affidavit accusing a government anti-corruption official of secretly meeting the president's lawyers, shortly before she instructed the bank to focus more on improving the "socioeconomic well-being" of citizens and less on inflation. Last month the

courts dismissed that order as unconstitutional.

Tightening the screw

The UN Security Council imposed its toughest sanctions yet on **North Korea** following its recent nuclear test. The measures target the country's textile exports and imports of petroleum products, and bans other countries, notably China and Russia, from admitting more North Korean workers.

The crackdown by the armed forces in **Myanmar** against the Rohingya community was described by the UN's human-rights chief as a "textbook example of ethnic cleansing". The security forces say they are responding to a violent campaign by militants. Around 370,000 Rohingyas have fled to neighbouring Bangladesh.

Halimah Yacob was installed as president of **Singapore** without an election, after a government committee ruled that the other candidates were not eligible to run. The presidency was "reserved" this year for a member of the city-state's Malay minority.

Banana split



The wrangling over the rights to a "**monkey selfie**" that went viral was resolved after a legal battle. An animal-rights group claimed that the crested black macaque owned the image, as it had taken the photo and should benefit financially. The camera's human owner thought he was being aped, but last year an American judge ruled that copyright protection does not extend to animals. Both parties have now agreed to give 25% of any future revenue generated by the snap to the monkey. ➤

Business

Apple unveiled the **iPhone X**, a “super-premium” phone that will be priced from \$999 in America. The X has no familiar home button at the bottom of the device; a user will need to swipe upwards to return to the home screen. The Touch ID feature that enabled users to activate a phone with their fingerprint has gone. Instead, the X allows access by recognising its owner’s face. Facial recognition is controversial, and may prove awkward for those shopping with Apple Pay, who will have to wave the device in front of their face to confirm a purchase. Apple also upgraded its more conventional phone range, launching the iPhone 8.

Countdown, engines on

The Trump administration released its first guidance on the future of **autonomous vehicles**. The document, “Vision for Safety 2.0”, focuses on the benefits of driverless technology and calls for the lightest possible regulatory touch in testing the technology.

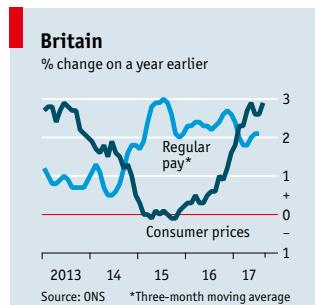
Google lodged an appeal against the European Commission’s decision to fine it €2.4bn (\$2.7bn) for promoting its shopping service over similar search results from its rivals.

The total amount of bad debt held by **Italian banks** fell by 10% in July to €174bn (\$200bn), the biggest monthly decrease since figures started to be compiled in 1998. Most of the drop is explained by UniCredit, Italy’s biggest bank, selling off its portfolio of toxic loans.

The Japanese government announced that it would sell shares in **Japan Post** later this month, in an offering that could fetch up to \$12bn. Japan Post’s IPO in 2015 raised funds that were put towards the continuing reconstruction efforts after the earthquake and tsunami of 2011.

Inflation in **China** rose to 1.8% year on year in August, a seven-month high, mostly be-

cause of more expensive commodity prices. But the price of pork, which worried the government when it surged last year because of its effect on the many households for which the meat is a staple food, fell again, by 13.4%.



Britain’s headline year-on-year **inflation** rate hit 2.9% in August, matching the four-year high recorded in May. With average earnings increases running at 2.1%, wages are losing ground against rising prices. **Public-sector workers** have been hit hardest, given a 1% cap on salary increases. The government signalled its intent this week to scrap the cap for the police and prison staff, and possibly for other public-sector employees.

Median household income in America grew for the second consecutive year in 2016, to \$59,039. But over the previous

decade the poorest fifth of households saw their incomes decline by an average of \$430, while the richest fifth saw theirs rise by \$19,500. The poverty rate fell to 12.7%, the lowest since before the financial crisis.

It's complicated

The bid by Rupert Murdoch’s **21st Century Fox** to buy the remaining shares it does not already own in **Sky**, Britain’s biggest subscription-TV broadcaster, hit another hurdle. The deal was already headed to the antitrust regulator for scrutiny over whether it would concentrate too much power in the hands of Mr Murdoch. This week the culture secretary said she wanted the regulator also to consider whether Fox would abide by Britain’s broadcasting standards.

Brazilian police took Wesley Batista, the CEO of JBS, the world’s biggest meatpacking firm, and his brother Joesley, a former chairman, into custody for questioning about alleged **insider trading**. Earlier this year the brothers struck a plea-bargain deal with prosecutors for bribing politicians. The police are now looking into a sale of JBS shares that took place while those negotiations were taking place.

Jean-Claude Juncker, the president of the European Commission, proposed a system for screening **foreign takeovers** in the EU. Mr Juncker was addressing concerns that some countries, notably China, are buying up Europe’s strategic assets in technology, infrastructure and energy, an argument that has fuelled a backlash against free trade.

The reaction by **Equifax** to a data hack affecting up to 143m customers became a lesson in how not to respond to a crisis. Equifax checks the credit of people applying for loans. Among other things, its policy of charging for credit-freeze requests prompted outrage on social media, forcing it to scrap the fee temporarily.

In the market

Cities across America scrambled to make their pitches to host **Amazon’s** second headquarters. The e-commerce pioneer has been based in Seattle since 1995, but in a surprise announcement said it wants to open offices elsewhere to house 50,000 new workers. It will invest \$5bn in the complex. Toronto is in the running, too.

Other economic data and news can be found on pages 78-79



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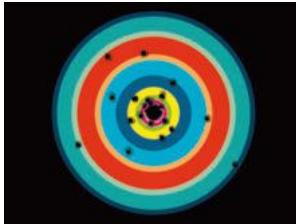
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Closing in on cancer

Science will win the technical battle against cancer. But that is only half the fight



But the statistics do not begin to capture the fear inspired by cancer's silent and implacable cellular mutiny. Only Alzheimer's exerts a similar grip on the imagination.

Confronted with this sort of enemy, people understandably focus on the potential for scientific breakthroughs that will deliver a cure. Their hope is not misplaced. Cancer has become more and more survivable over recent decades owing to a host of advances, from genetic sequencing to targeted therapies. The five-year survival rate for leukemia in America has almost doubled, from 34% in the mid-1970s to 63% in 2006-12. America is home to about 15.5m cancer survivors, a number that will grow to 20m in the next ten years. Developing countries have made big gains, too: in parts of Central and South America, survival rates for prostate and breast cancer have jumped by as much as a fifth in only a decade.

From a purely technical perspective, it is reasonable to expect that science will one day turn most cancers into either chronic diseases or curable ones. But cancer is not fought only in the lab. It is also fought in doctors' surgeries, in schools, in public-health systems and in government departments. The dispatches from these battlefields are much less encouraging.

Cell-side research

First, the good news. Caught early, many cancers are now highly treatable. Three out of four British men who received a prostate-cancer diagnosis in the early 1970s did not live for another ten years; today four out of five do. Other cancers, such as those of the lung, pancreas and brain, are harder to find and treat. But as our Technology Quarterly in this issue shows, progress is being made. Techniques to enable early diagnosis include a device designed to detect cancer on the breath; blood tests can track fragments of DNA shed from tumours. Genome sequencing makes it ever easier to identify new drug targets.

The established trio of 20th-century cancer treatments—surgery, radiation and chemotherapy—are all still improving. Radiotherapists can create webs of gamma rays, whose intersections deliver doses high enough to kill tumours but which do less damage to healthy tissue as they enter and leave the body. Some new drugs throttle the growth of blood vessels bringing nutrients to tumours; others attack cancer cells' own DNA-repair kits. Cancer may be relentless; so too is science.

The greatest excitement is reserved for immunotherapy, a new approach that has emerged in the past few years. The human immune system is equipped with a set of brakes that cancer cells are able to activate; the first immunotherapy treatment in effect disables the brakes, enabling white blood cells to attack the tumours. It is early days, but in a small subset of patients this mechanism has produced long-term remissions

that are tantamount to cures. Well over 1,000 clinical trials of such treatments are under way, targeting a wide range of different cancers. It is even now possible to reprogram immune cells to fight cancer better by editing their genomes; the first such gene therapy was approved for use in America last month.

Yet cancer sufferers need not wait for the therapies of tomorrow to have a better chance of survival today. Across rich and poor countries, the survivability of cancer varies enormously. Men die at far higher rates than women in some countries; in other countries, at similar levels of development, they do comparably well. The five-year survival rate for a set of three common cancers in America and Canada is above 70%; Germany achieves 64%, whereas Britain manages a mere 52%. Disparities exist within countries, too. America does well in its treatment of cancer overall, but suffers extraordinary inequalities in outcomes. The death rate of black American men from all cancers is 24% higher than it is for white males; breast-cancer death rates among blacks are 42% higher than for whites. A diagnosis in rural America is deadlier than one in its cities.

Practical as well as pioneering

Variations between countries are partly a reflection of health-care spending: more than half of patients requiring radiotherapy in low- and middle-income countries do not have access to treatment. But big budgets do not guarantee good outcomes. Iceland and Portugal do not outspend England and Denmark on health care as a proportion of GDP, but past studies show wide variation in survivability in all cancers.

Instead, the problem is often how money is spent, not how much of it there is. To take one example, a vaccine exists against the human papillomavirus (HPV), which causes cancers of the cervix in women, as well as cancers of the head and neck. Rwanda started a programme of routine vaccination in 2011, and aims to eradicate cervical cancer by 2020. Other countries are far less systematic. Vaccinations could help prevent cervical cancer in 120,000 Indian women each year.

Policymakers are not powerless. More can be done to verify which treatments (and combinations thereof) work best. A £1.3bn (\$2bn) cancer-drug fund in England, which made expensive new medicines easier to obtain, did not assess the efficacy of the drugs it provided—a huge missed opportunity. Measuring the incidence and survival of cancer, through cancer registries, spotlights where patients are being failed. Access to health care matters, too: the number of Americans whose cancers were diagnosed at the earliest possible opportunity went up after Obamacare was enacted. And prevention remains the best cure of all. Efforts to rein in tobacco use averted 22m deaths (many of them to cancer) between 2008 and 2014. Yet only a tenth of the world's population lives in countries where taxes make up at least three-quarters of the price of cigarettes, as recommended by the World Health Organisation.

Taxes and budgeting are a lot less exciting than tumour-zapping proton beams and antibodies with superpowers. But the decisions of technocrats are as important as the work of technicians. Cancer kills millions of people not simply for want of scientific advance, but also because of bad policy. ■

Hurricane Irma

Caribbean confetti

By working together, Caribbean countries can do a lot more to prepare for and respond to disasters



BEFORE tearing up parts of Florida, Hurricane Irma ravaged whole Caribbean islands. In doing so, it exposed the strange territorial shreds that make up the region: it destroyed Barbuda, Antigua's poorer partner in their independent state; it wrecked most dwellings on St Martin, an island divided between France and the Netherlands; it flattened Tortola, the largest of the British Virgin Islands, and St John in the American-owned half of the same archipelago. The storm did not kill huge numbers of people—around 40 before it hit the American mainland and probably fewer than 80 all told—but the economic toll in small island territories is immense. In the United States the property damage wrought by Irma and Harvey, an earlier storm that struck Houston, is equivalent to about 1.5% of GDP. Irma's cost to some small Caribbean islands, which promote themselves as tourist paradises, exceeds their GDP (see page 37).

As the strongest hurricane ever to hit some of those islands, Irma is a harbinger. Warmer seas will strengthen hurricanes, and higher sea levels will make storm surges more destructive. These will smash the beach resorts from which the Caribbean largely makes its living (some are tax havens, too). A one-metre rise in sea levels, which might happen in this century, could displace more than 100,000 people in the region.

The islands have learned some lessons since Hurricane Ivan smashed into Grenada in 2004. They are better at providing shelter, which helped to limit the death toll. A regional disaster-insurance scheme, called CCRIF, pays out quickly (see page 38), softening the economic blow. CDEMA, a regional body, co-ordinates planning and relief for its 18 members, including British overseas territories.

But governments have failed to do many of the hard things needed to make their islands more resilient. Building codes written with the storms of yesteryear in mind are spottily enforced. Much of the region's population occupies housing too flimsy to withstand severe storms. Developers rip out protective mangrove swamps to plonk hotels by the water's edge. Fixing such problems is expensive, and politicians have trouble seeing beyond the next election.

Weak bureaucracies and political fragmentation make it harder. Regional governments give little support to the joint initiatives they have created. Even as Irma loomed, CDEMA's members had yet to approve the budget of its disaster co-ordination unit. The Caribbean Community Climate Change Centre, which helps its members adjust to climate change, gets almost no money from them.

Category-five imperatives

To weather the coming storms, as well as earthquakes and droughts, the region will have to do much more. Billions of dollars will have to be spent on upgrading buildings, roads and other infrastructure. When storms like Irma force islands to rebuild, hotels and roads should be moved farther back from the shore and built to standards set across the region. CCRIF should be expanded and strengthened, for example by requiring countries to have contingency plans for spending the money they claim. CDEMA needs stronger backing from its members; it should be able to mobilise fleets of boats and planes at short notice when disaster strikes.

Better planning and more co-operation will not be enough. Caribbean islands will need help from their European and North American patrons and other donors to adapt to the disasters that will follow Irma. And global action on climate must become much more ambitious. Otherwise, large parts of paradise will eventually be washed away. ■

America and the Middle East

Shia crescent rising

America is right to worry about Iran's growing influence. But its strategy for countering it makes no sense



THE long-feared "Shia crescent", stretching from Iran to Lebanon, is now materialising. As the Sunni jihadists of Islamic State (is) are crushed by disparate military coalitions, their place is being filled by radicals of the Shia sort sponsored by Iran—Lebanon's Hizbullah group, local militias and mercenaries recruited from as far as Afghanistan and Pakistan.

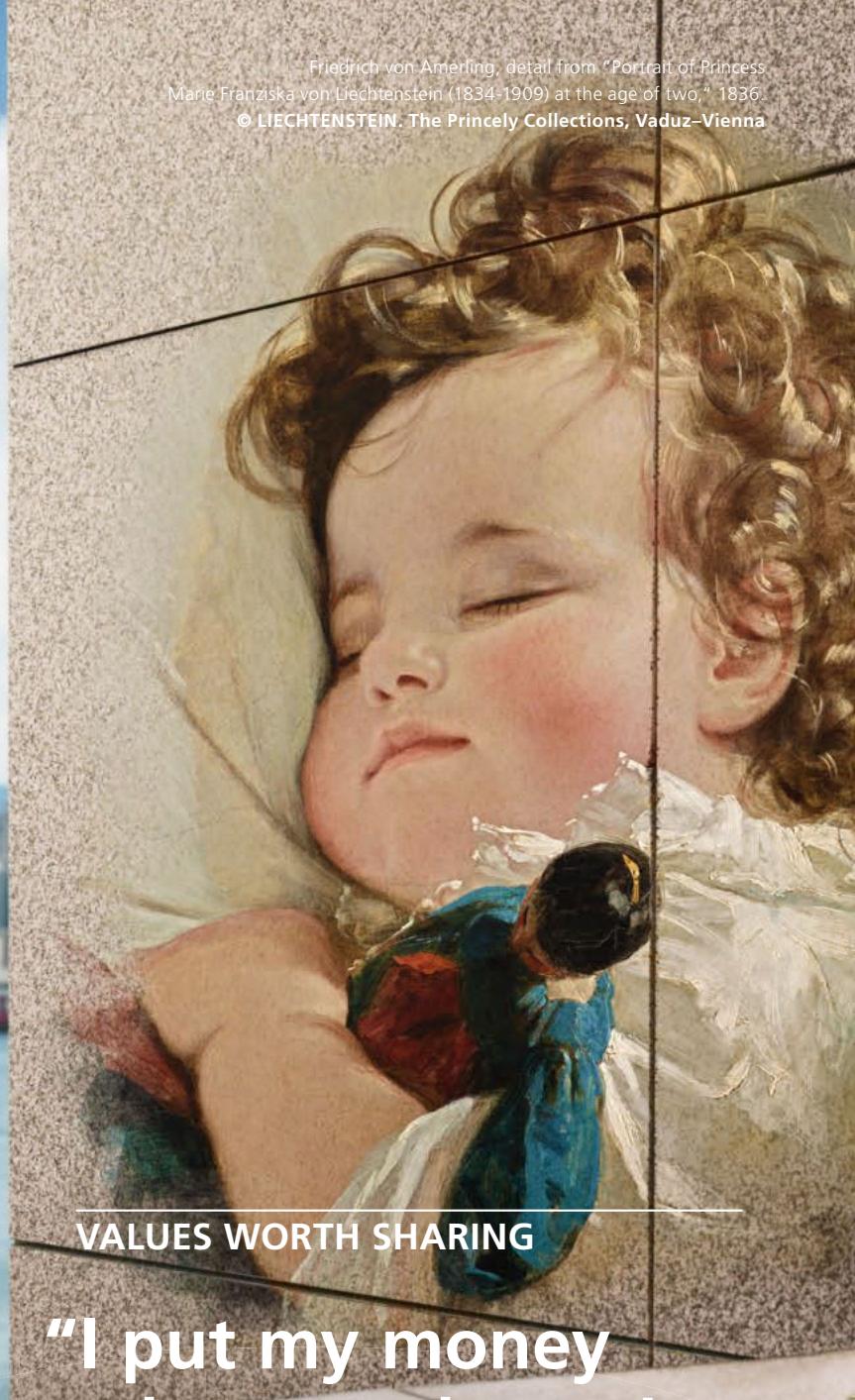
The prospect of Iranian hegemony is raising alarm across the region (see Briefing). Israel is holding large military exercises to prepare for a future war against Hizbullah. Saudi Ara-

bia, fearing the rise of a Hizbullah-like group in Yemen, has waged a poorly run campaign against the Shia Houthis. Gulf states are spending billions on new weapons. Now President Donald Trump may be about to make everything worse by, in effect, renegeing on Barack Obama's nuclear deal with Iran.

Trump's Muddle East

The Trump administration appears to have four goals in the Middle East: destroy is, roll back Iran's gains, dismantle Mr Obama's legacy and reduce America's involvement. So far, progress on the first objective—American soldiers have helped the Iraqi army and Syrian Kurds crush the is caliphate—has masked the inconsistency of these goals. But America cannot ►

Friedrich von Amerling, detail from "Portrait of Princess
Marie Franziska von Liechtenstein (1834-1909) at the age of two," 1836.
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▶ push Iran back and, at the same time, reduce its own involvement in the region. And tearing up the nuclear accord would remove an essential constraint on Iran.

The renewed focus on the nuclear accord is, in part, a function of the calendar. Under congressional rules, the president must certify every three months that Iran is complying with the deal (the Joint Comprehensive Plan of Action, or JCPOA); and that waiving nuclear-related sanctions is vital to American interests. Though he campaigned against the accord, Mr Trump has twice certified that Iran was abiding by its terms. The next certification is due in October. Mr Trump does not want to grant it, even though the UN's nuclear inspectors report that Iran is sticking to the bargain. Instead Nikki Haley, his ambassador to the UN, signalled that Mr Trump could "decertify" Iran's compliance, perhaps citing national-security interests, without formally withdrawing from the JCPOA—leaving Congress to decide what, if any, sanctions to reimpose.

That would be a dereliction of presidential responsibility. Devising and implementing a complex strategy to counter Iran is the job of the executive, not the legislature. Whether Congress rips up JCPOA or not, Mr Trump will be signalling that America cannot be trusted to keep a bargain. And without a clear breach by Iran, European states will not support sanctions. Iranian hardliners would be strengthened, and might resume the nuclear programme. If so, the question for America (or Israel) would once more be whether to bomb Iran's nuclear sites. Iran has many ways of retaliating.

Ms Haley considers the JCPOA to be so flawed that, without strong action against Iran, "we will be dealing with the next North Korea". The opposite is true: the JCPOA is preventing a second nuclear crisis. Unlike North Korea, Iran has no nukes, and under the JCPOA cannot get them for well over a decade, if ever. That makes it easier to contain Iran by other means—alliances, proxies, diplomacy and calibrated force. Sanctions are already part of America's strategy; any new ones should preserve JCPOA and target hardliners, including the businesses of Iran's Revolutionary Guards Corps.

A bigger priority is to bolster Sunni states. Shias are the minority in Islam; Iran's strength ultimately reflects the weakness of the Sunni world. America should work to restore unity in the Gulf Co-operation Council by helping to end the rash move by a Saudi-led group to isolate Qatar. And it should push for a reasonable deal to end the Saudis' unwinnable war in Yemen. America should stay on to foster a government that is more inclusive of Sunni Arabs, and less subject to Iran.

Most urgent is Syria. Mr Trump boasts that America has little business there "other than killing ISIS [is]". In fact, allowing Bashar al-Assad, Syria's president, to settle the war on his malign terms will entrench Iranian power. America should push harder for its allies to seize Syria's eastern border posts before Mr Assad and his allies get there—both to prevent Iran from creating a land corridor from Tehran to Beirut and to gain leverage in a future peace settlement. If it wants to curb Iran's influence, America must be more assertive on the ground. ■

The Federal Reserve

Dangerously vacant

Why Donald Trump should reappoint Janet Yellen to lead the Fed



ONE of the many fears about President Donald Trump was that he would pack the Federal Reserve with loyalists. That concern has been replaced by another: the central bank's top echelons are unpacked with anyone. On September 6th Stanley Fischer, a seasoned policymaker and crisis-fighter (see Free exchange), announced that for personal reasons he was retiring early as vice-chairman. That means a fourth vacancy has opened up on the Fed's board; as a consequence, four of the 12 seats on the Fed's interest-rate-setting committee are also up for grabs. That number could rise to five in February, when Janet Yellen's term as Fed chair is due to end.

Mr Trump has been slow to make senior appointments of any kind. But an underpowered Fed is a particular concern. Its policies help determine everything from the health of the American economy to the price of credit in emerging markets. The best way for the president to start dealing with the backlog is to reappoint Ms Yellen head of the Fed. That might clash with his instincts. Mr Trump values loyalty above competence. Ms Yellen, first appointed by Barack Obama, is a Democrat who has pushed back against proposals from the Treasury that would weaken financial regulation. But a second term for her would provide clarity about the Fed's future direction and independence, and make the other posts easier to fill.

The case for reappointing Ms Yellen is not cut and dried. In principle, it would be better for central-bank bosses not to serve more than one term; a supplicant for a second term is likelier to do the bidding of politicians. The president of the European Central Bank is limited to a single eight-year term in part for this reason. Alan Greenspan served as Fed chairman for long enough to inspire an unhealthy cult of personality.

Yet the arguments for an experienced hand to guide the economy also have more power than usual at the moment. The Fed faces some tricky technical tasks, from reversing quantitative easing (see page 63) to solving the puzzle of why low unemployment has not juiced up inflation. America's economy is on a good run. Only twice in its history has its GDP grown for more consecutive quarters. Mistakes in monetary policy are often made as the economic cycle matures, when judgments about the right interest rate are hardest. And when the next recession arrives, the Fed will not have much firepower: its policy rate is unlikely to be much above 2%, leaving little room to cut. A seasoned policymaker will be all the more valuable, since the Treasury is also notably short of them.

A second reason to reappoint Ms Yellen is that the Republican-backed candidates to replace her are not impressive. Gary Cohn, Mr Trump's senior economic adviser, has no experience as a central banker. (He may also have scuppered his chances by criticising his boss's response to the recent violence in Charlottesville.) Another aspirant, Kevin Warsh, served on the Fed's open-market committee from 2006 to 2011, and has been ►

▶ lobbying hard for the top job. But he displayed some questionable judgment during that stint, fretting that monetary policy was too loose at a time when the American economy still needed support. His co-authorship of a paper in praise of the economic-policy proposals of Mr Trump may endear him to the White House but raises questions about how independent he would be as Fed chairman. Another of the co-authors, John Taylor of Stanford University, might be too rigid in his judgments on interest rates when discretion is needed. Others in the frame lack the breadth of experience and knowledge that the job demands.

A third argument in her favour is precedent. Every Fed chairman since the late 1970s has been given a second term by a president from a different party. Paul Volcker, a Democrat, was reappointed by Ronald Reagan. Bill Clinton gave Mr Greenspan, a Republican, a second term. And Ben Bernanke

was renominated by Mr Obama. The Fed is supposed to stand above politics; ideally the appointment should have bipartisan support. If Mr Trump is not swayed by precedent, he might be convinced by a more practical concern: Ms Yellen's confirmation would be less fraught than that of other candidates.

Four more years

None of these arguments would carry much weight if Ms Yellen had not done a good job. But she has. She is decried both for having raised interest rates too soon and for being too cautious about the pace of increases. Yet instinctive hawks should note that inflation is still shy of the Fed's 2% target. And doves should acknowledge that jobs growth has been a healthy 185,000 per month since the Fed started to raise rates in December 2015. The Yellen Fed has found a decent balance. Mr Trump should decide now to give her another term. ■

Cyber-security

Learning the lessons of Equihack

The company handled its hack spectacularly badly. Other firms, take note



Equifax, like all credit-monitoring firms, trades on its ability to handle sensitive financial information. So there was grim irony in the news that the firm has been the victim of a particularly big and damaging data breach. The company reckons that more than 143m people, mostly Americans, have been affected. The pilfered data include addresses, credit-card details and Social Security numbers. The Social Security numbers are especially valuable: they are the closest thing America has to a centralised national-identity system, and are far harder to change than a password on a compromised account.

A series of self-inflicted wounds made things much worse (see page 65). A rickety website set up so that customers could check whether they had been affected seemed to require them to waive their right to sue (not so, insisted the firm, which later changed the site). Those who wanted to freeze credit checks were at first asked to pay. Senior managers sold shares after the breach had been discovered, but before it had been made public (the firm insists no insider trading has taken place). Lawyers and attorneys-general are right to want to investigate.

There but for the grace...

The breach was big but Equifax is no outlier. Last year Yahoo revealed that hackers had swiped details from more than 1bn accounts; AdultFriendFinder, a casual-sex site, had more than 400m accounts compromised. Disruptions from cyber-attacks hurt investors on a regular basis. A.P. Moller-Maersk, a big shipping company, had its computers frozen by malware earlier this year; it reckons the losses could reach \$300m. The same attack cost Reckitt Benckiser, a consumer-goods firm, £100m (\$133m) in lost sales. Firms that might once have been tempted to shrug off the dangers are increasingly at risk of regulatory action. New European laws envisage hefty fines for non-compliance with cyber-security standards; rules enacted by New York's financial regulator came into force in August.

The nature of the threat is changing, too. The computerisation of everyday objects, for instance, turns the whole world into a hacker's playground. One casino recently suffered a data breach after hackers gained access to an internet-connected fish tank, and jumped from there to more sensitive parts of the company's network. Hackers are also changing their business models. Instead of selling data on the black market, some are trying to hold companies to ransom, as Netflix, a video-streaming firm, discovered in April when thieves made off with an unaired episode of one of its hit programmes.

What to do? Two principles ought to guide the way that firms plan their cyber-security. The first is to take a layered approach to defence. That is how societies think about many other risks. Cars are dangerous machines, for example. Driving codes and road signs try to prevent accidents from happening. But that does not always work, so cars are engineered to protect their occupants in the event of a crash. If that is not enough, emergency services and hospitals try to fix the damage.

This sort of thinking is relatively new in the computer-security business, which has tended to focus mostly on prevention. As more attention is paid to mitigation and disaster recovery, firms should take a similar approach themselves. Walling off different chunks of sensitive data within a company, for instance, can reduce the impact of any hacks that do breach the outer defences. Planning in advance how to respond to a hack reduces the risk of Equifax-like botches.

The second principle is to think about data more intelligently, including how much is stored, and for how long. Firms mostly regard information as an asset. The attractions of technologies such as artificial intelligence encourage them to stockpile as much as possible. But the same digital infrastructure that makes piles of data useful makes them vulnerable to anyone who fancies trying to swipe them. That—and regulators' increasing impatience with leaks—makes data a source of business and legal risk. This newspaper has argued that, in powering the economy, data are today what oil was in the 20th century. The analogy is apt. Oil is valuable stuff. But it is also toxic and flammable—and spills can be disastrous. ■

A limited technology

The rubric to your article on facial technology ("Keeping a straight face", September 9th) stated that advances in artificial intelligence can be "used to spot signs of sexuality". What the research from Stanford University actually found is that AI could identify a pattern of physical traits from a small subset of photos that people uploaded to internet dating sites. To conflate the two is sensational.

A more accurate rubric would have read: "AI identified a pattern of human aesthetics among a small subset of white gay men and lesbian women on dating sites." The research openly ignored large portions of the LGBTQ community, as did the article. Also, the research team did not independently verify that the information in the dating profiles was accurate. They confused correlation with causation to "infer" sexual orientation. If such AI was workable, facial morphology could ostensibly identify those who like basketball or any self-reported particulars on dating profiles.

Academic freedom is a right, but hyperbolic research claims about being LGBTQ can put people in harm's way. This flawed research could be taken out of context and support efforts to identify or persecute people believed to be gay, which is criminalised in at least 72 countries and punishable by death in eight.

Many LGBTQ people in countries with legal equality are still not safe to come out. The world should unite to ensure their safety, not troll dating profiles for patterns that could unnecessarily out and expose them.

JIM HALLORAN
Chief digital officer
GLAAD
New York

Healthy alternatives

You presented a strong case for investing in primary health care in developing countries through training, technology and carefully aligned incentives ("The right treatment",

August 26th). Yet even well-established primary-care systems, such as England's, need to evolve radically to meet the changing nature of disease.

Chronic diseases such as dementia and diabetes have spectacularly dethroned infections and malnutrition to become the dominant causes of death and disability. In rich countries, smoking, drinking, eating badly and little exercise cause up to 50% of all disease.

Primary-care systems are geared towards identifying and treating the conditions that patients walk through the door with. We need to put more emphasis on training primary-care workers to be proactive in preventing disease and promoting health in their local communities, rather than waiting for illnesses to brew. This paradigm shift, from reactive cure to proactive prevention, is already under way in a handful of countries across Europe. Business as usual is unsustainable, and a poor model for developing countries to follow.

DR LUKE ALLEN
GP Academic Clinical Fellow
University of Oxford

Local flooding

The real solutions to our effective response to flooding may lie as much with people than with insurance systems and zoning ("How to cope with floods", September 2nd). Bangladesh lost nearly 30,000 people to monsoon flooding in 1974; in the recent rains that figure dropped to 145. The country's most effective response solutions are home-spun; some 55,000 community volunteers across the coastal belt. The Bangladesh Red Crescent Society has worked with local authorities to operate a low-tech, community-based early-warning system for cyclones, which works in tandem with investments to protect and raise roads that are crucial for evacuation, and uses simple construction techniques, like raising housing plinths to reduce exposure.

Early-warning systems operate quite literally by bicy-

cle and bullhorn, with trained and educated local volunteers giving warnings in local languages. The task is to build resilience. It is often low-cost; it is always local; and it is always common sense. We can save up to \$16 in disaster response for every dollar we spend in disaster preparedness.

ELHADJ AS SY
Secretary-general
International Federation of Red Cross and Red Crescent Societies
Geneva

A true revolutionary



Your review of William Taubman's biography of Mikhail Gorbachev was to the point ("The story of a good Soviet man", September 2nd). Unlike Lenin, Stalin, Trotsky and, yes, Vladimir Putin, Gorbachev is Russia's real hero of our time. Although it sounds unrealistic today, he is a moral giant for whom Russians will erect statues in the future. If there exists a genuine Russian soul, Gorbachev is its best incarnation.

MARCEL H. VAN HERPEN
Garches, France

Culture counts

The "Economics brief" on externalities (August 19th) rightly stressed the importance of legislation and regulation in affecting behaviour, alongside market incentives. But you could have emphasised the third big influence: ethical and cultural values. For example, the piece mentioned that the demand for plastic bags fell by more than 90% when a tax on them was introduced, and implies that this was the result of the price effect.

Yet the increased appreciation of the ecological damage

caused by using plastic bags was also a big factor. The price signal encouraged the latent ethical and cultural values to be expressed, rather than simply working through the price elasticity for plastic bags as commodities. Likewise, higher car-insurance premiums for those who are guilty of drink driving will have some direct price effect, but the huge shift in cultural attitudes to drink driving has probably had a greater effect.

These three influences on behaviour—market, regulatory and cultural—are all important. Policymakers should be aware of their mutually reinforcing potentials.

JONATHAN MICHIE
Professor of innovation and
knowledge exchange
University of Oxford

The long slog

We can only dream that resolving the ambiguous status of illegal immigrants brought to America as children "ought to be as hard politically as declaring a new public holiday" ("Let them stay", September 9th). The most recent federal public holiday to be approved by Congress is Martin Luther King day. It was signed into law in 1983 after a 15-year debate. Even then, it wasn't until 2000 that it was officially recognised in all 50 states.

MALCOLM BEGG
London

The American comparison

Germany's election may be one of the most boring ever ("Return of the yuppies", September 2nd). But as our candidates are so ordinary, at least I don't have to endure endless coverage of Angela Merkel's e-mails, or of Martin Schulz groping women.

NIELS BEENEN
Berlin ■

Letters are welcome and should be addressed to the Editor at The Economist, The Adelphi Building, 1-11 John Adam Street, London WC2N 6HT
E-mail: letters@economist.com
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Executive Focus



ECONOMIC ADVISER TO THE CHIEF EXECUTIVE OFFICER

WASHINGTON, DC

The International Finance Corporation (IFC), a member of the World Bank Group (WBG), is committed to promoting private sector development through its Investment and Advisory Services, mobilization and Asset Management Company (AMC), as a means to end extreme poverty by 2030 and to boost shared prosperity among the bottom 40 percent of the population in developing countries. The organization is now seeking to hire an Economic Adviser to the Chief Executive Officer.

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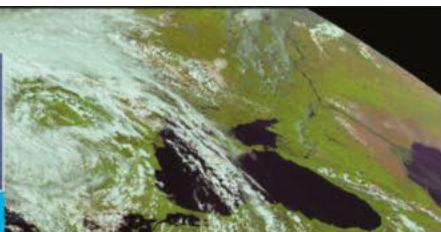
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Not quite a dead cert

Also in this section

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Donald Trump's distaste for Barack Obama's deal to restrain Iran's nuclear capabilities could make the world a more dangerous place

WHEN he was running for the presidency, Donald Trump described the agreement that constrained Iran's nuclear ambitions in return for the relief of sanctions as "the worst deal ever negotiated". He has yet to find a way out of it. But he gets a chance to do so every 90 days—and the next opportunity is coming up.

The Iran Nuclear Agreement Review Act (INARA) of 2015 obliges the administration to certify to Congress every three months that Iran is verifiably and fully implementing the Joint Comprehensive Plan of Action (JCPOA), as the Iran deal is formally known; that it has not broken agreed limits on its stockpiles of various nuclear materials; that it has not taken any action that could advance a nuclear-weapons programme; and that continued suspension of nuclear-related sanctions is vital to America's national security. If the president does not confirm all this the issue is thrown back to Congress, which after 60 days can vote to reimpose sanctions.

Mr Trump first certified that Iran was meeting its obligations in April. When he did so a second time, in July, he reportedly lambasted his national-security team, and in particular his secretary of state, Rex Tillerson (pictured, left), for failing to provide him with a case proving Iran's bad faith.

When the next review comes up in October Mr Trump will be furnished with such arguments, however specious. The administration will have difficulty withholding certification on the first three grounds. Though Nikki Haley, America's ambassador to the UN (pictured, right), has said that Iran is guilty of "multiple violations" of the JCPOA, her assertion does not bear scrutiny. The International Atomic Energy Agency, the UN's nuclear watchdog, which is responsible for monitoring Iran's compliance and inspecting its nuclear facilities, said earlier this month that everything was in order and that its inspectors were able to go where they wanted "without making distinctions between military and civilian locations".

The reference to the sites was in response to complaints by Ms Haley and others in the administration that Iran is not allowing routine access to some military bases. This is true: but the JCPOA does not require it to. Some sites may be visited only after an (admittedly cumbersome) procedure involving submitting evidence of banned activities to a joint commission of the JCPOA signatories (America, Britain, France, Germany, Russia, China and Iran). If the Iranians have no satisfactory explanation and continue to deny access to the

site in question, the UN Security Council would then be asked to vote on restoring international nuclear-related sanctions.

There is thus no evidence that Iran is doing anything which would merit decertification. But the fourth condition INARA imposes—taking a view of what is or is not in America's national-security interest—is essentially subjective. Mr Tillerson, James Mattis, the defence secretary and the national security adviser, H.R. McMaster, all believe that sticking with the JCPOA is in the national interest. But other figures may think otherwise. The CIA director, Mike Pompeo, when a congressman, was a fierce critic of the deal. In taking a hawkish line, Ms Haley may be positioning herself to replace the lacklustre Mr Tillerson.

In a speech to a conservative think-tank on September 5th, Ms Haley indicated that Congress should be allowed to debate the issue. "If the president finds that he cannot in good faith certify Iranian compliance, he would initiate a process whereby we move beyond the narrow technicalities and look at the big picture." That picture sees Iran, through its "destabilising" behaviour in the region (see next story), its support for terrorism and its ballistic-missile tests, as flouting the "spirit" of the JCPOA.

This is to misunderstand the JCPOA. It is ►

► true that Barack Obama expressed a hope that relations with Iran might improve over time as relief from sanctions allowed Iran to open up its economy. But the deal itself was never presented as anything other than a highly technical arms-control agreement. It was designed specifically to make it impossible for Iran to produce a nuclear weapon for at least 15 years and, thereafter, to make it prohibitively difficult for it to do so without being exposed.

The JCPOA's critics say they want a "better deal" in which the entire nuclear infrastructure is dismantled and Iran stops throwing its weight around in the region. But they have no plausible account of how such a thing might be brought about. If Mr Trump blows up the JCPOA, Iran, free of constraints, could crank up its enrichment programme and take a chance on developing nuclear weapons. Iran's leaders might reasonably calculate that the prospects of Mr Trump rebuilding the international coalition on sanctions painstakingly put together by Mr Obama would be slim.

America could wage a preventive war to stop Iran from becoming a nuclear-armed state. But most military experts agree that air strikes to destroy Iran's nuclear facilities would only slow its path to a bomb by a year or two, and would strengthen the regime in the long-term. Only a war to bring about regime change would suffice. The example of Iraq, a much weaker country, is not encouraging.

It is more likely that the JCPOA, which is strongly supported by the other signatories, will limp on, weakened but not killed by Mr Trump's decertification. The last time the Senate voted on the JCPOA in 2015 its critics had a 58-42 majority; a Democratic filibuster saved Mr Obama from exercising his veto. But Robert Einhorn, a former State Department adviser on arms control now at the Brookings Institution, questions whether there would now be a Senate majority for reimposing nuclear-related sanctions if the administration's arguments are as feeble as they seem to be.

Regardless, decertification on its own would do damage to America's already shaky relationship with its European allies. It would delight Iran's hardliners who need America as a bogeyman. Iran's non-nuclear adventurism would continue unchanged. And Iran would from then on be able credibly to blame America if it were at some point to call time on the JCPOA.

Decertifying could have an outcome typical of Mr Trump's presidency. Mr Trump would feel good about honouring a pledge; an achievement of Mr Obama's would be threatened; and America's reputation overseas would be further diminished. The JCPOA itself might survive. On the other hand, Mr Trump's assault on it could be the first step towards Iran becoming a problem like North Korea. He might reflect that one of those is quite enough. ■

Iran in Syria

Endgame angst

BEIRUT AND JERUSALEM

A powerful position for Iran in post-war Syria has Israel worried

IN THE early hours of September 7th air-launched missiles struck a set of buildings near the town of Masyaf in western Syria. None of the governments with armed forces operating in and over Syria took responsibility for the air strike. They did not need to. The target was being used for missile research by the Syrian regime and Hizbullah, the powerful Lebanese militia-cum-party backed by Iran. That was enough for all concerned to be sure that the attack came from Israel.

The Jewish state has long been carrying out air strikes against Hizbullah targets in Syria. But most of them have been around Damascus and near the Syria-Lebanon border. This time the target was nearly 300km (200 miles) from Israel's border and close to Russian anti-aircraft missile batteries. The strike was not just designed to set back Syria's and Hizbullah's missile programme. It was a message to all concerned: if Russia does not restrain Iran and Hizbullah, Israel will act.

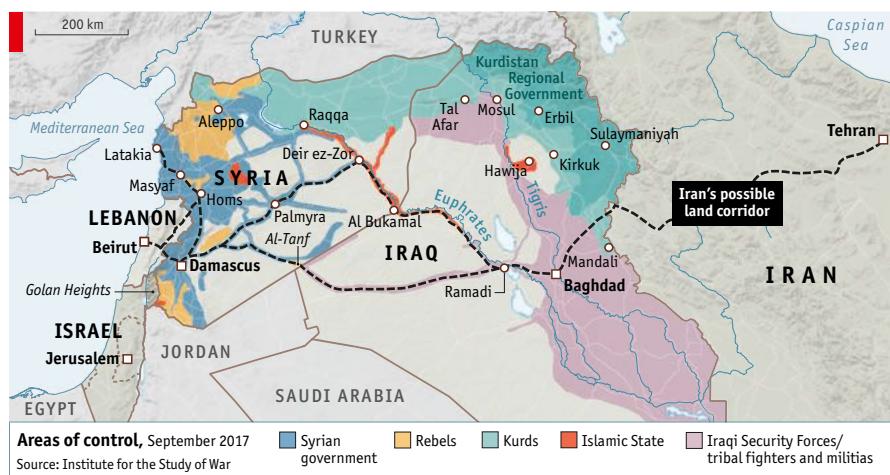
Iran's clout in the Middle East has grown fast, exploiting the breakdown of Arab states and ties to Shia and kindred Alawite communities (see map, next page). Arab rulers fear the creation of a "Shia crescent". In Syria, Iran mustered the Shia fighters who helped save the regime of Bashar al-Assad, enabling him to start reconquering lost lands. On September 5th Syrian soldiers and Iranian-backed militiamen relieved the garrison in the eastern city of Deir ez-Zor, which had been besieged by the so-called Islamic State (IS) since 2014. The advance brings Iran close to securing an overland route that would run from Tehran, via Baghdad, to the Mediterra-

nean. This would make it much easier for it to supply Hizbullah with arms and fighters from Iraq, Afghanistan and Pakistan. Such a land bridge is anathema to Israel.

President Donald Trump has said America has no interests in Syria beyond "killing ISIS" (another acronym for IS). But on September 9th America belatedly sent a combined force of Kurdish and Arab fighters to take up positions north of Deir ez-Zor. American officials say they want these allies, known as the Syrian Democratic Forces (SDF), to push south along the Euphrates valley to capture towns near the Iraqi border, such as Al-Bukamal, before the regime and its allies get there.

As part of the co-ordination to make sure that the major powers do not run straight into each other, America called on Russia to hold back Syrian government forces from crossing the Euphrates. But a big build-up of boats and men on the river's bank suggest they may cross anyway. What is more, battle-hardened and well supplied Shia militias in Iraq are headed for the border crossings, too. They have the Iraqi government's backing to control the highway west to Jordan and Syria instead of an American contractor.

America is also pushing Russia to remove Iranian and Hizbullah forces from the Golan Heights as part of an extension to the ceasefire between the Syrian government and rebel forces in the south that the big powers put together in July. In return America is promising to end the war in the south, give the regime control of a lucrative border crossing with Jordan and to close Al-Tanf, a special-forces base that sits on the Baghdad-Damascus highway. ►



► These moves, and the concerns about Iran which drive them, are set in the context of a war that is winding down. Opposition to the regime of Bashar al-Assad from regional foes is melting. Jordan, which used to run money and weapons to rebel forces in the south, has begun to normalise relations with the regime. Turkey, one of the largest backers of rebel forces, aims its proxies at Kurds in northern Syria instead of Mr Assad. Saudi Arabia, distracted by the war in Yemen, no longer believes he can be removed. When the man leading the UN's peace talks, Staffan de Mistura, says it is time for the opposition to accept that they cannot win the war he reflects a growing consensus.

Western diplomats still speak of Mr Assad's eventual departure, but this seems fanciful. The dictator who has butchered hundreds of thousands of his compatriots and immiserated almost all the rest—85% of the population now lives in poverty and 5m refugees with the know-how to rebuild the country have fled—will remain at the helm of a deeply dysfunctional state, and in control of a large fraction of its former territory, for the foreseeable future. The fear which America and Israel share is that the influence on Mr Assad which Iran has bought with its support in the war will be further entrenched as it props up his sickly state and helps it rebuild.

Israeli intelligence officials claim that Iran will soon be getting air and naval bases, as well as mining rights, in Syria. Iranian firms have won fat contracts in the oil, gas and agricultural sectors, and on September 12th a contract to import Iranian power plants for the ruined city of Aleppo was announced. An Iranian firm recently made a deal to operate Syria's third mobile-phone network, making it easier for the country's spies to gather intelligence after the fighting stops.

Attempting to forestall Iran's influence brings up the tricky issue of dealing with the Syrian regime's other major ally, Russia. President Vladimir Putin may not be



The future of Kurdistan

Rare agreement

KIRKUK AND SULAYMANIYAH

Almost everybody is against a Kurdish referendum

AMERICA and Iran are not always at loggerheads. As the two dominant powers in Iraq since America's invasion in 2003 they have repeatedly aligned their policies to keep the country together. They agreed, for example, that Haider al-Abadi should emerge as prime minister from the jumble of coalitions produced by the election of 2014. They have shared the goal of crushing the so-called Islamic State (is), indirectly co-ordinating ground and air campaigns against it. And they both want Iraq to be preserved as a unitary state. That is why, on September 12th, General Qassem Suleimani, the head of the Quds Force, Iran's foreign legion, Douglas Silliman, the American ambassador to Iraq, and Brett McGurk, Donald Trump's envoy to the coalition against is, were all in Sulaymaniyah urging Kurdish leaders to defer the referendum on independence they have scheduled for September 25th.

These shared goals do not mean shared motives. America wants to bolster Mr Abadi's standing in the run-up to Iraq's election next spring. Iran wants to make sure that thoughts of secession do not spread to the Kurds and other minorities who live within its own territory. It also wants to prevent an Israeli presence on its borders. Israel is the only country in the region to back a Kurdish state.

If the Kurds do vote for independence, the Iranians and Americans may be pushed closer to conflict. Disapprove though it may of the referendum, it is hard to see America abandoning the Kurdish autonomous enclave it fostered in 1991 and has backed ever since. By contrast, Iranian officials sound increasingly anti-Kurdish. Some fear they will dam rivers, hold up pipelines and close border crossings. They could also withdraw their support for Kurdish rule of Iraqi territories beyond their official enclave. On September 10th Shia militiamen pulled down a Kurdish flag at Mandali in Diyala province.

The battle for Hawija, is's last enclave in central Iraq, could precipitate a showdown. The route to Hawija goes through Kirkuk, an oil-rich, multi-ethnic province that lies beyond the Kurdish enclave but is contentiously controlled by the Kurds. Iraqi soldiers and militiamen, flying Iraqi flags and green Shia standards, could march into town just as Kurds are preparing to vote. "It could be a way to abort the referendum," says Twana Othman, a Kurdish analyst in Sulaymaniyah. The Kurdish president, Masoud Barzani, insists Kurds will fight to keep control of Kirkuk and is reinforcing it. Having seen off Sunni jihadists, the Kurds may soon be contending with Shia fighters.

eager to see Iran's regional power wax too far. Israeli officials believe it may still be possible to drive a wedge between the two countries. On August 23rd Binyamin Netanyahu, the Israeli prime minister, met Mr Putin at his Black Sea retreat in Sochi to warn that, if necessary, Israel would use military force to prevent Iran's designs. He probably also repeated previous assurances that Israel will do nothing to stop Mr Assad regaining control in Syria, as long as that does not include an enhanced post-war role for Iran.

Whether Russia is able or willing to do anything about Iran and Hizbullah is another matter. The fact that the recent Israeli strike took place in an area under Russian control suggests that Mr Putin is content to allow Israel its head, at least up to a point. "Russia understands that military entrenchment of Iran, Hizbullah and Shia militias in Syria holds an explosive potential," says Chagai Tzuriel, director-general of Israel's Ministry of Intelligence. That said, Russia needs the ground forces that Iran provides to keep Mr Assad in power, and preserve its interests in the region.

The immediate threat to Israel's security remains Hizbullah. The last war between the two sides, in 2006, ended in a draw of sorts. This month, in its largest military exercise for nearly two decades, Israel deployed an entire army corps to simulate a response to an incursion by Hizbullah. Israeli officers say that the exercise had been scheduled for over a year and had no connection to the recent tension. Israeli intelligence believes that another war in the near future is unlikely. The Syrian civil war has seen Hizbullah evolve from a militia into something resembling a professional army, capable of fighting brigade-scale battles. But it has also lost nearly 2,000 of its fighters and is suffering from severely depleted resources. It does not need or want a second front.

Israel wants to be sure that Hizbullah will not be further strengthened by Iran. But it does not want to go to war with it; Mr Netanyahu is a cautious man, and dislikes the unpredictability of war. But if Iran really seeks to hold sway from Mesopotamia to the Mediterranean the status quo may not hold for long. ■



India's economy

Just the job

LUCKNOW

Ever more Indians are struggling to find work

A DOZEN hefty wooden crates sit outside a small factory on the outskirts of Lucknow, the capital of India's most populous state, Uttar Pradesh. On the shop floor inside, where chattering machines bag and package herbal teas, a manager explains what will happen when he opens the crates. "His job will go," he says, nodding at one boiler-suited operator. "And his over there, and that one's too."

Improved technology has already boosted the firm's output fivefold since its launch in 2002, with no increase in staff. The new machines in the crates, which require a single operator rather than three, will double it again. But the manager insists that, as in the past, he will somehow find jobs for everyone—as drivers or even watchmen if necessary.

Few Indian workers have such conscientious employers. They do, however, increasingly face similar risks of redundancy, or of failing to find a decent job in the first place. A big part of the challenge stems from automation. According to McKinsey, a consulting firm, machines could eliminate some 52% of India's jobs if current technology were adopted across the board. This affects not only manufacturing. For the first time in nearly a decade, India's high-flying IT industry this year laid off thousands of workers. A survey of private-sector workers by the Economic Times, an

Indian daily, found 62% agreeing that their job prospects were shrinking.

India's labour force will soon overtake China as the world's largest, but the country is struggling to generate opportunities for a workforce with the wrong skills. Slowing economic growth, a decline in investment rates, the shock of economic reforms, a long-term decline in agricultural employment and a faulty education system have combined to reduce the proportion of Indians who hold proper jobs.

India is also in the midst of a demographic transition, as birth rates fall. The share of the population that is of working age is peaking relative to the share of chil-

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dren and old people. That should, as long as jobs are available, lift the rate of economic growth. Yet the proportion of working-age people actually in work has been falling steadily (see chart). India, home to a sixth of humanity, is in danger of forfeiting its "demographic dividend".

The numbers are daunting. Just to keep unemployment in check, India needs to create some 10m-12m jobs a year. When economic growth is strong, it has just been able to do that: the government's Labour Bureau estimates that from 2013 to 2015 the economy added 11m jobs a year. A slowdown in the prior two-year period, however, had kept job growth at half that level, leaving a shortfall of 10m jobs. The tipping point seems to be economic growth of about 7%. Ominously, growth has steadily slowed since 2016; in the quarter ending in June it fell to 5.7%, although transitory factors may have played a part in that.

The data on jobs are also unreliable. Officially, India's jobless rate has hovered at an enviable 4% for many years. But the government is generous in its definition of work. By its own admission, some 35% of workers in 2015—the most recent year for which in-depth surveys are available—had held a job for less than 11 months in the previous year. According to the World Bank, over 30% of Indians between the ages of 15 and 29 are NEETS, "not in education, employment or training".

This may be an exaggeration. In a country where some 86% of workers are reckoned to be in "informal" employment—ie untaxed and without a contract—counting can be difficult. But the pressure for jobs is real. Last year thousands of Jats, a community in northern India that traditionally owned small farms but has become increasingly urbanised, rioted to press de-



►mands for an expanded quota of government jobs. The unrest left 25 dead and briefly severed the main water supply to Delhi, India's capital. Other castes and ethnic groups have taken similar action in recent years, in the same hope of strong-arming their way into jobs.

Successive Indian governments have tried to tackle the dearth of employment. One massive state program, the world's largest, doles out millions of temporary make-work jobs in rural areas. The current government has also tried to boost skills. Last year its National Skill Development Corporation trained some 557,000 workers. By its own count, however, only 12% of these trainees found jobs. The central government has also promised to clarify India's dauntingly complex labour rules: it says it will streamline compliance, and shrink some 44 different labour statutes into four simpler bundles.

The rules are indeed onerous. In many states, firms with more than 100 employees must seek government approval to fire a single worker. As a result, many resort to contractors to fill their payrolls with temporary hires, a solution that evades red tape but produces neither dedicated staff nor a happy workplace. Other companies simply choose to stay small: some 98.6% of non-farm businesses have fewer than 10 workers. This carries a long-term cost in productivity. Indian garment-makers, for example, tend to be tiny. Small wonder that competitors in such countries as Vietnam and Bangladesh, where giant factories are plugged into global supply chains, now far outpace India in exports.

India's biggest industrial firms have found yet another solution. Surprisingly for a relatively poor country, their factories tend to be more capital-intensive than those of their counterparts in China. For example, at a sprawling site outside the southern city of Chennai run by Hyundai, a South Korean firm, some 8,500 workers toil alongside 530 robots. The fully digitised facility turned out 661,000 cars last year, one every 72 seconds. It ranks second in productivity and quality among the firm's 34 factories around the world; its engine plant is number one. "What we have here is an integrated cascade between suppliers and the assembly line," says Ganesh Mani, the vice-president for production, "The entire ecosystem has to be in sync."

Not all Indian workplaces can hope for such efficiency. But if the government does not do more to boost growth and to tip the balance between hiring people and installing robots, the jobs crunch will grow ever more severe. The problem requires not tinkering at the edges, but a concerted effort to put India's economic ecosystem—from underfunded and poorly run schools, to a hopelessly clogged legal system, to ensnaring webs of red tape, to overburdened infrastructure—in sync. ■

Myanmar's Rakhine state

A hiding to nothing

SITTWE

Aung San Suu Kyi's idea for quelling violence against Rohingyas is not viable

IN AN office on the outskirts of Sittwe, the capital of Rakhine state, an official in charge of fisheries points to a pile of documents. Here, he explains, is a five-year plan to modernise fish-farming in Rakhine—or rather, what is left of it. After a bout of violence last year, foreign donors withdrew, the budget was revised and the plan was whittled down to a year; \$9m in investment, equivalent to a tenth of the state budget, went up in smoke. The official is not sure the plan will proceed at all. He admits he never really believed it would anyway. Such is the mood in Rakhine, a state racked by years of conflict between ethnic Rakhine Buddhists and Rohingya Muslims that has descended into a state-led assault on the Rohingyas.

When Aung San Suu Kyi took control of Myanmar's government last year after 50 years of military rule, Rakhine state was already seething. Riots in 2012, in which the authorities sided with Rakhines, had left many people displaced and tensions high. Ms Suu Kyi opted to duck the explosive question of whether Rohingyas, most of whom had been stripped of their citizenship in the 1980s, should have it restored. Instead, she spoke of bringing development to Rakhine in the hope that prosperity would help to defuse sectarian hostility.

Unfortunately, the development never arrived. More than three-quarters of Rakhine's population live in poverty. Most of the people in the northern part of the state are farmers or fishermen—or were until Au-

gust 25th, when the Burmese army went on the rampage after a militant group called the Arakan Rohingya Salvation Army attacked 30 police posts and a military base. Almost 400,000 Rohingyas have since fled to neighbouring Bangladesh, where most Burmese think they belong despite their long history in Myanmar. Even before the latest exodus, some 120,000 people were internally displaced, confined to camps and dependent on aid. Most of the better-off and educated had left the region. The most flourishing local business was the smuggling of methamphetamines into Bangladesh.

Rakhine's minister of finance says that the state should be rich. The soil is fertile, but a lack of modern equipment keeps yields low. By the same token, fish are plentiful, but there are no facilities to process or export the local catch. Pristine beaches and ancient pagodas might attract tourists, were it not for the rudimentary infrastructure and threat of violence. Rakhine is also rich in gas, he adds, but locals do not reap the benefits. An ethnic Rakhine MP from the state says the country's elite is "selling us off". He believes that Rakhine should get more of the income from offshore gas that is piped across the state to China.

Yet when asked about their priorities, Rakhine politicians almost unanimously call for the ejection of the Rohingyas. Businessmen are more moderate, but despondent. "Business is very difficult right now," sighs the chairman of the chamber of commerce. With so many people having fled, manpower is scarce. To make things worse, Rakhine employers come under pressure from Buddhist nationalists not to hire Muslims. In a teashop in Sittwe, a group of local traders laments that they are, once again, cut off from customers in the north. A planned economic zone near the town of Maungdaw is now a battleground.

A government-commissioned study ►



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led by Kofi Annan, a former secretary-general of the UN, confirmed the state's economic potential. But it also suggested that development would hinge on reversing various forms of discrimination against the Rohingyas. Most specifically, it called on the government to revise the citizenship law that has left Rohingyas stateless.

Even Ms Suu Kyi's hand-picked commission, in other words, does not see economic development as a viable alternative to a political settlement in Rakhine state. As Mr Annan himself put it, "Unless concerted action...is taken soon, we risk the return of another cycle of violence and radicalisation, which will further deepen the chronic poverty that afflicts Rakhine state." That is exactly what is happening. A senior UN official this week described the military operation as "a textbook example of ethnic cleansing". ■

Singaporean politics

No contest

SINGAPORE

The government decides that only one Singaporean is fit to be president

IT IS very important, Lee Hsien Loong, Singapore's prime minister, explained last year, that all Singaporeans feel they have a real chance of becoming president. To that end, his government tinkered with the eligibility criteria for candidates. Yet Singaporeans primed for a festival of inclusiveness at this year's election must be confused. On September 11th a committee of senior officials declared that only one candidate was eligible to stand, and that the woman in question, Halimah Yacob, a former speaker of parliament, was thus deemed to have been elected unopposed. She was sworn in on September 14th.

Singapore's democracy can sometimes seem a little regimented: the ruling People's Action Party (PAP) has been in power since before independence in 1965. So when the government decided to amend the constitution in 1991 to allow direct elections for president, ostensibly to deepen popular engagement with politics, observers were suspicious—and rightly so. The criteria for eligibility were set so narrowly that only two of the subsequent five elections have involved more than one candidate. Even so in 2011, the PAP's preferred candidate came within a whisker of losing.

The government says this close shave had no influence on its decision to narrow the eligibility criteria yet more before this year's election. The intention, Mr Lee explained, was to make sure that none of Singapore's three main ethnic groups—Chinese, Malays and Indians—was excluded

from the job for too long. In November the government duly changed the constitution to reserve presidential elections for members of a particular ethnic group if no one from that group has held the job for five terms. On this basis, the presidential election this year was limited to Malays, who make up 13% of the population but have not held the presidency since 1970. Coincidentally, the new rules stopped the candidate who fell just 7,383 votes short last time, Tan Cheng Bock, from running again, as he is one of the 74% of Singaporeans who are Chinese (9% of the population is Indian).

Cynics point out that the government's concern with diversity goes only so far. All holders of the much more powerful post of prime minister have been Chinese—two out of three of them from the Lee family. Singapore normally prides itself on being a meritocracy, in contrast to neighbouring Malaysia, where Malays and other indigenous groups are accorded special privileges. And while candidates for president this year had to be Malay, not just any Malay could apply. They also needed to have served in an extremely senior government job or to have run a profitable company with S\$500m (\$371m) in shareholder equity. The figure used to be S\$100m, but a decision to raise the bar was announced last year. Undaunted, two other Malays beside Ms Halimah applied to run, but were judged not to have met the criteria.

Popular and able, Ms Halimah seemed likely to win even with competition. Disqualifying her challengers robs her of the modicum of legitimacy the election could have given her. Voters excited to mark ballots for Singapore's first female president are particularly disappointed. Then again, the repeated rule-tightening suggests a lack of faith that voters, given a choice of candidates, would pick the right one. ■



Only Halimah was worthy



Elections in New Zealand

Jacindamania

AUCKLAND

The new leader of the Labour Party shakes up an otherwise staid campaign

WHEN Jacinda Ardern was elected deputy leader of the Labour Party in March, she was unknown to most New Zealanders. The soft-left party was favoured by less than a quarter of voters when her uninspiring boss, Andrew Little, resigned last month, thrusting her into what she described as "the worst job in politics". The change was akin to "anointing a prophet", notes Raymond Miller, a professor at the University of Auckland. Labour has staged an unprecedented resurgence, climbing by as much as 20 points in some polls. That has cast doubt on the outcome of an election on September 23rd which had previously seemed certain to provide the right-of-centre National Party with another term in government.

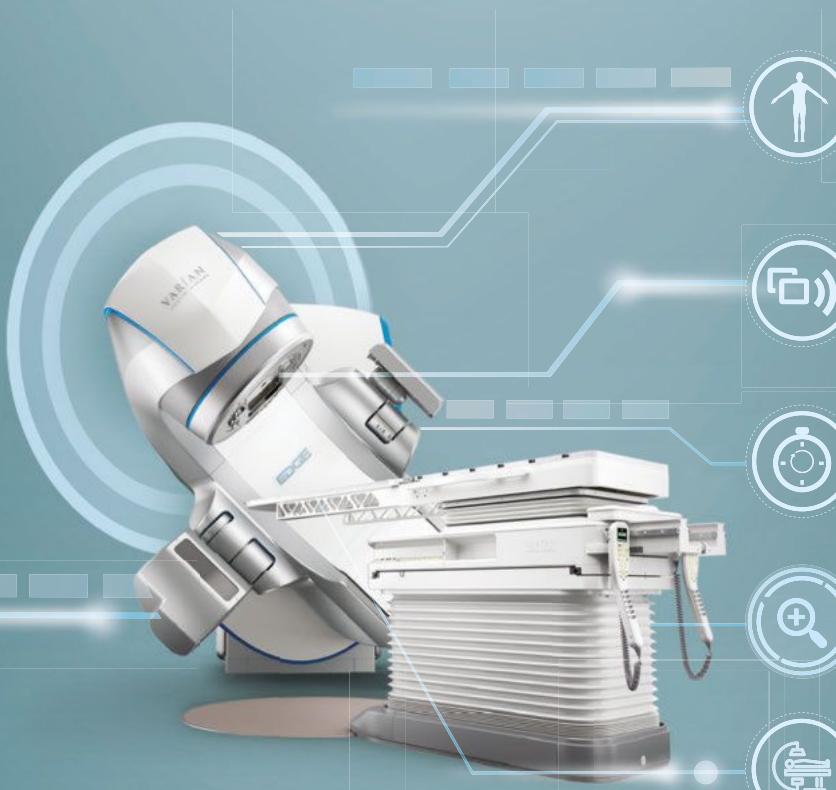
The local press calls it "Jacindamania". At the tender age of 37, Ms Ardern has harnessed what she calls a "mood for change". Not all locals have benefited from the strength of New Zealand's economy. Wages are stagnant and the price of housing has soared, feeding a debate about New Zealand's high levels of immigration. A record 71,000 more people arrived in New Zealand last year than left, partly because Kiwis who had left the country have been lured home by a stronger economy. Inadequate investment in housing has exacerbated the problem: New Zealand needs 60,000 new homes. The government spends NZ\$140,000 (\$100,000) a day accommodating the homeless. ►

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► Unusually for a left-leaning leader, Ms Ardern has put immigration at the heart of her campaign, proposing to cut net arrivals by up to 30,000 annually. Labour also plans to ban non-resident foreigners from buying homes, arguing that it is wrong that American tech billionaires and Chinese investors can snap up houses and leave them empty amid such a shortage. (The Nationals, in contrast, say curbing immigration would hurt the economy.)

But Ms Ardern rejects the idea that she is trying to stir up or harness hostility towards immigrants. If the government had responded faster to the housing crisis, she says, "we would not be having this conversation." Labour also wants to double New Zealand's intake of refugees. Her real target, she says, is the high cost of living: "I want everyone who chooses to call New Zealand home to have a decent start." To that end, she also promised to abolish tuition fees for university students.

Yet personality, as much as policy, has underscored Labour's resurgence. Her sudden ascendancy has left Ms Ardern with "no time to be anyone other than me", and many voters are enthralled. Critics point to her youth and relative inexperience: she has been a member of parliament for nine years, but only in opposition. Yet others see energy and a breath of fresh air. Those who have worked with her say she is dedicated and considerate. Her campaign has been characterised by a rare brand of what she calls "relentless positivity". Posters of her beaming face are emblazoned with the slogan: "Let's do this!"

In charm and charisma, Mr English, who took over the top job when his predecessor resigned last year, is eclipsed. During a previous stint as leader of the Nationals in 2002, he presided over a crippling defeat. Yet he has a reputation for credibility. During his eight years as finance minister unemployment fell, the budget returned to a surplus and New Zealand enjoyed one of the highest growth rates in the rich world. Ms Ardern, by contrast, has never championed a weighty bill or served as a minister. Some of her crowd-pleasing goals, like eradicating child poverty, seem unlikely to be met. In other areas she is accused of being uncomfortably vague. "You can't replace a tunnel with a vision," the prime minister scolded her during a debate about infrastructure.

In the face of this unexpected opposition, Mr English has made late promises to increase spending on roads and housing. He is favoured by farmers who have thrived on Chinese demand for New Zealand's milk. Kiwis may ultimately plump for his tried-and-tested approach. That would make the election memorable for stability, rather than a shake-up: another victory would give the Nationals the longest stint in government for any party in almost 50 years. ■

Entertaining at home in Japan

Keeping up appearances

TOKYO

Western-style dinner parties get a Japanese makeover

THE Japanese love to dine out, and have hospitality down to an art form, known as *omotenashi*. Yet rarely do they invite people to their homes. In a formal country, where people address one another by their surnames and respect for others guides behaviour, it is all too stressful. What is more, many Tokyoites are embarrassed to welcome people into living quarters that average 35 jo, the Japanese measure of floor area based on *tatami* mats, equivalent to around 60 square metres.

All the same, Japanese are now embracing the idea of *hoomu paatei* (home party in local parlance). The Japanese edition of *Elle*, a lifestyle magazine, has dedicated an issue to how to host with style. New recipe websites pop up daily. The Japan Home Party Association issues certificates to those who pass its course.

Nobuko Oba started "Atelier Let's Have a Party!" (the name is written in the Roman alphabet), a school that runs workshops on entertaining at home, after moving back to Tokyo from the American state of Ohio. There, she was shocked when, dressed to the nines for dinner at the house of one of her husband's American colleagues, the meal turned out to be "self-service from a big chunk of ham from the local supermarket". On returning the invitation, her American guests thought it equally strange that she spent the evening cooking and serving rather than at the table with them. "I realised that conversation is the priority, and I wanted to bring this casual style to Japan," she says.

The sudden enthusiasm for home entertaining is illustrative of what makes for a fad in the country, which seems to

adopt new fashions, and words for them, every day. But Japanese seldom adopt foreign practices without giving them a local twist. Countless consumer products, from teriyaki burgers at McDonald's to green-tea-flavoured KitKats, seem to embody the local saying, "Japanese spirit, Western things".

In traditional Japanese meals, every detail is thought about. The crockery is specially chosen to complement the dish. Each person's portion of rice is placed to their left to spare them from having to reach over it during the meal. In Ms Oba's class, that formality translates into colour-co-ordinated table linen and crockery. She suggests measuring with fingers to make sure forks and knives (not chopsticks) are set the appropriate distance back from the edge of the table. Chairs should be placed a fist-width away from the table, she explains.

The theme for Ms Oba's latest lesson is Oktoberfest, an annual German festival that revolves around beer. She gives advice on picking a suitable colour scheme, in this case browns and blues. Students make decorations following the principles of *ikebana*, the Japanese art of flower arranging, which dates back to the seventh century.

After cooking and serving a meal of pork, potatoes and iced tea (a substitute for beer), the students—ranging from 23 to 55 years old—take snaps of the perfectly set table to post on their "insta" (Instagram) accounts. Mitsue Osawa, a beauty-salon owner taking the class, says she is inspired by what she has seen in Western films and television dramas: "I love the British way of having afternoon tea with a three-tiered cake stand."



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Banyan | The people's strongman

Will democracy in the Philippines go the way of Thailand?



WHEN Filipinos attempt to explain the political success of their tough-guy president, Rodrigo Duterte, they tend to point to local precursors. Joseph Estrada, a former matinée idol who had often played Robin Hood types, rose to the presidency by promising to be hard on bad guys and good to the poor. And then there is Ferdinand Marcos, who cultivated an image as a war hero to win election before assuming dictatorial powers, and whose reputation Mr Duterte is doing his best to restore.

Both these comparisons make Mr Duterte's knack of casting himself as a friend of the people while giving short shrift to the niceties of democracy seem like a function of Philippine politics, in which populists occasionally attempt to stir up resentment against the hereditary caste of landowners who dominate government and the economy. After all, despite regular elections and much talk of reform, the 40 best-connected families still control about three-quarters of the Philippines' wealth. Poverty is equally entrenched, as a visit to Manila's slums or the southern, partly Muslim island of Mindanao makes clear.

But the Philippines is not the only country in South-East Asia with an entrenched establishment presiding over profound inequality. Most are blighted by single-party rule, or by a political churn which does not seem to have much impact on local power structures. Thailand, with a monarchy manipulated by the elites, is a case in point. The purpose of 12 military coups, two in the past 12 years, has been, as Michael Vatikiotis argues in "Blood and Silk", a perceptive new book on the region, to maintain "an imposing if arcane edifice of power and [cultivate] a conservative mindset that has prevented the devolution of power and autonomy to ordinary people."

Indeed, Mr Duterte may have more in common with Thaksin Shinawatra, a former prime minister of Thailand now living in self-imposed exile, than with any Filipino predecessor, for all that Mr Duterte is foul-mouthed and scruffy where Mr Thaksin is silver-tongued and bespoke. Mr Thaksin swept to power in 2001 by identifying himself with the underdog, particularly the rural poor in the country's north and north-east, his political base. To the alarm of the establishment, which ousted him in 2006 (it did the same eight years later to his sister after she was elected by a landslide), Mr Thaksin appeared keen to supplant the monarchy

in the people's favours. Though Mr Duterte, whose power base is in Davao city in Mindanao, is not challenging a system as cosmic as the Thai monarchy, he has openly confronted the landed and political elites. He rails at the "feudal state" and "imperial" Manila. Even before he was elected, the talk at glitzy dinner parties was of how to depose him.

Both men claim to speak for the poor. Mr Duterte lambasts the Catholic church as being "full of shit" for supposedly caring more about what it receives from the rich than what it does for the less fortunate. Both have been drawn to leftists. When Mr Thaksin was a police officer in the northern city of Chiang Mai, he got to know survivors of the army's massacre of students in Bangkok in 1976; they had fled to join a communist insurgency in the northern hills. Some became senior advisers as he rose to power. Similarly, Mr Duterte struck up relationships with leftists while a prosecutor in Davao. His cabinet secretary, Leoncio Evasco, is a former Marxist priest and communist guerrilla.

After taking office, Mr Duterte agreed a truce with the Philippines' communist insurgents, though it is now fraying. He has been sucked into intractable Muslim insurgencies in the south. In particular, the army is trying to retake the city of Marawi, which groups claiming allegiance to Islamic State suddenly seized in May. Mr Thaksin, too, took a similar no-nonsense approach to an Islamist insurgency in southern Thailand.

Neither man sought power in order to respect the rule of law. The unwitting model for Mr Duterte's ghastly war on drugs is Mr Thaksin's similar war against methamphetamine use in 2003. In that, more than 2,800 died in three months at the hands of police and vigilantes, and officials were threatened with punishment for failing to meet targets for seizures and arrests. In Mr Duterte's war, more than 7,000 Filipinos have died in summary executions by police and hitmen. Amnesty International describes it as a murder economy. Many victims are small-time drug users, or entirely innocent. This week Mr Duterte cut the annual budget of the country's Commission on Human Rights, a rare voice criticising the killings, to \$20.

Waging war on the poor

It is, in effect, a war on the poor—so much for Mr Duterte's claim to speak for them. Mr Thaksin was a more credible advocate: his introduction of cheap health care for all was groundbreaking. Perhaps Mr Duterte still intends things of substance. He seems to have talked to the communists about sweeping reforms, including the wholesale transfer of land to peasants.

To Mr Vatikiotis, who caught up with the exile sipping white wine in Montenegro, it was clear that Mr Thaksin's own narrow interests in pursuit of power, including furthering his multi-billion-dollar businesses, trumped any real concern for the fate of followers taking to the streets—and being shot—in his support. Even the sudden flight abroad in August of his sister, Yingluck Shinawatra, who was facing a controversial court case relating to her time as prime minister, might not spell the end of the Shinawatras, whose ambitions, and pockets, are deep.

As for Mr Duterte, he must know the oligarchy might challenge him if they feel threatened. He has reinforced his political base in Davao, with his daughter and son in prominent positions. Some suspect he might in future use the martial law which he has declared in Mindanao to build an impregnable power base. In the Philippines as in Thailand, the chief challenge to the old order is not full-blooded democracy, but populism. ■



Foreign affairs

God's gift

BEIJING

A propaganda campaign aims to show that China has become a global power

IN RECENT days government employees across China, from postal officials in the north-east to tax auditors in the south-west, have been corralled into watching state television. The Communist Party often orders bureaucrats to study propaganda. This time, however, the mandatory viewing has deviated from the usual themes of domestic politics and economic development. Instead, it has focused on China's emergence as a global power, and the role of the president, Xi Jinping, in bringing this about.

In late August and early September the state broadcaster aired six 45-minute programmes on this topic at peak viewing hours. The Chinese title could be rendered as “Great-Power Diplomacy”, but some state media prefer to call it “Major-Country Diplomacy”. That sounds a little more modest. Describing China’s growing global clout has long been a problem for propagandists. In 2003 they seemed to have settled on the term “peaceful rise”, only to abandon it a few months later in favour of “peaceful development”—the word “rise”, they thought, risked causing alarm abroad.

There is not a hint of reticence, however, in the series’ portrayal of China’s purported foreign-policy successes under Mr Xi, and his personal involvement in them. The programmes, made with the help of the party’s own Publicity Department, are

peppered with fawning remarks by Chinese and foreigners alike. In a clip from a speech given in 2015, Zimbabwe’s leader, Robert Mugabe, says of the smiling Mr Xi: “We will say he is a God-sent person.” (China has long admired Mr Mugabe’s contempt for the West.) “I really liked him, we had a great chemistry, I think,” America’s president, Donald Trump, is shown telling an American television interviewer after meeting Mr Xi in Florida in April.

Must-Xi TV

The main message is that Mr Xi is responsible for crafting a new approach to foreign policy that has won China global admiration: “great-power diplomacy with Chinese characteristics”. Mr Xi emphasised the need for this in November 2014 in a speech on foreign affairs (official translations of which often used the words “major country” instead). Last year the term appeared for the first time in the government’s annual work report. Like Deng Xiaoping’s “socialism with Chinese characteristics”, the phrase serves more to obfuscate than enlighten.

The nub of it is said to be “win-win cooperation”. But its introduction marked a clear departure from Deng’s more reticent approach to foreign policy, which was often described in China as *taoguang yanghui*, or “hiding brightness, nourishing ob-

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scurity”. By contrast, in the television series, the narrator says: “Maintaining world peace and stability is the unshirkable responsibility and burden of a great power.” It shows Chinese troops evacuating Chinese (and others) from strife-torn Yemen in 2015, the Chinese navy on anti-piracy missions off the Horn of Africa and Chinese marines setting off in July to establish the country’s first overseas military base in Djibouti.

While the series was being aired, a party newspaper published an article by the foreign minister, Wang Yi, on Mr Xi’s “diplomatic thought”. It said the president’s approach to foreign affairs had “blazed new trails and gone beyond traditional Western international-relations theory of the past 300 years”. The programmes aim to show that, unlike other rising powers in history, China (thanks to Mr Xi) has managed to maintain stable relations with established powers. They gloss over huge underlying tensions with Japan and America. Time and again Mr Xi is shown standing still while foreign leaders walk towards him to shake his hand. “It’s the ancient Chinese tributary system re-enacted,” says a Chinese academic, referring to emissaries from neighbouring states who brought gifts to the Chinese emperor as a means of securing peace.

But for all the talk of Mr Xi’s skills as a global leader, he still shares Deng’s aversion to risk-taking abroad. The series skates over the crisis on the Korean peninsula (a day after the final episode was shown, North Korea tested what appeared to be a hydrogen bomb.) Mr Xi’s great-power diplomacy had clearly failed to avert a grave international crisis—one that has developed not least as a result of China sitting on its hands. ■

Politics in Macau

High winds and high rollers

MACAU

Unlike the residents of Hong Kong, few in the former Portuguese colony demand greater democracy

FOR residents of Macau, a former Portuguese colony that is now an autonomous region of China, Typhoon Hato was striking not just for the damage it did, but for the help that came in its wake. After the storm pounded the territory in late August, Chinese troops emerged from their barracks to help with relief work. It was the army's first deployment on the streets of the territory since the end of Portuguese rule in 1999. Strikingly, the soldiers' presence was cheered.

In nearby Hong Kong, to which Macau is due to be linked by a long bridge next year, Chinese troops have not been called out to help the local authorities since Britain handed the territory back to China in 1997. Suspicions of the Chinese army run deep. Annual commemorations of its crushing of the Tiananmen Square protests in Beijing in 1989 attract thousands.

Not so in Macau, where critics of China have been far less vocal, and opposition to the local government has also been more muted. Pro-government candidates are expected to do well in elections for the local assembly on September 17th, despite the authorities' apparent haplessness in the face of Hato, which flooded the old town and cut power to much of the territory.

The day after Hato hit, Macau's chief executive, Fernando Chui, apologised, admitting his government had been ill-prepared. He also announced the resignation of the head of the meteorological department who, in the eyes of many locals, was too slow to issue a warning. Nonetheless, many pro-government candidates have been quizzed by angry residents about the authorities' response to the typhoon, and some have criticised the government themselves. One candidate, Ron Lam, has gathered 10,000 signatures on a petition demanding that the former weather chief be investigated for dereliction of duty. An opposition candidate, Sulu Sou, accuses Mr Chui of failing to plan adequately and invest enough in flood defences.

It is unlikely that voters' discontent will result in big electoral gains for the government's critics, however. Pro-government legislators hold 29 of the assembly's 33 seats. The system is rigged in their favour. Twelve of the seats go to labour unions and other interest groups, which can be relied upon to support the government. The chief executive appoints the occupants of another seven. That leaves only 14 to be filled by direct elections. Yet even in these,

the opposition won less than a quarter of the vote at the previous election, in 2013. In Hong Kong, in contrast, pro-democracy candidates won over half the vote in the seats in the local assembly filled by direct elections in 2016.

Among the few politicians in Macau who criticise the Chinese government is Au Kam San, a legislator. He is one of about 180 people competing for seats in the upcoming elections. Mr Au posted a message on his Facebook account questioning the role of Chinese soldiers after the storm: he dismissed them as mere rubbish collectors. But pro-Communist sentiment is so strong in Macau that Mr Au himself admits that his comments may have hurt his chances of re-election.

The party's sway over the territory's politics long predates the end of Portuguese rule. It gained strength in the 1960s when the Cultural Revolution spilled over from the mainland, triggering pro-Communist riots. Similar unrest erupted in Hong Kong, but the British authorities curbed it far more effectively. In Macau, the party became entrenched; its influence spread throughout civil society. Unlike Hong Kong, the territory never became a haven for Chinese fleeing communism. Its 600,000 people—one-twelfth the number of Hong Kongers—were more receptive to the party's control.

In contrast with Hong Kong, to which China promised the eventual introduction of "universal suffrage" in elections for the

territory's leadership, Macau received no such pledge. Few people appear to mind much. Pro-China patriotism is drilled into residents at school and by news media that are largely pro-party. Even the territory's largest pro-democracy group, the New Macau Association, avoids criticising the Communists too loudly.

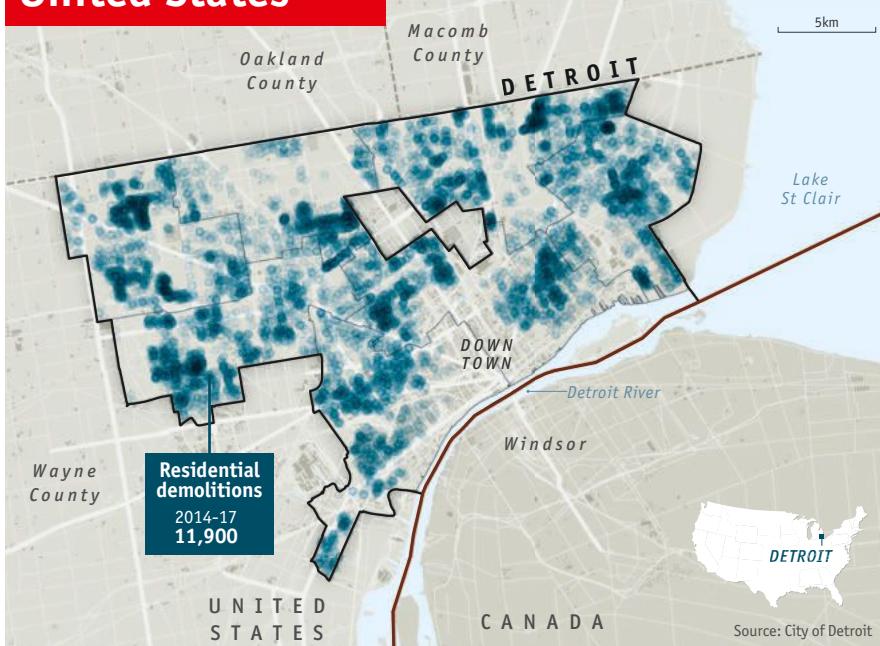
The government keeps residents in line with a stick and a carrot. The carrot is a "wealth-partaking scheme", an annual handout of 9,000 patacas (\$1,100) for every permanent resident. The government can afford this thanks to Macau's transformation, in the space of a generation, from post-industrial backwater to the world's largest gambling centre. Its GDP per person rose from 121,363 patacas in 1999 to 554,619 in 2016, among the highest in the world and 68% more than that of Hong Kong.

The stick is a national-security law, which was introduced in 2009. In Hong Kong, huge protests in 2003 forced the government to shelve its plans for a similar bill (it remains hesitant about introducing one). There was little such fuss in Macau. Its government has not yet prosecuted anyone under the law and continues to tolerate criticism of the authorities. But democrats in Macau say fear of the law causes people to censor themselves. The government often bars activists from Hong Kong from entering the territory, for fear they might foment unrest.

Despite the territory's high wages and plentiful jobs, many in Macau, especially the young, grumble about the cost of buying a home, a shortage of social housing, poor public transport and overcrowded hospitals. They moan about a lack of parking spaces and a huge influx of tourists from mainland China who, they say, are changing the quiet, laid-back character of the territory for the worse. As long as discontent remains muted, however, the rulers on the mainland will be content. ■



If it looks like rubbish collection...



Detroit

The end of blight is in sight

DETROIT

What happens when a place accustomed to bad government elects a good one

SPERAMUS meliora resurgent cineribus": the Latin incantation, offered by a French Catholic priest after a fire nearly destroyed the city in 1805, is Detroit's motto—"We hope that better things may rise from the ashes". The once-great city, the "arsenal of democracy" during the second world war and home of the world's most innovative manufacturers, has almost been ruined a second time. National interest in Detroit has waned since its bankruptcy proceedings, brought on by decades of mismanagement, ended in December 2014. Most tales of the city now take one of two tacks. Either Detroit remains mired in poverty and unemployment, its doom merely forestalled by a few years. Or the hipsters flooding in are, with each overwrought coffee contraption and jam-jar cocktail, returning the city to something like its former glory.

What both accounts miss is that Detroit seems on the point of doing something remarkable: re-electing a mayor whose singular achievement has been to knock bits of the city down faster than his predecessors, and swapping racially tinged politics for a more managerial sort. Mike Duggan took office in 2014 after an unlikely write-in campaign. In August this year he won 68% of the vote in the primary, and is likely to win the election proper in November. This despite the illustrious lineage of his opponent, Coleman Young II. Mr Young's father

was the city's first black mayor, ran Detroit for two decades and has his name inscribed on city hall. Mr Duggan was the city's first white mayor in 40 years. In the past four decades the city has undergone a racial transformation: from 70% white in the 1960s to just 10% now.

Mr Duggan, whose office overlooks the Detroit river (Caesars Casino in Windsor, Ontario, is visible in the distance), calls himself a "metrics nut". The mayor's cabinet meeting room is blanketed in graphs charting the city's employment, ambulance delivery and crime rates, among other statistics. "The police are going to show up in under 14 minutes; the ambulance is going to show up in under 8 minutes; the grass is going to be cut in the parks every 10 to 12 days—it just is." City employees who do not meet these targets do not last long. "It's a pretty unpleasant experience to come in the meeting and not have your numbers straightened out," he says. Cabinet members grimace in agreement.

Plenty of these numbers have improved. Police response times are down from an average of 40 minutes to 13. But the most important numbers for Detroit's future concern derelict properties. There were 40,000 such structures in 2014—ruins left over from an extreme population crunch. The sprawling metropolis, covering 139 square miles, once housed 1.8m people—three times as many as today. The

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city "is just too big", says David Schleicher of Yale Law School, pointing out that "all that expanse increases the expense of providing services". Urbanists suggest that the solution for such cities is "right-sizing"—shrinking them down to a size where the city can afford to provide pavements, streetlights, sewerage and so on.

Wholesale restructuring of Detroit inspires scepticism, because past city efforts hurt black residents in the name of development. Because of blatantly racist mortgage policies and racial "covenants" that prohibited blacks from living in certain neighbourhoods, African-Americans were kept in segregated areas, like Black Bottom and Paradise Valley, and had much lower rates of home ownership. Albert Cobo, mayor for much of the 1950s, pursued the building of motorways by razing black neighbourhoods, sowing the seeds for the race riots in 1967 which marked, for many, the beginning of Detroit's decline. Because of those scars, using eminent domain (compulsory purchase) to restructure the city is off limits.

Appetite for destruction

That means the same task has to be accomplished by persuasion instead. Mr Duggan has an ambitious project, fuelled by federal dollars, to demolish abandoned houses at record speed. The centrepiece of those efforts is the mayor's expansion of the Detroit Land Bank, a quasi-governmental authority which now owns 96,000 properties across the city—most of them acquired through foreclosure because of unpaid taxes. The land bank centralised city control over abandoned and vacant properties, replacing an antiquated registry scattered across 83 data sets, some of them still on paper. Wiping away liens and back taxes means the properties are more ➤

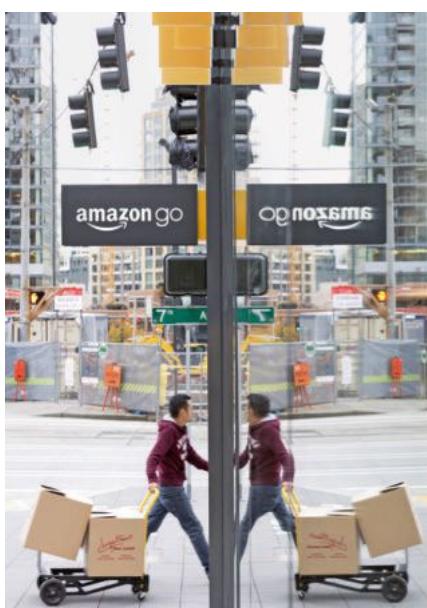
► easily cleared for demolition or restoration into something habitable.

Since Mr Duggan took office, the city has demolished 11,900 residential properties. City officials have worked from the highest-density districts, with 80% occupancy rates, downwards, reasoning that demolitions there stabilise prices for more people. The demolition of a blighted property increases the value of a home 500 feet away by 4.2%, according to one study. The pace has been unprecedented. "I've been living Michigan for 29 years. Every mayor has said, 'I am going to demolish 10,000 structures'. No one ever came close," says Margaret Dewar of University of Michigan.

With this speed have come problems. Allegations that the city's demolition programme awarded contracts improperly have dogged the administration and attracted a federal investigation. Michigan's state housing agency suspended funds for two months, after a state audit found improper controls in place. Land bank officials, including the director of demolitions, have resigned. Mr Duggan, who is not a subject of the investigation, blames the mistakes on a desire to increase the pace of demolitions, but acknowledges that regulators were right to rap his knuckles.

One hole in his plan is the high pace of tax foreclosures—the main pipeline for properties that end up in the land bank's possession. Owners who do not pay taxes after three years lose their property, according to state law. But those property taxes were last comprehensively reassessed decades before market values plummeted, meaning many are set too high. Median sale prices for city houses fell from \$70,000 in 2006 to \$16,200 in 2012. The owner of a house worth \$15,000 could owe \$3,000 in property taxes. The state-mandated interest rate on property-tax debt is 18% per year. A much-needed update, finished in January, should see lower bills but will not be retroactive. Up to 53,000 properties will receive foreclosure notices this autumn.

Not every foreclosed property will necessarily end up derelict. But it is easy to see how tax foreclosures, which are driven by government policy rather than market forces, could dislodge longtime residents and exacerbate the problem that the demolition drive, which has already cost \$162m, is trying to solve. The average back taxes for houses that go up for auction are \$7,700—much less than the cost of demolition. "It's like an auto-immune disorder. We penalise people for not paying, and then we end up paying more for the punishment," says Michele Oberholtzer, director of the Tax Foreclosure Prevention Project. Provided he can solve this puzzle, Mr Duggan thinks that at the current pace of demolitions he can clear the city's long-standing blight within five years. Detroit would emerge smaller, but no longer a by-word for decline. ■



Hosting Amazon

One-click shopping

WASHINGTON, DC

It is rational for cities to bid for company headquarters, but not for the country

IT WAS an announcement to set a mayor's heart aflutter. Amazon—one of the world's most valuable and innovative companies—plans to build a second headquarters, equal to the Seattle original, in a North American city. A whopping \$5bn in Amazon cash could ultimately be invested in the new base, which should eventually house 50,000 high-wage technology workers, a tantalisingly large crowd of tax-paying, goods-and-services-buying residents. Cities from the small but precocious, to the deindustrialised and desperate to the already rich, are preparing to throw in their bids before the October deadline.

Amazon, however, is in the market for prime sites. Its request for proposals specifies that it seeks a large city, rich in skilled workers and the urban frills they crave. It wants a "stable and business-friendly environment", which could rule out places with micromanaging governments or dubious finances. Good access to transport, including public transport and an international airport, are on the wish list. So is a willingness to think "big and creatively" about Amazon's place within the city—including, presumably, the incentive package it can expect to enjoy.

However generous the winning bid, the investment is likely to pay off. Amazon estimates that the more than 40,000 employees at its Seattle headquarters support an additional 53,000 local jobs, and more than \$38bn in local investment. Other ana-

lyses suggest that is not an unreasonable guess. Enrico Moretti, an economist at the University of California, Berkeley, estimates that an additional high-tech worker raises local employment by five jobs, a "multiplier" significantly greater than the 1.6 jobs associated with an additional manufacturing worker. Amazon's arrival should give a boost to other firms in the area, according to research by Mr Moretti, Michael Greenstone, of MIT, and Richard Hornbeck, of Harvard University, who find that places which win contests for big new plants experience broad productivity gains relative to those which narrowly lose out.

The bounty is unlikely to end there. Most of the time, big public investments—in infrastructure, for instance—are politically tricky to enact. The benefits of a new transport system are spread widely, across people and time, while its costs are concentrated on citizens most exposed to new taxes, and on those living close to construction zones. An angry minority therefore has a powerful incentive to use lobbying and lawsuits to slow, shrink or kill projects. The prospect of landing Amazon upends this dynamic; even those likely to be inconvenienced by new projects stand to gain from its arrival.

Amazon asserts that the playing field is level. In practice, the firm's conditions mean that few places stand a real chance. Only a handful of North American cities boast the infrastructure, the amenities and the workforce it requires. Amazon could single-handedly transform the economy of Detroit, but in doing so would face the risk of municipal financial woes, besides the need to lure tens of thousands of workers to a place with far fewer consumer comforts to offer than New York or San Francisco. The shortest odds are on cities already dripping with rich, highly skilled workers, which least need an injection of economic life. Indeed, it is just possible Amazon has already made its decision; the qualities of the cities of North America are not unknown to its executives, after all. The contest could simply be a way to extract concessions from the city it already knows it will choose.

As a matter of national policy, that is not ideal. Competition for firms is healthy when it encourages places to improve policy and invest in public goods; less so when used by powerful firms to extract public subsidies, which hurt taxpayers and competitors alike. But to the extent that Amazon's gambit provokes a race to promise funding for education, infrastructure and other public goods, there is a broader lesson. Big firms are not the only organisations which can offer goodies. A policy to send government research institutes or extra infrastructure funding to the places with the best plans for civic improvement could help more cities to attract Amazon-like firms—or nurture their own. ■

Disaster fraud

After the deluge

CHICAGO

Hurricanes and earthquakes provide plenty of opportunities for the unscrupulous

NATURAL disasters such as Hurricanes Harvey and Irma bring out Americans' sterling civic spirit, stoicism and selflessness. Millions are giving millions, thousands are volunteering, donating blood, packing parcels with food and clothes, and sheltering victims of the floods. Acts of kindness, such as one Florida man giving a generator to a stranger, or of pointless defiance, such as another trying to shoot at Irma, go viral. Yet hurricanes, floods and earthquakes also present lucrative opportunities for criminals who

steal from charities, insurance companies, government agencies and victims of disaster with ever more inventive scams.

"It is repulsive to have to talk about fraud when lives are still at risk," says Corey Amundson, a federal prosecutor who heads up the National Centre for Disaster Fraud (NCDF), yet talk about it he must. On August 31st Mr Amundson and the Department of Justice formed a working group of various federal law-enforcement agencies in Houston to fight crime related to Harvey and Irma.

Hurricane Irma

Flood and flight

DELRAY BEACH, FLORIDA

Irma, which largely spared America, still had a big effect on it

LIMITED menu, cash only!" said the owner of Luna Rosa, a seaside restaurant that opened for business on September 11th, hours after Hurricane Irma stopped lashing Delray Beach on Florida's eastern coast. Police limited access to those who could prove they lived along the shoreline road, which was cluttered with debris, uprooted palm trees and fallen power lines. Running on its propane-fuelled generator, Luna Rosa served an early lunch. Business at the bar in particular was brisk. On the beach, just across the road, intrepid surfers revelled in the churning waters left behind by Hurricane Irma.

Irma's landfall was preceded by one of the largest peacetime evacuations in America's history. Around 6.5m people were ordered to move by the state government, including 650,000 in Miami-Dade County, Florida's largest (a small fraction obeyed). Yet thanks to Irma's unexpected path, Miami was spared the worst of the flooding. Some evacuees found themselves in areas on Florida's west coast that were hit more severely.

Deciding whether or not to evacuate is tricky, in particular for the frail and elderly. A botched evacuation of Houston ahead of Hurricane Rita in 2005 left 90 dead as they succumbed to heat exhaustion during traffic jams on highways. The panic was due to the carnage wrought by Hurricane Katrina earlier that year, which had caused the deaths of some 1,400 mostly old, poor and black resi-

dents in New Orleans.

Irma disrupted most of Florida's power lines. By nightfall on September 11th two-thirds of Florida's 10.5m homes were without power. As the hurricane moved north, lights went out in another 1m homes in Georgia. Getting them back on could take weeks, according to the power companies. The disruption equals the record set by Hurricane Sandy in 2012, which left 8m homes without power for an average of eight days.

The shifting of America's population to coastal communities, where 39% of the population live, means Americans are more vulnerable to rising tides. One in 12 lives in a home that can expect a 1% chance of flooding in any given year, according to data published in the *Annals of the American Association of Geographers* in June. Urban development on floodplains slowed between 2001 and 2011, though not in Manhattan and Miami. Around 15% of Manhattan and 40% of Miami are in flood-risk zones.

Miami's seas have risen ten inches (25cm) over the past 100 years which, coupled with storm surges, makes it extremely vulnerable. Southern Florida can expect to be battered by a category-three hurricane (one with wind speeds over 95 knots, or 176km per hour) every five years. Though climate models predict global warming will not increase the frequency of storms, it will make them more severe. The collective sigh is likely to be one of only temporary relief.

The NCDF was set up by the Justice Department in 2005 in the wake of Hurricane Katrina, the costliest and deadliest hurricane in American post-war history, when tens of billions of dollars in disaster relief poured into the Gulf-coast area and several billions ended up in the wrong hands. In 2006 the Government Accountability Office found that up to \$1.4bn of disaster-relief payments made by the Federal Emergency Management Agency (FEMA) were improper and possibly fraudulent. FEMA funds, the auditors found, were used to pay for jewellery, Dom Pérignon champagne, holidays in the Caribbean, pornography and even a divorce lawyer. The FBI estimates that up to \$6bn of \$80bn in government funds earmarked for reconstruction went to insurance fraudsters. "Fraud was so widespread and we were so unprepared," says Walt Green, Mr Amundson's predecessor, who was still dealing with Katrina in March this year. The NCDF prosecuted more than 1,300 cases of Katrina-related fraud in 49 states.

Unlike hurricanes, disaster fraud tends to move in a predictable sequence. Charity fraud is first. After Katrina the Red Cross asked the FBI to investigate at least 15 websites impersonating one of America's largest charities. Contractor fraud comes next, involving fake contractors asking for up-front payments for the removal of trees or the repair of a roof and never turning up, or doing the work so poorly that it needs to be redone. A former Alabama state legislator was sentenced to 60 years after swindling more than \$240,000 out of Katrina victims in New Orleans for modular homes he never delivered.

When reconstruction begins the big sums start pouring in, and the most egregious pilfering occurs. Identity fraud can involve criminals making fake insurance ►



► claims for property or governmental benefits with stolen Social Security numbers. Insurers say fraud accounts for 10% of its property and casualty expenses in an average year, or about \$34bn, but in a year with an unusual number of natural disasters it can be much higher.

Public corruption comes last, from bid-rigging to price-fixing and collusion involving big reconstruction and equipment contracts. Mr Amundson says he prosecuted a fire chief from Shreveport in Louisiana who stole defibrillators worth more than

\$1m that were destined for New Orleans. He was sentenced to 14 years in prison, in part because he tried to kill his co-conspirator, who he thought had betrayed him.

Messrs Amundson and Green predict the NCDF will be going after Harvey and Irma fraudsters for many years, at least until the end of the statute of limitations. Companies and public bodies are taking greater care over investigating victims' claims. Unfortunately, this also means that victims will probably have to wait longer than in the past for relief payments. ■

Title IX compliance officers, a newly sprouted type of academic bureaucrat, who often act as investigator, judge, jury and appeals board all at once. Some officers advise the accusers, making them far from neutral. In some colleges, the accused are not given complaints, and are not allowed to address the evidence gathered against them. Other colleges skip hearings altogether, issuing summary judgments after an investigation.

Stories of malpractice at these courts abound. The University of Southern California launched an investigation, and eventually expelled, one student after he was accused of abusing his girlfriend, despite her vehement denials. A federal judge excoriated Brandeis University for its handling of an investigation filed after two male students, called John and JC in court proceedings, broke up after a two-year relationship. JC contended in a complaint to university officials that, during their relationship, John would wake him up by kissing him, even when JC wanted to sleep. The university special examiner concluded that the events constituted "sexual violence", and a note was made in John's permanent record. The possibility of racial bias also haunts the proceedings. Observers have noted that black men make up a disproportionate share of the accused.

University officials have also constructed their own definitions of sexual consent and of sexual harassment. The University of Wyoming demands that consent should be "voluntary, sober, enthusiastic, verbal, non-coerced, continual, active, and honest"—a hard-to-enforce edict. It also offers university-recommended sex talk ("I've got the ship. You've got the harbour. Can I dock for the night?" is among the least cringe-inducing suggestions). The expanded policies can also stifle academic freedom. After Laura Kipnis, a tenured professor at Northwestern University, wrote an article on "sexual paranoia" in the academy, two students filed a Title IX complaint claiming that her article had created a hostile learning environment.

Those who want to keep the Obama-era guidelines in place paint the issue as a zero-sum contest between the victims and the accused. They point to decades in which women who had claimed sexual harassment were not believed, and the chronic underreporting resulting from this. But the antidote to that history is not to punish the innocent and the guilty alike. Others fans of the status quo point to the cost of providing lawyers and funding independent investigators. Janet Halley, a Harvard Law School professor who has campaigned against the regulations, issues this challenge: "What is the cost of innocent students being expelled from school with a transcript that makes it impossible for them to ever go to a four-year college again? It's career-ending." ■



Campus rape

Undue process

WASHINGTON, DC

Efforts to revise directives about sexual assault on college campuses are welcome

ANY sentence containing the phrases "Donald Trump" and "campus sexual assault" could reasonably be expected to conclude with the word "outrage". Yet when Mr Trump's secretary of education, Betsy DeVos, announced her intention to "revoke or rescind" directives to universities on handling sexual assault issued by the Obama administration, the move was quietly welcomed by plenty of colleges. The Obama administration's determination to discourage campus sexual assault—which is suffered by as many as a fifth of women attending college—was well-intentioned, but poorly thought out.

In 2011 the Office of Civil Rights (OCR) sent a "Dear Colleague" letter—named after its misleadingly congenial salutation—which issued a sweeping reinterpretation of Title IX, a federal law prohibiting gender discrimination. The letter urged universities to investigate sexual assaults and conduct hearings assessed on a lower

standard of proof, requiring just a "preponderance of the evidence", or 51% certainty of guilt. Universities were discouraged from using a tougher "clear and convincing" standard because this was judged to be "not equitable". Because the OCR letter was sent without time for notice and comment—steps that Ms DeVos is rightly taking in revising the policies now—the letter lacked the force of law. Still, colleges were cowed into compliance after the OCR threatened to cut off federal funding to offending institutions.

Opposition to the Obama-era policies is not just a cause for dubious men's rights activists or alt-right agitators. The most prominent critics have been the faculty of Harvard Law School, who publicly broke away from Harvard University's new sexual-assault procedures (which they said lacked "the most basic elements of fairness and due process") and established their own. They pointed to the improper role of

Trump and Congress

Just one of those things

WASHINGTON, DC

The dangers of reading too much into an agreement with Democrats

LEgend has it that when Ronald Reagan was president, he often ended a day of wrangling with the Democrats who then controlled Congress by calling Tip O'Neill, the House Speaker, to ask, "Is it after six o'clock?" That signalled it was time to end the partisan bickering and have a glass of whiskey together. Such shows of cross-party amity in Washington have grown rare. But the deal that Donald Trump cut with Nancy Pelosi and Chuck Schumer, Democratic House and Senate leaders, to lift the debt ceiling, fund the government until December and allocate \$15bn in disaster relief has led some to wonder whether bipartisanship is staging a comeback.

Mr Trump seemed to promise as much. The adulation heaped on the deal by those who usually excoriate him reportedly thrilled the president, a teetotal non-smoker whose chief addiction is praise. "I think we will have a different relationship," he said afterwards. "That's what the people of the United States want to see."

Theoretically, opportunities for future deals abound. On September 13th Ms Pelosi and Mr Schumer claimed to have struck a deal with the president to shield undocumented immigrants brought to America as children from deportation. Mr Trump and Democrats have both suggested trillion-dollar infrastructure plans; congressional Republicans are less free-handed with the public purse. Messrs Schumer and Trump have mulled ending the debt ceiling, a statutory measure that limits how much the government can borrow to pay its bills; conservatives like the leverage it gives them. The president's former strategist, Stephen Bannon, proposed raising

Measuring the presidency

Charting the travel ban

NEW YORK

Even when it was suspended, it worked

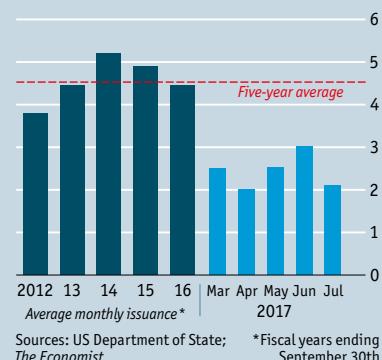
ONE of Donald Trump's first acts as president was to try to introduce a version of the ban on Muslims entering America that he promised on the campaign trail. Judges stayed his executive order, which went through several iterations, until June 26th, when the Supreme Court allowed a modified version to proceed. According to data from the State Department, just 2,095 visas were issued in July to nationals of the countries effected (Iran, Libya, Somalia, Sudan, Syria and Yemen). That is 55% lower than the monthly average from 2012-16.

Yet that total differs only slightly from the monthly average of 2,526 new visas granted between March and June, a period when the courts had suspended the ban, and policy was formally the same as it was before Mr Trump took office. The State Department has not published figures on how many applications it received from the affected countries since the president announced the measure, so it is hard to know if the decline early in the year stemmed from

consular officials rejecting a greater share of applications, or because would-be visitors were discouraged from applying. Regardless of the mechanism, however, it seems that Mr Trump's earlier, stymied attempt had the effect he desired.

Taking the hint

United States, visas issued to non-immigrants from travel-ban countries: Iran, Libya, Somalia, Sudan, Syria and Yemen, '000



the political blowback of a government shutdown when his own party controls both Congress and the White House. But he still wants a government-funded border wall, huge cuts to social programmes and a rollback of environmental regulations, all of which are anathema to Democrats.

Congressional Republicans know that Mr Trump's voters like him more than the party; they are right to worry that this gives him room to manoeuvre. But for all the teeth-gnashing from Messrs Ryan and McConnell, this deal suited them too. They had no interest in a shutdown or a financial meltdown. The deal averted both outcomes, and it isolated the party's troublesome far-right flank in Congress. Opposing this deal would have meant opposing Mr Trump, which is precisely what their voters do not want them to do.

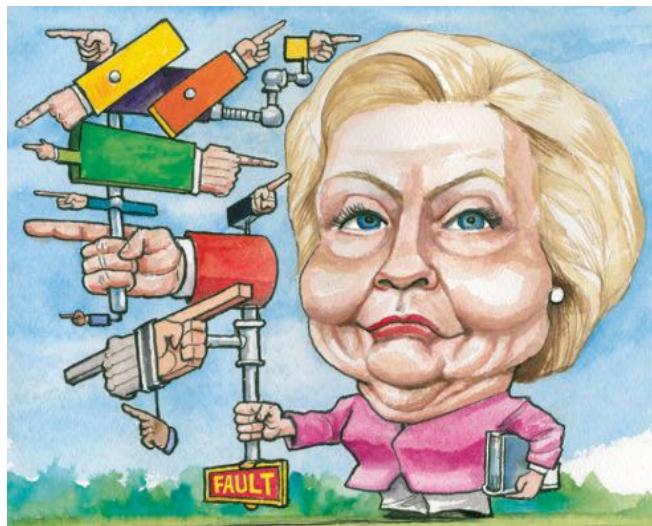
But congressional Democrats have no such room; the Trump-loathing of their base constrains them. For them, one reasonable decision will not erase his long list of previous convictions—equivocating over the violence in Charlottesville, banning transgender people from military service, opening the door to the deportation of Dreamers—racked up just in the past few weeks. Democrats do not want to head into next year's elections with Mr Trump crowing over his bipartisan victories. They want a millstone to hang round the neck of every Republican office-seeker. ■



Here's hoping we meet now and then

Lexington | Finger-wagging good

Hillary Clinton's account of her electoral humiliation contains a warning for her party



MANY Democrats were dreading Hillary Clinton's chronicle of electoral failure, "What Happened", which was published this week. The former First Lady was always more admired than loved by her party (a dirty secret that even the slickest Clinton-style stage-management of her rallies could not conceal), and her defeat by Donald Trump eroded much of that grudging regard. Worse for her resentful supporters, in post-election interviews and leaked excerpts of the book, Mrs Clinton appeared to blame everyone but herself for her loss—including Senator Bernie Sanders, her rival in a rancorous primary contest that still divides the Trump-bruised Democrats. Many considered that disloyal. "If I were her, I would move on," advised David Axelrod, a Democratic guru. A columnist for the *New York Daily News* was more forthright: "Hey, Hillary Clinton, shut the f--- up and go away already."

Mrs Clinton's book will rile her critics even more. Granted, she owns up to her errors, including a naive faith in the power of wonkish ideas to placate angry voters, and some embarrassing bloopers. Celebrating the death of coal-mining in Ohio is (no kidding) a particular regret. Mrs Clinton also acknowledges her "limitations" as a campaigner, including the carefulness of a rote-learned performer, which many voters find insincere: "I wear my composure like a suit of armour." Yet not for a moment does Mrs Clinton believe she caused her defeat. Most of the 494-page tome (her books, produced with trusted aides, are always too long) is dedicated to causes beyond her control. Mr Sanders is among them; Mrs Clinton accuses him, among other dirty tricks, of portraying her as a "corrupt corporatist who couldn't be trusted...paving the way for Trump's "Crooked Hillary" campaign". But that is trifling, set against her three biggest gripes.

One is the savaging of her reputation by an updated version of the "vast right-wing conspiracy" she accused, with some justification, of smearing her and her husband in the 1990s—including radical conservative donors, fake-news peddlers and Russian hackers and their internet bots, all egged on, unwittingly or not, by a Republican candidate who "trafficked in dark conspiracy theories drawn from the pages of supermarket tabloids and the far reaches of the internet". The results were devastating. Out canvassing in leafy suburbs, Mrs Clinton's supporters were politely

assured their candidate "had killed someone, sold drugs and committed any number of unreported crimes". When, a month after the election, an apparently sane man shot up a pizza parlour in Washington, DC, in a bid to free the child sex slaves he believed Mrs Clinton had imprisoned there, no one was surprised.

A second complaint is the hyperventilating coverage mainstream outlets gave to Mrs Clinton's use of a private e-mail server while secretary of state. This, as she concedes, was a fatheaded blunder. But it broke no law, caused no security breach and, while frowned upon, was not especially unusual at the State Department. Yet it was the prevailing intrigue of the election, more incessantly discussed than any of Mr Trump's manifold scandals. By one measure, television news devoted three times as much airtime to Mrs Clinton's e-mails as to her entire policy agenda. Her third grievance is related—the late intervention into the election of James Comey, the then FBI director, to announce he had reopened, and then that he had closed, an investigation into Mrs Clinton's e-mails—even as early voting was taking place.

Even admirers of Mrs Clinton will curl their toes at this. No one likes a sour loser. And Mrs Clinton's account is sufficiently self-serving to be open to that charge. In particular, she blames the competing din of fake news for her failure to persuade voters that her economic plans—an infrastructure package, incentives for apprenticeships and so on—represented a compelling picture of future prosperity. But Lexington listened hard to her economic speeches and could not identify the main point of them—a shortcoming her book repeats. Mrs Clinton insists she had "fundamental differences" with the populist Mr Sanders, while also suggesting they were only of degree—he vowed to soak the rich and splurge on everyone else; she says that would be nice, but tricky to pull off, so advocates a watery version of the same. This will not discourage the many Democrats who believe Mrs Clinton's failure to impart a compelling economic vision cost her the election—especially as many of them back Mr Sanders's vision.

To the devil her due

But there is a problem with that: Mrs Clinton's analysis is basically sound. Had it not been for the uncontrollable "headwinds" she describes, she would probably have won, despite her shortcomings. Going into the election, she was up by six points; then Mr Comey intruded and her lead evaporated, as undecided voters recoiled from this clinching evidence of her perfidy. Of course, had she been a better campaigner, including on economic issues, she might have been further ahead. But that is harder to quantify; in fact, in the rustbelt states where she is thought to have lost the election, Michigan, Wisconsin and Pennsylvania, she polled well on economic issues. There is also little reason to think a more populist message would have helped her there. The white, working-class voters who, continuing a decades-old-trend, went from Democrat to Republican in those states, wanted less immigration, not more handouts for immigrants (among others) to enjoy.

In this election, policies, messaging and campaign effectiveness hardly seemed to matter. It was decided by partisanship and internet-borne misinformation—the enabling environment and means by which Mr Trump and his proxies destroyed Mrs Clinton. Wonk that she is ("If you're unconvinced that friends are worth it, consider the data," she writes), that is a surpassing humiliation. For her party, it is a warning not to resort to the comfort-blanket of left-wing policy. It might make the Democrats feel better; it probably cannot restore them to power. ■



Hurricane Irma (1)

Paradise lost

After one of the most powerful hurricanes ever to hit the Caribbean, the region will have to change the way it plans for disasters

FOR three days in early September Hurricane Irma ground through the eastern Caribbean like a bulldozer made out of wind and rain. Tropical breezes became 300kph (185mph) blasts, turning “tin roofs into flying razor blades”, as Maarten van Aalst of the Red Cross put it. Placid seas reared up in giant waves and rainwater coursed through streets. Even when the sun eventually came out the nightmare did not end. Shortages of food and water sparked looting on some islands. Survivors were grateful that fewer than 50 people, at last count, died in the Caribbean, but Irma’s fury left thousands homeless in the 13 island countries and territories in its path, including Cuba. Entire settlements were wiped off the map.

Most islanders want above all to return to normal life as fast as possible, which for many means reopening the hotels, bars, restaurants, surfing schools and the like that are the region’s economic lifeblood. Authorities on St Barthélemy, a territory that belongs to France, talk of reopening in time to catch part of peak tourist season, which starts in December.

But business as usual will not come back as quickly as the islanders hope. After Hurricane Ivan struck Grenada in 2004, tourism fell to 10% of its pre-storm level in the island’s first high season. Annual GDP dropped by 24%, though it recovered after that. The costs of rebuilding will be staggering. France’s public insurance agency esti-

mates that it will cost €1.2bn (\$1.4bn) to repair infrastructure in St Barthélemy and the French half of St Martin, an island of 75,000 people that France divides with the Netherlands. More than two-thirds of structures on St Martin were damaged or destroyed; on Barbuda nearly all were wrecked. In all, rebuilding the ruins in the Caribbean, including Puerto Rico, will cost nearly \$13bn, according to the Centre for Disaster Management and Risk Reduction Technology in Germany.

Just putting back what the storm took away will not be enough this time. Irma was the first category-five hurricane to strike some of the islands but it is unlikely to be the last. Global warming makes such storms stronger, and it raises sea levels, which add to their destructiveness. They will strike hardest at the playgrounds on which the region’s prosperity depends. The Caribbean is more reliant on tourism than any other region; the industry is responsible directly and indirectly for more than 2m jobs. If the region is to prosper in the long run, governments will have to do more to protect coastlines and strengthen buildings and infrastructure.

Living life the easy way

The islands have been slow to do that. “Caribbean governments speak a lot about climate change but their actions leave a lot to be desired,” says Ottis Joslyn of the Caribbean Community Climate Change Centre

Also in this section

38 Insuring against Irma

38 Mexico’s quake of the century

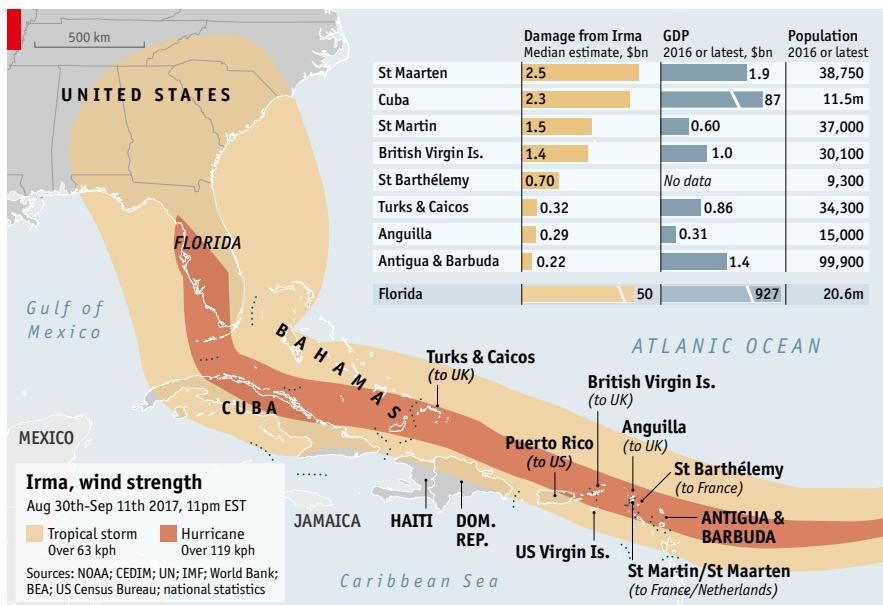
39 Bello: A long haul in Venezuela

(CCCCC), a body set up by the region’s governments to help countries adapt. The centre urges governments to protect poor people (for example by replacing fragile houses with sturdier ones), shift to renewable energy and avoid development that damages coastlines. A few countries have made progress. Barbados has an agency that oversees development on the coast. But this is an exception.

Three main barriers get in the way. The first is that weather patterns are changing faster than scientists and policymakers expected. In 2012, in a project paid for by the World Bank and the government of St Lucia, a CCCCC team built a “climate-smart” shelter with a “hurricane-strapped roof”, impact-resistant windows and a backup generator. It was supposed to be a model. But it can only withstand a category-three storm. Irma would have destroyed it.

The second obstacle is short-term thinking, which encourages fast economic growth but neglects climate-change planning. St Martin offers a good example. A tourism boom that began in the 1980s attracted immigrants (the population of the French side rose from less than 8,000 in 1982 to 38,000 in 2005). The newcomers crowded into shantytowns where building codes were not enforced, says Virginie Duvat, a French geographer who wrote a study of the island in 2008. Failure to enforce the rules, and lack of planning and investment, exposed the population to hurricane hazards, she wrote. After Irma, many of the island’s homeless realise that.

The third barrier is lack of money. Most Caribbean islands are not poor. With GDP per person of nearly \$9,000 on average, the independent island states qualify as middle- and high-income countries. But most have high levels of public debt and many have suffered from a decline in prices of agricultural goods. Their small populations ►



mean that the cost per person of building and upgrading infrastructure is high. And when a catastrophe occurs it can be massive. A disaster like Irma “wipes out the economy in one fell swoop”, says Rawleston Moore, who represented Barbados in negotiating the UN Framework Convention on Climate Change.

Donors outside the region contribute to its short-termism. Money pours in to alleviate the effects of a disaster, but not to prepare islands for future ones. Regional insurance schemes are a small step in the right direction (see next article). Caribbean governments hope that rich countries will provide money to adapt to climate change under the Paris climate agreement, signed in 2015. They have joined other “small island developing states” to argue that industrialised countries, which have been emitting carbon dioxide longer than developing countries, and continue to emit more of it per person, should compensate them for losses and damage caused by extreme weather. (That said, Trinidad and Tobago, in the southern Caribbean, is one of the world’s biggest emitters per person.)

The rich have promised to contribute \$100bn a year by 2020 to establish a “green climate fund” to pay for developing countries to reduce their carbon-dioxide emissions and to adapt to warming. So far, though, the fund has raised just \$10bn. It is not clear where the rest will come from and just how it will be spent. Bangladesh, which is poorer and more populous than the Caribbean, and is deluged every year, looks to some donors like a worthier beneficiary than, say, Antigua and Barbuda.

Rich countries have resisted the idea that they bear unique responsibility for climate change and should pay compensation to countries that suffer from it. Besides, it is hard to figure out what part of the damage from bad weather comes from global

warming, what nature would have done anyway and how much responsibility developing countries bear for poor planning and shoddy construction. “Are 10% of Irma’s losses due to climate change and the rest to the natural phenomenon? Twenty percent? It’s hard to put a number on it,” says Peter Hoeppel of Munich Re, a reinsurance company.

Unchecked, global warming could overwhelm the efforts of even the most far-sighted island governments to adapt to it. That may force people to leave. Hurricanes between 1980 and 2004 were followed by upticks in migration to the United States, according to a new study by two economists at the University of Michigan. A one-metre rise in sea levels would displace more than 100,000 people from 15 Caribbean countries. The islanders are coming back after Irma. Her grandchildren could drive them away. ■



Hurricane Irma (2)

Too little, but not too late

The Caribbean is a pioneer in disaster insurance

ON SEPTEMBER 12th, before it could reckon how much damage Hurricane Irma had caused, Turks and Caicos got some heartening news. Within a fortnight the tiny Caribbean territory would get \$13.6m to pay for disaster relief. Days earlier, Antigua and Barbuda, St Kitts and Nevis and Anguilla were pledged \$15.6m. The sum, a substantial 1% of their combined GDP, won’t come from foreign do-gooders. It is a reward for home-grown prudence.

Like 13 other members of the Caribbean Community (Caricom) and Nicaragua, the four had been paying into the Caribbean Catastrophe Risk Insurance Facility (CCRIF). Created in 2007, it has so far doled out \$69m to places battered by storms, floods and earthquakes. Unused funds are retained as reserves. Besides its own resources, CCRIF can draw on around \$140m underwritten annually by reinsurers.

Spreading risk across Caricom and beyond—CCRIF is open to associate members such as Anguilla and, since 2015, to Central American countries—has kept premiums affordable. “Parametric” triggers release money automatically depending on how severe a calamity is (as measured by wind speed, rainfall or magnitude of tremors) rather than after a tedious damage assessment. That makes cash available in the critical early days.

Disaster-based financial instruments have been around since the 1990s. In 2006 Mexico issued the world’s first sovereign catastrophe bond to finance its Natural Di- ►

Shaken Mexico

The strongest earthquake in a century struck the coast of Mexico on September 7th, killing at least 96 people. Most died in the southern state of Oaxaca. In the town of Juchitán the quake destroyed the hospital and made a third of the houses uninhabitable. The death toll was far lower than in the earthquake off the coast of Michoacán in 1985, in which at least 10,000 people died, many of them in Mexico City. That caused political tremors, discrediting the then-president, Miguel de la Madrid, of the Institutional Revolutionary Party (PRI), who seemed paralysed by the disaster. Mexico’s current president, Enrique Peña Nieto, who also belongs to PRI, is hardly more popular. But in the hope of avoiding his predecessor’s mistakes, he visited Juchitán on September 8th.

► saster Fund (FONDEN); investors lose their principal if calamity occurs, as it did on September 7th when a powerful earthquake killed at least 96 people. This helps Mexico deal with the aftermath.

The Caribbean pioneered sovereign parametric insurance taken out by governments, not companies or households. Other parts of the world have followed. The African Union and the Pacific Islands Forum have launched CCRIF-like initiatives. In August the cyclone-prone Philippines set up something akin to FONDEN.

Such schemes have problems. The promise of payouts may encourage reckless-

ness, such as building on vulnerable land. The money, which often flows directly into treasuries with a patchy governance record, could be misspent (or stolen). At first countries worried that unscrupulous brokers were overcharging for the reinsurance.

Still, CCRIF and the like are worthwhile, says Stefan Dercon, a disaster-finance expert at Oxford University. Insurance has not replaced broader preparations for disaster. On the contrary, Mr Dercon observes, “paying for insurance forces you to think what to insure” and how to protect those assets. Some schemes dictate how payouts must be spent. Premiums for rein-

surance have fallen, suggesting brokers are keen to build markets, not bilk customers.

A bigger problem, says Simon Young, who until 2013 headed the company that supervises CCRIF, is that countries still scrimp on coverage. The Bahamas let its policy lapse and missed out on a \$32m payout after Hurricane Matthew socked it in 2016. In some territories Irma has wiped out assets worth more than annual GDP. CCRIF will cover a fraction of that. As similar tragedies grow more common with climate change, governments may increasingly view premiums not as a cost, but as an investment. ■

Bello | A long haul in Venezuela

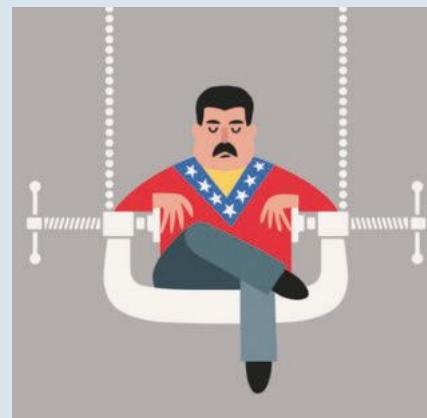
Can sanctions force a return to democracy?

DESPITE four months of protests, more than 120 deaths and mounting diplomatic pressure, Nicolás Maduro has got away with it. Venezuela's president has imposed a rigged constituent assembly to replace the elected, opposition-controlled parliament. He is ruling as a dictator, jailing or harassing scores of opponents. This poses a stark question: what, if anything, can be done to restore democracy?

In the short term, the answer is not much. The protests have stopped. Mr Maduro has the opposition where he wants it: split as to whether or not to participate in an overdue election for regional governors next month, organised by the same tame electoral authority that shamelessly inflated the turnout for the constituent assembly vote from under 4m to 8.5m. For now, the main threats to Mr Maduro's regime come from elsewhere—from outsiders and from its acute shortage of money.

The United States has responded to the slide to dictatorship by ordering sanctions against 21 Venezuelan officials whom the administration of Donald Trump holds responsible for human-rights violations, corruption or the organisation of the new assembly. They are denied visas and Americans are barred from doing business with them. Last month the administration went further, imposing selective financial sanctions designed to make it impossible for Venezuela's government and PDVSA, the state oil company, to raise fresh debt in New York.

Mr Maduro's predictable response has been to denounce imperialist intervention. Few Latin American governments instinctively warm to the idea of Yanqui sanctions; many were horrified by Mr Trump's talk of a “military option”. But unlike the economic embargo against Cuba, these sanctions are limited and do not extend to third countries. They are



supported not just by conservatives, such as Marco Rubio, a Republican senator, but also by human-rights groups. Without sanctions, Venezuela's leaders would face “no tangible pressure” to change their conduct, says José Miguel Vivanco of Human Rights Watch, a pressure group.

The question is whether they will be effective. Ricky Waddell, the deputy national security adviser, told a conference this month that they are aimed both at punishing the regime and at pressing it to return to democracy. Some worry that those goals are contradictory.

Sceptics argue that to work the sanctions need to be multilateral (and reversible if the regime engages in serious negotiations with the opposition). Both the European Union and the main Latin American countries have denounced the rupturing of democracy but have yet to take much action. Spain is pushing the EU to apply sanctions against individuals.

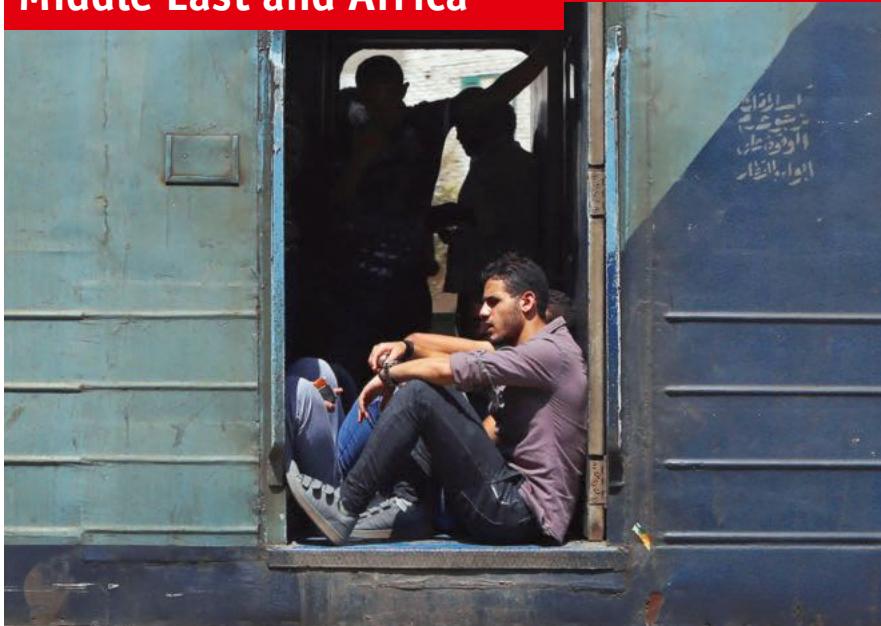
Mr Maduro's dictatorship poses an unprecedented diplomatic challenge to democratic Latin America. At a meeting in Lima last month, 11 of the region's governments (plus Canada) agreed not to recog-

nise the constituent assembly, nor support any Venezuelan candidacy in regional or international bodies. To deny Venezuela a platform, they are seeking to postpone a biennial summit between Latin America and the EU due next month. But as a Latin American diplomat notes, the region does not seem to know what further action to take. It is not clear whether the Lima group has the ability or stomach to suspend Venezuela from all regional bodies—which would hurt Mr Maduro symbolically—and investigate illicit Venezuelan fortunes.

Mr Maduro's response to outside pressure is to draw even closer to authoritarian allies. His government has savagely squeezed imports in order to continue to service its foreign debt of around \$100bn because it fears that if it defaults creditors would seize oil shipments. To meet debt payments of \$4bn later this year, it is likely to tap Russia and China for extra funds.

Chinese officials have voiced concern over their exposure to Venezuela, but are unlikely to cut loose an ally parked on the doorstep of the United States. Russia seems to spy opportunity: Rosneft, a Russian oil company, lent Venezuela \$1bn in April in return for oil concessions. Venezuela recently asked to restructure its bilateral debt, according to Russia's finance minister.

Outsiders have repeatedly underestimated Mr Maduro's determination to cling to power at the expense of destroying his country. Yet in the long run his attempt to turn Venezuela into a communist dictatorship on Cuban lines is unlikely to succeed. His regime is corrupt and unloved. His country is not an island and has a stronger democratic tradition than Cuba. Nevertheless, opponents, both inside and outside, have much work to do to end Venezuela's nightmare. ■



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Egypt's economy

Changing track

The Egyptian government is making renewed efforts to reform the economy through privatisation

THE train north from Cairo winds through the lush fields and meandering canals of the Nile Delta, before chugging into Alexandria. The scenery is pleasant on a 180km journey that can drag on for more than four hours. It is slow enough that EgyptAir offers flights on the same route.

Egypt's state-owned, 6,700km rail network, the oldest in Africa, has seen better days. Stations are dingy; trains are dangerous and often delayed. In August 41 people were killed in one collision. It was the deadliest crash since 2012, but smaller ones are common, with over 1,200 last year alone. (Britain's rail network, with three times as many passengers, saw about 750.)

Days after the accident the transport minister said that he would bring in the private sector to improve quality and safety. His ministry is drafting a law to allow private firms to run trains and stations. If it passes, it would be the clearest sign yet that Egypt is serious about reforming its top-heavy economy.

The state has played an outsized role in business since the coup in 1952 that created the modern republic. It ran factories, banks, utilities and even newspaper publishing houses. At one point more than half of Egypt's industrial production and 90% of its banking revenue came from the public sector. This socialised economy helped create an urban middle class. But by the 1970s it had become bloated and inefficient. Anwar Sadat, then president, had

limited success encouraging private investment with his *infitah* ("openness") policy.

His successor, Hosni Mubarak, oversaw a real shift. In 1991 his government picked 314 public companies to privatisate. They employed 1m people and generated more than 60bn Egyptian pounds (then \$21.4bn) in annual revenue, about 15% of GDP. Within ten years the state had sold more than half, including soft-drink bottlers to Coca-Cola and Pepsi, and a cement factory to Lafarge, a French industrial giant. A study in 2002 for the American government found that these early sales increased productivity at little cost to employment.

By the time Egyptians overthrew Mr Mubarak in 2011, though, privatisation had become synonymous with corruption and job losses. Most notorious was Ahmed Ezz, who bought a public steel company and soon cornered the market. Then he became an influential MP. Critics accused Mr Ezz of using his position to protect a near-monopoly, though the government dismissed two cases against him. In 2006 Mr Mubarak sold a chain of department stores called Omar Effendi. The shops were crumbling but sat on valuable real estate. The investment ministry valued the chain at 1.1bn pounds (then \$210m). The Saudi buyer paid half that price, and promptly pushed thousands of employees into early retirement. An Egyptian court later overturned the sale, one of several re-nationalisations that followed the revolution of

2011. The privatisation scheme was halted.

Despite forecast GDP growth of 3.5% in 2017, the government badly needs cash. The budget deficit was 10.9% of GDP for the year ending in June, most of which went on paying interest on government debt. So the sale of state assets is set to resume. The government has hired three banks, both local and foreign, to sell part of its stake in ENPPI, an oil company. That could bring in up to \$150m. It also wants to offload shares in Banque du Caire, the third-largest state-owned bank. It hopes to raise about \$10bn from such sales over the next three years.

Last year Egypt allowed its currency to float in order to obtain a \$12bn loan from the IMF. The exchange rate plummeted from around nine to the dollar to nearly 18. Foreign remittances, a big source of hard currency, are up sharply in the local currency. The tourism industry, which once employed more than one in ten Egyptians, is slowly reviving as foreigners snap up cheap hotel bargains. Visitor numbers rose by 54% in the first seven months of 2017, and tourism revenues jumped by 170% (both still far below their 2010 peaks).

No room for complacency

That said, economists reckon much of the recent growth is thanks to loose fiscal and monetary policy. Government debt has risen to 130% of GDP. The central bank is printing money at an alarming clip to fund the deficit. The broad measure of money supply grew by 39% over the past year, which drove galloping inflation. The official rate is 33%, which probably understates reality, and food prices are rising even faster.

Salaries and pensions have not kept pace. Even the middle classes are struggling. Any attempt to privatise public services would be controversial. The railways raised fares in 2015; Egyptians fear private

► operators would hike them further.

The companies marked for sale, therefore, are mostly in the banking and energy sectors, which have little direct impact on most Egyptians. The government is offering only minority stakes, limiting buyers' ability to carry out restructuring. It will sell only about a quarter of ENPPI, which is healthy and well-managed, with 19% growth in profits, reaching \$64m last year.

Such sales may help the state's balance-sheet. But they will not fix dismal public infrastructure and hospitals. In June a wealthy animal-lover offered the government 10m pounds to rent Giza's grim zoo, where dead animals have been left to rot in cages, promising major investments. It declined, worried that he might raise the five-pound entry fee. ■

Iraq's wetlands

Drying up again

War and dysfunctional politics threaten Iraq's marshlands once more

THE recovery of southern Iraq's marshlands is arguably one of the great environmental triumphs of recent times. Reduced to dust and withered reeds when Saddam Hussein drained them to flush out rebels in the 1990s, the wetlands once again buzz with birds, dragonflies and the songs of buffalo-breeders, thanks to the devoted efforts of Iraqi conservationists. But the renewed symphony may be the marshes' swan-song. A water crisis rooted in wasteful irrigation, climate change and dam-building is imperilling them again.

A weakened flow into the Tigris and Euphrates rivers means that salt water from the Persian Gulf can now seep upstream into the marshes. This, coupled with farming run-off that has boosted salinity, again threatens wetland wildlife, vegetation and the local Marsh Arabs who have depended on them for millennia. Jassim al-Asadi, a conservationist brought up in the marshes before Saddam drained them, fears that no more than half the 5,600 square kilometres slated for restoration will survive in the years ahead. "It is a nice place now," he says. "But what about the future?"

The problem is partly home-made. Iraq's irrigation methods are often wasteful, and the equipment tends to be rickety. Many farmers rely on thirsty crops such as rice. Politicians have in the past secured extra water for their upstream districts at the marshes' expense. Reform-minded technocrats are forced to contend with deep-rooted corruption, the distracting and costly fight against the Islamic State (IS) group, and low oil prices, all of which have

Qatar's opposition

No place to go

CAIRO

Efforts to end the Saudi-Qatari row are getting nowhere

THIS time Donald Trump seemed to back his braggadocio with results. On September 7th he met the ruler of Kuwait, who has tried to mediate the three-month feud between Qatar and his Gulf neighbours led by Saudi Arabia. Mr Trump suggested a new mediator: himself. "I think you'd have a deal worked out very quickly," he said. The next day Qatar's emir made a surprise phone call to the Saudi crown prince, their first known talk since the crisis began.

But the rapprochement was fleeting. Hours after the call, Qatar's state news agency said that Saudi Arabia had offered to appoint two envoys to negotiate a deal. But the Saudis were insulted. It was as if they had made the first concessions. Qatar's report, they fumed, was a "distortion...of the facts." Any further talks stalled. The call had made things worse.

The Saudis—along with Bahrain, Egypt, and the United Arab Emirates—cut ties with Qatar in June and cut transport links with the tiny peninsula. They told it to stop backing the Muslim Brotherhood and close its Al Jazeera television network. Recently they have fired up their

rhetoric, calling for regime change in Qatar. They have enthusiastically promoted a conference on "democracy in Qatar" in London on September 14th, organised by critics of the regime.

The most prominent is Khalid al-Hail, a businessman whose Twitter profile calls him the "official spokesman for the Qatari opposition". He tends to pop up amid Gulf crises. During the last row, in 2014, he launched a movement to "rescue Qatar", which faded fast. Amnesty International accuses a construction firm in which he is the Qatari partner of failing to pay its workers, a charge he denies.

It was unclear who would attend the conference. A notable absentee will be Abdullah bin Ali al-Thani, a little-known Qatari prince who met the Saudi crown prince last month. There was talk of him forming a government in exile. But when he suddenly emerged as its would-be leader, few Qataris recognised him. His branch of the royal family lost power in 1972, after the current emir's grandfather deposed Abdullah's brother. Abdullah's last public role was as head of the camel-racing federation in the 1980s.

drained state coffers.

But other problems lie beyond Iraq's control. For decades dams built in Syria, Turkey and Iran have swallowed up the waters of the Tigris, Euphrates and other rivers feeding the marshes. New dams due to open in Turkey, including the 1,200-megawatt Ilisu Dam, could further restrict the flow of the Tigris.

Talks over these dams have been inconclusive, partly because the Syrian and Iraqi states barely function and partly because IS has controlled swathes of the Euphrates. Turkey may be tempted to exploit its upstream position. "Obviously now it's easi-

er, because there's such chaos going on that Turkey can carry on and do what it wants without anyone really having time to say anything about it," says Francesca de Chatel, an expert on water in the region.

Climate change is taking its toll, too. Last summer temperatures of about 54°C were recorded in southern Iraq, among the hottest ever. Such heatwaves may become more regular, along with drought. As groundwater is pumped to make up for shortfalls, ancient aquifers could run dry.

The link between ecological decline, political unrest and migration has sharpened minds since civil war erupted in neighbouring Syria, where a three-year drought helped fuel revolt against Bashar al-Assad, the president. Iraq, torn by fighting between rival Shia, Sunni, and Kurdish factions, faces similar pressures.

The marshes face a hotter, drier future. But better water management could help. If only Iran, Iraq, Syria and Turkey would share their waters as amicably as the Danube countries do, laments Mr Asadi. Dam levels should be calibrated during wet and dry years to ensure steadier flows. Iraqi officials might also ponder novel solutions, he says, such as renting storage at the Ilisu Dam for use when needed. Yet stronger countries have exploited their advantages rather than seek compromise. ■



Art in Congo

Painting their land

Congolese art is recovering from its lowest days, and provides a popular critique of poverty. Yet it relies heavily on outsiders

JOSEPH KINKONDA, one of the most famous artists in the Democratic Republic of Congo, lives in a dank bedroom in Ndjili, a scrubby neighbourhood of Kinshasa. At the end of his bed sits a plate with a few balls of paint wrapped in plastic. The air-conditioning unit is broken; a single bare light bulb hangs from the ceiling. Mr Kinkonda, who goes by his pen name of Chéri Chérin, seems as worn down as the surroundings. His legs are swollen; his belly barely covered by a shirt that is as dirty as it is shiny. Yet when he speaks, this miserable studio comes alive.

"I was born with drawing," he announces. "I did not learn it. I had it in my blood." Born in 1955, he recounts how his father wanted him to become a priest and sent him to a Jesuit seminary. But sensing that his passion was not for religion, the Jesuits sent him to Kinshasa's Académie des Beaux-Arts instead. On finishing he started drawing huge murals on shop walls. Today he is the leader of a collective of a dozen or so painters. In the courtyard outside the studio his paintings stand in the sun, to be viewed by passers-by. They depict daily life in Congo in an almost cartoonish style, with a vicious satirical touch. One shows an overloaded truck stuck on a mud road, with the caption "wait until when?"

Congolese painting has an illustrious history. As early as 1929, under Belgian colonialism, an exhibition of watercolours by Albert Lubaki, a painter, caused a sensation at the Palais des Beaux-Arts in Brussels. Coco Chanel was a notable early collector. After independence, under the late dictator Mobutu Sese Seko, who advocated an ideology of African authenticité, Congolese artists also benefited from the state's patronage. Even today, in the filthy mega-city of Kinshasa, remnants of that era remain in the form of impressive public sculptures and murals on public buildings.

Yet recent decades have been less generous. At the end of the cold war, Mobutu's kleptocratic patronage ran out, along with state funds for almost everything else. In 1994 the academy in Kinshasa closed down as students joined pro-democracy strikes against the regime. And in 1997 a ragtag rebel army sponsored by Rwanda and Uganda marched across the Congo basin and into the capital, at the start of a war which in some parts of the country has yet to end. Art continued: Jean Pigozzi, the heir to a French motoring fortune, supported more than a few painters. But making a liv-

ing became much harder, says Franck Dikisongele, an artist and curator.

Today, however, Congolese art, like painting across much of Africa, is reviving. As before much of the impetus has come from outside. In 2015 an exhibition took place in Paris that brought many Congolese artists to attention in the West. One new collector is Sindika Dokolo, a Congolese businessman who is the husband of an Angolan, Isabel dos Santos, reputedly Africa's richest woman. But even within Congo, some patrons have emerged. Trust Merchant Bank, one of Congo's biggest, hosts an impressive gallery in its head offices in Kinshasa, and sponsors exhibitions. The best hotels in the city feature a growing number of Congolese works.

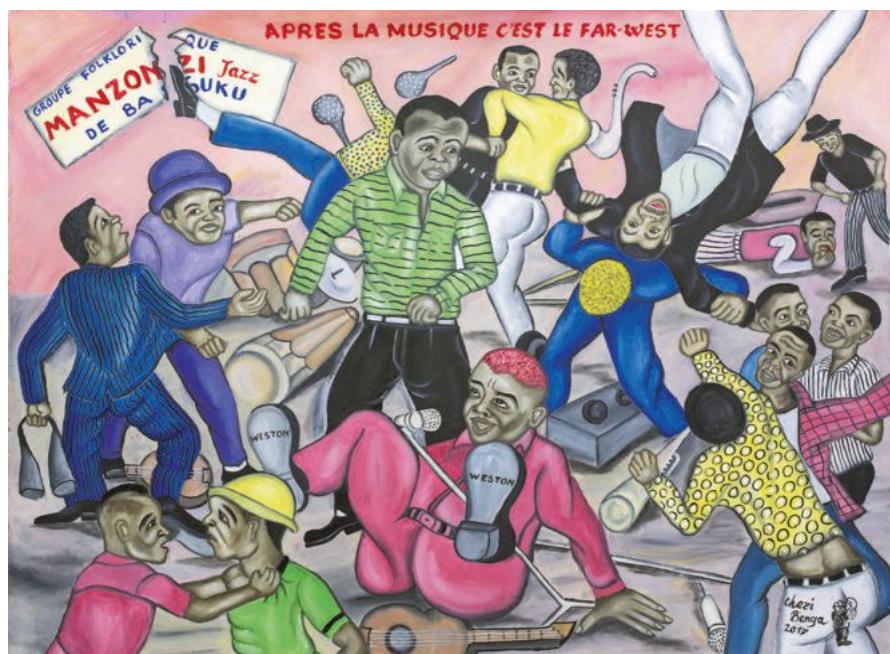
Artists in Congo tend to deal with real life, rather than abstractions. Art, says, Papy Malambu, who paints expressionist portraits of working men, is "a mirror for all of the world". Mr Kinkonda's school, which he calls "popular art", focuses on street scenes. Others deal more directly with the tragedy of war. Freddy Tsimba creates elaborate sculptures out of found pieces of metal, including used cartridge cases gathered from battlefields.

Mr Malambu says he likes to paint men pulling carts as a reminder to Congo's big men of what real work is. Mr Kinkonda in-

serts hidden satirical messages into his street scenes: a dog surrounded by objects refers to a proverb that ultimately hints at the uselessness of politicians. Mr Tsimba's sculptures include one of a life-size car being pushed along by figures made from spoons. The car represents Congo, moved by its people and driven by a politician who refuses to start the engine.

Unfortunately, unlike music, Congo's other big cultural export, art does not tend to pay. Though some Congolese paintings have sold for hundreds of thousands of dollars overseas, many accomplished Congolese artists still live in poverty. "It is mostly expatriates, the whites, who buy. We Congolese cannot buy because there is no money," says Hyppolite Benga Nzau, who goes by Chéri Benga (and whose work appears below). Mr Malambu reckons he does well to sell a few paintings a year, typically for a few hundred dollars each. Most artists work out of slum studios or, in the case of one collective of young painters, out of an abandoned, dilapidated building. Materials such as paint and canvas often still have to be brought in the luggage of foreign patrons.

What does the future hold for Congo's artists? For all their success abroad, the political situation at home grows ever more tense. Despite his second and supposedly final term running out last December, Joseph Kabila, the president, remains in office. New conflict has displaced roughly 1m more people in the past year. If the unrest spreads to the capital, the artistic renaissance could be arrested again. Yet, says Sam Ilus, one of Mr Kinkonda's protégés, "there is always hope. We live today because we know that we will live tomorrow. Eventually, things always change." ■



Worth a thousand words

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More world leaders signed up in Paris in 2015 to an international agreement on climate change than had ever done so before. But since then progress in Asia has been slow, and America's president, Donald Trump, has announced his intention to withdraw his country from the accord.

What role can Asia-based companies and governments play in shaping new thinking and turning ambition into action? And who will fill the global-leadership vacuum?

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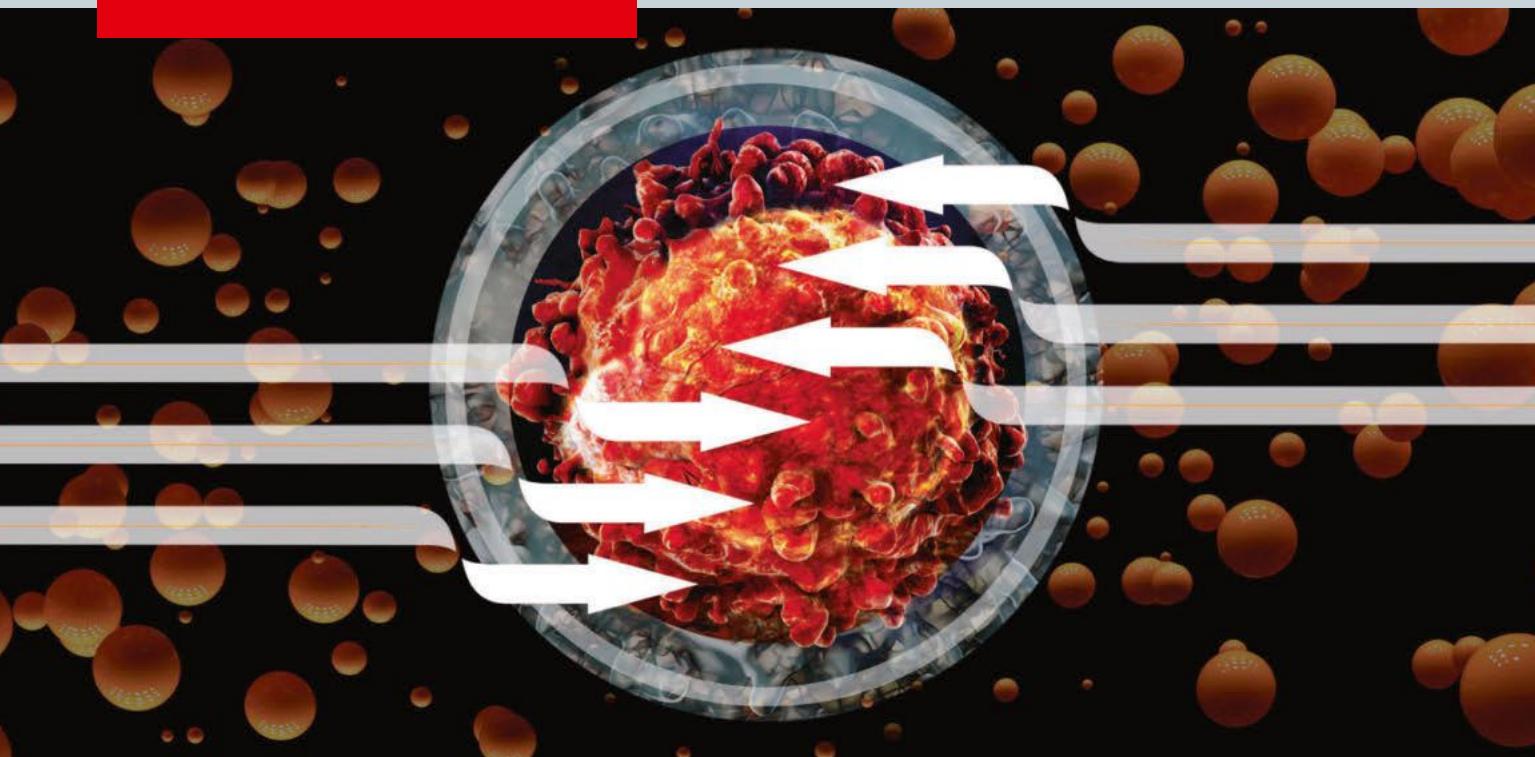
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A new era of cancer treatment

Targeting tumours

In rich countries half of cancers are now survivable. And better understanding means that more cures are coming, says Natasha Loder

HERE are few whose lives have not been touched by cancer. It cuts down friends, loved ones, siblings, spouses, parents and children. And it does so more than it used to. A generation ago, one in three people in the rich world could expect one day to hear the fateful words, "I'm afraid you have cancer." In some countries it is now approaching one in two. The longer other things do not kill you, the more of the wear and tear that leads to cancer your cells accumulate. Live long enough and it will be the reward.

Worldwide, cancer is the second leading cause of

death after heart disease; it killed 8.8m people in 2015, three-quarters of them in low- and middle-income countries. Between 2005 and 2015 the number of cases increased by 33%, mostly owing to the combined effects of ageing and population growth. New cases are expected to increase by 70% in the next 20 years.

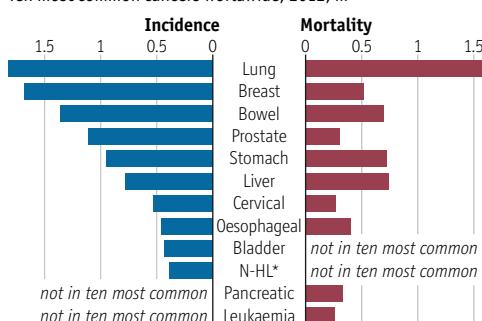
Set against this rise is the fact that, in rich countries, cancer is becoming more survivable. Today 67% of patients in America will survive for at least five years. Different cancers fare differently, as do different sorts of patients—cancer has proved more treatable in children than in adults. Some cancers, such as that of the pancreas, have seen barely any improvement. But there are general grounds for optimism.

New research tools, such as easily generated antibodies, rapid gene sequencing and ever easier genetic engineering, have revolutionised biologists' understanding of cancer. This understanding has allowed more specific approaches to the disease to be developed, and the trend will continue. What is more, the tools of molecular biology have moved out of the lab and into the clinic. Genetic tests are used to find the precise vulnerabilities of a particular patient's cancer. Antibodies attack the specific molecules that have gone haywire. The cells of patients with cancer are engineered to better fight the disease.

And in the current decade a whole new branch of therapy has sprung up. Unshackling the immune system's response to cancer, once a pipe dream, has be- ►

A plague on all their houses

Ten most common cancers worldwide, 2012, m



Source: Cancer Research UK

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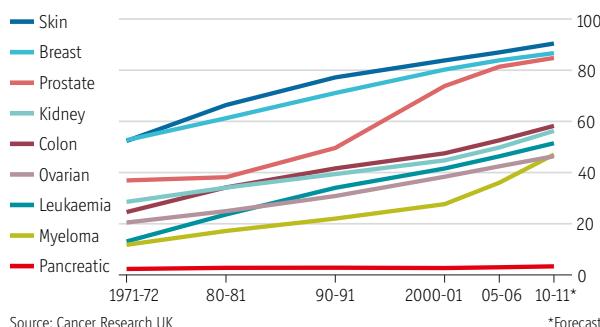
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Living longer

England and Wales, five-year relative survival rate by type of cancer, %



▶ come practical medicine, with approved therapies for eight kinds of cancer. The excitement at oncology conferences is palpable.

As these advances have arrived regulators have increased the speed with which treatments for life-threatening diseases are approved. This is in some ways a mixed blessing—some expensive drugs with little if any benefit are nevertheless getting to market. But it has encouraged an unprecedented wave of investment and innovation. The pipeline of oncology drugs in clinical development has grown 45% in the past decade. There are currently about 600 drugs under development at biotech and pharma companies.

The picture is not uniformly rosy. In both treatment and prevention the poor are ill served. Basic chemotherapy and pain relief is difficult to come by in many parts of the world. The failures are not limited to poor countries. Cancers due to bad diet, obesity, alcohol abuse and smoking could all be reduced a great deal in wealthy ones. And while vaccination against human papilloma virus is routine in Rwanda, it is still limited in America—which means thousands of American women will face cervical cancers they could have avoided in years to come.

But if some low-hanging fruit still go tragically, lethally unpicked, progress is not merely possible. It is happening. ■

Unruly origins

Beginnings, and how to spot them

It all starts with a single cell

DIANE MILLEY, a teacher, remembers getting the small, dry cough just before school broke up for the summer in 2013. She wasn't worried: she considered herself generally healthy—she ran three times a week and went to the gym. Her doctor in Bradford, Massachusetts, put her on a course of antibiotics. When they didn't work she had an x-ray. It showed nodules across her lungs. A bronchoscopy was ordered to retrieve a tissue sample from her lung. As she came round from the anaesthetic she remembers overhearing two medical staff talking. One said "It's malignant." She had late-stage lung cancer.

Ms Milley's body, like all human bodies, contained tens of trillions of copies of her genome. In theory, all those copies should be more or less the same. In practice, over the years, they all get knocked around in different ways. The oxygen that powers cell metabolism damages the DNA on which the genes are stored as a

matter of course; so do background radiation and exposure to the many low-level carcinogens; so do sunlight and infection with viruses; so do choices about diet and recreational drugs, notably alcohol and tobacco (from which Ms Milley abstained).

The vast bulk of this damage is quickly fixed by DNA-repair enzymes; fewer than one mutation in a thousand persists. But wear and tear builds up. Many such changes make little or no difference. A few will be of consequence to the cell concerned, reducing or eliminating its capacity to do its job. But the loss of a single cell's contribution matters not a jot.

There are some genes, though, where uncorrected damage can matter a lot. Foremost are the genes which control cell growth, such as *HER2*, which tells the cell how to make a protein called human epidermal-growth-factor receptor type 2. This is a protein that, when it sees a particular hormone, tells the cell it is in to divide. Mutations in the *HER2* gene can make cells proliferate when there is no need. When they do so their daughter cells, which will share that *HER2* mutation, will go on to do the same.

Among some 20,000 genes in the genome there are dozens which, like *HER2*, can cause unwanted cell division when they go wrong. To forestall such problems there are various tumour-suppressor genes whose job is to make sure that cells damaged in this way shut themselves down. The best known is the gene for a protein called *p53*, which stops cells from reproducing if their DNA is damaged. But these tumour-suppressor genes, too, are subject to mutation.

The numbers game

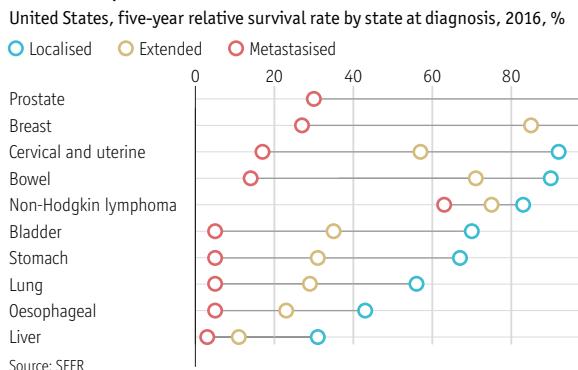
Thus over time, as genetic damage accumulates, the likelihood rises that somewhere in the body's trillions of cells there is one that has, through five or six mutations in key genes, developed the ability to grow without check. This likelihood is not the same for everyone. Some people start off with quirks in their genome which make them more susceptible. Take the genes *BRCA1* and *BRCA2*, which describe proteins that repair DNA; people who inherit a damaged version of one or the other face a higher risk of cancer (in particular, breast and ovarian cancer) because, with one crucial function already compromised, it takes fewer mutations for a tumour to get going.

Once a cancer has begun its unruly growth it will pick up more and more mutations: the cancer genome project at the Sanger Institute, outside Cambridge in England, has found that cancers can have as few as ten mutations or as many as a few hundred. Though all the cells in the cancer are descended from one parent cell, they become increasingly diverse over time. Some cells come loose and start new tumours of their own elsewhere. The body's immune system will often recognise that something is amiss and try to fight the cancer and slow its spread. Sometimes it wins, stopping the cancer or killing it. Sometimes it doesn't.

When Ms Milley's cancer was diagnosed all the things that could go wrong already had; the tumour was well developed and had spread through the lung and beyond. It would have been far better for her if it had been diagnosed earlier (see chart on next page). But with lung cancer, as with many other forms of the disease, there are often few symptoms until the disease is already at an advanced stage. If cancer could be reliably detected earlier, many lives might be saved.

In some wealthy countries, some cancers—for example, those of the breast, prostate and cervix—are regularly sought out before they start to cause symptoms. Now researchers are trying to improve diagnostic tools even further, so that more types of cancer can be found early on (and with greater reliability). For some it is a terribly personal hunt. Billy Boyle, the president of a small biotech company, Owlstone Medical, based in Cambridge, in England, is one of them. He lost his wife Kate, mother to their two young boys, on Christmas morning in 2014. She died of colon cancer that had been picked up too late. Mr Boyle says that if colorectal cancer is detected early, 95% of sufferers survive. Only 6% survive if the can-

First come, first saved



►cer reaches stage four. For many cancers, early detection is “our greatest opportunity to improve survival,” says Mr Boyle.

Mr Boyle wants to detect cancer on the breath using an ion-mobility spectrometer—a gadget that weighs chemicals by passing them through an oscillating electric field. The breath contains a wide range of organic molecules that reflect what is going on in the body’s metabolism. Cancers, which affect the metabolism, should in so doing change the pattern of molecules on the breath. Although Owlstone’s system is very small—it fits on a chip the size of a coin—it is sensitive, identifying molecules at a level of a few parts per billion. The firm hopes that when it has identified molecular “fingerprints” associated with particular cancers it will be able to detect the disease earlier than other tests do.

Improved diagnostics can do more than pick up cancers sooner. They can also reveal the cancers’ weaknesses. Because cancer drugs work in different ways, some will do well against a tumour with one set of mutations but one that has become cancerous by some other pathway unscathed. Troy Cox, head of Foundation Medicine, a diagnostics company based in Cambridge, Massachusetts, says that in America 14 cancer drugs now have “companion diagnostics”—tests that show whether a cancer is likely to be susceptible to them or not. Ms Milley’s lung cancer, for example, turned out to harbour a mutation which meant she could be treated with a drug that targets that specific protein (see next section).

So far, such genetic tests are used when planning therapy for 50% to 60% of solid tumours, according to Foundation. New drugs, new understanding of cancer mechanisms and new technologies that can scan many genes for mutations at once mean such testing will be more informative in the near future. Many, including England’s chief medical officer, Sally Davies, want cancer patients to be routinely offered genetic screening of their tumours. Foundation and ThermoFisher, a diagnostics firm in Waltham, Massachusetts, are hoping to encourage this by offering every gene of interest on a mass-produced chip. Some of these mutations will help doctors pick the best drugs for that particular cancer, others may indicate how it is likely to develop. The tests would also identify mutations for which there is not yet an approved therapy—but for which there is one in clinical trials.

David Hyman, at the Memorial Sloan Kettering Cancer Centre in New York, worked on a trial of an experimental drug, larotrectinib, that was expected to work in cancers where a gene called NTRK1 had undergone a specific mutation. Because that mutation is found in less than 1% of all cancer patients, recruiting people to the trial was a “Herculean effort”, he says. It was worth it, though. The drug was tested on 50 patients with 17 different types of tumour. In results published in June, 78% of patients with 12 different tumour types responded to the drug.

Aside from picking the right drugs, genetic tests are also starting to reveal more about the outcome and risks of any individual cancer—something that is useful for deciding whether a cancer needs

to be treated at all. The MammaPrint test, made by Agendia, based in Amsterdam, analyses the activity of genes in early-stage breast cancer. If women with early-stage breast cancer were routinely tested in this way, those who will not need chemotherapy after surgery could be picked out (a recent study of patients found 58% to be in this category). A similar test is available for prostate cancer from the firm Myriad Genetics, based in Salt Lake City, Utah. A recent study suggests that people who have inherited a mutation in the P53 tumour-suppressor gene might be well advised to have whole-body MRI scans to screen for cancers, since their unsafe-guarded cells are at particular risk.

Identifying genes from tumours normally means retrieving cancer cells via biopsies. This is invasive and often done only once in the course of the disease. But cancers are both heterogeneous and labile; elsewhere in a tumour, and later in a tumour’s progression, things may look different.

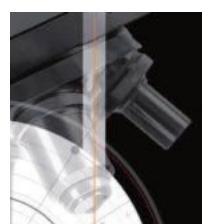
These challenges are now being tackled with blood tests, a technique termed “liquid biopsy”. Tumours shed DNA into the blood, and these circulating fragments of DNA can be tested for mutations. Regularly testing this DNA could be a way of keeping track of a tumour’s mutations. The Institute for Cancer Research, based in London, recently showed that it could use a liquid biopsy to pick out whether a patient was likely to benefit from a new type of drug called a PARP inhibitor. Using liquid biopsies the researchers were able to find out if the drug was doing any good in just four to eight weeks. Liquid biopsies are also a promising technology for the routine monitoring of patients who have been successfully treated for cancer, lest their disease return. Mark Roschewski, a researcher with America’s National Cancer Institute, the NCI, thinks the technology could be “orders of magnitude more sensitive than radiographic imaging”.

Biopsies optimised

The big question for the firms developing these liquid biopsies is whether the technology will also be suitable for the early-detection market that Mr Boyle is chasing with his breath tests. Guardant Health, a firm based in Redwood City, California, currently offers a liquid biopsy that allows patients to obtain a genetic profile of their tumour. It is using the data it gathers to look at the feasibility of early detection. Helmy Eltoukhy of Guardant says the firm is “agnostic” about the markers it seeks in the blood, meaning that its researchers will not look just for DNA from tumours—if the data suggest that RNA (a relative of DNA) or proteins provide the telltale fingerprint, then that is what they will look at.

All diagnostic tests have to overcome two hurdles. They have to be sensitive enough to identify those who have the disease correctly and also specific enough that they do not see signs of the disease when it isn’t actually present. The more widely they are used, the more important that second requirement gets; false positives are a pervasive problem with existing tests such as mammograms and PSA, a test for prostate cancer. (This is why PSA screening, while common in America, is much less prevalent in Europe.)

In liquid biopsies the challenge will be to detect cancer-specific signals against a noisy and confusing background. Barry Kramer, director of the division of cancer prevention at the NCI, warns that the same marker can have different functions in different organs. He notes that a programme screening infants for neuroblastoma was halted after it started to pick up too many growths that did not merit clinical concern and didn’t reduce the death rate. Specificity, says Mr Eltoukhy, is early detection’s Achilles’ heel. Others warn that liquid bi-



Improved diagnostics reveal cancer’s weaknesses

opsies aimed at DNA will never be sensitive enough for early detection, because early tumours may shed very little DNA, or shed it only occasionally; other molecules might prove more telling.

Nonetheless, biotech is gung-ho about the idea. Grail, a liquid-biopsy startup in Silicon Valley spun out of Illumina, a sequencing firm, recently raised \$900m. Earlier this year Guardant raised \$360m, and Alphabet invested \$65m in Freenome, a San Francisco startup with similar plans. Grail has begun a trial of its technology which will enroll 120,000 women who are receiving mammograms to see if its technology really does offer early detection.

Whether it will make sense to adapt liquid biopsies to population screening will depend on their costs—currently still too high for widespread use—their sensitivity and, crucially, their false-positive rates. Unnecessary investigations after false positives are both worrying and debilitating for patients and costly for the health-care system. But some, such as Luis Diaz, an oncologist at Memorial Sloan Kettering, argue that initial overdiagnosis is a necessary part of moving ahead: “One never learns to ride a bike without falling off.”

The costs and difficulties of blood screening are one of the things that tiny Owlstone has going for it. Testing the breath for metabolites doesn’t require the tumours to have started shedding DNA. Britain’s NHS is running a £1.1m trial of the technology in patients suspected of having lung cancer who are also being examined by other means. If this finds the technology to be reliable it might be expanded for use in population screening. In July Owlstone said it would collaborate with academic partners to see if breath biopsies could be expanded to pick up bladder, breast, kidney, pancreatic, prostate, brain, and head and neck cancers.

There is no question that blood biopsies will be at the heart of the future of tracking and profiling tumours. But for early detection other options might yet win out; success will not hinge on which company starts with the most money but which offers the biggest bang for the buck. Health-care systems will seek to adopt technologies that work at scale. The benefit will be that more cancers can be cured with the most basic, oldest and most effective methods of cancer treatment. ■

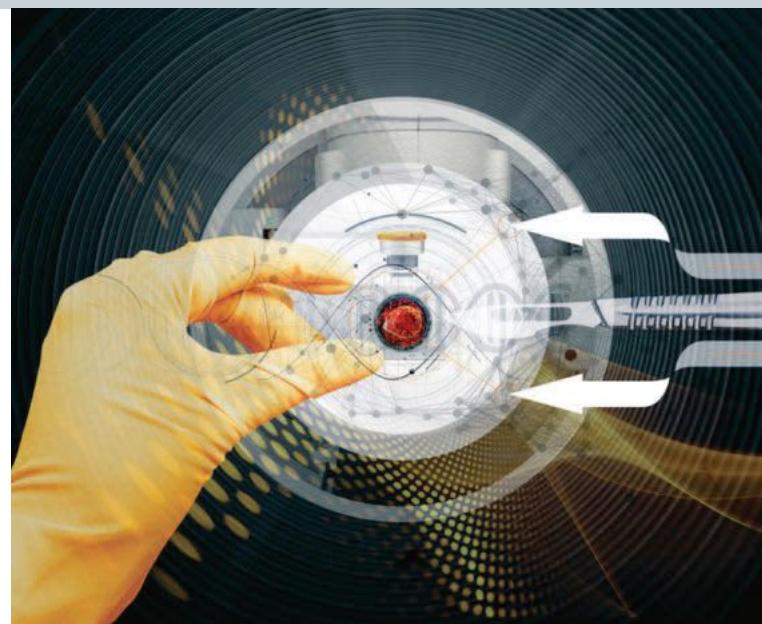
Molecular medicine

Progression, and how to stop it

Surgery, radiotherapy and cancer drugs are all becoming more tightly focused

MS MILLEY’S primary tumour was in the middle lobe of her right lung, which surgeons removed entirely. Surgery is an ancient form of cancer treatment and still a common one. Today’s surgeons have everything from lasers to cryosurgery—the freezing of abnormal tissue—at their disposal. By and large, they use this expanding range of tools to cut out less and less. Ultrasound, magnetic-resonance imaging (MRI), x-ray tomography and positron-emission tomography (PET) scans have between them eliminated much of the need for “exploratory surgery” to understand the scope of a cancer.

Often surgery goes hand-in-hand with radiation therapy. Soon after the discovery of x-rays at the end of the 19th century it became clear that radiation which killed cells could be used as a cancer therapy. In its early days practitioners judged the correct dose by trying their machines out on their own arms, looking for a pink reaction on their skin. Many went on to develop leukaemia.



Today radiotherapy is considerably safer for its practitioners and more beneficial to its recipients. After a cancer is cut out, radiation is frequently used to kill the cancer cells the surgeon’s knife has missed. It is also sometimes used to destroy the tumours themselves, particularly in places where surgery would be hard. In rich countries about half of patients with localised cancers receive radiotherapy. Two out of five of those treated for cancer and cured in Britain will have had treatment which consisted of radiotherapy either alone or in part. Breast and prostate cancers respond well to it.

To make all this possible, medical physicists produce beams of x-rays, gamma radiation, neutrons and, increasingly, protons; they have ever more sophisticated ways of ensuring that these cell-damaging energies are delivered to the tumours being targeted, rather than to healthy tissue nearby. Ms Milley experienced this when she had a superficial brain metastasis dealt with by stereotactic radio-surgery. The procedure uses 3D imaging to determine the exact location of a tumour, at which point a number of different beams are focused on it from various directions (see diagram on next page). The idea is that only in the part of the brain where all the beams cross is the dose high enough to kill cells—the individual beams, on their way in and out, do comparatively little damage. The idea is to match the extent of the lethal criss-crossing as closely as possible to the location of the tumour. It is a way of achieving what Emma Harris, a medical physicist with the Institute of Cancer Research (ICR) in London, calls the current state of the art: “Shaping the beam and varying the intensity of the radiation dose to create exquisite volumes of radiation.”

Proton therapy offers another way to deal death to tumours while sparing the surrounding tissues. By choosing the right energy for the beam physicists can determine how deep into the tissue it will get before doing most of its damage. This specificity is seen as particularly useful in tumours that are near eyes, brains and spinal cords.

Radiation can also be emitted inside the body; radioactive pellets and seeds can be put right where they are needed. A new version of this approach is being developed by Nanobiotix, a biotech firm based in Paris, which is developing nanoparticles containing hafnium oxide which generate electrons when exposed to x-rays. When these nanoparticles are injected into tumours that are then zapped with x-rays they increase the damage done.

As well as surgery on the lung and radiation treatment for the tumour in her brain, Ms Milley also had chemotherapy—the third of the 20th century’s medical responses to cancer. She was given a cocktail of cisplatin, a drug containing platinum that was ap-

► proved in 1978, and Alimta (pemetrexed).

Chemotherapy's origins can be traced back to the development of chemical weapons in the first world war. Looking into the records of soldiers affected by mustard gas, two doctors at Yale University, Louis Goodman and Alfred Gilman, noticed that many were short of white blood cells. They wondered if this meant that cancers in which white blood cells proliferate—lymphomas—might be treated with something similar. The first patient to receive this treatment was a man with advanced lymphoma who is known today by the initials "J.D.". His symptoms were greatly relieved.

The treatment worked because mustard gas damages cells' DNA, stopping cell division. These effects are not specific to cancer cells; but because cancer cells divide a lot, such poisons are particularly bad for them. In 1947 aminopterin, a chemical which messes up cell division by interrupting the metabolism of folic acid, was found to produce remissions in children with acute leukaemia. This drug was a precursor to methotrexate, a treatment which provided the first cures of a metastatic cancer in 1956 and is still commonly used today. By the 1960s, chemotherapy had induced long-term remissions, and even cures, of Hodgkin disease, a lymphoma, and childhood acute lymphoblastic leukaemia. Cures of testicular cancer arrived in the 1970s. Though few cancers can be cured with chemotherapy on its own, many can be set back a long way and controlled for quite some time. Chemotherapies, like radiation therapies, are often used to mop up the cancer left over when primary tumours have been excised.

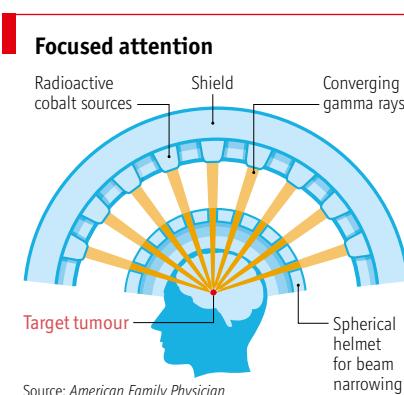
Elective affinities

One problem with chemotherapy is that cancers can become resistant to it. Most cancers are genetically heterogeneous, because the cells accumulate new mutations as they grow. Some of these mutations can make the cells less susceptible to the chemotherapy. As treatment continues, such cells become more numerous, and as they divide they go on to accumulate mutations that make them even more resistant—the cancer evolves resistance to chemotherapy rather than an infection can evolve resistance to antibiotics. This is why chemotherapies are now often used in combination; it is harder to evolve resistance to two or three drugs at the same time.

Another problem with chemotherapy is that it attacks cells that are dividing for perfectly legitimate non-cancerous reasons, too. Hence the side-effects, which include fatigue, hair loss, mood changes and nausea. The severity of the effects vary greatly from person to person, and some, such as nausea, can be treated with secondary drugs under some circumstances. But some chemotherapies can have long-term side-effects, damaging the heart, the nerves and fertility.

Before taking on her chemotherapy, though, Ms Milley was given another treatment: Tarceva (erlotinib). Tarceva is a small molecule which disrupts signals transmitted by a protein called the epidermal growth-factor receptor (EGFR). At least eight mutations that cause the EGFR to be constantly active have been tied to lung cancer, and Ms Milley had one of them. Her course of Tarceva saw all the tiny tumours across her body shrink, one by 60%. She went back to work.

A key tool for targeting cancer-specific pathways and molecules is the antibody. Antibodies are proteins made by the immune system which stick to a particular bit—the "antigen"—of a particular molecule. Turning them into mass-produced drugs has been one of the biotech industry's triumphs. In the 1990s they started to come into use as cancer therapies. Aimed at antigens that crop up on cancers, but not other cells, they are far more spe-



Source: American Family Physician

cific than older chemotherapies. Rituxan (rituximab), an antibody which targets a protein on the surface of the immune system's B-cells that misbehaves in B-cell non-Hodgkin lymphoma, was approved 20 years ago, in 1997. Other early targeted therapies that blocked growth signals in different cancers included Herceptin (trastuzumab) and Erbitux (cetuximab), which are both antibodies, and Iressa (gefitinib) and Gleevec (imatinib), which are smaller molecules like Tarceva. These drugs transformed the treatment of many cancers. Herceptin, for example, dramatically altered the outcome of breast cancer in patients with the HER2 mutation. With Her-

ceptin as part of a two-drug therapy, a woman diagnosed with the metastatic form of the disease can hope to survive for almost five years; previously it was 20 months.

Another promising targeted approach involved aiming drugs at the creation of new blood vessels. If tumours are to grow beyond a few millimetres in size they need to encourage new blood vessels to bring them nutrients. Drugs which inhibit this process arrived in 2004 with Avastin (bevacizumab). It is currently used to treat advanced colorectal, kidney and lung cancers.

A third approach attacks DNA repair systems. Losing some of the ability to repair DNA helps cancers accumulate mutations, and is often part of how they get started. But the cancers need to keep some residual DNA repair functions; otherwise the cells will simply die. Thus cancers that have mutations in the BRCA1 and BRCA2 genes rely heavily on a backup DNA repair mechanism which uses proteins called poly-ADP-ribose polymerases (PARPs). Now targeted drugs have been designed to inhibit this repair mechanism. In its absence, massive genetic damage drives cancer cells to their death. Some of these PARP inhibitors have been shown to help in BRCA-linked breast cancers, and there are promising results in ovarian cancer. They seem also to have promise in some prostate and pancreatic cancers.

Finding targets for such therapies has been made far easier by the sequencing of the human genome and the remarkable reductions in the cost of sequencing DNA which followed on from it. With a baseline genome for comparison, identifying the mutations in cancers became much easier. Once found, these genes can be used to understand the molecular workings of the disease and, in theory, to find new targets for drug developers.

Imperfect chemistries

Mike Stratton, director of the Sanger Institute, set up its cancer-genome project in 2000, when sequencing was still a comparatively arduous business. They were interested in looking at mutations of 40 different genes, but practical limitations meant they could only start working on 20. The third gene they looked at was BRAF; sequencing the genes from 500 cancers the researchers found that there were BRAF mutants putting yet another cell-growth-signalling pathway into overdrive in half or more of the malignant melanomas in their sample. By 2011 the first BRAF inhibitor, Zelboraf (vemurafenib), was approved for the treatment of melanoma. In a trial, the six-month survival was 84%, compared with 64% who were treated with chemotherapy. The drug was quite toxic—despite their targeting, such drugs do have side-effects—but it was still approved for use.

Hundreds of thousands of cancers have now been sequenced, and the hunt for targets is seeing diminishing returns. Though there are hundreds of genes that go wrong in cancers, only a limited number promote cancer development and are common to a number of cancers. A significant amount of work is now focused not on finding new targets but on second-generation drugs aimed at targets that have already proved vulnerable; these newer drugs ►

► aim for higher efficacy, lower side effects or, ideally, both. There are also ways to combine the specificity of antibodies aimed at a well characterised target with other forms of treatment—to bind the antibody to something poisonous, say, or to something radioactive, and use it as an address label.

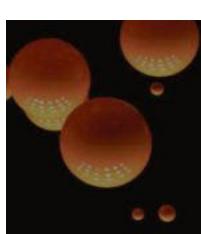
But there are still new targets being hit for the first time. In 2016, the drug Xalkori (crizotinib) was approved for ROS1-positive lung cancer. Louis Staudt, director of the centre for cancer genomics at the National Cancer Institute (NCI) in Bethesda, Maryland, says about 1-3% of cases of lung cancer are driven by a ROS1 mutation. Dr Staudt is working on a repository for genomic information called the NCI Genomic Data Commons, which hopes to identify more low-frequency drivers of cancer.

These targeted therapies are changing the way the doctors and regulators look at cancer. Typically cancers have been classified according to where they occur and how they behave. Now they can also be classified according to which genes are going wrong in them. This allows new sorts of investigation such as the NCI's MATCH trial, which matches patients to treatments based on the genetic changes in their tumours. More than 6,000 patients treated at more than 1,000 institutions have had their tumours sequenced as part of this trial. The large numbers are needed to pick out the rare mutations that drive cancers.

By their genes shall you know them

A milestone in the transition to a genomic era for cancer therapy was reached earlier this year when America's Food and Drug Administration (FDA) approved a treatment based on a specific genetic indicator rather than the type of tumour, as determined by location and its tissue structure. A similar "biomarker"-based approval is expected soon for a drug which targets a defect in a family of signalling proteins called tropomyosin receptor kinases, proteins which play an important role in tumour growth. A rare mutation (it affects only about 1% of patients) sees the genes that code for TRKs become fused to other genes. Loxo Oncology, a biotechnology firm in Stamford, Connecticut, has developed a drug aimed at this aberration; the idea is that it should be licensed for use in anyone with the relevant mutation.

Targeted therapies mark a significant advance over, and addition to, older chemotherapies. But they share their familiar weaknesses. In the 2000s Olivia Rossanese, a researcher at the ICR, worked on a BRAF inhibitor at the British pharma firm GSK. She says: "We made a drug to it, we said patients with this mutation are going to respond and that happened. It was a beautiful story...right up until resistance." To cancers, targeted therapies, including antibodies, are another constraint to evolve around, and in the end that is what they tend to do.



"It was a beautiful story...right up until resistance"

For 13 months Ms Milley responded wonderfully to Tarceva. Then her doctor at the Dana-Farber Cancer Institute in Boston noticed spots on her adrenal glands that indicated resistance. That was the point at which she started cisplatin chemotherapy. It worked for eight months. When it started to falter, she went back on to the Tarceva, which worked for another four months. That looked like the end of the road for approved treatments. The only remaining option seemed to be to take a chance with a clinical trial, and this she agreed to do.

In the middle of October 2015 her doctor called unexpectedly. She was not eligible for the trial she had been trying to enrol in. But the FDA had just approved a brand new drug for lung cancer: Keytruda (pembrolizumab). It was one of a very promising new class of treatment known as immunotherapies. ■

Loosening inhibitions

Immunity, and how to encourage it

Medicine has finally figured out how to get the immune system to fight cancer

THAT infections could sometimes cause a cancer to retreat, or even vanish, was known well before the advent of modern medicine. Imhotep, a pharaoh, recommended treating a tumour with a poultice followed by an incision—something that would help an infection develop. In early modern Europe doctors used septic dressings on tumours with ulcers and deliberately created purulent sores. By the end of the 19th century, William Coley, a bone surgeon in New York, was methodically infecting patients with *Streptococcus* bacteria.

Coley's work fell out of favour, partly thanks to the rise of radiation therapy. Many continued to cling to the idea that the immune system might in some circumstances be provoked into recognising, attacking and subduing a cancer; they just didn't know how to provide the provocation. In 1976 this latent belief in the potential of "immunotherapy" blossomed into hope with the discovery of interleukin 2 (IL-2). IL-2 is a growth factor that encourages the production of T-cells, white blood cells that scan the body for unwanted invaders and, on finding them, activate other parts of the immune system, including the B-cells which produce antibodies.

But IL-2 was a false dawn. On its own, it activated the immune system indiscriminately, and the immune system is a powerful beast; Elad Sharon, at the National Cancer Institute's division of treatment and diagnosis, says the effects were "toxic and messy, and frequently sent patients to the ICU." That might have been more tolerable in a drug that delivered. But to general surprise and discouragement IL-2 cured only a few patients of metastatic cancers. It was not clear why the treatment was not more effective.

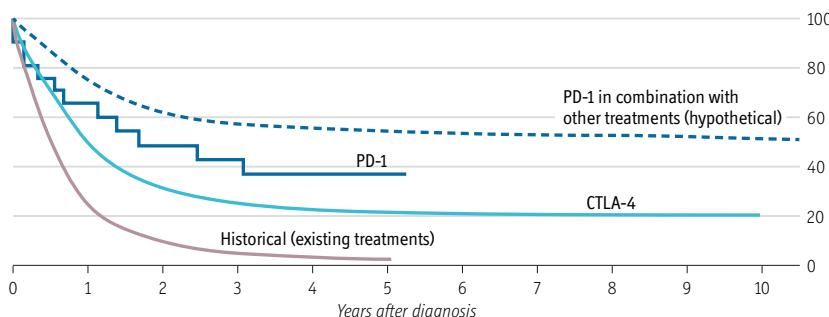
Answers started to arrive in the 1990s. James Allison, at the Cancer Research Laboratory at the University of California, Berkeley, began work on a protein called CTLA-4 on the surface of some T-cells. By 1996 he had shown that this protein put a brake on the immune response to cancer. Blocking CTLA-4 with an antibody removed the brake; the immune system activated itself and got to work. Tumours in mice vanished when the animals were given CTLA-4-blocking antibodies. Though it was not immediately obvious, in retrospect this came to be seen as one of the reasons IL-2 never really worked: it is not possible to make a car run faster if its brakes are jammed on.

At the time oncologists were unimpressed by Dr Allison's results. Cancer had been cured in mice many times over. And after many failed trials, immunotherapy was in exile—banished to the small corners of the big oncology meetings. But in 1999 Tasuku Honjo of the University of Kyoto, in Japan, showed that the gene for a protein called PD-1 also seemed to tamp down the immune system. When this gene was switched off in mice, some developed autoimmune diseases—a sign of an immune system in overdrive. In collaboration with Arlene Sharpe and Gordon Freeman at Harvard, Dr Honjo showed that some cancer cells had a second protein called PD-L1 on their surfaces which, by interacting with the PD-1 on T-cells, protected the cancer from them. Dr Honjo remembers approaching many companies with the finding, but "none wanted to invest."

Despite a general wariness on the part of pharma companies, though, a trickle of development on therapies aimed at CTLA-4 and PD-1 did begin. Then, in 2010, Bristol-Myers Squibb released results from a trial of an anti-CTLA-4 antibody, Yervoy (ipilimumab).

Stepping up

Survival rates of melanoma patients, by type of treatment, %



Sources: AACR 2016; *J Clin Oncol*

► mab), in malignant melanoma. Compared with the state of the art, they were fantastic. It was the first drug shown to change survival in this devastating disease, raising the median to ten months. Some survived much longer.

What was going on? Because the immune system is such a powerful beast, evolution has equipped it with a system of checks and balances lest it get out of hand. Both CTLA-4 and PD-1 are parts of that system. When one sort of immune cell presents an antigen which it has picked up to another, the second cell will ignore it if, at the same time, the first cell stimulates the CTLA-4 receptor. If the CTLA-4 receptor is blocked with an antibody like Yervoy, though, this “checkpoint” system does not work. Unchecked, the immune system is able to react to a wider range of antigens—including tumour antigens. Freed up by Yervoy the body’s T-cells started attacking the melanomas. And, it turned out, kept on attacking them. Perhaps the most remarkable feature of the new “checkpoint inhibitor” was that a small subset of patients survived for year after year.

Despite indications of success with melanomas, many scientists thought the checkpoint-inhibitor mechanism would not be broadly effective. Melanomas accumulate a very large array of mutations, and are thus more likely than most cancers to display antigens which trigger an immune response. This argument was bolstered by the observation that melanomas are more likely than other cancers to be subject to spontaneous remissions—presumably because something else kicks the immune system into gear. What was more, Yervoy had serious, sometimes life-threatening side-effects.

Pessimists have a pretty good record when it comes to cancer prognostication. But this time they were wrong. At Merck Roger Perlmutter, an immunologist who had previously left the company, was brought back to run the research labs. He became very interested in a PD-1-blocker then known only as MK-3475. Unlike CTLA-4, which works higher up the immune system’s chain of command, PD-1 has a front-line role; if a cancer cell carries PD-1’s

counterpart, PD-L1, on its surface, T-cells will ignore the cell despite any suspicious antigens it may be carrying (see diagram). MK-3475 seemed to block the interaction nicely. It might thus render the immune system blind to the cancer’s subterfuge. “Whatever [else] you are doing, stop,” Perlmutter told his clinical-development group. Merck expanded a phase 1 trial programme looking at the drug’s effect on advanced melanoma to more than 1,200 patients, making it the largest phase 1 trial in the history of oncology.

The expansion was in part a response to a new discovery: early evidence suggested that checkpoint inhibitors could also get results with lung cancers, which are a much

bigger killer than, and thus represent a much larger market than, malignant melanomas. Luis Diaz, head of solid-tumour oncology at the Memorial Sloan Kettering Cancer Centre in New York, recalls: “It was completely unexpected. Prior to that I was not a believer in immunotherapy.”

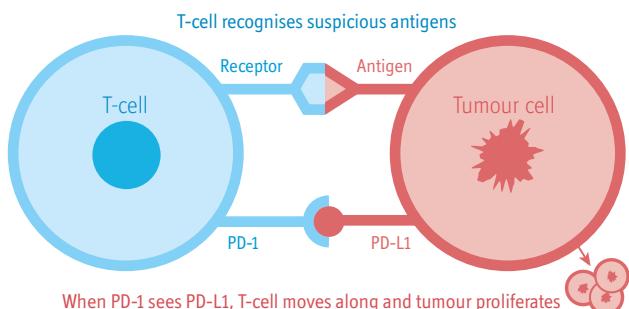
Whispers of a cure

Merck’s PD-1 drug would eventually be given the commercial name Keytruda (pembrolizumab). In 2014 it became the second checkpoint inhibitor to be approved in America—the world’s largest and most lucrative pharmaceutical market. Opdivo (nivolumab), a PD-1 drug which Ono Pharmaceuticals had developed on the basis of Dr Honjo’s work, soon joined it, having been licensed in Japan a little earlier. In some cases the drug produced effects little short of miraculous. In 2016 it was announced that it had cleared former president Jimmy Carter of metastatic melanoma that had spread to his liver and brain.

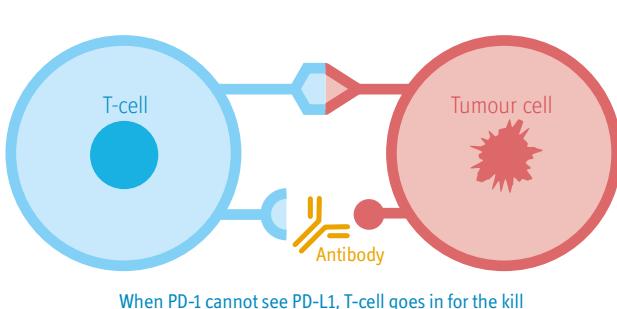
In lung cancer, and in many other cancers, the patients who responded tended to have a higher mutational burden, like that seen in melanoma. More antigens means more targets for the immune system to tackle when the drug lets it off the leash. This observation provided a way to spot some of the patients most likely to benefit. In 2017 Keytruda was approved for use in any cancer that has mismatch-repair-gene defects, a flaw which means that a cancer accumulates even more mutations—and thus more possible antigens—than most.

Another indicator that the drug may have something to offer is the tumours’ expression of PD-L1. Tumours expressing a lot of PD-L1 are investing in keeping the immune system duped; when the PD-1 system is interrupted they should prove particularly vulnerable. At the start of October 2015, Keytruda was approved for use in advanced non-small-cell lung cancer in cases where other treatments had failed and when there was PD-L1 on more than 50% of the tumour cells. Ms Milley’s score was 80%, and she started treatment almost immediately.

Checking out



Source: *The Pharmaceutical Journal*



► Jedd Wolchok, a medical oncologist at Memorial Sloan Kettering, says immunotherapies do not have the same kinds of impact as other types of cancer therapy. In some cases they do not work at all. In other cases they can either eliminate the cancer entirely, or cause it to stabilise, or regress. Responses to therapy are often longer lasting than those seen in targeted drugs. And they tend to persist after patients stop taking the drug (at present CTLA-4 drugs are usually administered for only a matter of months).

The nature of the long-lasting responses is intriguing. Dr Wolchok has patients who started treatment for malignant melanoma eight years ago. He finds it particularly interesting that in some cases scans of the cancers taken before treatment (when the prognosis for the patients would have been six or seven months) and scans taken today look more or less equally dreadful. Biopsies of the tumours reveal a lot of immune cells and a lot of dead tumour cells. Dr Wolchok says it looks like a “chronic struggle between a patient’s immune system and cancer”. This apparent equilibrium

is quite different from what is seen in chemotherapy, where the cancer will be either susceptible or resistant. The difference seems to be due at least in part to the fact that the immune response, like the cancer, can evolve.

Though immunotherapy is still new, it has already radically shifted the treatment and research landscape. A wide range of combinations is being tested in the hope of improving patients’ responses. A trial combining Opdivo and Yervoy in malignant melanoma has shown tumours to shrink in 60% to 70% of patients (although it causes serious side-effects). Dr Wolchok says it is not yet possible to calculate the median survival time in the trial population—because more than half of the patients are still alive.

Compared with the more limited range of patients that can be treated with most targeted therapies, immunotherapies seem to work in many cancers. And as Dr Sharon at the NCI points out, it also produces cures. But this excitement needs to be tempered with the grittier reality that, across all cancers tried so far, only ►

Brain scan | Meeting the unmet burden

Much of the world has yet to see progress on cancer

MEG O'BRIEN, the director of global cancer treatment at the American Cancer Society (ACS), first went to Africa some 15 years ago to work on HIV. She has thus seen at first hand how advanced treatments can make a difference to deadly diseases in poor countries. Now she wants to see the same done for cancer. But it is an uphill struggle.

It is not just that the resources needed are not there. Nor is the hope. “Nobody in Africa knows anyone who survives cancer,” she says. “It is considered 100% fatal and is associated with so much suffering.” This means that the idea of getting tested for cancer when symptoms are spotted is a hard sell. Indeed, according to Dr O'Brien, there is more stigma around cancer in parts of Africa than there is around AIDS.

Working with IBM, the multinational technology firm, Dr O'Brien has been trying to improve the availability of cancer treatments in sub-Saharan Africa. She says the biggest barrier is that the market for pharmaceuticals functions so poorly because of a set of interlocking problems—what she calls a “twelve-part equation”.

Because there is very little cancer treatment at present the agencies which procure medicines are unfamiliar with the cancer treatments they might want; their interests have mostly been focused on infectious disease. The pharma companies, for their part, neglect the market because of the low volumes—low volumes which mean that the procuring agencies pay higher prices than they should for old, off-patent drugs. Countries are often inundated by counterfeit

products (sometimes taking as much as 40% of the market) and many of the products being sold would never be approved by a stringent regulator.

The ACS and IBM have been working on ways to predict the number of cancer cases countries can expect to see. That should allow drugs to be ordered in bulk at wholesale prices from reliable suppliers. The ACS is also helping countries redraft their guidelines for treating cancer so that they match the locally available treatments.

The effort extends to private pharmacies. At the moment their incentives encourage them to buy either the products with the highest margins or those that sell for the least. The charity is devel-

oping a tool called “chemo finder” that doctors can use to find pharmacies that have high-quality products at competitive prices. Dr O'Brien hopes that this tool will encourage pharmacies to bring in the products that the doctors most need.

In Uganda another innovation is to create partnerships between cancer-care centres and experts abroad who can diagnose pathology slides that have been uploaded into the cloud.

Such progress is urgently needed, because the number of patients with cancer in low- and middle-income countries is rising rapidly. BIO Ventures for Global Health (BVGH), a non-profit organisation based in Seattle, Washington, notes that 60% more Africans die from cancer than succumb to malaria. A white paper from BVGH says that over 20% of African countries have no access to cancer treatments at all and most cancers are diagnosed at an advanced stage. The five-year breast cancer survival rate in the Gambia is 12%, compared with 90% in America. The number of deaths is rising at an alarming rate, thanks to ageing and the spread of Western lifestyles. In some countries the proportion of the population that smokes tobacco is growing as people get richer.

Many African countries have rapidly growing economies. They already spend money on cancer treatments and could spend more—but they need to do so effectively. Dr O'Brien’s emphasis is to make sure people who arrive at cancer centres get a decent level of treatment. “Right now we have more patients waiting for treatment than we have treatments,” she says. “One of the first things we need to do is get drugs on the ground.”



► about 20% respond to the new approach. The response varies greatly between types of cancer. In patients who have failed the usual treatments for Hodgkin's lymphoma it is 90%. In pancreatic and most colorectal cancers it is basically zero.

Improving this response is perhaps today's biggest oncological challenge—the source of more excitement, and investment, than any other recent development in the field. Part of the answer will come from a better understanding of the steps needed to generate an anti-tumour response from the immune system, and of the therapeutic targets available. For example, Hervé Hoppenot, the boss of biotech firm Incyte, a biotech firm based in Wilmington, Delaware, says that some tumours protect themselves from the immune system using another checkpoint, IDO1 (an enzyme that was first discovered in a search for ways to protect a fetus from immune rejection). Incyte is testing epacadostat, an existing drug known to inhibit IDO1, as a cancer treatment both alone and in combination with PD-1 blockers.

There are well over 1,000 clinical trials of checkpoint inhibitors going on; what was at first a trickle, then a current, is now a torrent. Some worry that things have gone too far too fast. Jeff Bluestone, who runs the new Parker Institute for Cancer Immunotherapy in San Francisco, says "many of [these trials] are based on minimal data and very limited clinical evidence about what combination will work". Some fear there are too few patients to allow these trials to be run, others that there is too little thought and planning and a lot of duplication of effort. Dr Freeman at Harvard says he has been told there are over 80 Chinese groups developing different PD-1 antibodies.

This enthusiasm may lead to wasted efforts, and even delay progress. But there is no doubt that immunotherapy will from here on be a key part of treatment for a growing number of cancers. Perhaps the most telling measure of its success is that some oncologists have started to complain, quietly, of a shortage of specialist doctors. Patients keep coming back instead of dying. ■

Building on success

The future, and how to get there

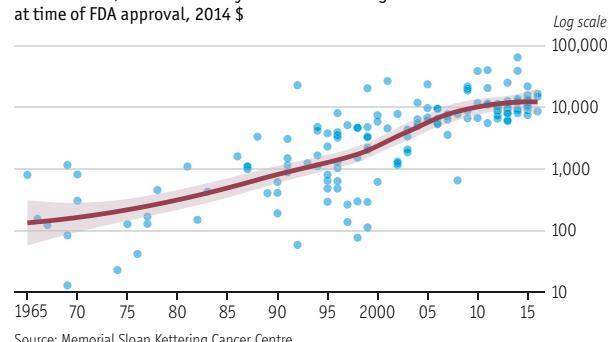
There is a lot more for immunotherapy to do

IMMUNOTHERAPY offers huge promise, both as an addition to established therapies and as a foundation for future ones. Hundreds of trials are pairing CTLA-4, PD-1 or PD-L1 inhibitors with chemotherapy, radiation and targeted therapies. One hope is that the older treatments will increase the range of antigens that the cancer offers for the immune system to latch on to, both by driving further mutations and by killing cancer cells. Dead cells release more antigens.

Then there is the development of further immunotherapies, which is being pursued both by building on the successes of the first checkpoint inhibitors and by using entirely new technologies, such as genome editing. Dr Wolchok at Memorial Sloan Kettering is working on the next generation of immune-modulators. These include new inhibitory compounds for IDO and TIM-3, another checkpoint. Some researchers are trying to remove further brakes on the system by killing or silencing some of its regulatory cells. Others are looking at molecules which activate the immune system in a similar way to IL-2. Nektar Therapeutics, a biotech firm based in San Francisco, is developing an engineered therapy which does this in a way that should, in principle, encourage tu-

Costly medicine

United States, median monthly cost of cancer drugs at time of FDA approval, 2014 \$



Source: Memorial Sloan Kettering Cancer Centre

mour-killing T-cells. It is being tested as a combination treatment with an anti-PD-1 drug in five tumour types, including bladder cancer and a hard-to-treat form of breast cancer.

Other approaches seek to make sure that the immune system responds to as many cancer antigens as possible. Viruses genetically engineered to attack cancer cells might be used to this end. Even if such viruses did not kill enough cells to do the cancer much damage, the way in which they kill the cells would release otherwise hard-to-detect antigens that might help the immune system target the tumour better.

Alternatively, the antigens could be provided from outside. Now that immunotherapies have wind in their sails, various old ideas are coming back into vogue. One of them is vaccination. The vaccines with which people are familiar are those against infectious disease. They work by priming the immune system to respond to an antigen associated with a specific pathogen, so that when the system encounters the infection for real it already knows how to fight it. Because some infections can lead to cancer, some of these vaccinations can prevent it. Sometimes, as in vaccination against hepatitis B, which can cause liver cancer, this is an added bonus. Sometimes, as in vaccination against human papilloma virus, which can cause cervical cancer, it is the main point.

But there may be another way to use vaccines against cancer. Equipped with the right antigen, a vaccine might encourage an immune response to a tumour which is already present, but which the immune system has failed to get to grips with. It is an approach that has been frequently tried in the past, and has repeatedly failed. But the availability of checkpoint inhibitors and the ability to pick out the most promising antigens may allow this form of targeting to come into its own.

Neon Therapeutics, Gritstone Oncology, Genocea Biosciences and other biotech firms are all pursuing the creation of personalised vaccines based on the mutations in an individual tumour. The trick is to find which of the novel antigens its genome says the tumour might be churning out are the most likely to provoke a strong response when served up to the immune system in the form of a vaccine. Jill O'Donnell-Tormey at the Cancer Research Institute (CRI), a non-profit in New York that concentrates on immunotherapies, says that everyone has their favourite algorithm to predict which antigens will get the best response. Together with the Parker Institute in San Francisco, CRI is creating a "bake off" where these algorithms will be tested against each other.

If vaccines work in late-stage cancer—which is where most therapies are tried



Prices are set by what the market will bear

► first—there might be scope for bringing them in sooner, at least in some cancers. In decades to come it is possible to imagine an approach where a tailored vaccine might be the first—and, ideally, the only—response to a blood test showing the presence of a cancer.

Reprogramming the genome

Like immunotherapies, vaccines offer a way to hack the immune system by changing the way that its cells fight the cancer and increasing the number of them doing so. A less circuitous way of doing this is now on offer: reprogram the immune system directly. Take some of its cells out of the body, manipulate them so that they do what you want, encourage them to divide and multiply, then put them back and let them get on with the job.

The technology along these lines that has got furthest is called CAR-T, where CAR stands for “Chimeric antigen receptor”. These CARs are produced by splicing together the gene for an antibody that recognises a tumour antigen and the gene for a receptor that sits on the surface of the T-cells; put this new gene into a T-cell and it will be precisely targeted at the tumour. The small clinical trials undertaken to date suggest that this could be extremely effective. A trial of 31 patients with acute lymphoblastic leukaemia brought a complete, and unprecedented, remission in 93% of cases. A CAR-T therapy called Kymriah (tisagenlecleucel), made by the Swiss firm Novartis to treat B-cell acute lymphoblastic leukaemia, was approved for use in America on August 30th.

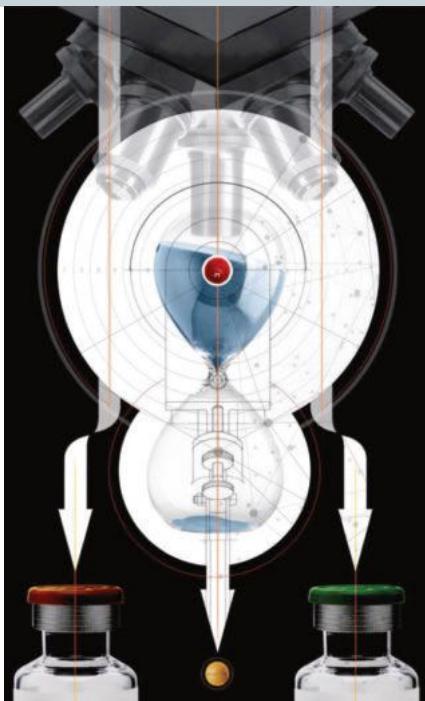
There are two main limitations to CAR-T. One is that so far the T-cells have been programmed to target a molecule, CD19, which is only common to the surface of a few blood cancers. The other is that CAR-T has been known to trigger immune reactions which can prove fatal. Neither problem is obviously insoluble. Editing genes has been made much easier by a new technology known as CRISPR-Cas9, which has already been used to improve the way that CAR-T cells are engineered in mice. It may well eventually allow the receptors used in such therapies to be personalised to the specifics of the patient's cancer. And more precision, as well as experience, should lead to immune responses less likely to run away with themselves.

What such advances will not do, though, is make such treatments cheaper. Novartis's new therapy costs \$475,000. Genome-editing treatments seem likely to be the most expensive cancer treatments the world has yet seen. And that is saying quite a lot, since many of the newer cancer treatments are eye-wateringly pricey (see chart on previous page).

There are various reasons for this. More sophisticated R&D costs a lot. And antibodies are much more expensive to make than the smaller molecules used in older therapies. Generic versions of them are still few and far between. A company than can make antibodies which pass regulatory muster is much better advised to make ones it can sell for a premium.

But the overwhelming factor is that in America, the world's largest market for drugs, prices are set by what the market will bear. When life-saving drugs are available from only one or two providers high prices are a given. This is why pharma companies have piled into oncology over the past decade. They see a market which, by 2025, is forecast to be worth \$45bn-100bn a year.

Not all progress is expensive. Effective early diagnostics could save both money and suffering. The knowledge gained from blood biopsies should allow doctors to tailor treatments better, and avoid drugs that will not work on a given patient. And in a dif-



ferent economic setting bespoke vaccines, gene-editing treatments and the like could in times to come short-circuit rising prices. Molecules made inside the body by reprogrammed cells should be cheaper than those made in expensive cultures. Cutting and splicing the genome could be a great deal cheaper than using scalpels and lasers on the body.

But in the world as it is new cancer therapies will continue to be among the most expensive interventions medicine has to offer, creating a challenge for health systems around the world. And some will disappoint. The immune system's complexity means that it will not always react as doctors hope. Some treatments will prove less effective than at first they seemed. This is a particular problem for cancer drugs, which tend to be approved after comparatively small trials. A recent study of 36 drugs approved between 2008 and 2012 found that 18 did not help patients to live longer. The price of these drugs ranged from \$20,000 to almost \$170,000 per patient.

The incidence of cancer will continue to be dominated by demographics. In developed countries, new therapies may not reduce the chances of getting cancer for some time, simply because older people get more cancers. But the chances of surviving your first cancer, or your next cancer, will improve—and for those with more amenable cancers, and access to the best treatment, they may do so quite quickly. Ever more people will still be told, “I'm afraid you have cancer.” But the words will become less fateful, the diagnosis ever less feared.

The cost of progress

When Ms Milley was diagnosed with advanced lung cancer, she went on to Google and read the words “death sentence”. It is, alas, fairly typical for patients with terminal cancer to have little idea about their prognosis unless they seek it out. Many might be better served by more openness.

But prognosis is not destiny. Ms Milley started taking Keytruda in December 2015. After two months of treatment her lesions had almost entirely vanished. So far, they have mounted no comeback, and she continues to feel well. She finds the response “amazing”.

On any given drug, in any given trial, most people will not be as fortunate. But one of the strange consolations of the current progress being made against cancer is that modern biomedicine makes it possible to learn more from failure than ever before. Huge amounts of the knowledge now saving lives was gained from dead and dying patients, loved ones and friends who lost their fight for life but left a legacy of data. In any given case, that is scant recompense. Put those contributions together, though, and they make a remarkable memorial. ■

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The Norwegian right's re-election

How to tame your dragon

OSLO

Letting populists join governments can be a good way to defang them

GRONLAND, a bustling neighbourhood in central Oslo, may be the Platonic ideal of European multiculturalism. Outside a polling station on a pedestrian square, young couples—some Norwegian, others immigrants from Pakistan, Syria, Poland and Somalia—strolled along pushing prams. Ayaan Aden, a 28-year-old student in a black headscarf, had just cast her vote for the opposition Labour Party. She was angry at the anti-Muslim rhetoric of Norway's immigration minister, who belongs to the populist Progress Party (Frp). "They're saying we're forced to wear the hijab," Ms Aden said. "It's my own decision!"

The immigration minister, Sylvi Listhaug, had spiced up an otherwise dull campaign by travelling to Sweden and impugning its laxness towards migrants. Labour, traditionally Norway's largest party, hoped her polarising rhetoric would turn voters away from the government, a minority coalition between the Conservatives and Progress. It also promised a 15bn kroner (\$1.9bn) tax hike to redress inequality and shore up government finances. It was a poor campaign strategy. When the polls closed on September 11th Labour had got 27.4% of the vote, its second-worst result in 93 years. Erna Solberg, the prime minister, became the first right-wing leader to win re-election since the 1980s.

Norway still has Europe's most generous welfare policies, backed by its oil re-

serves and immense sovereign-wealth fund. Smaller left-wing outfits did well in the election, especially the Centre Party, which caters to regional resentment against Oslo. There has been no overall shift to what Norwegians call the *borgerlige partier* ("bourgeois parties"); even Trond Helleland, the Conservatives' leader in parliament, calls their win "more a matter of a weakening of the Labour Party". That is a problem Labour shares with many of Europe's struggling social democrats.

Rebels turned rulers

But from an international perspective, the most interesting story was that of the Progress Party, once a libertarian fringe group. When it joined the coalition many expected its support to collapse as it was forced to take responsibility for government policies. Instead its vote share fell only slightly, to 15.2% from 16.3% in 2013. Progress's leader, Siv Jensen (pictured), serves as finance minister, and she shares political credit for Norway's strong economy and for the government's business-friendly tax cuts. The election cements the party's role as a serious player. That holds lessons for anti-immigrant populists across Europe, and for other parties that need to deal with them.

"The Progressives are the most liberal and moderate populist party in Europe," notes Kristin Clemet of Civita, a think-tank in Oslo. Their ideological roots differ from

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those of most other European right-wing populists. The Danish People's Party, the Sweden Democrats, the Finns Party (once known as the True Finns), France's National Front, Italy's Northern League and the Dutch and Austrian Freedom Parties have always been primarily about national identity. They have concentrated on opposition to immigration and Islam, and on resistance to the European Union, which Norwegians voted to stay out of in 1994.

The Frp shares these positions, but its main goal since its founding in the 1970s has been to shrink the welfare state. "They are very neoliberal, they very much believe in the free market and low taxes," says Cas Mudde, an expert on populism. In a country where the rest of the political spectrum backs generous benefits and a regulated labour market, says Mr Mudde, that makes them a protest party.

Its focus on libertarian economics means the Progress Party has never been ostracised as other populists have. That may have helped Norway to develop a healthier debate. The Sweden Democrats, who evolved out of neo-Nazi groups, have been shunned by every other party, silencing Sweden's conversation on migration—and driving sceptics to the extreme right. Polls show they are now Sweden's second-largest party, with some 20% of the vote. "Sweden didn't take the cultural backlash seriously," says Bard Larsen, of Civita. "We [Norwegians] are more open about it."

Most populist parties find entering government traumatic. The Finns Party's support fell from 18% to under 10% after it joined the coalition in 2015, and it has since split in two. The Danish People's Party has more or less run the country's immigration policy ever since the late 1990s, but has never joined a coalition, preferring supply-and-confidence deals.

The Progress Party, in contrast, has become a relatively normal coalition member. It backed the Conservatives' compromise tax reforms, including cutting corporate and wealth taxes, which passed with Labour's support.

On immigration it is aided by the fact that the left, too, has come to support strict limits, fearful of undermining Norway's labour standards and high wages. In November 2015, in the face of the migrant crisis, all but the farthest-left party agreed to laws tightening immigration policies. The number of asylum applications fell from over 16,000 in 2015 to about 1,200 so far this year, and the growth of the immigrant population has slowed.

That threatens to take one of Progress's key issues off the table. Many see Ms Listhaug's rhetoric on Islam as an effort to keep it in play. A ban on the full veil in schools is already expected to pass in parliament, and Ms Listhaug wants to ban hijab in elementary schools as well. "We need to fight the culture of social control and controlling women," she says. But the rest of the coalition opposes the idea, and the Conservatives want her to drop it.

A greater threat may come from the decline of Norway's oil revenues. The central-bank governor says the sovereign-wealth fund's contribution to government spending, which was 213bn kroner in 2016 (20% of the entire budget), is too high. One reason the politics of immigration and inequality have been muted in Norway is that "we have the cushion of the wealth fund," says Nikolai Brandal, a historian. As it hits its limits, big parties like Labour and the Conservatives will face more pressure. And Europe's most moderate populist party may become less well-behaved. ■

Germany's refugees

Hearts and minds

BERLIN

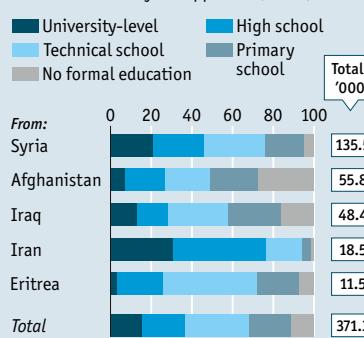
How Germany is integrating its refugees

NAURAS NERAPI lived a comfortable life in Aleppo as a manager at a French catering company. Then came the Syrian war. He fled through Turkey and the Balkans to Germany, arriving in September 2015. "They put me on a bus but I didn't know where I was going," he explains. At a reception camp in Berlin he offered to help with the cooking. Today he speaks good German, lives in a shared flat and works as a chef. "In Aleppo I was left with nothing. Germany has been really good to me."

His arrival coincided with a pivotal point in Angela Merkel's career. As thousands made their way north and west, the

Work to do

Germany, highest educational attainment of adult first-time asylum applicants, 2016, %



Source: Federal Office for Migration and Refugees

chancellor declared "We can manage this," and kept Germany's borders open. Some 900,000 people arrived that year. Many predicted social chaos and Mrs Merkel's downfall. Her apparent cruise to victory at the election on September 24th is a testament to two factors. First, thanks largely to a repatriation deal with Turkey, the numbers coming fell to 200,000 last year and just 80,000 so far this year. Second, and more happily, despite the strains most of the refugees are on the path to integration.

That path begins at the reception camps, from where newcomers are allocated to hostels like Rudower 18, in eastern Berlin. "We had three days to turn a derelict school into a home," says Andrea Koppelman, its director. Today, children's paintings on the walls make it cheerier, but conditions remain basic: two or three families to a classroom. Women with babies peer nervously from behind bedsheets strung up for privacy. Other hostels focus on gay and lesbian refugees, lone men or unaccompanied minors. Friedrich Kiesinger, a psychologist whose charity, Albatros, cared for some 40,000 people in reception centres, took over an empty hotel and turned it into a home for tortured, traumatised and disabled refugees.

Within three months refugees with good prospects of staying should move into "community homes" with private bedrooms and kitchens. But building these takes time. One family has been in Rudower 18 for over two years. The final step—moving to a private flat—might take four or five years, says Mr Kiesinger. And in any case, he adds, integration does not end at that point: "We don't want little Afghans growing up behind doors." Education and work are both essential.

The first is going well. Children are usually attending school within three weeks of arrival, says Ms Koppelman. Several teenagers at Rudower 18 attend the nearby Anne Frank School, where Dagmar Breske, a teacher, has devised a three-stage programme. In a class for illiterates, three Afghan boys haltingly read out lists of words

beginning with the letter "A". In another, the second stage, seven teenagers—mostly Syrians and Iraqis—are practising multiplication. A third class, the highest, is going over verb forms in preparation for the test determining whether they can enter regular German schools. Much of the work is cultural: training the teenagers to attend classes on time, follow rules and treat women with respect.

Getting adults into work is harder. Only those granted asylum can take jobs. Once they have submitted their applications, those with good prospects (like many Syrians) take a compulsory integration course: 600 hours of German lessons and 100 hours of civics. Many refugees have had little education (see chart 1) and progress towards work could take time (see chart 2). Mr Kiesinger blames the obsession with formal language qualifications: "The best way to learn German is to get a job."

The asylum process is slow, with appeals taking years to process. Many officials are new and inexperienced. Schools and homes are often left without guidance. Yet everywhere people are muddling through and mucking in. Networks of schools, refugee homes and lawyers are springing up to share good practice. Legions of volunteers have turned out (100 at Mr Kiesinger's hotel). Michele Pirger is one. "I just read up on the subject and decided to get involved," she says. Having started by taking refugees to concerts, she now helps Copts who have fled persecution in Egypt, and houses one in her flat.

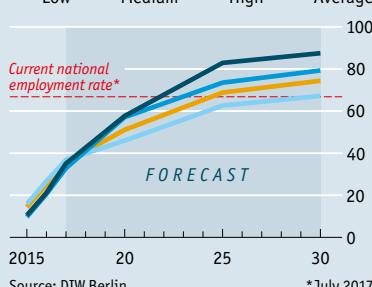
How well are the refugees integrating? The picture is varied. But those with previous education, a good prospect of asylum and an affinity with Germany—like Mr Nerapi—do best. And two big trends stand out. Men, who make up two-thirds of asylum applicants, struggle disproportionately. Many travelled to Germany alone, are disappointed by the drudgery they find and miss the social status they once enjoyed. Waiting while asylum or deportation processes drag on, they can easily slip into addiction, crime or radicalisation, says Mr Kiesinger. They need work: "It's not just

The learning curve

Germany, employment rate of 18- to 64-year-old refugees registered in 2015

By qualification level, %

Low Medium High Average



Source: DIW Berlin

Campaigning in Germany

Knock, knock

JENA

New tech has brought door-to-door campaigning to continental Europe

HELLO! I'm Cornelius Golembiewski from the CDU. Could I give you our manifesto and a leaflet about Johannes Selle, our local candidate?" The woman at the door beams: "We already voted by post, so don't worry!" Mr Golembiewski wishes her a good day and pulls out his phone, opens an app called Connect17 and taps a smiley face. "When we started, we were the only party that did this," he explains. Along with other young activists, he is plying the hilly streets of Jena, in the state of Thuringia, doing something new to continental Europe: door-to-door canvassing.

Elections here traditionally involve posters, street stalls and rallies, but not the doorstep campaigning common in America and Britain. Tighter privacy laws prevent parties from holding data on individuals. Continentals more often live in intercom-protected blocks of flats, increasing the time and effort needed to



Unexpected visitors

reach a voter's front door. And electoral systems in countries like Germany are proportional, lowering the rewards: micro-targeting voters in key places counts for much more in majoritarian Anglo-Saxon systems in which swing constituencies decide everything.

Yet things began to change when Barack Obama's grassroots campaign in 2008 showed European strategists how much knocking on doors could achieve. Guillaume Liegey, a consultant then studying in Boston, brought the techniques home to France and applied them first to François Hollande's successful campaign for the presidency in 2012, and then last year to "En Marche!", Emmanuel Macron's new political party.

Apps and big data are managing to skirt around stringent privacy laws. Connect17 never uses voters' names, instead directing activists to demographically promising areas, where they record responses (positive, neutral or negative) at each door. Combined with GPS co-ordinates, this provides the party with a street-by-street mood map, explains Christian Zinke, the former CDU staffer whose firm built the app.

Primarily, though, European politicians are turning to doorstep campaigning to boost trust and interest in an age of disenchantment. The new tech serves an old principle: people trust their fellow citizens more than faraway leaders. In three German state elections earlier this year, Connect17 coaxed unexpectedly high numbers of CDU supporters to polling stations. Parties in Spain, Italy and Scandinavia are making similar discoveries. Sweden's Social Democrats have found that canvassing raises turnout by four points. As Mr Liegey puts it: "When voters see political volunteers who look like them, it contradicts the *a priori* that politics is a distant world to which they do not belong. It sends a signal."

► about money. It's about friends and emotional stability...the young men who come here are too inactive."

Children, on the other hand, integrate easily. In Ms Breske's classrooms pupils who arrived months ago are fluent, self-confident and ambitious. Asked what they want to be, the boys tend to say policemen or engineers and the girls—many without headscarves—say doctors or lawyers. Omar, a 16-year-old from Baghdad, is about to start training as a hairdresser. Mahdiya, an Afghan, says she plans to study political

science and become a politician: she admires Mrs Merkel. Ms Breske tells of a recent day-trip when German and refugee pupils mixed so well that "I could no longer tell them apart."

Of course it will be many years before Germany can fully assess how well it has integrated its newcomers. But it is already clear that the gloomiest predictions were wrong. Germany has taken in more than 1.2m people over the past two years, and coped. There is much more to do. But for now, it seems to be managing. ■



Serbian guest workers

Northward ho!

NITRA

Serbian workers are, legally and illegally, heading for Slovakia

DEJAN, a 51-year-old Serb standing outside a scruffy apartment block for migrant workers in Nitra, an hour's drive from Bratislava, the Slovakian capital, couldn't be happier. He has a job in a factory making parts for televisions and earns €450-750 (\$540-900) a month, depending on the season. Back in his hardscrabble town of Zajecar, in eastern Serbia, there are hardly any jobs and even if he could find one, he reckons he would earn only around €180 a month. But Slovakia's booming factories are desperate for labour, and they are turning to Serbia to find it.

Serbia and Slovakia have old historical ties. Their languages and culture are close. Two of central Bratislava's streets are named after Serbian heroes. And so the number of Serbs coming to work in Slovakia has been climbing since 2015. In July the registered number was 9,363. Though small, that was a 61% increase since January. The number will only rise, says Miroslav Kralik, the president of the Slovak-Serbian Chamber of Commerce.

Tiny Slovakia, with a population of just 5m, is short of at least 80,000 workers, says Mr Kralik. Others say the shortfall is much larger. Since Slovakia is a full member of the European Union, Slovaks can easily go off to Germany or Austria and work there for far more than they could earn at home. Since Serbia is not in the EU, its workers cannot easily do likewise. So many Serbs work in Slovakia on 90-day permits arranged by agencies. An unknown number more do so illegally. Added to that are an-

► other several thousand workers, students and immigrants from the dwindling Slovak minority in Serbia who are eligible to apply for Slovakian citizenship after three years in the country.

Later this month Slovakia and Serbia aim to sign an agreement making it even easier for Serbs to work in Slovakia. The two countries say they will also clamp down on agencies who send workers illegally, or who fail to pay social-security and health-insurance contributions. According to Sani Dermaku, the Serbian ambassador to Bratislava, illegal practices continue; every month his staff have to help Serbs who say they were deceived by their agencies and who have no money, or no passport because their agency confiscated it.

Slovakia's labour shortage means that wages are rising. Trade unions are starting

to complain that employing desperate Serbs and other workers from poorer countries will depress wages (even though Serbs are mostly paid the same as their Slovak counterparts). The number of Ukrainians with work permits has also shot up this year.

Serbia's government is especially well disposed towards Slovakia's because the country is one of only five in the EU that declined to recognise Kosovo's independence from Serbia in 2008. But that does not mean it is not trying to poach its businesses. Serbian officials, for instance, have been trying to persuade carmakers with factories in Slovakia to move south to join Fiat, which is already there. Even if they do, it will be several years before production could begin. Until then an increasing number of Serbs will be heading north. ■

is "massive potential" to curb the number of empty cars, says Frédéric Mazzella, the firm's boss.

Ms Hidalgo's crusade against motorists is partly political. She governs Paris in a coalition with the Greens, who hold the transport portfolio. Her detractors say she is in thrall to "hipsters on bicycles". But it is also part of a broader rethink of how the city should adapt to an age that will be shaped by electric vehicles and driverless transport. "It's a revolution that will be as great as the transition from horse-drawn carriages to the motor car," says Mr Missika. He expects to authorise the first experimental driverless six-person taxis in Paris next year, and claims that city hall will ban privately owned cars (as opposed to ones that are leased) in the centre by 2025-30. On current plans, diesel cars will be banned altogether from Paris by 2020. (London, by contrast, has nothing nearly as ambitious in place, though surcharges for older diesel models will come into effect in the centre of the city from next month. The mayor, Sadiq Khan, is reportedly planning to extend this to the whole city.)

The spread of electric, and in time driverless, vehicles means that Paris is not heading towards a post-car future. When it comes to making cycling the norm, the city still lags far behind others in Europe, such as Copenhagen or Amsterdam. A far bigger effort to invest in public transport may ultimately have a greater impact on car use, as well as help to spread jobs and businesses outside the city centre. The Grand Paris Express, Europe's biggest infrastructure project at a cost of some €30bn (\$36bn), is a new fast train under construction that will link outer Paris with its airports, stadiums and universities in a figure-of-eight around the city. With four new lines and 68 stations, it is due to be in full service in 2030. A big stretch of each of the four lines should be open by 2024, in time for the city's hosting of the Olympic games. ■

Cycling in the city

A driverless Paris?

PARIS

Bicycles and bans are reshaping the city

THE quayside roads that wind along the Seine used to throb with hurtling traffic. Today, potted palm trees have been ranged along the tarmac. Joggers and cyclists enjoy the waterside calm. On a stretch of the right bank opposite the Eiffel Tower formerly used as a convenient express route, cars have been squeezed into a single lane, leaving the other to bicycles. Over the centuries, the French capital has been the backdrop to many warring tribes. Today's conflict pits contemporary urban combatants: enraged car owners, and everybody else.

A sense of siege is keenly felt by the capital's motorists. Anne Hidalgo, the Socialist mayor, is waging "a war against cars", said *Le Monde* earlier this year. Parisians, says Pierre Chasséray of "40m Motorists", a lobby group, are "living in daily hell".

As part of the town hall's plan to increase the share of trips taken by bicycle from 5% to 15% by 2020, protected cycling routes are being extended along some of the city's main arteries. An entire lane on the busy Rue de Rivoli is being converted into a two-way bike route. The left bank's quayside road was closed to cars in 2013, six years after the city installed a bike-sharing scheme. Inevitably, until habits change (assuming that they ever do), traffic on those roads still open to vehicles is now more clogged than ever.

Paris is "not anti-car, but anti-pollution", retorts Jean-Louis Missika, the head of planning at city hall and a deputy to the mayor. Small-particle pollution levels in

the city are particularly high. With its narrow medieval streets and its 19th-century boulevards, the transport reformers seek above all to discourage cars that do not carry passengers. Fully 80% of vehicles circulating in central Paris carry only one person, and 79% of those on its roads are privately owned, according to the town hall. On September 14th BlaBlaCar, a French ride-sharing startup, launched BlaBlaLines, a new app designed to help commuters in the Greater Paris region organise carpooling with a couple of clicks. With 1.2m commuting trips of over 10km (six miles) made each day in outer Paris, there



Progress, of sorts

5 GEOPOLITICAL RISKS THAT MIGHT AFFECT YOUR BUSINESS

Who would be the biggest loser in a trade war between the US and China? What if there is a large-scale cyber-attack on banking and telecoms companies? Would a pandemic outbreak be an unhappy side-effect of globalisation? Will China and India push ahead with clean energy amid America's retreat from the Paris agreement? What would be the possible economic impact on the EU in the unlikely event of an "Italexit"?

With the rise of populism and protectionism, geopolitics is more relevant than ever. The Economist Intelligence Unit (EIU) has developed 5 scenarios in an interactive infographic and a series of articles to explore that.

The screenshot shows a digital interface for the 'Growth Crossings' tool. At the top left is a button labeled 'HOW DO I USE THIS TOOL?'. In the center is a heading 'CHOOSE AN INDUSTRY' above five icons: TELECOMS (phone), FINANCE (scale), CONSUMER (two people), ENERGY (factory), and HEALTHCARE (hospital). The 'CONSUMER' icon is highlighted with a yellow circle and an orange arrow pointing down to a bold title 'CONSUMER'. Below the title is the subtitle 'A PROTECTIONIST US TRADE POLICY HARMS CONSUMER MARKETS'.

Explore scenarios on growthcrossings.economist.com

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Charlemagne | Mr Juncker's Indian summer

The commission president strikes a confident note after years of gloom



A YEAR ago Jean-Claude Juncker, president of the European Commission, surveyed his dominions and found them wanting. "Never before", he told the European Parliament in his annual state-of-the-union address, "have I seen such little common ground between our member states." Battered by economic and political crises, the European Union was staring into the abyss. Britain had just become the first country to vote to leave the club, and populists were on manoeuvres across the continent. Difficult elections loomed. "Our European Union is, at least in part, in an existential crisis," Mr Juncker said.

Twelve months on, the mood has lifted so dramatically that last year's fears have come to seem almost quaint. There is a whiff of change in the air, explained by two things. The first is a sense of optimism. It is fostered by defeats for anti-European parties in France, the Netherlands and elsewhere; and by a cyclical economic upturn that has seen the EU outpace America's GDP growth for two years. There is also a confidence among officials that, rather than encourage Europe's disruptive forces, the horrors of Brexit and Donald Trump have helped Europeans recover their love for stability. One calls the EU "super-vaccinated" by uncertainty elsewhere. And the election of Emmanuel Macron in France, along with the imminent re-election of Angela Merkel in Germany, offer a window of opportunity for reform.

Thus was the scene set for Mr Juncker, on September 13th, to declare the wind back in Europe's sails. In an hour-long address to MEPs he scampered through an ambitious set of proposals designed to illustrate that Brussels still matters. Some of his more outlandish notions—eg, to merge the presidencies of the European Commission and Council, thus creating one mega-president for the EU—reminded sceptical observers why they were reluctant to give the commission presidency to the old federalist Mr Juncker in the first place. But other ideas were broadly welcomed. Among other goodies, Mr Juncker offered a rash of trade deals, a beefed-up cyber-security agency and a promise to expand the EU to the troubled countries of the western Balkans. Mrs Merkel's chief of staff called it an "important and great" speech.

The second driver of Mr Juncker's ambition is a quiet fear that it could all go wrong again. Gone in the president's address were the pleas of previous years to help the teeming masses of irregu-

lar migrants crossing the Mediterranean; in their place came a celebration of border guards and praise for Italy in slashing migration from Libya. The trade deals Mr Juncker promises with friendly partners like Australia and Japan are tempered by plans to screen foreign investments in "strategic" sectors that cut across countries (think Chinese state-owned firms buying large European ports). Put all this under the rubric "a Europe that protects", a phrase that, with Mr Macron's approval, looks set to serve as a mantra in the years ahead as the EU seeks to draw the sting further from Eurosceptic parties.

Look, too, to the insistence on extending the signature achievements of the EU to all its members. Mr Juncker peppered his speech with treats for eastern European countries that have lately felt neglected, even finding time to promise action against food manufacturers who offload dodgy fish fingers onto Slovak consumers. Lurking beneath was a vision that may give some pause. Brexit barely featured in his speech, but Mr Juncker believes the departure of the country that, with its endless opt-outs, threats and prevarications, served as a constant brake on integration offers a chance to set the EU back on its natural path.

What of those countries that do not share Mr Juncker's ambitions? The leaders of Denmark and the Netherlands swiftly dismissed some of his more outré institutional proposals; Mr Juncker, who was kite-flying, will not much mind. More serious is the euro area which, officials now like to note, will account for 85% of the EU economy once Britain leaves. Mr Juncker poured cold water on Mr Macron's proposals for a discrete euro-zone budget overseen by its own parliament, insisting that such things should be managed by the EU as a whole. That debate will be resolved in Berlin and Paris, not Brussels, but provides a clue to Mr Juncker's thinking on the EU's future. All its remaining members bar Britain and Denmark are obliged to join the single currency. Mr Juncker pressed the point this week, proposing a new "pre-accession fund" to help countries that remain outside the euro.

In passing

Mr Juncker is placing two bets with all this. The first is that meaningful integration is possible via stealth. The commission knows that changes to the EU's treaties, with all the accompanying paraphernalia of referendums and summits, are off the table for now. Instead officials are unearthing so-called *passerelle* clauses that allow for changes to the EU's rule book to be made quietly. Mr Juncker also hopes to remove national vetoes from some areas of decision-making, such as tax and bits of foreign policy.

The bigger gamble is that there is a single vision for the EU that is broad enough to include everyone. The intra-Europe divides that Mr Juncker lamented a year ago have hardly disappeared. Rows over migration, money and the rule of law run so deep that some, not least in Germany and France, have increasingly been tempted by the old idea of a Europe running at different speeds. Mr Juncker, to the surprise of some, rejects that. Here, then, is the new mood in Brussels: confident but not cocksure, impatient for change after years of uncomfortable stasis, but jittery that it could all yet be unwound. It is true that Mr Juncker, an ageing Europhile of the old school, has never looked much like an agent of change; after making his speech in Strasbourg he cut short his replies to MEPs, pleading illness. And his plans will go nowhere if they do not capture the imagination of Europe's national governments. But after years of crisis, they do at least show that there are still signs of life in Brussels. ■



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Immigration

Return journey

PETERBOROUGH

Britain's biggest-ever episode of immigration has drawn almost to a halt

THE windows of the Biedronka Polish supermarket in Peterborough are plastered with posters for local events: a Polish “power disco”, a radio festival and a family fun day. On the noticeboard inside hang advertisements for Polish car services, flats for rent and jobs. The city has one of Britain’s fastest-growing populations of European migrants. But next to the poster for “Golden Clinic”, a Polish beauty salon, is a more ominous message. “Being you is not a crime. Targeting you is,” reads a sign from Cambridgeshire Police, encouraging people to report hate crimes.

Before Britain opened its borders and job market to the citizens of eight eastern European countries in 2004, its Office for National Statistics predicted that 5,000–13,000 migrants would come each year. In the end, in the first decade 1.5m arrived, in what by some measures was the single biggest inflow of people in Britain’s history. Poles are now the country’s largest foreign-born community. And a new generation is blooming: last year Polish-born mothers gave birth to 22,382 babies in England and Wales, more than any other foreign group.

But recently net migration from the EU8 countries has fallen close to zero (see chart). In the year to March 2017, some 52,000 EU8 citizens arrived in Britain, 25% fewer than in the previous 12 months. At

the same time 46,000 left, 59% more than before. Migrants continue to come from Romania and Bulgaria (known as the EU2), but the pace is slowing. Over the same period 59,000 arrived in Britain, a drop of 14%, while 16,000 left, an increase of 100%.

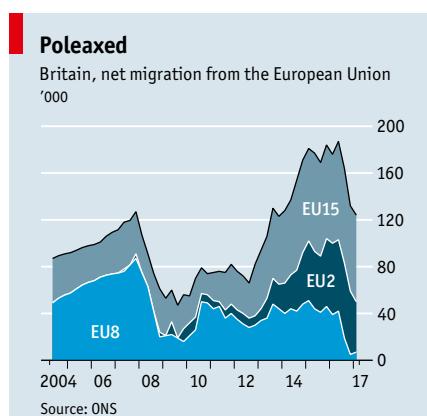
Economic factors begin to explain the turnaround. Three-quarters of eastern Europeans who have come to Britain since 2004 have come to work, either with the definite offer of a job or seeking employment on arrival. These days British jobs are less attractive than they used to be. Since its recent high in 2015, the pound has depreciated by about 20% against the Polish

zloty, reducing the value of migrants’ remittances (and increasing the costs of imported Polish delicacies, sighs the checkout assistant at the Biedronka supermarket). Meanwhile, the gap in living standards between Poland and Britain has steadily narrowed: since 2004 real GDP per person in Poland has increased by around half, while in Britain it has barely budged.

Just as important are the feelings of uncertainty and insecurity caused by the Brexit vote, reckons Paulina Trenova, a Polish sociologist at the University of Glasgow. The status of EU citizens in Britain after Brexit is yet to be decided. The Home Office has told them to sign up for e-mail alerts that will inform them if and when their status changes. John Holdich, the leader of Peterborough council, is enthusiastic about the idea of helping European residents but says the uncertainty about their position makes it hard to do so.

Extensive coverage in the British and Polish press of the hostility towards migrants in the aftermath of the referendum has also caused alarm. Some fear their rights have already been affected, as British employers and landlords take the Brexit vote as permission to discriminate. On September 9th the equalities minister, Nick Gibb, said his office would review evidence that EU citizens were being illegally prevented from applying for jobs and renting or buying houses.

As Britain loses its appeal, migrants are heading elsewhere. Germany has been the most popular destination for Poles for the past three years (Britain has come second). Poland itself is trying to tempt back its diaspora, whose children it is cultivating via Saturday schools (see next story). Polish companies and international firms with a ➤



presence in Poland are making concerted efforts to attract expat Poles, with companies such as McKinsey reaching out to Polish students' societies in Britain, for example, says Agata Dmoch, a solicitor in Birmingham.

Paradoxically, a stricter post-Brexit immigration regime, of the sort proposed in a recently leaked Home Office document, could initially result in greater numbers settling in Britain, suggests Michal Garapich, a Polish anthropologist who studies migration. Getting citizenship for a family of four costs more than £5,000 (\$6,600). But if Britain were to introduce work permits for skilled Europeans and limit the

time that unskilled ones could stay, as suggested in the Home Office proposals, those who commute back and forth might find that stumping up for citizenship was worth it. In the first half of this year 4,171 Poles applied to become British citizens, compared with 1,526 in the first half of 2016.

Stricter immigration rules may also lead to more illegal working. Some industries that many eastern Europeans work in, such as construction, are already quite informal, creating the potential for working off the books. Forecasting how migration flows will change after Brexit is tricky. Predicting whether Britons will be happy with the results is even harder. ■

Diasporas

Polishing up

Why Polish children can often be found in school at the weekend

ON A Saturday morning in a hall in north London, two young children put on a spirited production of a scene from Stanislaw Wyspianski's "The Wedding", a tragic satire about national liberation. Fifty or so more, most below the age of ten, watch attentively. It is the first weekend back at school, and the festivities are part of Poland's national reading day. The performance over, the children stream out into the sunlight, ready for their time off to begin.

For young Poles in Britain, Saturday school is an increasingly common experience. Founded in the late 1940s by refugees, the number and size of such schools has grown fast over the past decade or so. In 2002 there were 45 registered with the Polish Educational Society. There are now 130, with around 20 more unregistered ones and another ten being set up. As one parent explains, "There is a nice kind of pressure to attend. If you don't, other parents will ask why not."

The growth reflects the boom since 2004 in Britain's Polish population. Many of the new schools were established to cater to recent arrivals, who tend to be fluent in Polish and likelier to return to their homeland. Others have separate classes for second- or third-generation migrants, says Małgorzata Lasocka, a former head of the Maria Skłodowska-Curie Polish Saturday School.

It is a trend the Polish government is keen to encourage. Last year it disbursed £10m (\$13m) to such schools across Britain and provided training to teachers. Earlier this year a law passed in the Polish parliament granted pupils at foreign Saturday schools the same benefits when in Poland as natives, such as some free travel and entry to museums. British schools are good at helping newcomers but pro-



Vaulting ahead

vide little information on Polish culture, says Arkady Rzegocki, the ambassador. Saturday schools fill that gap.

Government subsidy and the efforts of volunteers mean attendance is cheap: a day's tuition often comes to less than £10, and payment is sometimes optional. For that, pupils typically receive four hours of classes in the Polish language, history, geography and culture. Schools tend to take pupils up to age 17. Those who remain that long often take GCSEs and A-levels in Polish.

Children who are dragged away from Saturday-morning cartoons seem to benefit from the extra study. Though data are scarce, there is some indication that those who attend Saturday schools do better than their peers in exams, says Kirsty Gillan-Thomas of the Paul Hamlyn Foundation, a charity. Just as important, they make friends. In the final class before the performance of "The Wedding", pupils natter happily to one another, speaking a mixture of Polish and English.

Exit from Brexit

The Blair ditch project

A talented fudger proposes a third way out of the Brexit mire

BRITAIN'S eventual exit deal with the European Union will not only have to be signed off by the bloc's 27 increasingly irritated member states. It must also satisfy a home audience split between those with sky-high expectations of Brexit and those who oppose it in any form. There is a growing sense that the government—which announced this week that the next round of talks in Brussels would be delayed by seven days, until after the prime minister has made a big speech on Europe in Florence—lacks the political skill to forge such a delicate compromise.

On September 9th Tony Blair, whose knack for fiddles and fudges helped to sell peace to Northern Ireland and capitalism to the Labour Party, piped up with a plan. In a report published by one of his several foundations, Mr Blair proposed a deal that he said would occupy "the space between Brexit At Any Cost and simple reversal of the referendum". He suggested that the EU might weaken its rules on the free movement of people—the biggest driver of the Leave vote—in order to persuade Brexit-backing Britons to switch to the Remain camp, or at least to accept free movement and thus keep Britain eligible for membership of the single market.

Some of his proposals might just about be acceptable to European leaders. Tightening the rules on migrants' eligibility for benefits, for instance, has already been suggested by Angela Merkel in Germany. In France, Emmanuel Macron is keen to amend the so-called posted workers directive, which allows employers temporarily to provide migrants with different pay and conditions to domestic ones. But these tweaks would hardly dent British opinion on Brexit: after all, David Cameron negotiated similar concessions before calling last year's referendum, to no avail.

More boldly, Mr Blair suggests restricting free movement for those without firm job offers. That might satisfy Brexiteers' desire to take back control of migration policy (though in practice it would not cut numbers by much). But there is no chance that European leaders would consider such a change. Immigration bothers the EU, but its worry concerns migrants from outside the bloc, not within it. In support of serious reform of free movement, Mr Blair's paper cites only the Dutch deputy prime minister and former prime ministers of Denmark and Finland. The search for an emergency exit from Brexit goes on. ■

Bagehot | The hollow centre

The Liberal Democrats are failing to fill the void at the heart of British politics



THE biggest puzzle in British politics is why the Liberal Democrats are so feeble. Forty-eight per cent of Britons voted to remain in the European Union. Millions of people think that Theresa May is a discredited mediocrity and that Jeremy Corbyn, Labour's leader, is a dangerous fantasist. And yet the only party that campaigned to keep Britain in the EU and that proudly stands for the "open and tolerant" centre against extremists on left and right can't even muster 8% of the vote. What should be the vital centre has become a no-man's-land, if not a killing field.

This newspaper endorsed the Lib Dems in the election in June, partly because the other two parties were so unappetising and partly in the hope that a Lib Dem revival would spark a more general realignment. But voters have not forgiven the party for joining the Conservatives in forming the coalition government of 2010-15. A former president of the Lib Dems once described his party as the "cockroach" of British politics, for its ability to survive. Yet the coalition was an industrial-strength cockroach killer. The Lib Dems went into the coalition with 23% of the vote and 57 seats. They came out with 7.9% of the vote and eight seats. They lost all but one of their MEPs and thousands of local councillors. The coalition forced them to sign up to a programme of austerity and higher university fees that was anathema to the party's members, who are disproportionately employed in the public sector. Worse, raising fees meant breaking a manifesto pledge.

The party's implosion after the coalition coincided with the opening up of its biggest opportunity in decades: the Brexit vote. Had the party entered the post-referendum world with 60 seats and a charismatic leader it would have had a chance of engineering the political realignment that it has always dreamed of. Instead it entered that world as a political husk. A party with eight MPs was not well positioned to attract voters who wanted to reverse the referendum. The Lib Dems are now in a classic cycle of decline, with a weak bench ensuring that they have weak leaders who fail to break through to voters.

Tim Farron, the party's leader in 2015-17, was arguably the weakest head of any major political party since the second world war. A poll taken two weeks before the election found that half the electorate could not name him. The one thing he was known for was that he was an evangelical Christian who was uncomfort-

able about homosexuality and abortion. This reduced his appeal to the secular liberals who formed the core of the Remain vote. When it came to attracting the young, the Lib Dems might as well have chosen someone who went around proclaiming that beards and tattoos were outward displays of moral depravity.

Vince Cable, the party's current leader, is in a different class from Mr Farron. He is by far the most intelligent of the three party leaders (which is not meant to be damning with faint praise). He is a technocrat with a wealth of experience in both the private sector (he was chief economist for Shell in 1995-97) and in government (he was business secretary in the coalition) and lots of ideas for fixing problems like intergenerational inequality. He is also a publicity hog: he appeared on "Strictly Come Dancing", a popular TV show, and has just published a novel, "Open Arms".

So Mr Cable will save his party from being ignored. But the other points on his cv may not work in his favour. Voters want moral purity rather than experience, particularly if that experience involves working for a giant oil company. They want magicians who can shake the money tree rather than economists who point out that money trees don't exist. Mr Cable also has two big drawbacks. He is 74 years old. Admittedly this makes him only six years older than Labour's leader, but Mr Corbyn is essentially a young idealist trapped in an ageing body. Mr Cable is also the man who, as business secretary, introduced the bill raising tuition fees. Videos of him making that speech in Parliament will kill any chances of the Lib Dems breaking through to the young.

Mr Cable is also confronted with two problems that his talents are unlikely to equal. The first is Labour's resurgence. The party has all but locked up the youth vote with a combination of anti-austerity politics and vague idealism. It has built a fearsome campaign machine that threatens to destroy the Lib Dems' established advantage as a campaigning force. Above all, it has succeeded brilliantly, if disgracefully, in preserving "strategic ambiguity" on the question of Brexit by sending reassuring signals to both Remainers (who might otherwise be attracted to the Lib Dems) and Leavers (who once abandoned Labour for the UK Independence Party). Labour is doing its best to complete the work of destruction that the Conservatives began when they seduced the Lib Dems into jumping into bed with them in 2010.

Stuck in the middle

The second is the party's ancestral problem with its identity. The Lib Dems are as much a hotch-potch as a party. They have always been divided between classical liberals, who believe in free-market economics, and communitarians, who are motivated by local issues. (Mr Cable is at the liberal end of the spectrum.) They are split between anti-establishment types, who are voting for "none of the above", and establishment types who think the Lib Dems represent good sense. The party of electoral reform has 100 members in the House of Lords compared with just 12 in the Commons. The party of the open economy has its strongest roots in the most isolated bits of the Celtic fringe, such as Cornwall.

The first rule of modern politics is that almost anything can happen. The two major parties are dicing with disaster, the Tories by tying their fate to Brexit and the Labour Party by embracing Corbynism. France's Emmanuel Macron has proved that anti-establishment sentiment can be harnessed by the centre as well as the right and the left. But so far the Liberal Democrats show few signs that they possess either the ideas or the momentum to fill the void at the heart of British politics. ■



The Gates report

Generation games

The past 15 years have seen spectacular falls in poverty and ill health. The next 15 are unlikely to be as good

IF YOU look beyond the rich West, most of which has been in a funk ever since the financial crisis of 2007-08, the world has had an amazing run. Fully 6m fewer children under the age of five died in 2016 than in 1990. Never before have so many people been free of grinding poverty and ill health. Never have women been so unlikely to die as a result of giving birth, or to lose a baby to illness.

But the possibility that after this long winning streak humanity could be about to trip and fall is preoccupying Bill and Melinda Gates, a pair of self-described “impatient optimists” who run a foundation dedicated to solving the world’s problems. A report from the foundation published on September 13th suggests that progress on several fronts may be starting to falter.

For a variety of reasons, from demography to American and European politics, Mr Gates fears that campaigns to eradicate extreme poverty, HIV and malaria are going awry. He also believes that the rich world has not noticed. The Bill and Melinda Gates Foundation has hitherto been characterised by confidence, especially about the potential for technological innovation to solve the world’s knottiest pro-

blems. So the change of mood is significant. Peter Piot, director of the London School of Hygiene and Tropical Medicine, describes the report as “a wake-up call”.

Demography is one of the biggest reasons for gloom. Few countries in a terrible mess have a low birth rate (Libya and Venezuela are among the rare exceptions). In general, the poorest parts of the world, with the worst health, have the highest birth rates. In recent decades an enormous fertility gap has opened between these benighted places and everywhere else. It is caused not by women in poor countries having more children but by women everywhere else having many fewer.

In 1950-55 Africa’s most populous country, Nigeria, had a fertility rate of 6.4 (meaning that a woman could expect to have that many children if she survived through her childbearing years). That was much higher than in Europe or North America, but similar to the biggest countries in Asia and Latin America. In the early 1950s China’s fertility rate was 6.0. India’s was 5.9 and Brazil’s was 6.1. Six decades later a chasm had opened up. In 2010-15 Nigeria’s fertility rate was estimated to be 5.7, whereas Brazil, China and India all had rates below 2.5.

High birth rates put a big strain on countries. They lead to high dependency ratios, meaning that a relatively small adult population must support lots of children. In mostly agricultural societies, farmers must scratch livings from smaller plots on ever less fertile soils. High birth rates also have an arithmetical effect on global averages measuring development. When lots of children are born in countries that are largely poor and unhealthy, and few in better-off places, the world taken as a whole becomes poorer and sicker. “Just to tread water takes increasing effort,” says Chris Murray, the director of the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, which produced most of the forecasts for the Gates report.

Date with destiny

Over the next few decades the fertility gap between Africa and the rest of the world is expected to narrow, but only excruciatingly slowly. If UN projections are right it will take 40 years, from the early 2010s to the early 2050s, for the fertility rate in sub-Saharan Africa to fall from the current level of five to below three. The same drop occurred over 25 years in Latin America and the Caribbean, and just 20 years in Asia, beginning in the early 1970s. The population of sub-Saharan Africa, which stands at about 1bn, is expected to reach 2bn in 2046 and 3bn in 2071.

This demographic divergence is a big reason to fear that poverty will stick around. Today 9% of the world’s people are believed to live in extreme poverty—de- ►

fined as consuming less than \$1.90 a day at 2011 purchasing-power parity. About half of those people are under 18. This represents remarkable progress: in 1990 about 35% of all people were thought to be extremely poor by the same yardstick. But progress will probably be much slower from now on.

In the past quarter of a century, poverty has fallen greatly in Asia and Latin America. In 1990 two-thirds of Chinese people lived in extreme poverty. At the most recent estimate, which relies on data from 2013, just 2% did. China is responsible for two-thirds of the overall drop in deep poverty between those years. India, Indonesia and Vietnam are also seeing it gradually disappear. In short, says Homi Kharas of the Brookings Institution, a think-tank in Washington, DC, whose forecasts the Gates Foundation uses, the “big pools of Asian poverty” are drying up.

Sub-Saharan Africa is sadly quite different. Although the share of Africans living in deep poverty is falling, it is not falling quickly enough to outweigh rapid population growth. The number of paupers in sub-Saharan Africa is holding steady at roughly 415m. Half of the world’s poor people are now thought to be African (though statistics are patchy for some very poor, dysfunctional countries, such as the Democratic Republic of Congo).

The region’s poverty is particularly intractable. This is largely because so many of its paupers live well below the threshold of extreme poverty, meaning it is harder to pull them over that level. It is also unpredictable. A terrible ruler, a war or a dismal harvest could send poverty rates shooting up. The growing weight of African paupers in the global total makes forecasting tougher. But overall, Mr Kharas expects the share of the world’s population living in extreme poverty to fall to 6% around the mid-2020s, and to remain at that level in 2030.

Ancient evils

Infectious diseases add to the reasons for concern. Controlling them often requires increasing effort and rising levels of spending just to stand still. But for many illnesses that afflict the world’s poorest people, future funding is uncertain. That includes HIV, malaria and the 20 ailments collectively referred to as “neglected tropical diseases” (NTDs), such as lymphatic filariasis, river blindness and sleeping sickness.

The example of HIV is cautionary, says Mr Gates. He fears that Americans and Europeans, lulled by plummeting infection rates in their own countries, and treatment protocols that can keep the disease at bay for decades, think the global battle against HIV is largely won. The term “AIDS-free generation” is being bandied about. But in some poor countries there is a serious risk that infection rates will start to rise.

Tackling HIV requires co-ordinated action on several fronts. The number of people being infected needs to be brought down, for example by promoting behavioural changes such as using condoms. Those already infected must be kept alive and healthy, which requires systems capable of delivering anti-retroviral drugs and other care. As time goes on, rising survival rates mean that the number of people with HIV in the population keeps growing. Treating all of them becomes more difficult and expensive—and poor countries where many people are infected, as in much of Africa, struggle most. If funding cannot keep pace, more will receive inadequate treatment. The virus will multiply in their bodies. They will become more infectious and spread the disease further. And they will die young.

The coming years will see the largest youth cohorts in Africa’s history. By 2030 the continent will be home to more than 280m 15- to 24-year-olds. And more young people means more sex, says Dr Piot. “If we continue to do what we are doing now—which is already a considerable effort—that is not going to be good enough.”

Malaria, too, has been beaten back in the past 15 years, but could stage a resurgence. A vaccine is already in use in several countries, but its efficacy is limited and it is not yet clear how much use it will be in the poorest countries. Drug companies and research foundations are working to develop better ones, but success is some way off. In the meantime, drug-resistant strains could evolve and spread. Without continuing re-

search into new insecticides to use with bednets, says Mr Gates, deaths from malaria could rise again, as high as 1m a year.

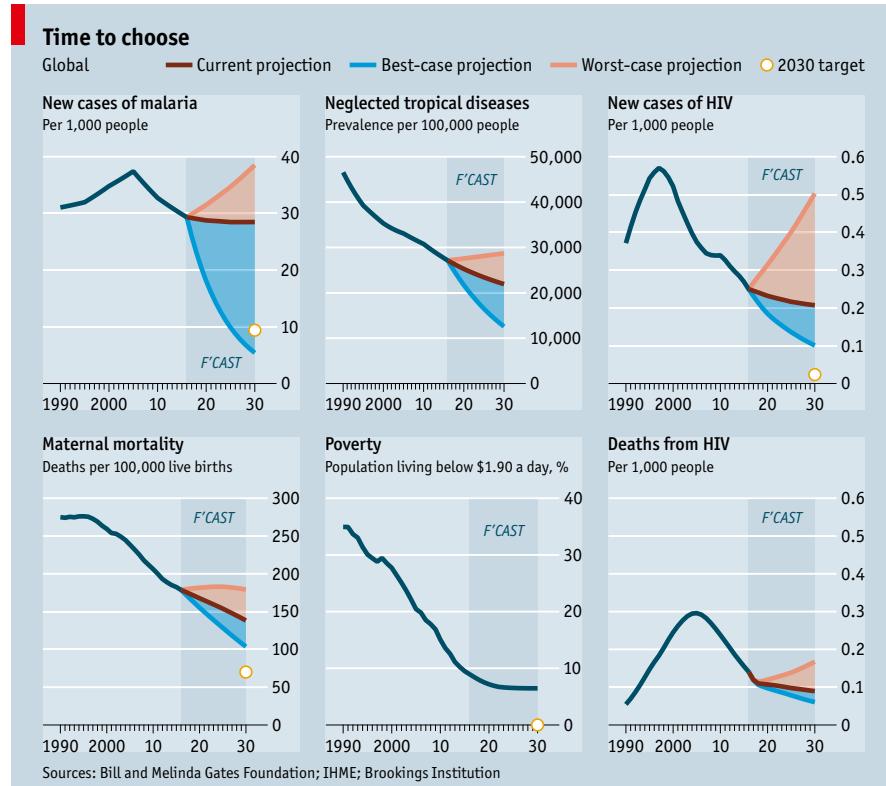
He also worries that a “mood of retrenchment” means that Western countries are losing interest in the poorest parts of the world. At the same time, many developing countries are failing to spend enough of their own money on health care. A new paper in *The Lancet*, a medical journal, finds that 32 countries in sub-Saharan Africa spend less than 3% of GDP on health. Experts regard 5% as the minimum required to cover the basics.

International aid remains essential. Britain’s government has stuck to a pledge made in 2013 to meet a UN target of spending 0.7% of GDP on aid (Britain and Germany are the only large donor countries to have reached that level). But this target is controversial, not least within the governing Conservative Party. It might not survive a financial pinch caused by Britain’s exit from the European Union.

Hunkering down

More broadly, in Britain and elsewhere in Europe, the political case for aid is changing. Governments are presenting it to voters less as a way to help the world’s poorest people and more as a way to discourage them from trying to migrate to Europe. The European Union has allocated funds to the governments of several countries, including Niger and Turkey, in the hope that they will clamp down on people-smuggling.

And rich countries have taken to including the cost of dealing with the refu-





Mighty oaks from little acorns grow

► gees who fetch up on their shores as part of their foreign-aid spending. Between 2014 and 2016 in-country spending on refugees by the 35 mostly-rich members of the OECD has risen from 5% of net aid to 11%. Such spending does little or nothing to help sorghum farmers in Mali or girls in rural Bangladesh.

President Donald Trump has already slashed American funding for charities that provide, or even talk about, abortions in other countries. That will probably lead to more unwanted pregnancies (and more abortions) since many of those charities also provide family-planning services. Mr Trump's proposed budget would slash foreign aid more generally. Since America is the world's largest aid donor, that would have a big impact.

Cause and effect

Congress is likely to make amendments, but not to the extent that spending actually rises. This would be a change in direction. Under George W. Bush America led the global fight against HIV. Now, Mr Gates says, "the best case is flat funding to deal with a larger pool of people." The foundation's report includes projections of the impact of possible cuts to funding for HIV. A cut of 10%, it predicts, could cost 5.6m lives between now and 2030.

Is all the pessimism warranted? On some indicators, notably maternal mortality, the Gates report is reasonably sanguine. And better policies in developing countries could do much to improve the lot of their poorest citizens, even without spending more. India, for example, which Mr Kharas estimates still has 92m people in extreme poverty, could stop frittering money on fuel subsidies and other hand-outs that have mostly gone to the better-off. Sub-Saharan Africa could also fare a little better than expected. Though many of the region's governments are weak and cor-

rupt, at least most are stable these days.

The most hopeful development would be an unexpected decline in birth rates in sub-Saharan Africa. Demographers have been caught out before. In 1978, for example, the UN forecast a fertility rate for Vietnam of 4.4 in 1995-2000. The rate turned out to be just 2.2. Swift declines in the Middle East also came as a surprise.

The persistence of very high fertility in the region is something of a puzzle. Some researchers posit cultural explanations. Perhaps the boost to a man's status from having many children is greater than elsewhere, or perhaps communal land-holdings mean that large families continue to be economically beneficial. More optimistic, since it suggests better policies could turn things around, is the theory that poor access to modern contraceptives is the main problem.

Look at Bangladesh and Iran, says John Bongaarts of the Population Council, in New York. Bangladesh promoted family planning by mobilising village women to preach the virtues of contraception. In the 1980s Iran lurched from pro-natalist policies to promoting family planning. In both countries, the birth rate plunged. Few African countries have done the same (the big exceptions are two highly authoritarian states, Ethiopia and Rwanda, and one well-run democracy, Botswana). "It's really very frustrating," says Mr Bongaarts.

Sub-Saharan Africa may muddle its way to a lower birth rate faster than the forecasters estimate, even without help from governments. The region's cities are growing at a terrific clip of about 4% a year. This growth is often unplanned and messy, and the cities are seldom terribly productive. But urban living is likely to suppress birth rates, all the same. Whereas farmers can put even young children to work pulling weeds and minding goats, city-dwellers tend to find that their offspring add little

to household output and, moreover, require expensive schooling. As a result, they seek to have fewer children.

Another hope for a better future is that medical progress will be faster than expected. Optimists put their faith in new drugs, better delivery systems and technologies as yet unknown: there is even the prospect of a vaccine for HIV, though certainly at least five years away.

Yet it would be unwise to rely on such breakthroughs, or indeed to imagine that the influence of medical developments on disease is always benign. Jeremy Farrar of the Wellcome Trust, a medical-research charity, warns that untreatable strains of HIV may emerge. Most pathogens eventually develop resistance to the drugs used to treat them. If drug-resistant strains become common, says Dr Farrar, "imagine controlling a second peak of HIV."

The real value of the predictions in the Gates report is less that they give an accurate picture of the world in 2030, than that they provide estimates of what is at stake. Between its optimistic and pessimistic scenarios are the lives and wellbeing of millions of people. And even in the best cases, some countries will make slow progress. In 2030 the world is highly likely to have at least 490m poor people, according to the Brookings Institution. The forecasts show where there is the greatest potential to save lives and make them better. Between now and 2030, the difference between the best- and the worst-case scenarios in the deaths of under-fives represents about 7.8m lives, according to the IHME. For maternal deaths the difference is 377,000.

The report also highlights the biggest risks to progress—namely, the control of infectious diseases. If HIV or malaria comes roaring back, the impact will be felt very quickly. Worryingly, the greater the progress against a disease, the harder it is to motivate people and governments to keep going. An anti-malaria campaign in the 1950s and 1960s is instructive. After early success donors became complacent and the disease rebounded. One of the report's most important messages, says Dr Farrar, is that "we have choices to make".

Peak progress

Belief in the efficacy of aid, which reached a high point during the "Make Poverty History" campaign in 2005, has been hard to reignite after the financial crisis. Rich countries and their citizens are increasingly looking inwards. They seem pessimistic about their own prospects and less inclined to devote much thought and effort to those of others. Yet the past 15 years' progress was built not only on investment, but on optimism, both in poor countries and rich ones. This generation has gained greatly from the generosity and resolve of the previous one. It remains to be seen whether the next one will be as fortunate. ■



Europe's chief trustbuster

Big Tech's nemesis

Is Margrethe Vestager the champion of consumers or of her own political career?

EVEN her enemies admire the bloody-mindedness of Margrethe Vestager, the European commissioner in charge of competition policy. Last autumn, not long after she had ordered Apple to pay €13bn (\$14.5bn) in back-taxes to Ireland, to the fury of many in America, she flew across the Atlantic on a charm offensive. The Americans were not charmed; Ms Vestager was unmoved. Buckling up for the flight home, she tweeted that she had never felt so European.

Since she assumed her current role in November 2014, Ms Vestager has had several high-profile clashes with American tech firms. In May she fined Facebook €10m for misleading EU trustbusters about its takeover of WhatsApp, a messaging service. In June a long-running investigation resulted in a €2.4bn fine on Google for using its search engine to promote its own comparison-shopping service. EU trustbusters have also charged Google with using its Android operating system to promote its mobile-phone apps and services over those of rivals. That investigation continues.

Ms Vestager has said the job of agencies like hers is "not to get too cosy with special interests but to have the courage to defend the public interest". Few would quibble with that. All too often regulators and trustbusters come to see the world as big business sees it, to society's cost. But a long-standing concern is that the commission

acts as prosecutor, judge and executioner in cases against dominant firms. The courts in Europe have been a weak check on its powers in recent years in this regard.

That may be changing. Last week the European Court of Justice asked the lower courts to look again at the economic merits of a case against Intel, which in 2009 was fined €1.06bn for abusing its dominant position in chipmaking. But the courts move slowly. Some worry that a number of Ms Vestager's recent, crowd-pleasing victories over big tech firms may come back to haunt the commission. And by then she might have moved on to a bigger job.

Oceans apart

To assess how fair that concern is, it helps to be clear about how competition policy varies between America and Europe. There are three main parts to the job: the control of mergers, the policing of cartels, and checks on "dominant" firms, or those that supply the bulk of a market. Cartel-busting is quite similar in both places. Europe has mimicked the American policy of offering immunity to firms that rat on their fellow price-fixers, for instance. The EU approach to mergers, especially "horizontal" tie-ups between competitors in the same industry, is also a lot like America's method (though research suggests that merger control has been far more lax there).

The big transatlantic gap is in the policing of dominant firms (known in Europe as

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Article 102 cases, after the relevant passage in the EU treaty). Europe's trustbusters have been far more likely to worry that a dominant company, of the sort that technology industries tend to produce, will force rivals out of business, leaving consumers facing less choice, higher prices and worse services. Trustbusting in America, in contrast, has taken its cue from the economist Joseph Schumpeter who believed that the promise of monopoly profits is a spur to the innovation and risk-taking that drives economic growth. In this view, the dominance of tech firms is likelier to attract competition than to crush it.

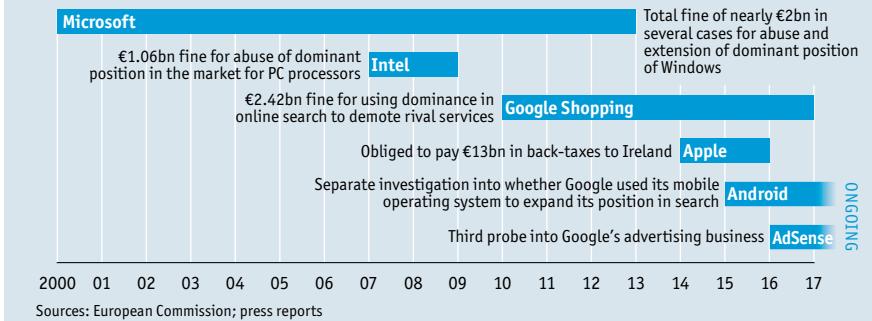
Since Ms Vestager took office, a mostly polite difference in philosophy has hardened. Brussels believes the growing power of big tech firms to shape politics, society and the economy requires a counter-weight. The battle is of greater urgency, the commission reckons, because the data that tech monopolies have accumulated make it far harder for upstart firms to displace them or keep them in check.

Few in Silicon Valley, meanwhile, doubt that competition policy in Europe is anything but thinly veiled protectionism aimed at shielding the region's old-economy firms from disruption. Challenged on whether she might have tech-envy when it comes to American giants, Ms Vestager resolutely denies a bias. There are Article 102 cases under way against many non-American firms, including Russia's Gazprom.

Even so, she has brought a different approach to competition policy, says Robert McLeod, of MLex, a market-risk agency. Her predecessor, Joaquín Almunia, was more inclined to compromise. He might well have agreed a settlement with Google over the shopping case, insiders say. His predecessor, Neelie Kroes, a Dutch former politician, was bold but tended to follow the advice of her civil servants. ➤

The price of success

European Commission and big technology companies' antitrust cases, selected



Sources: European Commission; press reports

► Ms Vestager seems to relish a confrontation. Her principles and zeal probably come from her upbringing as the daughter of Lutheran ministers. As Denmark's deputy prime minister, she regularly upstaged her boss, Helle Thorning-Schmidt. She has a knack of boiling down complex issues to catchy soundbites, such as "Europe is definitely open for business but not for tax evasion." In some of the battles she has started, tech giants had a case to answer. Facebook's misdeed, for instance, is not much disputed. The Google Android investigation seems to have merit.

But in other headline-grabbing cases, it is not clear how consumer welfare has been much enhanced. The commission said Google abused its dominance of online search to promote its own comparison-shopping service and relegate those of rivals. Yet it did not show, for instance, that consumers were denied a superior service as a consequence. Google said this week that it will appeal against the decision.

The benefit to competition from the Apple tax case is harder still to fathom. Under European law, it is illegal for a government to provide a subsidy to an individual firm, known as "state aid", which gives it an edge over its rivals. At its best, the enforcement of state-aid rules has severed the links between governments and national champions, such as flag-carrying airlines. Very often such firms are loss-making and a burden to the exchequer. Preferential treatment makes it hard for better firms to challenge them—so state-aid rules that cut them loose hugely benefit consumers.

Where's the harm?

But the case against Apple does not fit the paradigm. The thrust of the commission's argument was that Ireland cut a bespoke tax deal with Apple that was not open to other companies, equivalent to state aid. But which firm is the peer against which Apple's tax affairs should be gauged? How was competition distorted? Where are the chronic inefficiencies? The politics of the case seem clearer than the competition-policy benefits. Big EU states have long been critical of Ireland's 12.5% rate of cor-

porate tax. But it is a stretch to use state-aid rules to achieve the sort of tax harmonisation that is favoured in Brussels.

Many in the competition-policy establishment were deeply dismayed by the Apple decision. Ms Kroes publicly criticised the use of state-aid rules (a commission spokesperson later shot back that this was all too predictable from someone in the pay of Silicon Valley—Ms Kroes is on

Ms Vestager is described by one of her peers as "the most politically effective" trustbuster in recent memory. It is a judgment, admiring and grudging at the same time, that others in the field share. There is admiration that she has raised the profile of competition policy in a way that her dry and technocratic peers and predecessors could not. And there is a grudging acknowledgment that her brand of populist policymaking might be just what is needed to address the growing heft of big firms. But mixing politics with trustbusting so overtly is a dangerous game. The competition directorate's standing as a neutral arbiter may get damaged in the process. ■

Apple v Samsung

Phone tag

SAN FRANCISCO

The rivalry between the leading producers of high-end smartphones will only grow fiercer

NEVER shy about hype, on September 12th Apple's boss, Tim Cook, presented the firm's latest iPhones to a packed auditorium in its glitzy new headquarters in Cupertino. He made a grand prediction: its new, premium phone, the iPhone X (pronounced "ten"), will "set the path of technology for the next decade". Set to be released this November, ten years after the first iPhone launched, the iPhone X has new features such as an edge-to-edge OLED screen (a thinner screen that does not use a backlight), wireless charging, fa-

cial-recognition technology and a dual-lens camera.

On the same day, Samsung, a rival smartphone-maker, held a lower-key event in Seoul. Koh Dong-jin, president of Samsung Electronics' mobile business, announced that next year Samsung could reimagine the smartphone entirely and launch a new design with a foldable screen, which can close like a small book. On September 15th its latest premium smartphone, the Galaxy Note 8, will go on sale, boasting many of the features offered by the iPhone X.

Both are trying to convince consumers to spend around \$1,000 for their new gadgets. Samsung's new phone will cost \$960; Apple's high-end iPhone X will cost \$999, 45% more than the average selling price of an iPhone in 2016. (The iPhone 8, simpler than the X and available for sale in September, will start at \$699.)

The competition to wow consumers has been intensely fought between Apple and Samsung Electronics for years. They claim a duopoly over the premium part of the smartphone market. Together they control around two-thirds of the global market (Apple claims 44% of smartphone revenues and Samsung 22%; see chart). The



▶ two firms have tussled in courts around the world over intellectual property, with Apple accusing Samsung of infringing on its smartphone patents.

Last year Apple seized share in premium phones when Samsung struggled with its Galaxy Note 7; its batteries had a habit of overheating, which necessitated a global recall. Samsung's new phone is expected to win back users. It used to copy Apple's innovations but is now often ahead on new features, says Werner Goertz of Gartner. Samsung was the first to release an OLED screen, for instance.

The rivalry between the two will only grow fiercer (even though Samsung is also among Apple's most important suppliers of components, and is expected to provide OLED screens and chips for Apple's latest phones). In rich countries the market for smartphones is maturing: many of the firms' gains will come from stealing each other's customers. In emerging markets, especially China, they will compete to persuade consumers to trade up from cheaper phones. Apple globally claims an 82% retention rate, compared with Samsung's 67%. This is significantly higher than other firms', especially Chinese manufacturers like Xiaomi and OPPO, whose less expensive phones have gained share among Chinese consumers in recent years.

Samsung and Apple will fight on three fronts. One is to design a better overall software ecosystem and keep consumers within it. "I don't know if it's a smartphone war as much as it is an ecosystem war," says Tim Bajarin of Creative Strategies, a technology consultancy. Samsung runs on the Android operating system, whose design it does not fully control, whereas Apple has the advantage of complete oversight of its iOS operating system.

A second front will be fought over virtual assistants. Apple was the first mobile-phone maker to offer a voice-controlled assistant, called Siri, which it introduced in 2011. Samsung offers one named Bixby. Both have been underwhelming in their capabilities. But Samsung is investing huge sums to change this, while Apple is criticised for underinvesting in Siri.

A third battleground in software will be augmented reality (AR), or the projection of digital information onto the physical world. Both Apple and Samsung offer dual-lens cameras, which make it easier to integrate AR functions into apps.

There is unlikely to be one winner. Samsung is well hedged; its strong chip and smartphone-components business will insulate the firm if mobile-phone sales slow. Apple lacks this diversity, but its mobile devices project luxury, and its customers are less likely to defect because iOS runs across all their devices. Mr Cook may be right that Apple's phones will set technology's direction, but his firm will feel Samsung's breath on its neck all the way. ■

Liquefied natural gas

Think smaller

Amid an LNG glut, big oil is turning to poorer countries for new markets

WHEN it comes to liquefied natural gas (LNG), the supermajors have supersized appetites. The likes of Royal Dutch Shell, ExxonMobil and BP make discoveries described as "elephants"; their cost overruns alone can run into the tens of billions of dollars; and projects take the best part of a decade to complete. For years, the industry has demanded fixed, long-term contracts from their customers to justify the size of these megaprojects.

The producers also have pretty big problems. They are in the midst of a vast expansion in Australia and elsewhere just as the shale revolution and the start of American LNG exports has brought an unexpected burst of gas onto markets, clobbering prices for the foreseeable future and forcing producers into concessions. Demand in rich countries such as Japan and much of western Europe appears to be in long-term decline.

At least one big customer, China, is making life easier. Thanks to low prices and government policies favouring gas over coal, its consumption of LNG has shot up by 50% in the past year. But domestic gas production is growing, and within two years it expects to pipe in huge volumes of Russian gas, so it can play suppliers off against each other. India is a more immediate problem. On September 11th its main importer, Petronet LNG, said it had provisionally renegotiated a 20-year supply contract with ExxonMobil that is expected to bring in gas from Australia at lower cost, albeit in larger volumes. It is the second time in two years that India has arm-twisted a

producer into offering better terms.

The result is that huge LNG producers are increasingly reliant on small developing countries. The International Energy Agency, a body that represents energy consumers, says the number of LNG-importing countries has risen from 15 in 2005 to 39. Imports are rising at their fastest rate since 2011, in part because of demand from these places. Like India, low prices also embolden them to demand concessions. "We have a situation that is wonderful for emerging markets. It's a buyers' market," says Lance Crist of the International Finance Corporation (IFC), the private-sector arm of the World Bank.

The trouble is, many energy-hungry countries lack the pipeline networks to distribute gas. Nor do they possess the creditworthiness to sign long-term contracts. To tap new markets, the gas giants need to think small, not big. They must recognise that flexibility is vital, analysts say.

One way of doing this is to support the development of floating terminals, rather than fixed infrastructure, to bring gas to coastal cities. One model is Excelerate Energy, a Texas-based firm that provides floating storage and regasification units (FSRUs), which turn the liquefied hydrocarbons into gas, and pipe it ashore to power plants and local grids. One of its projects (pictured), backed by the IFC, is to supply gas to a coastal town in southeastern Bangladesh, starting next year. Nick Bedford, the firm's chief financial officer, says the cost to Petrobangla, the state oil company, will be \$85m a year, excluding the gas.

In contrast, building an onshore regasification plant instead could cost a hefty \$1bn, and would commit the country to natural gas for decades, even as the promise of renewable energy becomes more attractive. FSRUs are stimulating smallish pockets of demand around the world. Last year Total, the French supermajor, took a leaf out of Excelerate's book by agreeing to spearhead an FSRU project in Côte d'Ivoire. ►



Bringing rivers of the liquefied stuff

► Another option is for big oil companies to give financial support for the construction of gas infrastructure in poor countries as a way to foster demand. This week Shell took a step in that direction by announcing that it is exploring a joint project with a Nigerian firm, Shoreline Energy, to bring domestic gas to an area near Lagos. Kola Karim, Shoreline's boss, said the proposed \$300m project would enable Shell to pipe gas into places where the infrastructure is "shot to bits". But it is a departure from Shell's core job of producing gas globally.

Such ventures may become more widespread if big LNG export projects extend to

places like Mozambique and Tanzania, which are starved of fuel domestically. Tisha Schuller of Adamantine Energy, a consultancy, says LNG producers have a delicate balancing act. On the one hand, they want to avoid accusations of fostering an "addiction" to fossil fuels in poor countries with strong renewable-energy potential. On the other hand, reducing energy poverty by supplying gas, which is cleaner than coal and oil, could enhance their reputations. As Western consumers and financiers increasingly turn against fossil fuels, getting that balance right in the developing world will be vital. ■

Electric cars in China

Zooming ahead

FRANKFURT

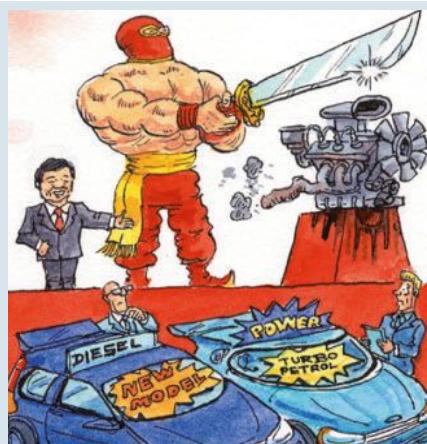
China puts its foot down on the road to electrification

"A DEFINING moment for the auto industry." That is how usually restrained analysts at Sanford C. Bernstein, a research firm, described the news that China's government wants to move towards a ban on gas guzzlers. On September 9th, Xin Guobin, vice minister of industry and information technology, told an automotive conference in Tianjin, a grimy industrial city near Beijing, that the government is developing a long-term plan to phase out vehicles powered by fossil fuels.

The news reverberated around car firms, for which China is the largest market. William Russo of China's Gao Feng Advisory, a consultancy, who was previously a senior executive at Chrysler, says China is simply far too big to lose out on. "If China says no more fossil-fuel powered cars, global carmakers must follow."

No timeline for a ban was suggested. China already has ambitious medium-term goals for automotive efficiency and climate change, including a cap on carbon emissions by 2030. Experts reckon this new ban might come into force around then. It is unclear whether the ban will include only pure-petrol cars or also plug-in hybrids that combine petrol engines with electric motors.

Mr Xin's news came just before the opening of the Frankfurt Motor Show, a spiritual home of conventional cars. Many attendees were sceptical. Despite much talk about national bans—this year Britain and France have said that by 2040 new cars completely reliant on petrol or diesel will be illegal—no country has passed concrete legislation to implement a ban, some noted. Others saw opportunity. Thierry Bolloré, chief competitive officer at Renault, the French arm of Renault-Nissan, a Franco-Japanese giant, says his firm is well prepared to start



making electric vehicles (EVs) in China.

Western firms are not going to get things their own way, however. China's government is getting better at boosting its own EV manufacturers after years of giving out ill-considered subsidies and setting unrealistic sales targets. Local manufacturers have not been able to match the quality and innovation of petrol-fuelled cars produced by Western rivals. But China has advantages when it comes to electrification and connected cars. It has many inventive internet companies, is home to some of the world's biggest battery producers and is at the centre of electronics manufacturing.

BYD, a Chinese automotive firm in which Warren Buffett has a stake, has dramatically improved the quality of its EVs and car batteries, and is making a push abroad. A new generation of inventive, venture-backed EV firms like ThunderPower and Nio are making a splash at global auto shows. The electrification of transport could give Chinese carmakers and suppliers a chance to change from also-rans into champions.

Logistics

Freight gain

ASTANA

New rail routes between China and Europe will change trade patterns

A STANA in Kazakhstan is one of the world's most remote capitals, surrounded by thousands of kilometres of empty steppe. This summer Astana attempted to launch itself onto the global stage by hosting the World Expo, which closed on September 10th and underwhelmed many attendees. But there are other ways to have an impact. On the city's north side, away from the Expo's exhibits, a series of diesel trains, each pulling dozens of containers, roll through the old railway station. Most are heading from China to Europe. Last year over 500,000 tonnes of freight went by train between the two, up from next to nothing before 2013. Airlines and shipping firms are watching things closely.

The trains rumbling through Astana result from a Chinese initiative, in tandem with countries like Kazakhstan, to build a "New Silk Road" through Central Asia. The earlier overland routes were once the conduits for most trade between Europe and China and India; they faded into irrelevance when European ships started circumnavigating the Cape of Good Hope.

China has long wanted to develop its inland regions and push industry to "go west", in order to spread economic growth more evenly. Manufacturers have been loth to shift, in part because of the higher cost of moving goods to ports for export. Developing a rail-freight network to Europe—an important part of China's "One Belt One Road" policy—opens up a new route to market for its poorest areas. The land route through Central Asia is relatively short. A container ship too large for the Suez canal must make a 24,000km journey to reach Europe. Trains travel no more than 11,000km to reach the same destination.

Kazakhstan has spent over 11tn tenge (\$3.2bn) on upgrading its railway lines and rolling stock since 2011. That includes \$250m on the Khorgos Gateway, a dry port at the border with China that lifts containers from Chinese trains onto Kazakh ones to overcome a change in track width (a problem that has stymied previous efforts to build railway routes between Europe and China).

Volumes of freight travelling between China and Europe by rail are rising quickly. Between 2013 and 2016 cargo traffic quintupled in weight. In the first half of this year the value of goods travelling by train rose by 144% compared with the same period in 2016. Western firms have been keen to em-



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brace rail freight because it helps them to lower costs, says Ronald Kleijwegt, an expert on the industry. In the case of high-tech electronics, for example, which consumers like to receive quickly, making them on China's coast and air-freighting them to Europe is extremely pricey.

How worried should shipping firms and airlines be? Kazakhstan's national rail company, KTZ, says it will have capacity for 1.7m containers to pass through the country between Europe and China each year by 2020; that is a tenth of the volume currently carried by sea and air between the two. In the longer term, a full modernisation of the existing main three rail routes from China to Europe could produce 3m containers a year in capacity.

But there are reasons to doubt that will happen. For one thing, China plans to stop handing out government subsidies for additional rail-freight capacity from 2020, which will slow the network's expansion. Sea freight has little to fear in the near term, says Soren Skou, chief executive of Maersk, the world's biggest container-shipping line. Trains may take away some future growth from ships, he concedes, but not their existing business.

Air cargo is more vulnerable. Last year, 180,000 tonnes of cargo travelled on trains to western Europe from China (the remainder was destined for Russia and eastern Europe). That is a small fraction of the 52m tonnes that came by sea, but a big chunk of the 700,000 tonnes that came by air. Much of that air cargo could switch to rail in future, says Mr Kleijwegt, with one important proviso—that Russia would need to lift the retaliatory sanctions it placed in 2014 on imports of Western food, which stop most foodstuffs from travelling by land between Europe and China. That is unlikely for the time being. But it was only a decade ago that people thought the idea of freight trains between Europe and China was a joke, says Mr Kleijwegt—and no one laughs at that any more. ■

The business of sperm banks

Seed capital

AARHUS

Modern families and differing national laws on sperm donation mean opportunities for companies

BROWSING websites that list sperm donors is weirdly similar to online dating. "Sanford is the total package," begins one online ad, describing his strong jawline and piercing blue eyes. With a degree in finance and a "charming demeanour", he is more than a pretty face. You can listen to a voice recording from Sanford himself. If all that wins you over, you can have his baby without ever having to go on a date. For \$635, Seattle Sperm Bank (ssb) will post you a vial of his frozen swimmers.

The fact that the main customers for many sperm banks are now single women explains the marketing technique. "They tend to be highly educated, impatient and picky," says Ole Schou, founder of Cryos International, the world's largest sperm bank, based in Denmark's second-biggest city, Aarhus. Its website is designed to resemble Match.com, a dating site, because "finding a donor should be as close to finding a natural partner as possible."

Outside the Cryos office, a steady trickle of young men park their bicycles and head for the donor room, which is equipped with the usual pornographic magazines, a television and an inexplicable cactus. After they hand in their contributions, lab technicians test them and sort them by quality. The samples are labelled, frozen and stored in five large vats of liquid nitrogen at -196°C. Once orders come in they will be shipped to homes, clinics and other sperm banks in over 100 countries.

Fertility is a sizeable industry; commer-

cial sperm banks are a crucial and profitable part of it. The global sperm-bank business could be worth nearly \$5bn by 2025, according to Grand View Research, a market-research firm in California. Demand has risen strongly. That is partly because people in rich countries are postponing their childbearing years; they struggle to conceive as a result. But an even greater reason is that in more places, it is both legal and increasingly acceptable for lesbian couples and single women to have children. These groups make up 60% and 90% of clients at Cryos and ssb, respectively.

As demand rises, politicians and regulators are trying to exert more control. That has created a patchwork of rules that affect sources of both supply and demand. In some countries, such as Britain and the Netherlands, anonymous donation of sperm has been outlawed, contributing to sperm shortages; in others, such as France and Spain, donors must be anonymous. In Canada, donors cannot be paid; in most European countries they can be compensated only for expenses; in America there are no limits on remuneration.

As for buyers of sperm, many head for jurisdictions where waiting times and prices are lower or the level of testing or information about the donor greater, or because restrictive rules at home prevent them from receiving donor sperm altogether. In Hong Kong and Switzerland, for example, only married, heterosexual couples are eligible for treatment with donor ►



Fruit of a global supply chain

► sperm. In France lesbians and single women are excluded. This legislative hodge-podge represents opportunity for those that can export sperm. Thanks to dry ice, the internet and DHL, good-quality sperm has become highly tradable.

Where did you guys gamete?

The industry has not always been in the hands of businessmen. For much of the 20th century, infertile couples would see a doctor who would pull his best-looking student from the corridor and use his freshly volunteered sperm to inseminate the woman, recalls Rene Almeling at Yale University. No records were kept. The HIV epidemic of the 1980s ended such shenanigans. Freezing, quarantining and testing both sperm and donors became crucial.

Worried about rising costs and legal liability, medical clinics left the business and commercial sperm banks filled the gap. The market has become highly competitive. Many customers need between six and ten vials to conceive, and with lots coming back for siblings, the business is all about the first sell. Cryos's sales department is bigger than the science lab.

Sperm banks can be divided into two groups: those that regard sperm donation as a medical matter and those that do not. Firms such as Cryos are adamant that donation to a healthy woman is not a medical issue. "It takes place millions of times each day without a doctor," argues Mr Schou. Other sperm banks emphasise clinical expertise. "We provide the highest quality donors for the safest possible babies and happiest families," says Fredrik Andreasson, chief financial officer of Seattle Sperm Bank, which focuses not just on healthy but on "sellable" donors, such as doctors. It prides itself in accepting only 1% of donors and on testing for more genetic diseases than any other bank.

Prices for sperm have roughly doubled over the past decade at several banks. London Sperm Bank now charges £950 (\$1,261) per vial. At Cryos the cheapest, anonymous vials start at €40 (\$48); the highest quality, with an identifiable donor, extra tests and more information, cost up to €1,600. Customers can gain "exclusive access" by buying out a donor for €12,000–30,000. American banks tend to charge extra for information. Want to see a picture or hear the donor's voice? That will be \$25.

For Amy Graves and her partner Claire Harrison, from Britain, information from Cryos about donors was crucial. "As I was going to carry the baby it was important to us that there were similarities between the donor and Claire," explains Ms Graves. They settled on a man who loved football, like Claire, and martial arts, like Amy, and who shares Claire's favourite colour (red) and some of her facial features.

The commercialisation of sperm, eggs and other human tissue makes many peo-

ple uneasy. Sperm banks are elusive about profit margins, but if a donor is paid \$100 per sample, often split into as many as five vials, sold for \$500–1,000 each, margins ought to be healthy even after costs. Yet the non-profit market has failed many people desperate to have children. After Britain started a national sperm bank in 2014, it recruited just eight donors in two years.

The industry has challenges. Heterosexual couples are increasingly likely to freeze their own eggs and sperm cells for later; fertility treatments with the poorest sperm are improving. Last year the first steps towards making sex cells out of body cells were detailed in *Nature*, a science journal. But for the foreseeable future, more sperm banks will be advertising for donors who "have what it takes" and are willing to lend a hand to modern families everywhere. ■



Politicians-turned-businessmen

The point of pantouflagle

PARIS

Why do European companies bother to hire ex-politicians?

THIS month Gerhard Schröder starts a new job. Shareholders in Rosneft, a Russian energy giant with a market value of nearly \$60bn, are set to appoint Germany's ex-chancellor as a board director on September 29th. Russia's government, Rosneft's majority-owner, nominated Mr Schröder, who is pals with Vladimir Putin. Despite Western sanctions imposed on the firm after Russia's invasion of Ukraine in 2014, Mr Schröder's move is no surprise. He has worked for years with Gazprom, another energy arm of the Russian state, to promote a gas pipeline to western Europe.

His ties to Russia win him few friends at home. His successor as Germany's leader, Angela Merkel, calls his behaviour "not OK". She also vows to reject offers of "any posts in industry once I am no longer chancellor". Other politicians are happier to follow Mr Schröder's example. It emerged last month that a former German president, Christian Wulff (pictured), is also employed by a foreign company. He advises a German arm of a Turkish high-street fashion firm, Yargici, topping up the salary of €236,000 (\$282,030) which he gets for being an ex-president. François Fillon, an ex-prime minister of France, became a partner at Tikehau Capital, an asset manager, on September 1st.

Cases such as these spread public unease about the revolving door between business and politics and the civil service. The French call it *pantouflagle*. In January a report by Transparency International, an anti-corruption group, assessed the careers of 512 EU politicians who left office in recent years. It found that over half of retired EU commissioners, and 30% of ex-members of the European Parliament, took jobs with companies or with organisations registered on an EU lobby register. Firms such as ArcelorMittal, an Indian-owned steel-maker based in Luxembourg, Uber, an American ride-hailing firm, and Volkswagen, Germany's scandal-prone car giant, have all hired ex-commissioners.

In Britain, too, ex-politicians routinely land sinecures advising funds and banks: Tony Blair is with JPMorgan Chase; his predecessor as prime minister, John Major, advises Credit Suisse; George Osborne, a former chancellor, this year joined up with BlackRock, an American investment firm.

Though the firms involved emphasise that they have high ethical standards, activists worry. "Conflicts of interest cannot be ruled out," said the authors of the Transparency International report. The appointment of José Manuel Barroso, an ex-president of the commission, as chairman of Goldman Sachs International, provoked particularly loud public complaints in July last year. Campaigners say an 18-month ban on politicians taking such jobs should last much longer.

Given such attention, do employers gain by hiring the once-powerful? Drawing a line from recruitment to the subsequent performance of a company is tricky. Ex-politicians offer expertise, contacts and—presumably—quiet influence among former colleagues. Tikehau Capital has specified that it plans to use Mr Fillon's international experience and knowledge of economic issues. Cynics argue that the real targets of such hiring decisions are not ex-politicians, but those still in office. The point of recruitment could be to send a signal to younger politicians that they, too, could land such a job one day, if they play their cards right. ■

Schumpeter | The weakest link

A legal vulnerability at the heart of China's big internet firms

COMPANIES' legal structures are usually mind-numbing fare. But occasionally it is worth pinching yourself and paying attention. Take "variable interest entities" (VIEs), a kind of corporate architecture used mainly by China's tech firms, including two superstars, Alibaba and Tencent. They go largely unremarked, but VIEs have become incredibly important. Investors outside China have about \$1trn invested in firms that use them.

Few legal experts think that VIEs are about to collapse, but few expect them to endure, either. One sizeable investor admits loving Chinese tech firms' businesses while feeling queasy about their legal structures. Like scientists appalled by their monstrous creations, even the lawyers who designed VIEs worry. They are "China's version of too-big-to-fail", says one. As well as being spooky, VIEs are another instance of how China's weak property rights hurt its citizens.

What are VIEs? Over 100 companies use them. Since the 1990s private firms have sought to break free of China's isolated legal and financial systems. Many have done so by forming holding companies in tax havens and listing their shares in New York or Hong Kong. The problem is that they are then usually categorised as "foreign firms" under Chinese rules. That in turn prohibits them from owning assets in some politically sensitive sectors, most notably the internet.

The lawyers' quick fix, first used in 2000, was to shift these sensitive assets, such as operating licences, into special legal entities—VIEs—that are owned by Chinese individuals, usually the firms' bosses. The companies sign contracts with the VIEs and their individual owners, which the companies say guarantees them control over the VIEs' assets, sales and profits. Abracadabra!

Alibaba, the world's sixth-most valuable firm, illustrates how it works. It is incorporated in the Cayman Islands and in 2014 listed its shares in New York, but makes 91% of its sales in mainland China. There it owns five big subsidiaries which have contracts with five corresponding VIEs. The VIEs contain licences and domain names and are owned by Jack Ma and Simon Xie, two of Alibaba's founders. It is as if Facebook were domiciled in Samoa, listed in Shanghai and its website and brand sat in separate legal entities that were the property of Mark Zuckerberg (but which he had agreed to allow Facebook to run and profit from).

American regulators allow VIEs if their dangers are disclosed. Although most VIE schemes have worked smoothly, the underlying risks have risen in the past five years. It is unclear if VIEs are even legal in China. The latest annual reports of the ten largest

firms that use them all admit to uncertainty about their status. In 2015 a draft reform from the Ministry of Commerce appeared to ban some VIEs, but the initiative has gone nowhere.

Meanwhile, VIEs have become more prominent; the total value of companies that use them has soared as China's internet industry has boomed. The share of firms' sales generated by their VIEs varies but for most of the ten companies has risen since 2012 (see charts). The inner workings of the VIEs are often in flux. In nine cases, their structure has changed in that period: either the names or number of entities, or the names or stakes of their Chinese owners, have been altered. If they are being honest, most shareholders have little idea what is going on.

For investors, there are two risks. First, the VIEs could be ruled illegal, potentially forcing the firms to wind up or sell vital licences and intellectual property in China. The second danger is that VIE owners seek to grab the profits or assets held within. If they refuse to co-operate, die, or fall out of political favour, it is far from clear that firms can enforce VIE contracts in Chinese courts.

Yet this manifestly flawed system has endured for two decades. One theory is that managers favour it because it gives them more power—it is hard for outside shareholders to keep track of VIEs. Like their peers in Silicon Valley, who limit voting rights, China's tech tycoons dislike it when investors call the shots.

The bigger question is why China's government tolerates the set-up. Perhaps it suits high officials to keep the country's internet bosses on an ambiguous legal footing, so that they toe the line. VIEs could even be a diplomatic tool. In the event of a trade war, a quick way to hurt Americans' economic interests (along with banning Apple, which makes a fifth of its sales in China) would be to void VIEs, although China's reputation with all investors would suffer.

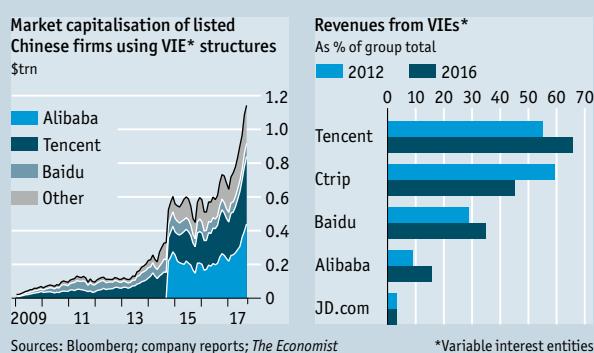
Unscrambling eggs

But failing to tackle the status quo has wider costs, chief of which is that having internet firms listed abroad means most Chinese citizens cannot invest in the most dynamic bit of their economy. It is easier for a pensioner in Dundee to invest in firms in the world's most exciting e-commerce market than it is for one in Dalian. Shanghai's stock exchange is full of stodgy state-backed companies. So far, foreigners have made a capital gain of at least \$500bn from China's internet sector, while locals have been all but shut out. Imagine if Americans could not invest in Apple, Amazon, Facebook or Alphabet. As China's internet firms get bigger, the unfairness of this will become ever more glaring.

VIEs need to be unwound. Some small internet firms have bought back all their shares and delisted in America, then relisted in mainland China, but the cost of this for the big firms would be prohibitive. Alternatively, they could create dual listings in Shanghai or float the shares of their subsidiaries there for locals to invest in. Yet the question of their VIEs' legality would linger.

The enduring answer is for China to relax its foreign-ownership restrictions and open its capital account. Both foreigners and locals could buy into internet firms with a solid legal footing. Whether it does is a test of its appetite for creating an economy based on rules, not fiat. Until then VIEs are the financial equivalent of the "One China" principle that governs China's relations with Taiwan, which the mainland considers a renegade province—a polite legal fiction that papers over serious problems. Such quick fixes can seem stable. But in the back of your mind there is a rational fear that they could blow up at any time. ■

China's strangest export





The Federal Reserve

Switching to autopilot

WASHINGTON, DC

The Fed prepares for its balance-sheet—and its board—to shrink

NINE years ago, in the autumn of 2008, the Federal Reserve was fighting a financial collapse. To stave off disaster, it lent aggressively—to banks, to money-market funds, even to other central banks. As a result, its balance-sheet ballooned. At the start of September 2008, the month when Lehman Brothers collapsed, the Fed's assets totalled \$905bn (at the time, about 6% of GDP). By December they had more than doubled in size, to \$2.1tn. That was only the start. As its emergency lending unwound, the Fed began purchasing government debt and mortgage-backed securities (MBSS), in an attempt to support the real economy. Three volleys of so-called "quantitative easing" (QE) eventually swelled the balance-sheet to \$4.5tn by 2015.

On September 20th the Fed will probably announce that it is putting QE into reverse. It does not intend to sell its assets. Rather, as its securities mature, it will stop reinvesting all of the proceeds. The permitted monthly "run-off" will gradually rise until it reaches \$30bn for Treasury bonds, and \$20bn for MBSS and housing-agency debt (see chart). The process will not be entirely predictable. Treasuries mature on a known date. But how fast the MBS portfolio shrinks will depend on how many Americans move house or refinance their mortgages (which in turn largely depends on interest rates).

Exactly how QE worked—and hence the

effects of unwinding it—remains a little mysterious. The consensus, however, is that asset purchases brought down long-term interest rates, and that the first programme, which began in 2009, had the biggest impact. Fed economists recently estimated that, combined, all the programmes lowered the ten-year Treasury yield by one percentage point.

So as the balance-sheet shrinks, this effect might be expected to go into reverse and interest rates to rise. But there are three reasons to doubt this. First, economists have speculated that some or even all of QE's potency came from its influence on traders' expectations for short-term rates. For example, when markets threw their so-

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called "taper tantrum" in mid-2013, after then-chairman Ben Bernanke said that asset purchases would be reduced, they were agitated in part by the prospect of faster interest-rate rises.

This time, however, there is little scope for the markets to change their assumptions about the path of rates. The Fed has clearly signalled its intentions in advance. Once balance-sheet reduction has started, it will "run quietly in the background", according to Janet Yellen, the Fed's current chairman. In any case, markets today view interest-rate rises and balance-sheet reduction as alternatives rather than complements, according to Daan Struyven of Goldman Sachs.

Second, markets have been relatively stable as the Fed has signalled its balance-sheet strategy. The ten-year Treasury yield is 2.1%, almost as low as it has been at any point in 2017. Prospects for tax cuts and new infrastructure spending seem to have moved the markets more than have the Fed's prognostications. Perhaps earlier QE announcements had an unusually large impact because markets were dysfunction-►

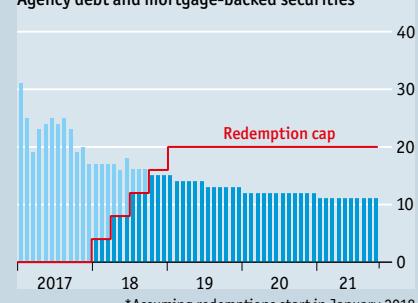
Redeeming features

Forecast maturations and redemptions of Federal Reserve assets*, \$bn

Treasury securities



Agency debt and mortgage-backed securities



► al at the time; today, by contrast, traders can shrug-off balance-sheet policy.

Finally, the run-off will be gradual. Even if the Fed hits its redemption cap every month, it would take eight years to offload all its mortgage-backed securities. This is important if, as many traders believe, it is the flow of central-bank transactions more than its stock of assets that determines prices. (If the stock—which economists emphasise—matters more, the eventual impact on MBS markets looks unavoidable, since the Fed owns 21% of the market.)

The Fed will almost certainly shed its entire mortgage portfolio eventually. Few

economists think it should meddle in housing markets in the long term. But how much of its Treasury holdings is sold depends on where the Fed wants its balance-sheet to end up.

That question will probably be resolved by a new chairman, and an almost entirely new Fed board, next year. After the departure of Stanley Fischer, the vice-chairman, in October (see *Free exchange*), the board might be left with just three members, rather than the intended seven—an unprecedented situation. A perverse effect, besides the higher workload, is that it could make it hard for board mem-

bers to confer privately. Any two would constitute a quorum.

Even if the Senate soon confirms Randall Quarles, the president's nominee to be vice-chairman for bank supervision, three slots would still be open. The vacancies give President Donald Trump latitude to reshape the central bank, and hence, indirectly, its balance-sheet. For now, they increase the power of the five presidents of regional Fed banks who, with the board, vote on monetary policy. They tend to be more hawkish than board members (perhaps because, unlike the board, they are not appointed by politicians). ►

Buttonwood | Investor Caution Obligatory

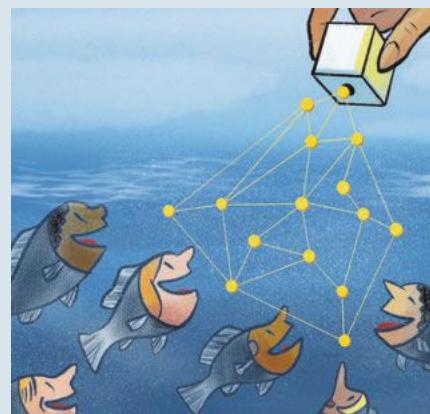
A new craze attracts the attention of regulators

HERE is the deal. You can buy an entry in a computer ledger issued by a start-up company on the basis of an unregulated prospectus. It is called an “initial coin offering” or ICO. But though the ledger entry is called a coin, you cannot spend it in any shop. And whereas the use of the term ICO makes it sound like an IPO (initial public offering), the process whereby a firm lists on a stockmarket, coin ownership does not necessarily get you equity in the company concerned.

This sounds like the kind of bargain that would appeal only to people who reply to e-mails from Nigerian princes offering to transfer millions to their accounts. But ICOs may well be the most popular investment craze since the dotcom boom of 1999-2000; even Paris Hilton, a celebrity heiress, has jumped on the bandwagon. The list of active, upcoming and recent ICOs on the website “ICO alert” covers 31 pages of A4 paper and includes around 600 companies. More than \$2bn has been raised in total.

There is a serious side to the craze, just as there was with the dotcom boom. The technology that underpins digital currencies—the blockchain—is an important development. This is a secure, decentralised ledger that everyone can inspect but that no single user controls. It seems likely to be adapted for use across the financial system—to record property transactions, for example.

Many ICOs are designed to finance applications that will make use of the blockchain—for trading currencies, lending money or searching for jobs. In some cases, the “coins” can be exchanged for services on the site. In a way, this is like selling air miles in a startup airline; investors can either use the miles for flights or hope they can trade them at a profit. For the business, it is also a way of creating



demand for the product they are selling.

But in plenty of cases, an ICO is just a way of raising capital without all the hassle of meeting regulatory requirements, or the burden of paying interest to a bank. Businesses are able to achieve this feat because investors hope that the coins will rise rapidly in value, as has been the case with bitcoin or ethereum, the best-known digital currencies, which have seen stellar gains in the past year. Nothing makes individuals more willing to take risks than the sight of other people getting rich.

But bitcoin is also different from ICOs. Its appeal is as a digital currency that can be used in a broad range of transactions. And the supply of bitcoin is designed to be limited, meaning some people regard it as an electronic version of gold.

So there is a chance that bitcoin or ethereum will come into widespread use, although their function as a means of exchange is undermined by the volatility of their prices. Currencies must be stores of value, at least in the short term. If you think a digital currency is going to rise by 20% tomorrow, you won’t want to swap it for goods and services; if you think it is going

to fall by 20% you won’t want to accept it.

It is also worth remembering that governments set the rules regarding the nature of legal tender within their borders. They will always have the whip-hand when it comes to issuing currency. If they believe that a digital currency is being used for widespread tax evasion, or is distorting the financial system, they will crack down hard.

As far as business-related ICOs are concerned, a few may succeed. Investors may well be taking the “lottery ticket” approach, hoping that one big winner will offset a large number of losses. In a sense investors are acting like venture capitalists. But the sultans of Silicon Valley’s VC industry insist on a wide range of rights before they invest their capital, including protection against dilution of their stakes and (sometimes) the right to nominate board members. Investors in ICOs have nothing like that level of protection.

In the circumstances, it is hardly surprising that regulators are getting involved. In America, the Securities and Exchange Commission has ruled that these coins may, in some cases, be securities and thus subject to regulation. A British regulator, the Financial Conduct Authority, this week warned investors about the risks involved. The Chinese authorities have gone a lot further, declaring that new ICOs are simply illegal.

It is not easy to draw a line between financial innovation and reckless speculation. Perhaps an ICO will finance some breakthrough that boosts economic efficiency. If you work in the tech sector, you may be able to spot the occasional grain of wheat among the pile of chaff. Everyone else should assume that ICO stands for “It’s Completely Off-limits”.

In February Ms Yellen's term will expire. Until recently, the favourite to replace her was Gary Cohn, Mr Trump's senior economic adviser, whose views on monetary policy are not clear. But Mr Cohn has reportedly fallen out of favour with the president, after criticising his response to a white-supremacist march. That might have boosted Ms Yellen's chances of reappointment. But she, too, has risked the ire of the White House, with a robust defence of financial regulations that Mr Trump wants to loosen. (Her backers hope that a recent breakfast with Ivanka Trump, the first daughter, helped to curry favour.)

The obvious beneficiary of these setbacks is Kevin Warsh, an ex-banker who served on the Fed's board during the financial crisis and was a confidant of Mr Bernanke. Unfortunately, Mr Warsh's skills at making friends seem stronger than his monetary-policy acumen. During the financial crisis, he fretted needlessly about inflation. His criticism of asset purchases from 2010 onwards have not aged well. And his muddled writings on monetary policy betray his lack of economic training.

Under Mr Warsh, the Fed might shed assets, especially MBSs, faster. Worryingly, it might also hesitate to use QE again if, as is likely, interest rates hit bottom once more during a future recession—especially if Mr Trump appoints other QE-sceptics, such as Marvin Goodfriend, a professor at Carnegie Mellon University, to the board. Ms Yellen, despite her efforts to shrink the balance-sheet now, would be a better firefighter come the next conflagration. ■

Goldman Sachs

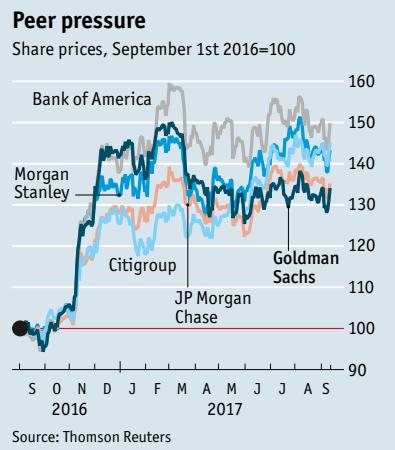
Ripples at the top

NEW YORK

America's star investment bank embraces change

IT IS not easy to feel pity for Goldman Sachs. Its alumni lord it in pivotal government positions around the world; from every prestigious business school, applicants queue in hope of a job; its senior executives earn eye-watering amounts; and it has a presence, it seems, in every corner of the global economy. Yet these are troubling times for the bank. It is facing fundamental questions about its business model.

Its investors are particularly worried by a precipitous decline in the fortunes of its core fixed-income, currencies and commodities unit (FICC). That is the business from which Goldman's current leadership graduated. The bank's president, Harvey Schwartz, used a conference on September 12th to give an unusually detailed account of how it is changing. He outlined plans for



igniting growth in an apparently stagnant business, and for preserving profitability despite that stagnation.

One factor in Goldman's problems has been a change in its staff structure. In the hunt for cost cuts, the number of partners and managing directors—the group that has been the very definition of Wall Street aristocracy—has declined by 13%. The number of associates and analysts has correspondingly increased. They form the lower-paid (but hardly low-paid) army of aspirants that once entered Goldman hoping for a career. Now they often just want a few years to make contacts, see the heart of the capitalist machine and add an important line to their cv.

The problems in the fixed-income business, are also structural. Industry revenue peaked at \$121bn in 2009 and has since fallen to \$66bn. Put simply, companies are doing less investment-banking business and the markets are more stable. So banks have fewer opportunities to make money from transaction fees and from what they see as clever trades (but which their corporate counterparties often see as taking advantage of their customers' confusion).

Goldman's performance stands out, nonetheless. Its market share has declined since 2009, from 19% to 10%. In July it disclosed that in the second quarter of this year fixed-income revenues plunged by 40%. All the big banks suffered, but Goldman's was the worst of the bunch. Of Goldman's customers, hedge funds have seen a particularly steep and protracted decline in activity. That erosion spread in the first half of the year to other important clients, notably asset managers.

Some banks have said they expect conditions to improve and are maintaining their current structures. But Goldman is taking a more active approach—either out of impatience or because the pain seems particularly severe and enduring in the areas it emphasises. It has cut employment in the hedge-fund area by 20% and the capital used for the business by 15%. Mr Schwartz said Goldman could expand its market

share in other areas of the fixed-income business; but every firm says that.

The troubles in fixed income and its inability to generate more revenue than it did a decade ago has led to a greater focus on new areas of business. Mr Schwartz outlined a path to an additional \$5bn in revenues, or growth of 16%, over the next three years. More capital will be allocated for credit directly provided to clients, including corporations, and for looking after rich individuals in its wealth-management operations, and, through an electronic trading platform, a broad swathe of Americans. It also wants its asset-management division to attract more funds.

It aspires, in short, to act more like a normal bank, though perhaps, because of its sophisticated technology and clients, in not-quite-normal ways. This is a shift from its earlier approach: of being a fast, dexterous and mysterious intermediary. The pressures on Goldman threaten not just its profits, but also the elusive characteristics that make it special. ■

The Equifax data breach

Once more...

The personal information of millions of Americans has been compromised

UNTIL something goes wrong, few people give much thought to the surveillance they undergo by credit-reporting agencies (CRAs). Yet these agencies' business is deeply intrusive: quantifying character. They assign individuals credit scores based on how they previously managed debt. The scores are then sold to lenders. In America, Equifax, Experian and TransUnion, the "Big Three" CRAs, have gathered credit histories and identifying information for nearly every adult.

On September 7th Equifax admitted that something had indeed gone very wrong: hackers had gained access to personal information on about 143m people, mostly Americans. It reported that, from mid-May to July, hackers exploited a vulnerability in its website. The data compromised included Social Security numbers (ssns), dates of birth and driving-licence numbers, and for 209,000 people, possibly their credit-card numbers as well. Equifax also noted that data about some Britons and Canadians may have been stolen.

The theft of ssns lays people open to several types of fraud. The government assigns them to Americans to monitor contributions to its pension and disability-benefits schemes. Nearly everyone has one and each is unique, so they are a convenient way to confirm identities. Lenders collect ►

them and pass them on to the CRAs. Naturally, identity thieves have uses for them. They could apply for loans in other people's names, for example, or defraud the taxman, inducing him to send them refunds that belong to others.

Given the dire potential consequences, Equifax's response did little to reassure those affected by the hack. After it became aware of the hacking on July 29th, it took six weeks before letting the public know about it. That three Equifax employees had sold shares in the company after the discovery but before its announcement further dented the company's reputation. (A spokeswoman for the company reports that the employees, who included Equifax's chief financial officer, were unaware of the breach when they sold their shares.)

After coming clean about the breach, the company put up a website that allows people to check if their information might have been compromised. Customers who enter their names and a portion of their SSNs can learn whether their information may have been accessed by the hackers. Few were reassured when it emerged that, at first, a person entering even a random name and number would receive a response suggesting that his data might have been compromised.

Equifax customers have also been offered one year's free access to Equifax's own TrustedID service. TrustedID monitors the use of customers' personal information and insures them for losses of up to \$1m caused by identity theft (see box). But some accused Equifax of enrolling customers in the hope of charging them once the year is up. Others noted that the offer's terms seemed to preclude users from joining class-action lawsuits against Equifax. Equifax quickly clarified that the terms did not apply to suits related to the data breach. Within days, at least 100 suits had been filed. Equifax also faces scrutiny from Congress, which is to hold two hearings, and several state attorneys general, including New York's.

Markets have already punished Equifax's share price (see chart), which fell by around 15% on the day after the breach was

revealed. Standard & Poor's, a credit-rating agency, has revised its outlook on Equifax's BBB-plus rated bonds from stable to negative. Banks and other lenders are reported to be reconsidering their relationships with Equifax, and might move some of their business to its competitors.

The breach raises a number of issues. Richard Parris, chief executive of Intercede, a cyber-security company, notes that it is just the latest of many. In 2013 hackers stole the credit-card data of 40m customers at Target, an American retailer. In 2015 the American government revealed that information about millions of employees had been stolen. Like many other experts, Mr Parris fears that data from these different breaches could be combined to create detailed profiles.

Another question is whether it makes

sense for three large, private CRAs to aggregate so much information when they are vulnerable to such incidents. The use of SSNs for so many purposes unrelated to their original purpose also deserves scrutiny. Finally, there are the inevitable worries about whether financial data are properly protected elsewhere. As Richard Nesbitt, chief executive of the Global Risk Institute (GRI), which advises the financial industry on risk management, points out, if a firm such as Equifax, whose very business is managing data, appears so vulnerable, concerns will mount that nowhere is safe. GRI surveys show that financial institutions have lately changed their views of the most serious danger facing their industry. In 2015 it was "conduct/risk culture". This year's most acute worry was "cyber/IT risk". ■

Identity-theft monitoring

Self defence

The market in services to counter identity theft

AS IDENTITY theft has proliferated, so has the number of businesses hoping to make money selling protection against it. Companies such as LifeLock, Identity Guard and PrivacyGuard sell products similar to Equifax's TrustedID Premier identity-theft protection. That was the service Equifax offered to every American with a Social Security number in the aftermath of its big data breach.

Those who enroll in TrustedID are promised notification if their information is offered for sale on the internet. Their credit reports with Equifax, Experian and TransUnion, the "Big Three" credit-reporting agencies (CRAs), are also monitored for suspicious activity, such as the opening of new accounts or failures to pay a bill on time. If such activity is detected, users can "freeze" their Equifax credit reports, ie, make them unavailable to lenders. And TrustedID offers \$1m-worth of insurance to compensate users for losses incurred as a result of identity theft. Equifax is offering the service free for a year; typically, such schemes can cost \$15-25 a month.

Unfortunately, the identity-theft protection offered by these services is more akin to a car alarm than a door lock. Lance Spitzner of SANS Institute, a global information-security training company, points out that credit monitoring does nothing to protect people from identity theft. Once warned, the schemes can help people freeze their credit reports, but, in America, state laws anyway mandate that CRAs provide such freezes upon request. In some states, CRAs are allowed to charge for these freezing services (fees

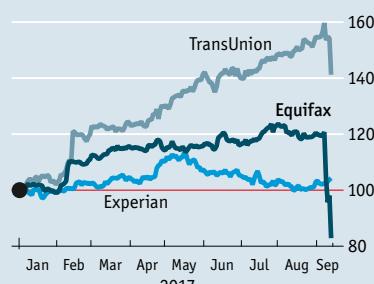


are generally not more than \$10).

Insurance may help victims of identity theft recover some of their losses. However, Mr Spitzner explains, being a victim is an unpleasant experience whether you have insurance or not. According to his research, undoing identity fraud can take an average of six months and 100 to 200 hours of a person's time. Complete protection is impossible. Safest is to look after personal information and carefully scrutinise bank and credit-card statements. Of course, companies that gather personal information should guard it with appropriate zeal. But, as recent events have made clear, it would be a foolish consumer who relied on that.

Equifailure

Share prices, January 1st 2017=100, \$ terms



Cross-border banking

Travel sickness

Retail banks' adventures abroad do not usually pay

NO T everybody—or every business—travels well. Retailers from Walmart to Tesco have faltered in forays into foreign lands. Banks, too, often fancy that success at home can be reproduced abroad. In meeting the needs of big companies, they are often right. Global corporations seem to want global banks. But in retail banking, serving households and small businesses, they are usually mistaken.

Or so concludes a report by Lorraine Quoizel and her colleagues at UBS, examining the performance of seven international banks (BBVA, Citigroup, HSBC, ING, Santander, Société Générale and Standard Chartered). For several measures, such as net interest margins and returns on equity, the Swiss bank's analysts constructed benchmarks for each firm. The benchmarks are the averages for all banks in countries where the seven are active, weighted by the importance of each market in each bank's loan book.

Most of the banks fall short on most measures. For example, UBS expects Standard Chartered's return on tangible equity to be just 5.7% in 2018, 7.1 points below its benchmark. Société Générale's projected net interest margin is 0.75 percentage points; par is 1.84.

Part of the explanation is that a global brand does not automatically confer pricing power. So international banks often sacrifice margin in the frequently vain pursuit of market share. HSBC's Mexican bank, the country's fifth-biggest by assets, made a net interest margin of 4.1 percentage points in 2016, a whole point below the local average. BBVA Bancomer, the Spanish lender's local arm and the market leader, scooped 5.7 points.

Banks also tend to overestimate the ease of replicating cross-selling models that have worked at home. And national borders constrain economies of scale. Businesses stretching across several countries are simply harder to run. Legal and compliance expenses multiply. Bigger, more complex banks carry heavier regulatory burdens. At only two of the seven are projected ratios of costs to income below the benchmarks.

A possible benefit of heading abroad is that diversification reduces risk. Even this is not always borne out: four of the seven make provisions, as a proportion of loans, above their benchmarks. Between 2003 and 2017 at only two, HSBC and Santander, were earnings per share less volatile than

in a comparable portfolio.

Globetrotting retail banks are not doomed to fail, especially if they can exploit new technology. ING, which the UBS team rates the best of the seven overall, has expanded as a digital bank outside its Dutch home. In Germany it boasts 8m customers. Although it has a thinner interest margin than the locals, its costs are far lower too, largely because it has no branches. Its return on equity beats those of German rivals by ten percentage points or more.

Perhaps wisely, since the financial crisis banks have retreated from foreign retail ventures, seeking to cut costs and bolster capital. UBS lists no fewer than 274 disposals of operations abroad since 2010. Last year mergers started to pick up. But the volume remains low and most deals have been domestic. Banks may be right to think twice before heading abroad again. ■



American banknotes

No change

NEW YORK

Putting a new face on a banknote is oddly difficult

IT WOULD be hard to find a better example of long-term gridlock in Washington than its treatment of banknotes, whose appearance has essentially been frozen since 1929. The administration of Barack Obama took a half-hearted step towards a new look, proposing the replacement of Alexander Hamilton's portrait on the \$10 bill with a portrait of Harriet Tubman, a former slave who became a civil-war hero.

Problems cropped up at once. It seemed ludicrous to scrap the portrait of the one person on a note who helped create America's financial system. It did not help that he was also the hero of a smash-hit Broad-

way musical. So the administration decided instead to replace Andrew Jackson, America's seventh president, on the \$20 bill. But by then it was too close to the election to push the change through.

President Donald Trump has since lent his support to keeping Jackson. In a recent interview, his treasury secretary, Steven Mnuchin, made it clear he had little interest in pursuing the change. That is a great pity. Tubman was a remarkable woman who emerged from chains to lead other slaves to freedom. (Like the current administration, she was also a Republican, if in a very different party.)

It is also odd that Jackson, of all people, ever appeared on a note backed by the central bank, let alone survived so long. He was a popular president, a successful general and founder of the modern Democratic Party. But as well as the grim aspects of his career—his ownership of slaves and support for the forced relocation of native Americans—his approach to the public finances, though intellectually defensible, makes his use on a note singularly ironic.

On taking office, he declared war on what was then the nation's central bank. He thought it beyond proper congressional oversight and too influential (criticism often made of its successor today). He told Martin Van Buren, later the eighth president: "The bank...is trying to kill me, but I will kill it." And, unlike current critics of Fed policy, he actually did so, despite objections by Congress, the courts and two of his own treasury secretaries, whom he fired for impeding his attack. What followed was a period when currency was issued by a private bank. That ended when Abraham Lincoln needed to finance the prosecution of the civil war.

Thereafter, banknotes initially featured a diverse range of personalities: presidents of course, including Lincoln; but also generals, secretaries of treasury and state, women in allegorical roles (both robed and partially disrobed), children, boats, trains, eagles, bison and even Martha Washington, America's first First Lady.

The risks of this approach became obvious after the first superintendent of the currency bureau, Spencer Clark, put his own image on a note. Congress then banned the portrayal of living people. But that is a minor constraint, and it is not clear why the process ossified. It has not done so in other countries. Britain, for example, changes notes quite often, introducing this week a new £10 bill featuring Jane Austen, a 19th-century novelist.

If one explanation for American banknote conservatism is the political difficulty of making any changes at all, at least there is no urgency to act. The new \$20, for example, is not due to be circulated until 2030. By then banknotes may have been superseded entirely and the \$20 Tubman bill be no more than a historical curiosity. ■

Free exchange | Remote control

Stanley Fischer and the twilight of the technocrat



IN 2004 Stanley Fischer described the wonder he felt as an economics student in the 1960s. "You had a set of equations", he said, "that meant you could control the economy." Technocracy—the dream of scientific government by a caste of wise men—arose in the 20th century, as rapid change rendered the world unfathomably complex; in economics, it came of age in the Keynesian revolution of the 1930s. On September 6th, after a remarkably distinguished career in public service, Mr Fischer, an intellectual heir to Keynes, announced his imminent retirement as the vice-chairman of the Federal Reserve. It is tempting to see in his departure the end of the era and the ideal of technocracy.

A century ago, as physicists unlocked the secrets of the atom and biochemists probed the molecular basis of life, economists sought to systematise their own field. But the growing complexity of their work created a problem: laymen could not make head or tail of it. Government consultation with experts, or the delegation of authority to them, became critical to the management of the economy. War-time state planning empowered technocrats further. And in the years after the second world war, when Mr Fischer was a boy in what was then Northern Rhodesia (now Zambia), technocratic principles were enshrined in extragovernmental institutions like the World Bank and the IMF, and in panels of economic advisers whose systems of Keynesian equations produced forecasts and shaped policy.

These systems were flawed. Trouble struck in the 1970s. Slowing growth, wobbling currencies and rising inflation upset the status quo and bolstered sceptics of Keynesian ideas, like Robert Lucas. A dose of stimulus might fool people into thinking the economy was doing better than it was, and so into working harder—but only for a while. People would catch on, and inflation rather than growth would result.

Mr Fischer questioned this fatalism and, in so doing, helped make the intellectual case for revitalising technocratic management. That work was centred on the Massachusetts Institute of Technology (MIT), the home of economic luminaries like Paul Samuelson and Rudiger Dornbusch and the theories that would become New Keynesianism. There, Mr Fischer and others explored when a deft intervention could do some good. In 1977, for instance, he argued that long-term contracts prevented prices and

wages from adjusting quickly to changes in economic fortunes. Such frictions could lead to soaring unemployment unless trained economists were on hand to tend the government's policy levers. New Keynesianism became the orthodoxy in central banks and finance ministries around the world.

A parade of economic talent came to work with and learn from Mr Fischer. They included Ben Bernanke, who would later lead the Federal Reserve through the financial crisis; Mario Draghi, who now pilots the European Central Bank (ECB); Olivier Blanchard, until recently chief economist at the IMF, as well as his successor, Maurice Obstfeld. These men helped build modern macroeconomics, then went out into the world to apply it.

In that, they followed the example of Mr Fischer. In the late 1980s he joined the World Bank as chief economist. He could draw on his research on economic growth—and the policy errors that could waylay it. Later he became the deputy managing director of the IMF, putting him at the centre of battles to contain the financial crises that punctuated the 1990s. After a turn at Citigroup, he went to run the Bank of Israel, navigating the Israeli economy through the Great Recession. Then, in 2014, Barack Obama nominated him for the vice-chairmanship of the Fed.

Mr Fischer and his acolytes often operated under intense pressure. In the 1990s the IMF faced withering criticism for the terms it imposed on struggling borrowers. But it faced hard choices; more generous terms from the fund might have helped the citizens of beleaguered economies, but also given spendthrift governments licence to misbehave—or put support for the IMF itself at risk. Messrs Bernanke and Draghi have their detractors, but were instrumental in saving their respective economies from catastrophe. Recent electoral pratfalls argue for leaving critical decisions in the hands of well-trained, pragmatic technocrats.

Even so, technocracy is in retreat. The sway of the World Bank, the IMF and other international institutions is slowly waning. Their supporters, notably America, seem to be losing interest in their mission; China is building rival institutions as vehicles for its geopolitical ambitions. Central-bank independence is far from assured, not least at the Fed under President Donald Trump. German frustration with the ECB is a dormant threat.

The disenchantment stems in part from a failure of expertise. The mathematicalisation of economics did not always enhance understanding. The IMF's forecasters almost invariably fail to see recessions coming; the Fed, during Mr Fischer's tenure, repeatedly overestimated the risk of rising inflation. The New Keynesian consensus itself has fractured; disagreements flare among Mr Fischer's acolytes over how much deficits matter, or whether monetary policy can be effective when interest rates are near zero.

The invisible hand

Technocracy's greatest vulnerability, however, is its fundamental premise, that complex decisions should be taken free of political influence. When officials unexpectedly face problems outside their intended purview—whether a global banking crisis or a period of chronic stagnation—public confidence in them erodes. The rub is that the complex systems technocrats are expected to manage inevitably yield surprises. Amid such uncertainty, the expertise of men like Mr Fischer is as valuable as ever. But the hard choices which must then be taken also demand the legitimacy that democratic processes confer. ■



Electric motors

Let's twist again

It's not just batteries that are getting better. Electric motors are improving too

HENRY FORD may have brought motor-ing to the masses in 1908 with the Model T, but his wife, Clara, preferred to drive an electric car. Combustion engines were noisy, dirty and in their early years required hand-cranking to start. Mrs Ford's 1914 Detroit Electric, however, moved away instantly, was nearly silent and its speed was easy to control by pushing or pulling on a wooden rod that selected the required amount of power from a bank of nickel-iron batteries. Her car could travel for about 80 miles on a single charge and exceed speeds of 20mph.

Mr Ford's mass-production techniques soon cut a Model T's price to \$500—one seventh that of Mrs Ford's car. As refuelling stations spread, the internal-combustion engine went on to conquer all. Now electric cars are cruising back, as performance improves and costs fall. Tesla's new Model 3, for instance, reaches 140mph and its lightweight lithium-ion battery has enough juice for 300 miles. But it is not just better and cheaper batteries that are changing the economics of electrification. Electric motors are getting better, too.

This matters because electric motors are everywhere. The International Energy Agency reckons they consume more than 40% of global electricity production, twice as much as lighting, the next largest user.

Electric motors power running machines in gyms and baggage-handling systems in airports; they run air-conditioning in homes, lifts in offices and robots in factories. In the future, besides electric cars, they will increasingly take to the sea in ships and start propelling aircraft.

Enter the black box

At the moment, many electric motors are still run at a constant pace, relying on mechanical systems such as gears to step that up or down to provide whatever speed is wanted by the widget to which they are attached. That is wasteful, and engineers are working to improve things. In electric cars, for instance, the job done by gears (or the wooden stick in Mrs Ford's ride) is already performed by a box of electronics. This is increasingly true of non-car motors, too.

A modern electric motor and its associated drive system can produce the same amount of power as one from 1910, but in a package that is a fifth the size, says Andrew Peters, who runs Siemens's drive factory in Congleton, in the north-west of England. The latest designs are extremely efficient: some big electric motors can now turn 97-98% of the electricity put into them into mechanical energy. Even the best internal-combustion engines can manage only about 45%. Small gains in efficiency mean

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big savings in cost, says Mr Peters. The cost of an electric motor and its drive represents just 1.15% of the cost of the electricity it will consume over a 20-to-25-year operating lifetime.

Much of the efficiency boost comes from highly precise modern manufacturing techniques, as well as advances in materials science. Electric motors waste energy mostly in the form of heat generated in their windings, which are coils of copper wire wrapped around a metal core. Several such coils form the rotor, which is the part of the motor that turns, and which sits inside the stator, which does not.

Electric motors work by sending electricity through the windings. That turns them into an electromagnet, generating a magnetic field which pushes against an existing field generated by a second set of permanent magnets inside the stator. That causes the rotor to turn until it has aligned itself with the magnetic fields. To keep it turning, and make a useful motor, those magnetic fields must be constantly changed. That is done by switching the direction of the current in the windings.

In a motor using direct current, which comes from a battery, the switching is done with a commutator, a type of mechanical switch. The commutator is attached to one end of the rotor, and picks up power from stationary "brushes" as it turns. These brushes, usually made from soft carbon, are infamous for burning out in electrical appliances.

These days, though, brushes are not necessary. In newer motors the usual order of things is reversed, with the windings held in the stator and the rotor sporting permanent magnets. The current in those windings can then be switched electroni- ►

►cally. Eliminating the brushes improves reliability, and electronic switching offers much finer control than the old mechanical system. The permanent magnets can be improved, too, by making them from strongly magnetic rare-earth materials such as dysprosium and neodymium.

Other designs are also being used. One is the switched reluctance motor, a nearly 180-year-old idea given a new lease of life by drive technology. A reluctance motor eliminates the permanent magnets as well as the brushes. Instead of relying on opposing magnetic forces to generate torque, it uses another property of magnetism, called reluctance, which is analogous to resistance in an electrical circuit.

In such a motor, the magnetic field produced by the energised windings follows a path of least reluctance through a rotor made of iron. The rotor turns to align itself with the field in an attempt to reduce reluctance to the minimum. Constantly switching the current forces the rotor to turn repeatedly. Since they sport few parts and use base materials, reluctance motors are cheap; they deliver high levels of torque.

Visedo, a Finnish company, has taken the idea even further with a synchronous reluctance-assisted permanent-magnet (SRPM) motor. One of the downsides of a reluctance motor is that to deliver a given amount of torque it needs to be larger than an equivalent permanent-magnet motor. By reintroducing magnets Visedo gives the reluctance motor extra oomph, which means it can be made smaller but still able to do the same amount of work. The SRPMs are liquid-cooled to make them more efficient and, says Kimmo Rauma, Visedo's boss, are particularly suitable for heavy-duty operations.

The company has put its SRPMs in a fleet of electric buses in Helsinki, in industrial equipment such as excavators, and in agricultural machines and ferries. Some machines are hybrids, with the electric motors used alongside internal-combustion engines. That still produces large fuel savings and reductions in emissions. Earlier this year a Visedo system was installed in a 100-tonne hybrid ferry in Kaohsiung, Taiwan. The vessel, which carries passengers to and from an island popular with tourists, uses a diesel engine for only part of the time. The ferry connects to a fast charger to top up its batteries when loading and unloading.

Electric motors are also taking to the sky. Most drones are powered by brushless motors; similar kit has also found its way into microlights and, more recently, light aircraft. Their high torque is ideal for turning propellers or ducted fans (a circular set of blades contained within a shroud). Though batteries add weight, some of this is compensated for by the simplicity (and therefore lightness) of electric motors and by the removal of unnecessary parts such

as gearboxes.

Lighter electric motors are now being developed specifically for aviation. Siemens, for one, has put an electric motor into a stunt plane made by Extra, a German firm. The plane has set a number of records, including being the first to tow a glider aloft. Boeing, Airbus, Rolls-Royce and General Electric have various electric-propulsion systems under study. One idea is for hybrid planes seating about 100 passengers that would take off and land using jet engines, when most power is required. During the cruise jet engines are throttled

back, so for that stage of the flight the plane would use electrically powered ducted fans instead.

As for Mrs Ford's Detroit Electric, the Anderson Electric Car Company, which owned the brand, stopped selling cars in 1939. But the Detroit Electric name has been revived by Albert Lam, a former boss of Lotus, a British sports-car firm. Having established bases in Britain and China he plans to bring a number of electric vehicles to market over the next three years. Clara would have been delighted; Henry perhaps less so. ■

Astronomy

Bracing for the Belt

After Pluto, New Horizons offers scientists a glimpse into one of the solar system's most remote regions

ON SEPTEMBER 11th, nearly 6bn metres from Earth, beyond the orbit of Neptune, a spacecraft emerged from hibernation. The primary task of New Horizons, launched by NASA in 2006, was to explore Pluto. It completed that mission in July 2015, zooming past Pluto at almost 50,000kph, then spending over a year transmitting back a trove of data and images that astronomers are still analysing.

Now, after five months asleep, New Horizons is turning its attention to its secondary objective, which is to explore the even more remote Kuiper Belt. A much larger analogue of the asteroid belt, the Kuiper Belt is a cosmic junkyard, full of rubble thought to be left over from the formation of the solar system. But whereas the asteroid belt is

made mostly of rock and metal, objects in the Kuiper Belt are composed largely of frozen water, ammonia and methane. Pluto is one such chunk, albeit considerably bigger than average. It was demoted to its present status of dwarf planet in 2006 after astronomers discovered another Kuiper Belt body, called Eris, that is of similar size.

Despite those discoveries, little is known about what the Kuiper Belt is like. It is so distant, and most of its inhabitants so small, that even the powerful Hubble Space Telescope can make out only the barest outlines of what is out there. New Horizons's next target is a case in point. Orbiting a billion miles farther from the sun than Pluto, it was discovered only in 2014 (hence its full name, 2014 MU69). It is thought to be 15-30km across, but it was only after long observation this summer, using several ground-based telescopes in Argentina, that astronomers realised it might not be one object, but two, orbiting a common centre of mass.

Scientists will soon know for sure. New Horizons is due to arrive at MU69 on New Year's Day in 2019, and will pass about 3,500km of its surface, much closer than the 12,500km it managed at Pluto. In the meantime, the probe will spend the next three months peering at other objects in the belt with a long-range camera and measuring the ambient radiation and dust, before returning to hibernation for the rest of its cruise.

Much of what New Horizons found during its fly-by of Pluto was both unexpected and spectacular. Before its visit, said one astronomer, what was known about Pluto "could fit on a postcard". The probe found mountain ranges made of water ice, a substance which, thanks to Pluto's average surface temperature of -229°C, appears ►



The heart of the matter

► to play roughly the geological role that rock does on Earth. It spotted unexplained hazes rising 130km into the thin atmosphere. Most surprising of all was the relative lack of craters, suggesting that Pluto's surface is regularly renewed. That, in turn, means the dwarf planet is geologically active—though exactly what processes could fuel all that activity remain a mystery.

On September 7th the International Astronomical Union, which rules on such matters, assigned names to 14 of the features spotted by *New Horizons*. One is the now-famous heart-shaped feature that dominates the dwarf planet's equator. It has been dubbed Tombaugh Regio, in tribute to Clyde Tombaugh, the astronomer who discovered Pluto in 1930. Sputnik Planitia, an ice-filled plain about the size of Hudson Bay, is named after the first artificial satellite, launched by the Soviet Union in 1957. And Burney Crater honours Venetia Burney, who, as an 11-year-old schoolgirl in Oxford, suggested the name "Pluto" for Tombaugh's discovery (her grandfather, Falconer Madan, ran the Bodleian Library, and cabled the suggestion to Tombaugh).

Primed by its experiences at Pluto, NASA hopes to characterise MU69's surface geology, as well as to look for moons and any glimmers of a possible atmosphere. As with Pluto, the spacecraft will be travelling far too fast to stop. But that is a virtue as well as a drawback: NASA is already hunting for yet more distant targets for *New Horizons* to visit after it adds MU69 to Pluto in its rear-view mirror. ■

Molecular biology

Suicide watch

A new way to regulate an over-eager immune system

AS PARACELSUS first pointed out in the 16th century, it is the dose that makes the poison. Inflammation, in particular, is vital to fighting infection or healing wounds. If it lingers, however, it can cause more harm than good. Chronic inflammation often impedes the very healing that it is meant to promote. Many drugs have been invented to combat that problem, but none is as effective as doctors would like. Now, as they describe in a paper in *ACS Macro Letters*, a team led by Mitsuhiro Ebara at the National Institute for Materials Science in Japan have come up with a new approach. They have worked out how to persuade cells in inflamed tissues to believe that other cells nearby have just committed suicide.

Cells can suffer chaotic deaths or orderly ones. Chaotic deaths are the end result



What a good death looks like

of a process called necrosis, in which toxins, pathogens or other forms of damage cause a cell to fail catastrophically and rupture, spilling its contents in the process. The detection of this detritus by the immune system leads to an inflammation response.

Graceful death, known as apoptosis, is a sort of pre-planned cellular suicide. It happens naturally throughout life and is vital for many developmental events (like the separation of fingers before birth). Unlike necrosis, the leftovers of apoptosis are mostly tolerated by the immune system. Dr Ebara knew from previous research that this is because cells cover their membranes in an immune-suppressing compound called phosphatidyl-serine just before they break up. Collecting cellular fragments coated in phosphatidylserine and introducing them to areas of inflammation can dramatically improve healing by persuading the immune system to stand down.

But harvesting those remnants is tricky, since they degrade quickly. Instead, Dr Ebara wondered whether he could build polymers decorated with artificial phosphatidylserine. These impostors could then be used to dupe overactive immune cells into believing that apoptosis rather than necrosis was taking place.

The researchers worked with mouse immune cells that had been treated either with lipopolysaccharide, a bacterial compound that reliably triggers an aggressive immune response, or with inoffensive saline solution and left as controls. Once the bacterial lure had created the expected inflammatory response, Dr Ebara and his colleagues treated the immune cells with either saline solution (again, as a control) or with the specially coated polymers.

Throughout the experiment the team collected immune cells from their Petri dishes and monitored them under a microscope. They knew from earlier work that macrophages, a particular type of immune cell, change shape depending on what they are doing. Those that drive inflammation spout long pseudopods from their bodies. Those that do not look roundish.

The team report that more than 80% of the macrophages treated with lipopolysaccharide and then saline grew long pseudopods. Less than 10% of the macrophages treated solely with saline had pseudopods. But when the cells were dosed with both the agitating lipopolysaccharide and then with Dr Ebara's polymer, less than 20% ended up in pro-inflammation mode.

It is a long way from the lab to the medicine cupboard. But a better way to damp down chronic inflammation would be welcome. Some of its consequences, like hay fever, are merely annoying. But it can also constrict the arteries, cause arthritis and even raise the odds of contracting forms of cancer. Too much of a good thing, in other words, can kill you outright. ■

Wireless data transmission

Cheap and cheerful

A clever way to send data on the cheap could help make smart cities a reality

THE word "smart" is ubiquitous these days. If you believe the hype, smart farms will all employ sensors to report soil conditions, crop growth or the health of livestock. Smart cities will monitor the levels of pollution and noise on every street corner. And smart goods in warehouses will tell robots where to store them, and how. Getting this to work, however, requires figuring out how to get thousands of sensors to transmit data reliably across hundreds of metres. On September 15th, at a computing conference held in Miami, Shyam Gollakota and his colleagues at the University of Washington are due to unveil a gadget that can do exactly that—and with only a fraction of the power required by the best devices currently available.

Dr Gollakota's invention uses a technology called "LoRa" (from "long range"). ►

Like Wi-Fi, this allows computers to talk to each other with radio waves. Unlike Wi-Fi, though, LoRa is not easily blocked by walls, furniture and other obstacles. That is partly because LoRa uses lower-frequency radio waves than Wi-Fi (900MHz rather than 2.4GHz). Such waves pass through objects more easily. More importantly, LoRa devices make use of a technique called "chirp spread modulation". That means the frequency of the carrier wave—the basic radio wave, which is then deliberately deformed in order to carry data—rises and falls in a sawtooth pattern. That makes even faint LoRa signals easy to distinguish from background noise, which fluctuates randomly.

Generating that carrier wave requires a lot of power. But modulating it, in order to impress data upon it, can be done by a chip that consumes almost no power at all. Conventional LoRa transmitters do both jobs. Dr Gollakota proposes to separate them.

In his take on the system, a central transmitter, hooked up to a big battery or to the mains, broadcasts the carrier wave, while the task of impregnating it with data is done by a chip on the sensor. It accomplishes that by choosing to earth its tiny aerial, or not, millions of times every second. When the aerial is earthed, part of the carrier wave will be absorbed. When it is not, it will be reflected. If one of those cases is deemed to stand for "1" while the other represents "0", the chip can relay data back to a receiver with the whole process controlled by three tiny, and thus very frugal, electronic switches.

Dr Gollakota reckons that such chips can be made for less than 20 cents apiece. The signals they generate can be detected at ranges of hundreds of metres. Yet with a power consumption of just 20 millionths of a watt, a standard watch battery should keep them going a decade or more. In fact, it might be possible to power them from ambient energy: Dr Gollakota and his colleagues have experimented with running the chips from the electricity generated when light strikes a small photodiode. Like other LoRa devices, the chips are slow, transmitting data at about the speed of an old-fashioned dial-up modem. But most smart sensors will produce just a trickle of data in any case.

The researchers are keeping quiet, for the time being, about the orders they have received. But early applications could be medical. The team have incorporated the chips into contact lenses and a skin patch. In hospitals, the chips could help track everything from patient gurneys to syringes and stethoscopes. Last year, Dr Gollakota unveiled variants of the chips that use ordinary Wi-Fi, too. These, he says, are in the process of making their way into disposable drug-delivery devices that notify patients via their phones when their medication is running low. That seems like a smart start. ■

Conservation

Bullish on bears

The giant panda is enjoying something of a revival

PANDAS are famously shy. Rather than counting them directly, surveyors must infer their presence from dung and semi-chewed bamboo stalks scattered on the forest floor. But they are also hard to find because there are not many left. A mix of hunting and habitat destruction has ravaged the species. By the late 1970s, their numbers had fallen to around 1,000 individuals.

Such precarity is why zoos spend so much effort trying to persuade captive pandas to reproduce. But it is a tricky task. On September 11th Edinburgh Zoo announced that Tian Tian, its resident panda, had failed to carry a pregnancy to term, the fifth time that attempts to produce a cub have failed. In America, keepers at the Smithsonian National Zoo, in Washington, D.C., are waiting anxiously, hoping that a bear called Mei Xiang will have better luck.

Yet things are looking up for this most charismatic of megafauna. China's most recent survey, completed in 2014, estimated that 1,864 pandas are now living in the wild. In March it announced plans for a new national park, more than 27,000 square kilometres in size, that is meant to link dozens of existing nature reserves on which two thirds of the animals live. Last year the International Union for Conservation of Nature (IUCN), which maintains the "Red List" of species at risk of extinction, promoted the panda from "endangered" to merely "vulnerable".

The reason for the rebound is the seriousness with which China now protects the animals. Pandas eat bamboo

almost exclusively, and they need room to forage, mate and hide. Yet even as its cities and farms have grown, China has added reserves. Today it has 67, up from four in the 1960s. Logging in these areas was outlawed in 1998. Poaching attracts at least a ten-year prison sentence; the maximum penalty is death. There have been changes, too, for people who live in hardscrabble mountain communities near the bears. Stoves powered by biogas from pig manure reduce the demand for wood. Beekeeping enables villagers to sell honey, not pelts.

If the future looks brighter, it is still not certain. Conservationists worry that China's westward development will renew the temptations to slash through panda habitat with roads and other infrastructure. Global warming could affect the bamboo supply, or make pandas' mountain retreats more attractive to farmers; one study suggests they would make fine vineyards. Conservationists worry that a return to "endangered" status remains a possibility.

But China is a motivated guardian. "Panda diplomacy" has been a feature of Chinese foreign policy since at least the Tang Dynasty; in 1984, Deng Xiaoping lent Los Angeles two pandas as Olympic gifts. Today, state-run media cover pandas lent to foreign zoos with tabloid zeal, celebrating birthdays and pregnancies. Environmental purists may bemoan the fact that a species' attractiveness to humans is what determines whether it is considered to be worth saving. But it is hard to complain about the results.



Climbing out of a hole



The power of tech firms

Monopoly is not a game

A crusade against the threats posed by the technology giants

PUBLIC scrutiny eventually stalks the kings of capitalism. Wall Street banks enjoyed decades of unfettered growth before coming to be seen, as Matt Taibbi, a journalist, described Goldman Sachs, as a "vampire squid wrapped around the face of humanity". Today another backlash is gaining strength, this time against the giant digital squids, whose tentacles are encircling both public and personal life. In June the European Commission fined Google a record-breaking €2.4bn (\$2.7bn) for suppressing rival comparison-shopping sites. (The firm filed an appeal this week.) The tech giants continue to snap up or shamelessly copy smaller rivals.

A rising figure in the cohort of tech-company critics is Franklin Foer, a journalist at *The Atlantic*. His new book "World Without Mind" decries society's capture by big technology companies, mainly Amazon, Facebook and Google. His criticisms are wide-ranging, but centre on the idea that they have become monopolies. Their dominance has gutted the financial health of publishers and music companies. He even charges tech firms with having bruised democracy: they serve up information based on opaque algorithms, suggesting what people should think, and so supplanting individual thought. Mr Foer compares tech's lack of transparency to Italy, "where it's never entirely clear how power really operates".

The book flits between history, philosophy and politics, but it is also a first-hand

World Without Mind: The Existential Threat of Big Tech. By Franklin Foer. Penguin Press; 272 Pages; \$27. Jonathan Cape; £18.99

tale. Mr Foer was editor of *The New Republic* under Chris Hughes, one of Facebook's founders, who bought the well-respected but loss-making magazine in 2012. An amicable partnership soured as Mr Hughes tried to push *The New Republic* to chase superficial, bite-sized stories to win cheap digital advertising. Mr Foer and most of the staff left in protest. His recounting of this clash between old and new media is authentic and absorbing.

But Mr Foer does not want to seem "fuelled by anger", and he makes a few important points. One is that tech firms exert so much power that people demur from criticising them. Mr Foer saw this first-hand when he became an activist against Amazon's treatment of authors and publishers. Because the online giant could influence the success of books, many lawyers and publishing executives feared speaking out.

Mr Foer's concern about opacity is also spot-on. For example, Facebook and Google are not bound by requirements to report sales of political advertising as traditional media firms are. Recent revelations of Russian ad-buying on Facebook during America's presidential election underscore the risk of so little oversight.

"World Without Mind" joins books

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such as "Move Fast and Break Things" by Jonathan Taplin, published earlier this year, and Tim Wu's excellent "The Master Switch", from 2010, in arguing that regulators need to look at these world-changing companies more critically. But readers looking for an enduring, well-researched manifesto about big tech's dangers will be disappointed by the book's lazy generalisations. Mr Foer is not a business journalist or economist, and he cares little for financial and legal details. He uses the word "monopoly" liberally but not specifically, consigning to a footnote that "My hope is that we revive monopoly as a core piece of political rhetoric that broadly denotes dominant firms with pernicious powers."

Mr Foer also claims that the tech giants, compete only "on the fringes of empire", betraying a weak grasp on their business models. Facebook and Google battle for digital advertising. They both, along with Amazon, compete vigorously to offer video—a growing segment. And he conflates Amazon's control of so many sectors with Jeff Bezos's ownership of *The Washington Post*, without showing that Mr Bezos's business interests have influenced the paper's coverage. (Indeed, the *Post* recently published an excerpt from Mr Foer's book.)

When it comes to solutions, he is also breezy. He suggests that much as some consumers have shunned packaged, unhealthy foods in favour of artisanal options, they might opt for new ways to spend time online. This optimistic solution misses a critical point. There is no local-farming equivalent of a search engine or an online social network. And tech firms are pushing into new sectors, even buying up the local alternatives that Mr Foer suggested as solutions in his food analogy (this summer Amazon bought Whole Foods, a grocer). Examining tech firms is more urgent than ever. Mr Foer is right to be sceptical, but his is not the final word. ■

Russia

Insider out

Russia's Dead End: An Insider's Testimony from Gorbachev to Putin. By Andrei Kovalev. Translated by Steven Levine. Potomac Books; 392 pages; \$34.95 and £26.50

HIdden within the Soviet system were able, conscientious officials who were appalled by the crimes and lies they were asked to defend. One of them was Andrei Kovalev, a diplomat who under Mikhail Gorbachev helped dismantle some of the worst abuses of what he freely accepts was an evil empire. Now living in western Europe, Mr Kovalev is a piercing critic of Vladimir Putin's misrule of Russia.

His sizzling memoir, which was first published in a two-volume Russian edition in 2012, is an unsparing account of the Soviet collapse, and of the hardliners' revenge that followed. It is now available in a condensed and edited version, translated by Steven Levine, a professor at the University of Montana.

The central argument of the book is that Russia has returned to the dangerous stagnation of the 1980s, largely thanks to the resurgence of the old KGB. The authoritarian squeeze will worsen at home, Mr Kovalev predicts, while foreign policy will become increasingly hostile and unpredictable. In the long run he fears a break-up of Russia, before—possibly—the dawn of democracy, the rule of law and modernisation.

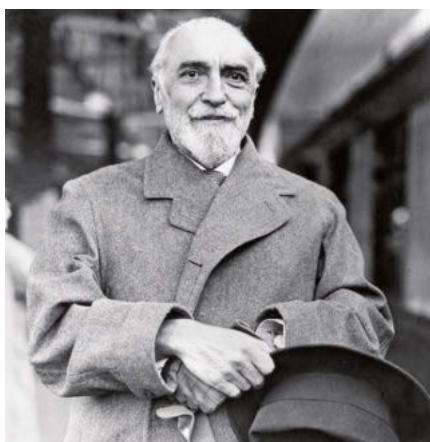
His language is strikingly blunt. Mr Putin is a “mumbling, stammering knock-kneed brow-furrowing ex-KGB agent who speaks the language of the gutter and values power above everything”. Echoing Alexander Herzen, a 19th-century émigré who declared Russia to be suffering from “patriotic syphilis”, Mr Kovalev diagnoses in his country “manic-depressive psychosis...acute megalomania, persecution complex and kleptomania”. Foreigners who write like this are accused of Russophobia. But it is hard to bring that charge against the erudite Mr Kovalev, with his long and distinguished public service.

He paints a convincing first-hand picture of the confusion of the Gorbachev years, the dysfunction of the Boris Yeltsin era and the ebb and flow of KGB influence in the highest reaches of power. Mr Kovalev's finest hour was ending the practice of coercive psychiatry. As a senior diplomat dealing with human rights, he brought the power of the reformist foreign ministry to bear on the secretive health ministry, which flatly denied that any abuse was taking place. He also pioneered reforms to improve religious freedom. This involved dispiriting meetings with the leaders of the

Russian Orthodox church, in which he noted their unpleasant views, worldly lifestyle and terror of competition.

Some may find that the book has a conspiratorial tinge. The botched 1991 coup which led to the break-up of the Soviet Union, he argues, was not the defeat for hardliners it appeared. It allowed them to make a break with the failures of the past, clearing the way for their return to power and wealth. But the evidence he adduces is thought-provoking.

Mr Kovalev chides American and European leaders for their naivety towards Yeltsin's administration, in which hardliners soon gained a fatal grip, and their indulgence of the current regime, whose foreign policy he compares to Hitler's. His main message is grim: Russia, as never before, is a danger to itself and those around it. ■



The Bank of England

A bank of many trades

Till Time's Last Sand: A History of the Bank of England 1694-2013. By David Kynaston. Bloomsbury Publishing; 896 pages; £35. To be published in America in November; \$75

MONTAGU NORMAN, the longest-serving (1920-44) and most eccentric governor of the Bank of England, had little time for economists. He quipped to his economic adviser that “You are not here to tell us what to do, but to explain to us why we have done it.”

It was a remark that hinted at the commitment to aristocratic amateurism that many feel the bank has displayed for three centuries. Today's bank is much more professional, but it is nonetheless blamed by the left for failing to prevent the financial crisis and by the right for its bleak forecasts of the economic costs of Brexit.

So there is likely to be a ready audience for this book from David Kynaston, a dis-

tinguished and tireless historian who has already written four volumes on the City of London, among other works. As always, Mr Kynaston's generous use of his source material makes this a heavyweight tome.

Admittedly, there is a lot to cover. The bank was founded in the 17th century. In return for a loan that helped William III finance a war against France, the bank was given the right to issue paper money. It was such a good business that George Washington remained a shareholder in the bank throughout the American war of independence. Over time, the bank's role expanded to manage the government's finances, safeguard the value of the currency and supervise the financial system.

Sometimes, in a crisis, it was hard to reconcile these objectives. By the 20th century, the bank, which was a private company until 1946, found its aims starting to conflict with those of democratically elected governments. In 1931, during Norman's long governorship, the bank's insistence on public spending cuts to maintain the gold standard caused the collapse of a Labour government. A new Conservative-dominated administration abandoned the standard anyway, adding to Labour resentment; when the party came back to power after the war, it nationalised the bank.

The post-1945 bank struggled to adapt. Its leading figures were overwhelmingly drawn from the private schools; its working conditions were Dickensian until the 1960s. By the 1970s, its reputation was badly dented: it played a subordinate role in economic policy to the Treasury, while its regulatory competence was called into question by a banking crisis. Margaret Thatcher referred to Gordon Richardson, governor from 1973 to 1983, as “that fool who runs the Bank of England”.

But it turned out that politicians were pretty hopeless at running the economy; after Britain's ignominious exit from the European exchange-rate system in 1992, the intellectual fashion favoured greater independence for central banks. Gordon Brown, then chancellor of the exchequer, gave the bank the right to set interest rates in 1997. The current governor, Mark Carney, is a more influential economic actor than the chancellor of the exchequer; when he was hired at great expense from the Bank of Canada in 2013, it was as if a British football team had hired Lionel Messi.

Mr Kynaston is scrupulously fair, so much so that the book might have benefited from a more pointed analysis of whether the bank has performed its many roles well. At least the modern bank is more transparent than ever, publishing detailed assessments of the economy and the markets that often reveal mistaken forecasts. That candour would have alarmed Norman who, when asked by an MP for the source of his information, replied by sagely tapping his nose three times. ■

New American fiction

Changed courses

Forest Dark. By Nicole Krauss. Harper; 304 pages; \$27.99. Bloomsbury; £16.99

THE latest novel from Nicole Krauss, "Forest Dark", opens with the mysterious disappearance of Jules Epstein. This vital man of great appetites and fierce arguments had spent nearly seven decades devoted to the pleasures of this world, swaddled in cashmere and surrounded by Old Masters in his posh Fifth Avenue flat. Yet in the year before he vanished, after the deaths of his parents, Epstein evinced a sudden "longing for lightness". He divorced his wife of 36 years, shed his wealth (to the alarm of his children) and fled to Israel, where he may have whiled away his final months in a grotty Jaffa flat.

Israel's inviting "openness and immediacy" also lure Nicole, a novelist with writer's block, temporarily from her Brooklyn home, crumbling marriage and two young sons. Like Epstein, Nicole is seeking answers to questions she has not quite formed yet. And like Epstein's, her trip becomes a confounding adventure.

These tales, which Ms Krauss unspools in alternating chapters, are both largely set in Israel, a vibrant, complicated place where "so little was hidden or held back—however messy and intense." Oddly, these duelling narratives—Epstein in the third person, Nicole in the first—never quite intersect. Their stories also enjoy different pacing. Epstein's bits tend to be more lively, amusing and acutely observed, whereas Nicole's mostly inhabit the realm of her own thoughts.

Yet the resonances between these characters are often profound. Both are searching for their true selves, an ocean away from the old lives that have tested their faith. In their eagerness for new ways forward, both are vulnerable to the sway of charismatic men with big plans for them (a rabbi for Epstein; a literary professor with possible ties to Mossad and an unbelievable tale about Kafka for Nicole). Also, most poignantly, both narratives offer incisive observations about how marriages can grow insidious, and how instincts can be deluding.

Epstein, for example, sometimes misses his wife's body in bed ("Without the rhythm of her breath the dark had no measure"), even as he recognises that "if he was touched by longing, it was not for what he'd had and given up." Nicole, meanwhile, notes that the devotion she and her husband share for their children long masked the way they were drifting apart, until it seemed that this parental love "only



shone a light on how alone each of us was, and, compared to our children, how unloved". This is where her novel shines. Indeed, Ms Krauss's recent divorce makes it rather easy to presume a level of autobiography in the ruminations of her novelist alter ego with the same name. The plot of "Forest Dark" often oscillates between lofty concepts and shaggy implausibility, but the feelings Epstein and Nicole have about their lives and loves feel hard-earned and true. ■

Pierre Bergé

Man at the wheel

The demanding co-founder of Yves Saint Laurent was crucial to its success

AS THE one-time lover and lifelong business partner of Yves Saint Laurent, Pierre Bergé was Diaghilev to Saint Laurent's brilliant Stravinsky. Demanding, small of stature and in possession of a filthy temper, he was, to some, quite terrifying. Yet he was also a bold and successful businessman, a noted art collector, a generous patron and philanthropist and a capable administrator. He had a profound belief in the importance of the creative impulse.

Mr Bergé, who died on September 8th, was a social liberal and a political conservative, a mover in the circles of state-funded culture. He voted for Valéry Giscard d'Estaing, the centre-right president, in the election of 1981, but went on to flourish under the winner and Mr Giscard's successor, François Mitterrand, a socialist. The president made him head of the Opéra National de Paris in 1988; he oversaw the building of a new opera house at the Place de la Bas-

title in Paris, in honour of the 200th anniversary of the French revolution.

He met Saint Laurent in Paris in 1958, three years after the designer had been taken on by Christian Dior. The two men could not have been more different: Mr Bergé was stocky where Saint Laurent was as thin as a reed. Mr Bergé was energetic, opinionated, and liked good food, wine and conversation. He had grown up in a family that did not care that he was gay. For Saint Laurent, who grew up in French Algeria, being gay was deeply embarrassing to his conservative father. Six years younger than Mr Bergé, Saint Laurent was exceptionally shy and, although a brilliant designer, needed constant care and reassurance. In fashion lore, it was a *coup de foudre*: love at first sight. Though their romantic relationship came to an end in 1976, when Saint Laurent retreated into drugs, alcohol and reclusiveness, the professional partnership between the two men continued for years afterwards.

The fashion house needed both men to survive. The financial backers who took charge of Christian Dior after the acclaimed couturier died in 1957 proved obdurate, as did the house's older, conservative clients. The young Saint Laurent felt shackled. So in 1961 Mr Bergé sold his flat on the Île Saint-Louis and the two men set up in business as Yves Saint Laurent (ysl). Thirty years later, in the depths of recession, he asked Wasserstein Perella, a boutique investment bank, to find a buyer for ysl, asking for \$1bn in cash.

In the meantime, the two had become important collectors. Decorating a magnificent duplex in Rue de Babylone (one of the most beautiful private apartments in Paris), a chateau in homage to Proust in Normandy, and Villa Oasis, their mansion retreat in Marrakech, gave Mr Bergé and Saint Laurent the excuse to begin collecting art and antiques. In February 2009, eight months after Saint Laurent's death, Mr Bergé sold the lot: the three Mondrian paintings bought to celebrate the launch of Saint Laurent's iconic shift dress, the Eileen Gray chair (a modernist icon) and the magnificent silver-gilt ornaments made in northern Germany in the 17th century. The sale raised €374m (\$448m): Mr Bergé divided the proceeds between various AIDS charities and a plan to build a museum in homage to Saint Laurent.

That project, which will be unveiled next month, turned out to be two museums. The first will be in Paris, where the two opened their fashion house, and the second will be in Marrakech, their spiritual home. Between them the two museums will house 7,000 textiles, 8,000 sketches, 8,000 accessories and 15,000 documents: in all 38,000 objects that the two men collected obsessively. They always knew they would one day build a museum to the designer, the first of its kind in the world. ■

America and Vietnam

Buried ordnance

A new series digs up the Vietnam war just as American politics have again become explosive

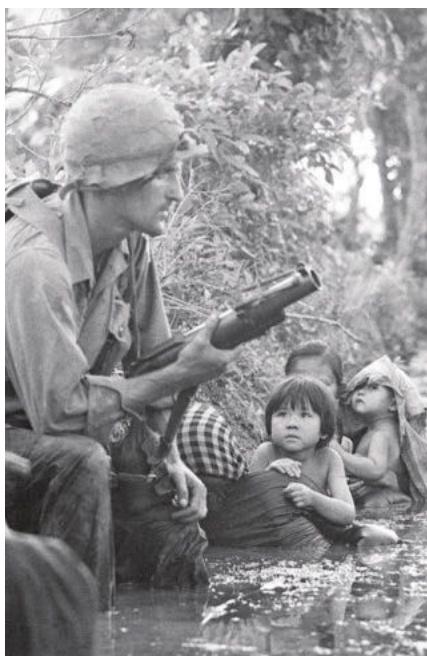
THE great novels of the Vietnam war, both in English and in Vietnamese, tend towards surrealism. In Tim O'Brien's "The Things They Carried", an army medic manages to have his 17-year-old sweetheart flown in from Ohio for a visit, only to watch her transform into a bloodthirsty commando sporting a necklace of human tongues. In Bao Ninh's "The Sorrow of War", ghosts haunt the Jungle of Screaming Souls, and severed limbs rain from the sky during a B-52 raid. The two writers, who fought on opposite sides, are among the dozens of interviewees featured in "The Vietnam War", a ten-part, 18-hour history by Ken Burns and Lynne Novick. Like Mr Burns's earlier work, the new series is encyclopaedic and solemn, but this time there is also an element of psychedelic frenzy. This is partly because, as with the novels, the material demands it. But it is partly because the war, a decade-long nightmare that killed 58,000 Americans and over 2m Vietnamese, remains too contested for a purely elegiac treatment. Its politics still split both American and Vietnamese society today.

One way America has tried to process the war is by casting it as an unnecessary tragedy. Like many other historians, Mr Burns and Ms Novick trace the points at which things might have taken a different turn, such as the brief alliance between Ho Chi Minh's Viet Minh guerrillas and the OSS (precursor to the CIA) at the end of the second world war, and America's unwise decision to back France as it tried to hold on to its colony. Later, as Presidents Kennedy and Johnson are forced to deploy troops in South Vietnam to protect their client state from a communist takeover, the filmmakers reveal both men's secret doubts. In a taped memo, Kennedy blames himself for approving the military coup that killed South Vietnam's autocratic president, Ngo Dinh Diem. Johnson tells a senator, "There ain't no daylight in Vietnam," even as he sends in the first Marines. Such presidential qualms create a sense of the road not taken; had Kennedy lived or Johnson been more confident, they imply, America might have heeded its better impulses.

Yet the uncomfortable truth is that whereas the war was in one sense an aberration from America's character, it was also an expression of it. Kennedy's intellectual arrogance and Johnson's cowboy bravado were two versions of the same typical American overconfidence. Throughout the

series, the Americans' misguided reliance on quantitative technical approaches to complex problems comes up over and over again, from the "body count" measure used by the hapless General William Westmoreland to the computer-processed pacification statistics of Robert McNamara, the defence secretary. The American belief that massive bombing would dissuade the North Vietnamese from trying to unify their country betrayed a crippling inability to understand that others' worldviews might be different from theirs. Or as James Willbanks, an army strategist, describes this approach: "When McNamara wants to know what Ho Chi Minh is thinking, he interviews himself."

The series will be equally wrenching for Vietnamese viewers. The conflict was a civil war, numerous Vietnamese interviewees insist—"down to the family level", says Duong Van Mai Elliott, a Vietnamese-American academic from the South whose sister went north to join the communists. This might seem blindingly obvious, except that the government in Hanoi has always resolutely denied it. For Vietnam's communist rulers, the former South Vietnamese government was a "puppet regime" controlled by America, and the war was not between two groups of Vietnamese but between the Vietnamese people



Their children will remember, too

and foreign invaders. To admit otherwise would be to acknowledge that there could be more than one source of political legitimacy in Vietnam.

Americans, too, long ridiculed South Vietnam and the Army of the Republic of Vietnam (ARVN) as corrupt and shambolic. But Mr Burns and Ms Novick, like many historians today, recognise that some ARVN units were disciplined and patriotic, and that the country, for all its flaws, was relatively free and had a strong civil society. Today's Vietnamese government, by failing to pursue a full rehabilitation of the former officials and soldiers of South Vietnam and to allow a free debate about rights and wrongs on both sides, continues to hamper the country's reconciliation.

Part of the force of "The Vietnam War" comes from its startling primary material. The film-makers interviewed George Wickes, then in his late 80s, who was with the OSS mission that met Ho in 1945. They persuade two ageing North Vietnamese Army veterans to acknowledge the North's massacre of thousands of civilians in Hue after the Tet offensive in 1968, which the communist government has always denied. They play recordings from the Oval Office in which Richard Nixon and Henry Kissinger openly admit that their programme to "Vietnamise" the war (ie, remove American troops and hand all responsibility to the ARVN) is doomed, and is intended merely to distance America from the South's inevitable collapse.

But the power of the series also derives from its disturbing contemporary echoes. To listen to Nixon's White House tapes is to feel nostalgia for a time when political lying was coherent and directed towards rational policy objectives. One cannot watch footage of construction workers beating anti-war demonstrators in New York City in 1970 without thinking of Charlottesville; footage of the killing of four students by the National Guard at Kent State inevitably recalls today's roiling campuses and police-brutality scandals. (At the time, a poll showed most Americans thought the dead students had it coming.)

Mr Burns notes that he and Ms Novick finished the films over a year before Donald Trump's election; the resonances, he says, stem from history's habit not of repeating, but rhyming. The series ends with the construction of Maya Lin's Vietnam war memorial in 1982, the gradual easing of tensions between supporters and opponents of the war, and the normalisation of relations between America and Vietnam in the 1990s. But today America's mercurial foreign policy is weakening that new friendship with Vietnam, and the hatred between the country's right and left has risen to levels not seen for 40 years. A decade ago, it felt as though the Vietnam war had been put to rest. Today, the rhymes of history are uncomfortably loud. ■

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Announcements



Call for nominations for the IDB Prize in Islamic Banking and Finance for 1439H (2018G)



The Islamic Development Bank Group is pleased to invite individuals, universities, academic, financial and Islamic institutions throughout the world to nominate whoever they deem eligible to be awarded the IDB Prize for the year 1439H (2018G) in the field of Islamic Banking and Finance. The Prize which aims to recognize, reward and encourage creative efforts of outstanding merit in the field of Islamic Banking and Finance, consists of a citation carrying the IDB's emblem and a cash award of 30,000 Islamic Dinars (approximately US\$ 45,000).

The Conditions Required for the Nomination of Individuals

1. A Nominee should have made an academic or practical contribution of outstanding merit in the field of Islamic Banking and Finance.
2. Research works, submitted for the Prize, should be published and academically recognized.
3. Services of the Nominee should have an effective impact on the development of Islamic Banking and Finance.
4. The Nominee should not be a Staff Member of IDB Group.
5. Self-nomination and the nomination of deceased researchers are not acceptable.

The Conditions Required for the Nomination of Institutions:

1. The Nominated Institution should have made an academic or practical contribution of outstanding merit in the service of Islamic Banking and Finance.
2. Services of the Nominated Institution should have an effective impact on the development of Islamic Banking and Finance.
3. The Nominated Institution should be recommended by at least one or more eminent scholars in field of Islamic Banking and Finance.
4. The Nominated Institution should not have been awarded the IDB Prize before.
5. Nomination of institutions by its Management is not acceptable.

The Requirements for the Nomination:

1. The nomination form (to be downloaded from IRTI website: www.irti.org).
2. The Letter of Nomination (in one of the three languages: Arabic, English or French) should motivate the reasons for the nomination.
3. The detailed Curriculum Vita for the individual/ A detailed prospectuses for the Institution.
4. 5 most relevant research works/publication/services submitted in support of the nomination.
5. A detailed report (with executive summaries) of all the research works/publication/services of the nominee. The detailed report should be carefully elaborated since it is very important for the evaluation.
6. The above documents should be sent by email to idbprize@isdb.org before 26 Safar 1439H (15 November 2017).
7. Books/research papers/etc. that cannot be sent by email should be mailed in hard copies to the below mentioned address and delivered to the Preparatory Committee of the IDB Prize before 12 Rabi Al-Awal 1439H (30 November 2017)
8. Any nomination received after the first deadline will not be considered.

Prize Awarding:

The Winner(s) of the award will be honored at a ceremony at the IDB Group Annual Board of Governors meeting.

The IDB Group reserves the right to withhold awarding the Prize.

Important Dates:

26 Safar 1439H (15 November 2017): Deadline for receiving nominations.

April 2018: Announcement of the Laureate (s).

Award ceremony during IDBG annual meeting 2018.

Preparatory Committee of the IDB Prize - Islamic Research and Training Institute
P.O. Box 9201, Jeddah 21413, Kingdom of Saudi Arabia

Tel: (+966)-12-636 1400, Fax No. (+966)-12-637 8927 - Email: idbprize@isdb.org - Website: <http://www.irti.org>

Economic data

% change on year ago

| | Gross domestic product | | | Industrial production latest | Consumer prices latest | Unemployment rate, % | Current-account balance | | Budget balance % of GDP 2017† | Interest rates, % 10-year gov't bonds, latest | Currency units, per \$ Sep 13th | Year ago |
|----------------|------------------------|-------|-------|------------------------------|------------------------|----------------------|-------------------------|----------------|-------------------------------|---|---------------------------------|----------|
| | latest | qtr* | 2017† | | | | latest 12 months, \$bn | % of GDP 2017† | | | | |
| United States | +2.2 Q2 | +3.0 | +2.1 | +2.2 Jul | +1.7 Jul | +1.9 | 4.4 Aug | -449.3 Q1 | -2.4 | -3.4 | 2.17 | - |
| China | +6.9 Q2 | +7.0 | +6.8 | +6.0 Aug | +1.8 Aug | +1.8 | 4.0 Q2§ | +157.3 Q2 | +1.5 | -3.9 | 3.62§§ | 6.53 |
| Japan | +1.4 Q2 | +2.5 | +1.6 | +4.7 Jul | +0.5 Jul | +0.5 | 2.8 Jul | +189.8 Jul | +3.6 | -4.5 | nil | 111 |
| Britain | +1.7 Q2 | +1.2 | +1.5 | +0.4 Jul | +2.9 Aug | +2.7 | 4.3 Jun†† | -99.8 Q1 | -3.4 | -3.6 | 1.08 | 0.76 |
| Canada | +3.7 Q2 | +4.5 | +2.6 | +10.0 Jun | +1.2 Jul | +1.7 | 6.2 Aug | -45.0 Q2 | -2.6 | -2.1 | 2.07 | 1.22 |
| Euro area | +2.3 Q2 | +2.6 | +2.0 | +3.2 Jul | +1.5 Aug | +1.5 | 9.1 Jul | +372.7 Jun | +3.2 | -1.3 | 0.39 | 0.84 |
| Austria | +2.2 Q2 | -1.0 | +2.2 | +4.5 Jun | +2.0 Jul | +1.9 | 5.4 Jul | +6.4 Q1 | +2.1 | -1.0 | 0.56 | 0.84 |
| Belgium | +1.5 Q2 | +1.7 | +1.7 | +4.0 Jun | +1.9 Aug | +2.1 | 7.6 Mar | -4.2 Mar | +0.7 | -2.1 | 0.73 | 0.84 |
| France | +1.7 Q2 | +1.9 | +1.6 | +3.7 Jul | +0.9 Aug | +1.2 | 9.8 Jul | -27.9 Jul | -1.2 | -3.1 | 0.70 | 0.84 |
| Germany | +2.1 Q2 | +2.5 | +2.1 | +4.0 Jul | +1.8 Aug | +1.6 | 3.7 Jul† | +274.1 Jul | +8.0 | +0.7 | 0.39 | 0.84 |
| Greece | +0.7 Q2 | +2.2 | +1.0 | +1.7 Jul | +0.9 Aug | +1.3 | 21.2 Jun | -1.0 Jun | -1.3 | -1.4 | 5.47 | 0.84 |
| Italy | +1.5 Q2 | +1.5 | +1.3 | +4.4 Jul | +1.2 Aug | +1.3 | 11.3 Jul | +50.3 Jun | +2.4 | -2.3 | 2.09 | 0.84 |
| Netherlands | +3.3 Q2 | +6.2 | +2.6 | +3.0 Jul | +1.4 Aug | +1.2 | 6.0 Jul | +68.4 Q1 | +9.9 | +0.6 | 0.52 | 0.84 |
| Spain | +3.1 Q2 | +3.5 | +3.1 | +2.0 Jul | +1.6 Aug | +1.9 | 17.1 Jul | +21.2 Jun | +1.5 | -3.3 | 1.59 | 0.84 |
| Czech Republic | +3.4 Q2 | +10.3 | +4.5 | +3.2 Jul | +2.5 Aug | +2.4 | 2.9 Jul† | +1.7 Q2 | +0.9 | -0.1 | 0.96 | 21.9 |
| Denmark | +1.9 Q2 | +2.5 | +2.0 | -2.4 Jul | +1.5 Aug | +0.9 | 4.5 Jul | +26.0 Jul | +8.2 | -0.6 | 0.53 | 6.24 |
| Norway | +0.2 Q2 | +4.7 | +1.9 | -1.6 Jul | +1.3 Aug | +2.1 | 4.3 Jun†† | +16.6 Q2 | +7.0 | +4.2 | 1.53 | 7.88 |
| Poland | +4.6 Q2 | +4.5 | +3.7 | +6.3 Jul | +1.8 Aug | +1.8 | 7.1 Aug§ | -3.0 Jul | -0.4 | -2.2 | 3.21 | 3.59 |
| Russia | +2.5 Q2 | na | +1.7 | +1.0 Jul | +3.3 Aug | +4.2 | 5.1 Jul§ | +33.6 Q2 | +2.7 | -2.1 | 8.13 | 57.9 |
| Sweden | +3.0 Q2 | +5.2 | +3.1 | +5.3 Jul | +2.1 Aug | +1.7 | 6.6 Jul§ | +22.5 Q2 | +4.5 | +0.9 | 0.58 | 8.01 |
| Switzerland | +0.3 Q2 | +1.1 | +1.3 | +2.9 Jul | +0.5 Aug | +0.5 | 3.2 Aug | +73.6 Q1 | +9.6 | +0.7 | -0.07 | 0.96 |
| Turkey | +5.1 Q2 | na | +4.0 | +25.6 Jul | +10.7 Aug | +10.3 | 10.2 May§ | -34.3 Jun | -4.4 | -2.0 | 10.65 | 3.45 |
| Australia | +1.8 Q2 | +3.3 | +2.3 | +0.8 Q2 | +1.9 Jul | +2.1 | 5.6 Aug | -21.8 Q2 | -1.4 | -1.8 | 2.62 | 1.25 |
| Hong Kong | +3.8 Q2 | +4.1 | +3.1 | +0.2 Q1 | +1.9 Jul | +1.6 | 3.1 Jul†‡ | +14.9 Q1 | +4.1 | +1.0 | 1.49 | 7.81 |
| India | +5.7 Q2 | +4.1 | +7.0 | +1.2 Jul | +3.4 Aug | +3.6 | 5.0 2015 | -15.2 Q1 | -1.2 | -3.2 | 6.59 | 64.0 |
| Indonesia | +5.0 Q2 | na | +5.2 | +1.4 Jul | +3.8 Aug | +4.2 | 5.3 Q1§ | -14.2 Q2 | -1.7 | -2.4 | 6.64 | 13,201 |
| Malaysia | +5.8 Q2 | na | +5.2 | +6.0 Jul | +3.2 Jul | +3.9 | 3.4 Jun§ | +8.1 Q2 | +2.2 | -3.0 | 3.86 | 4.19 |
| Pakistan | +5.7 2017** | na | +5.7 | +3.5 Jun | +3.4 Aug | +4.2 | 5.9 2015 | -12.1 Q2 | -3.8 | -4.5 | 8.10††† | 105 |
| Philippines | +6.5 Q2 | +7.0 | +6.5 | -1.1 Jul | +3.1 Aug | +3.0 | 5.6 Q3§ | -0.4 Mar | +0.3 | -2.8 | 4.56 | 51.0 |
| Singapore | +2.9 Q2 | +2.2 | +2.9 | +21.0 Jul | +0.6 Jul | +0.9 | 2.2 Q2 | +59.0 Q2 | +18.4 | -1.0 | 2.01 | 1.35 |
| South Korea | +2.7 Q2 | +2.4 | +2.9 | +0.1 Jul | +2.6 Aug | +1.9 | 3.6 Aug§ | +82.1 Jul | +5.6 | +0.9 | 2.24 | 1,128 |
| Taiwan | +2.1 Q2 | +0.5 | +2.3 | +2.4 Jul | +1.0 Aug | +0.5 | 3.8 Jul | +70.7 Q2 | +12.7 | +0.2 | 1.00 | 30.1 |
| Thailand | +3.7 Q2 | +5.4 | +3.5 | +3.7 Jul | +0.3 Aug | +0.7 | 1.2 Jul§ | +44.9 Q2 | +11.4 | -2.5 | 2.19 | 33.1 |
| Argentina | +0.3 Q1 | +4.3 | +2.6 | -2.5 Oct | +23.1 Aug† | +24.6 | 9.2 Q1§ | -16.8 Q1 | -3.3 | -6.1 | 5.05 | 17.1 |
| Brazil | +0.3 Q2 | +1.0 | +0.6 | +2.5 Jul | +2.5 Aug | +3.7 | 12.8 Jul§ | -13.8 Jul | -0.8 | -8.1 | 8.90 | 3.14 |
| Chile | +0.9 Q2 | +3.0 | +1.2 | +3.3 Jul | +1.9 Aug | +2.4 | 6.9 Jul§†† | -5.6 Q2 | -1.9 | -3.0 | 4.33 | 627 |
| Colombia | +1.3 Q2 | +3.0 | +1.7 | -1.9 Jun | +3.9 Aug | +4.0 | 9.7 Jul§ | -11.9 Q1 | -3.7 | -3.3 | 6.57 | 2,909 |
| Mexico | +1.8 Q2 | +2.3 | +2.1 | -1.6 Jul | +6.7 Aug | +5.8 | 3.2 Jul | -17.6 Q2 | -1.9 | -1.9 | 6.79 | 19.1 |
| Venezuela | -8.8 Q4~ | -6.2 | -9.0 | +0.8 Sep | na | +667 | 7.3 Apr§ | -17.8 Q3~ | -1.1 | -19.5 | 10.08 | 9.99 |
| Egypt | +4.3 Q1 | na | +3.7 | +33.0 Jun | +31.9 Aug | +22.8 | 12.0 Q2§ | -15.6 Q2 | -5.9 | -10.8 | na | 17.7 |
| Israel | +4.0 Q2 | +2.7 | +3.5 | +0.9 Jun | -0.7 Jul | +0.4 | 4.1 Jul | +11.7 Q1 | +4.1 | -2.6 | 1.76 | 3.55 |
| Saudi Arabia | +1.7 2016 | na | -0.5 | na | -0.3 Jul | +1.1 | 5.6 2016 | -1.0 Q1 | +0.5 | -8.2 | 3.68 | 3.75 |
| South Africa | +1.1 Q2 | +2.5 | +0.6 | -0.5 Jul | +4.6 Jul | +5.3 | 27.7 Q2§ | -7.9 Q1 | -3.2 | -3.2 | 8.46 | 13.2 |

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. †††Dollar-denominated bonds.

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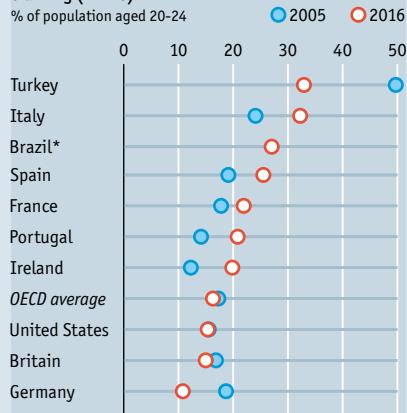
Markets

| | % change on | | | |
|---------------------------|-------------------|-------------|---|------------------------|
| | Index Sep 13th | one week | Dec 30th 2016 in local currency terms | Dec 30th 2016 in \$ |
| United States (DJIA) | 22,158.2 | +1.6 | +12.1 | +12.1 |
| China (SSEA) | 3,543.8 | nil | +9.1 | +16.0 |
| Japan (Nikkei 225) | 19,865.8 | +2.6 | +3.9 | +9.6 |
| Britain (FTSE 100) | 7,379.7 | +0.3 | +3.3 | +10.6 |
| Canada (S&P TSX) | 15,126.8 | +0.4 | -1.1 | +8.8 |
| Euro area (FTSE Euro 100) | 1,207.7 | +2.5 | +8.6 | +22.7 |
| Euro area (EURO STOXX 50) | 3,523.1 | +2.6 | +7.1 | +21.0 |
| Austria (ATX) | 3,280.4 | +1.9 | +25.3 | +41.5 |
| Belgium (Bel 20) | 3,989.1 | +2.5 | +10.6 | +25.0 |
| France (CAC 40) | 5,217.6 | +2.3 | +7.3 | +21.2 |
| Germany (DAX)* | 12,553.6 | +2.8 | +9.3 | +23.5 |
| Greece (Athex Comp) | 810.0 | -0.2 | +25.8 | +42.2 |
| Italy (FTSE/MIB) | 22,233.3 | +1.9 | +15.6 | +30.6 |
| Netherlands (AEX) | 528.7 | +2.4 | +9.4 | +23.6 |
| Spain (Madrid SE) | 1,044.7 | +2.3 | +10.7 | +25.1 |
| Czech Republic (PX) | 1,044.3 | +1.9 | +13.3 | +32.5 |
| Denmark (OMXCB) | 926.1 | +1.3 | +16.0 | +30.9 |
| Hungary (BUX) | 38,119.1 | +0.6 | +19.1 | +34.8 |
| Norway (OSEAX) | 837.4 | +2.2 | +9.5 | +19.7 |
| Poland (WIG) | 64,719.8 | -0.1 | +25.1 | +45.2 |
| Russia (RTS, \$ terms) | 1,118.4 | +1.1 | -2.9 | -2.9 |
| Sweden (OMX30) | 1,580.0 | +2.5 | +4.1 | +18.1 |
| Switzerland (SMI) | 9,053.8 | +2.2 | +10.1 | +16.2 |
| Turkey (BIST) | 108,155.5 | -1.3 | +38.4 | +40.9 |
| Australia (All Ord.) | 5,804.0 | +0.9 | +1.5 | +12.3 |
| Hong Kong (Hang Seng) | 27,894.1 | +1.0 | +26.8 | +25.8 |
| India (BSE) | 32,186.4 | +1.7 | +20.9 | +28.2 |
| Indonesia (JSX) | 5,845.7 | +0.4 | +10.4 | +12.6 |
| Malaysia (KLCSE) | 1,786.1 | +0.8 | +8.8 | +16.4 |
| Pakistan (KSE) | 42,310.1 | +2.2 | -11.5 | -12.3 |
| Singapore (STI) | 3,230.4 | -0.1 | +12.1 | +20.1 |
| South Korea (KOSPI) | 2,360.2 | +1.7 | +16.5 | +24.7 |
| Taiwan (TWI) | 10,532.9 | -0.1 | +13.8 | +22.0 |
| Thailand (SET) | 1,642.9 | +1.3 | +6.5 | +15.3 |
| Argentina (MERV) | 23,836.6 | -1.4 | +40.9 | +30.7 |
| Brazil (BVSP) | 74,787.6 | +1.9 | +24.2 | +28.9 |
| Chile (IGPA) | 25,804.3 | +1.5 | +24.5 | +33.0 |
| Colombia (IGBC) | 11,178.2 | -0.9 | +10.6 | +14.1 |
| Mexico (IPC) | 50,164.9 | -0.7 | +9.9 | +27.3 |
| Venezuela (IBC) | 351,810.0 | +31.8 | 1,010 | na |
| Egypt (EGX 30) | 13,442.6 | +0.9 | +8.9 | +11.8 |
| Israel (TA-125) | 1,285.2 | +1.5 | +0.6 | +9.3 |
| Saudi Arabia (Tadawul) | 7,379.6 | +1.0 | +2.0 | +2.0 |
| South Africa (JSE AS) | 56,152.5 | +1.2 | +10.9 | +15.2 |

Youth unemployment

Since 2005 the share of young people (aged 20-24) in the OECD who are not in employment, education or training (NEETs, for short) has fallen slightly, from 17.3% to 16.3%. Some countries have made striking progress, largely owing to increased access to further education. Nearly half of young Turkish adults were NEETs in 2005; by 2016 less than a third were. In Germany 18.7% of youths were NEETs back in 2005, well above the OECD average; by 2016 only 10.8% were. Other countries have not fared so well. Despite having more young people in education, the share of NEETs in Ireland, Portugal and Spain has risen to at least a fifth since 2005, principally because of the financial crisis and its aftermath.

Young people not in education, employment or training (NEETs)
% of population aged 20-24



Source: OECD

*No data for 2005

Other markets

| | % change on | | | |
|---------------------------------|----------------------|-------------|---|------------------------|
| | Index Sep 13th | one week | Dec 30th 2016 in local currency terms | Dec 30th 2016 in \$ |
| United States (S&P 500) | 2,498.4 | +1.3 | +11.6 | +11.6 |
| United States (NAScomp) | 6,460.2 | +1.0 | +20.0 | +20.0 |
| China (SSEB, \$ terms) | 359.5 | +3.4 | +5.2 | +5.2 |
| Japan (Topix) | 1,637.3 | +2.8 | +7.8 | +13.7 |
| Europe (FTSEurofirst 300) | 1,499.6 | +2.0 | +5.0 | +18.6 |
| World, dev'd (MSCI) | 1,986.7 | +1.4 | +13.4 | +13.4 |
| Emerging markets (MSCI) | 1,099.5 | +1.5 | +27.5 | +27.5 |
| World, all (MSCI) | 484.8 | +1.4 | +14.9 | +14.9 |
| World bonds (Citigroup) | 950.8 | -0.7 | +7.6 | +7.6 |
| EMBI+ (JP Morgan) | 844.2 | +0.2 | +9.3 | +9.3 |
| Hedge funds (HFRX) | 1,253.3 [§] | +0.3 | +4.1 | +4.1 |
| Volatility, US (VIX) | 10.5 | +11.6 | +14.0 (levels) | |
| CDSs, Eur (iTRAXX) [†] | 51.4 | -5.7 | -28.8 | -19.5 |
| CDSs, N Am (CDX) [†] | 56.1 | -5.2 | -17.2 | -17.2 |
| Carbon trading (EU ETS) € | 7.1 | +2.9 | +7.9 | +21.9 |

Sources: IHS Markit; Thomson Reuters. *Total return index.

[†]Credit-default-swap spreads, basis points. [§]Sep 12th.

Indicators for more countries and additional series, go to: Economist.com/indicators

The Economist commodity-price index

| | 2005=100 | | | |
|--------------------------------|----------|-----------|--------------------------|-------------------------|
| | Sep 5th | Sep 12th* | % change on one month | % change on one year |
| Dollar Index | | | | |
| All Items | 147.4 | 145.8 | +1.8 | +9.2 |
| Food | 148.6 | 147.9 | +0.2 | -3.1 |
| Industrials | | | | |
| All | 146.1 | 143.6 | +3.6 | +26.4 |
| Nfa [†] | 135.9 | 137.3 | +5.7 | +12.0 |
| Metals | 150.5 | 146.2 | +2.8 | +33.3 |
| Sterling Index | | | | |
| All items | 205.8 | 199.8 | -1.4 | +8.6 |
| Euro Index | | | | |
| All items | 153.7 | 151.6 | -0.2 | +2.7 |
| Gold | | | | |
| \$ per oz | 1,336.5 | 1,326.6 | +4.4 | +0.1 |
| West Texas Intermediate | | | | |
| \$ per barrel | 48.7 | 48.2 | +1.4 | +7.4 |

Sources: Bloomberg; CME Group; Cottlook; Darmenn & Curl; FT; ICPO; ICO; ISO; Live Rice Index; LME; NZ Wool Services; Thompson Lloyd & Ewart; Thomson Reuters; Urner Barry; WSJ. *Provisional

[†]Non-food agriculturals.

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The land of love

Nancy Hatch Dupree, “the grandmother of Afghanistan”, died on September 10th, aged 89

She cut a curious figure in the bazaars of Peshawar, in Pakistan, in the 1990s: a tiny figure in *salwar kameez* with fluffy white hair, a sweet doll's face and, when needed, the mouth of a stevedore. Nancy Dupree was looking for papers. Any papers. Magazines, UN reports, newspapers produced by rival factions of the mujahideen, posters, comics, photographs. It didn't matter if they had been used to light a fire, or wrap meat; if they were legible, she wanted them. Any goddamn thing, as long as it had to do with Afghanistan.

Her task was one she would never have started on, had she not fallen crazily in love with that poor, war-ravaged, beautiful land. She was reconstructing, document by document, the recent history of Afghanistan from the Soviet invasion in 1979. Those were times to pass over in silence, as far as Afghanistan's textbooks were concerned: the years of Soviet occupation, the rise of the warlords, the American invasion and the Taliban takeover, a period of such chaos that even she, who had lived there for decades, had left for Peshawar and America. But she had not forgotten.

The destination of those thousands of papers, after they had been put in sacks and sent on horseback through the Khyber Pass, was a new building on the campus of Kabul University, her own Afghanistan

Centre. Amid the blast-walls and quick-fix buildings of the new city, her centre was built of Afghan cedar and white Herat marble in the style of a *qala*, or fort, around a courtyard bounded with poplars. In this calm, traditional setting, Afghans could now discover their own history.

Of course, it took so much bloody time. But she kept on pushing, hustling any minister with Why? or Why not? Fortunately, after enough years, they seemed to forget that she was either a foreigner or a woman. In her own mind she was just “General Busybody” or “Nuisance”, but her networking prowess was so notorious that she was once approached, to see if she could help with permits to dig tunnels in Kabul, by the young Osama bin Laden.

By sheer persistence she got enough money for her centre, from Estonia and Norway among others. Even Hamid Karzai, at one time president of Afghanistan, helped to raise \$2.5m for it. If a people did not know their history, she kept saying, if they did not revere their culture or care for the monuments around them, their nation could not stay alive.

She had embarked on this work—soon after arriving in Kabul in 1962, as the bored but giddy wife of an American diplomat—by writing the first-ever guide to the magnificent Bamiyan Buddhas. How could

there be no guide? she cried to the tourism minister. It was a scandal. Not half as big a scandal, at least in Kabul, as her wild cocktail-partying affair with Louis Dupree, a married archaeologist. But she rode that out, and married him. Louis's other love was Afghanistan's prehistory; he had unearthed the oldest tools and art ever found in the country. She added to that by describing, in five books and many articles, Afghanistan's rich Greek and Buddhist pasts as well as its Islamic one, and the treasures that remained from each of them.

But this mixed history only enraged the Islamist fanatics who emerged victorious after the Soviet years. In 2001 they blew up her beloved Bamiyan Buddhas, leaving just a stump. The National Museum was hit by rocket fire, reducing many artefacts to dust and opening the rest to looters. She wrote a report on the destruction, reckoning that 70% of the collection had gone. But given the history of this place, anything could fall victim at any time either to a mullah with matches or an American bomb; and once something was thoroughly broken in Afghanistan, it seemed pretty Humpty-Dumptyish to try to mend it.

The best solution she knew was to make Afghans care about their past: not just the elite in Kabul, but also the country people whom the elite ignored. True, some could not read or write, but they were bright, open-minded and thirsting to learn. So her centre sent out boxes filled with pamphlets and books on health, nutrition and farming, as well as history, as lending libraries for villages. Yes, the government jibbed at it, and yes, she knew from tedious visits with bearded elders that sometimes the boxes were just locked away, but every book that got through was progress.

Tea and sympathy

It was also an act of love—as her whole career was. Louis had taunted her, in his profane, charming, cavalier way, into doing more guidebooks, and his red Land Rover had taken her all over her adopted country. He had taught her the prehistory, but he had also started the great collection of papers from the war years. After his death in 1989 she went on with it, as well as the libraries for the country people, because of what he wanted. Beside him, without him, she was just a piffling little shadow. Good God, was she even still alive?

“Grandmother of Afghanistan” (as many fondly called her) was not a bad title, though. She could be that. She recalled how once some village women had brought her their gummy-eyed children and asked for penicillin for them. Instead, like some wise woman of the hills, she suggested applying strong, fresh-brewed tea. It worked. And she thought, looking at the babies then, that there was nothing so lovely as opened Afghan eyes. ■


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