

INSIDE THIS WEEK: TECHNOLOGY QUARTERLY

# The Economist

SEPTEMBER 5TH–11TH 2015

Economist.com

Brazil disappoints, again

Primark's retail revolution

Angela Merkel's uncommon courage

The magic of migrant money

Making cycling less deadly

# Washington, we have a problem...



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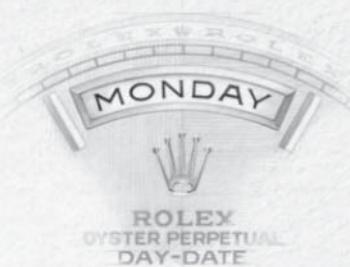
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# **ROLEX**

**On the cover**

**Why the Donald is dangerous:** leader, page 15. The Republican Party regularly sees insurgents in its primaries. A self-funding one who seems capable of saying almost anything, though, is something new, pages 25-27. Bosses must learn how to deal with the egomania that comes with power: Schumpeter, page 68

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**11 The world this week****Leaders**

- 15 American politics** Trump's America
- 16 Europe's migrant crisis** Merkel the bold
- 16 Brazil's disastrous budget** All fall down
- 17 South Africa's foreign policy** Clueless and immoral
- 18 Remittances** Costly cash

**Letters**

- 20 On China, science, Alexander Hamilton, editing genes**

**Briefing**

- 25 The Trump campaign** The art of the demagogue
- 27 Foreign policy** Time to strike fear

**Britain**

- 29 Older workers** March of the greybeards
- 30 Britain and Europe** Le wobble
- 30 Music and journalism** Public NME
- 31 Nuclear weapons** A political torpedo
- 31 Commercial property** Shop 'til you drop
- 32 Bicycle-making** Wheels with soul
- 34 Ethnic minorities** The XX-factor
- 34 Recruiting teachers** School's out
- 36 Bagehot** The land Labour forgot

**Europe**

- 37 Generation Interrail** What Europe means to the young
- 38 Polish gold fever** Waiting for the train
- 39 France's National Front** From protest to power
- 40 Workers and wages** Our turn to eat
- 40 Organised crime** Ruffians in Rome
- 41 Charlemagne** Sprechen Sie power?

**Merkel and migrants**

On refugees, Germany's chancellor is brave, decisive and right: leader, page 16. Once a symbol of hope, the EU has lost the power to inspire its future citizens, page 37

**United States**

- 42 Poverty** It's expensive to be poor
- 43 Arguing over Iran** Fighting talk
- 44 Dairy farming** From moo to you
- 45 Arctic America** Tales of Atlantis
- 46 Lexington** Carly Fiorina

**Technology Quarterly**

After page 46

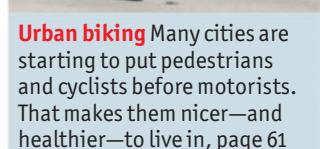
**The Americas**

- 47 Brazil's economy** Desperate times, desperate moves
- 48 Guatemala's president** Not so serene
- 48 Canada's pot-loving church** Dope springs eternal

**Middle East and Africa**

- 49 The Arabs and oil** The perils of relying on the sticky stuff
- 50 Iranian politics** A lion in winter
- 51 Investment in Iran** Not so fast
- 51 Smartphones and ultra-Orthodox Jews** Digital temptations
- 52 Tourism in South Africa** Beware of good intentions
- 52 Boko Haram** Shadow army

**Marriage in India** More and more young Indians are choosing their own spouses, page 53



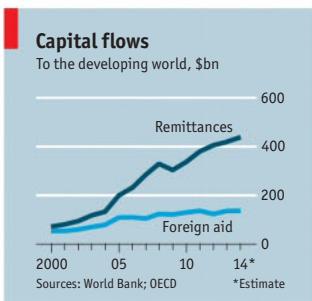
**Urban biking** Many cities are starting to put pedestrians and cyclists before motorists. That makes them nicer—and healthier—to live in, page 61



**Emerging-market woes** Brazil is in an economic hole—and still digging: leader, page 16. Dilma Rousseff tosses Congress a challenge, page 47. Local politics are a bigger threat to India than global shocks, page 69. Markets are dangerously dependent on central banks: Buttonwood, page 70



**Primark** A rapidly rising, super-cheap Irish clothes retailer prepares to conquer America. Rivals should be fearful, page 63



**Remittances** Regulation is raising the cost of sending money to the world's poor. Reform it: leader, page 18. How a torrent of money from workers abroad reshapes an economy, page 71. Why it is so costly to remit money, page 72

## Asia

- 53 Marriage in India** Love (and money) conquer caste  
**54 Pakistani politics** Karachi crackdown  
**55 Indonesia** Too-gentle Jokowi?  
**55 The Koreas and China** He shells, she shells  
**56 Women and work in Japan** Busy? Get an abortion

## China

- 57 Victory Day celebrations** Xi Jinpin's show of strength  
**58 The price of pageantry** Beijing in lockdown  
**59 Banyan** Chinese meritocracy

## International

- 61 Urban planning** Two wheels good, four wheels bad  
**62 Physical inactivity** You have waked me too soon...

## Business

- 63 Primark** Faster, cheaper fashion  
**64 Employers in America** Work to rule  
**65 Hispanic broadcasting** Univision's blurry picture  
**65 ENI in Egypt** Euregas!  
**66 Hon Hai** Kicking the Apple addiction  
**68 Schumpeter** The Trump in every leader

## Finance and economics

- 69 India's economy** Still in business  
**70 Buttonwood** Taming markets  
**71 Global banks** Emerging troubles  
**71 Remittances** Like manna from heaven  
**72 The cost of international transfers** A tax on the poor  
**73 Free exchange** Is China exporting deflation?

## Science brief

- 76 Why does time pass?** The moving finger writes

## Science and technology

- 78 Medicinal chemistry** Drugs that live long will prosper  
**79 The war on malaria** A charge that sticks  
**80 Fisheries** Drawing the line  
**80 Evolution** Slippery customers

## Books and arts

- 81 Gay rights in America** The arc of history  
**82 American college football** Punishingly profitable  
**82 Religious conflict** Bloodied brothers  
**83 Herring's history** Net worth  
**84 New American fiction** Being Franzen's friends  
**84 Cross-cultural art** East meets West

## 88 Economic and financial indicators

Statistics on 42 economies, plus our monthly poll of forecasters

## Obituary

- 90 Oliver Sacks** Travels through a mindspace



## Technology Quarterly

This week we publish our Technology Quarterly with stories on new ways to detect clandestine nuclear weapons, touchscreens that respond to multiple gestures, computer chips that get ever cheaper, 3D-printed buildings and much more, after page 46

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## Politics



Europe's politicians bickered as the summer's **migrant crisis** continued to play out in the headlines. Photographs of a drowned toddler, who died along with his Syrian mother and brother when their dinghy capsized and whose body had washed up on a Turkish beach, prompted calls for more to be done. In Budapest's main railway station crowds of migrants, mainly from Syria, staged protests when authorities stopped them from travelling on. Around 50,000 migrants crossed Hungary's borders in August alone; many are hoping to reach Germany and apply for asylum.

**Britain's** Electoral Commission told the government to reword a question in a referendum, to be held in either 2016 or 2017, that will ask voters whether they wish to remain in the European Union. The new phrasing will include a reference to leaving as well.

**Ukrainian** nationalists rioted in Kiev against the government's passage of constitutional amendments granting greater autonomy to the separatist regions of Donetsk and Luhansk. A volunteer soldier back from the front tossed an explosive that killed three national guardsmen. The amendments were agreed to as part of the Minsk peace deal signed with Russia, and while failing to pass them could restart the war, passing them threatens to bring down the government in Ukraine.

**Azerbaijan** sentenced an investigative journalist to seven and a half years in jail.

Khadija Ismayilova had reported extensively on corruption by the family of the oil-rich country's authoritarian ruler, Ilham Aliyev.

### The official line

**China** punished nearly 200 people for "spreading rumours" online. Some of them are alleged to have reported inflated death tolls in warehouse explosions last month in the port city of Tianjin that killed at least 150 people. Others were said to have circulated "seditious" posts about a parade on September 3rd in commemoration of China's role in defeating Japan in the second world war. It was the first large-scale military procession in Beijing in six years.

Millions of workers in **India** staged a day-long strike in protest against the government's economic policies, including the privatisation of state-owned enterprises and changes to rigid labour laws. The action caused widespread disruption to public transport.



**Malaysia's** former prime minister, Mohamad Mahathir, called for a "people power" movement to secure the removal of his one-time ally, Najib Razak, the country's current leader. Mr Mahathir was among tens of thousands of people who joined rallies against Mr Najib, who has been buffeted by corruption allegations. Mr Najib has denied any wrongdoing.

### Amid the ruins

Satellite images confirmed that Islamic State has blown up a second temple at the ancient site of **Palmyra** in Syria. The temple of Bel was Palmyra's most important monument.

**Egypt** announced that it will hold long-delayed parliamentary elections in October. Also in Egypt a court retrying three journalists from Al Jazeera for colluding with the Muslim Brotherhood, which was ousted from power in a coup two years ago, sentenced them to three years in prison. The decision stunned observers who for months had been led to believe that they would be acquitted. One of the journalists was sentenced in absentia.

Bosco Ntaganda, a Rwandan-born **Congolese** militia leader, went on trial at the International Criminal Court (icc) in The Hague on charges that include murder and rape. He was the commander of a militia implicated in numerous war crimes during a civil war in the Democratic Republic of Congo. Meanwhile, the president of **Sudan**, Omar al-Bashir, who is wanted by the icc on charges of genocide, visited China where he was welcomed as an "old friend". China is not a signatory to the statute that created the icc.

Militants from the **Shabab**, a jihadist group, attacked an African Union military base in the south of Somalia, killing as many as 50 Ugandan soldiers. AU forces have taken significant ground from the Shabab over the past year yet the militants have repeatedly struck back.

### A friend indeed

**Venezuela's** president, Nicolás Maduro, said during a visit to China that his hosts would provide his crisis-stricken country with \$5 billion to help increase oil output. Venezuela, which faces runaway inflation, a shortage of consumer goods and plunging energy revenues, has already received \$50 billion from China under a deal signed by Hugo Chávez, the late socialist president.

### In Guatemala

Otto Pérez Molina resigned as president after his immunity in a corruption scandal was lifted by Congress and a judge issued a warrant for his arrest. Prosecutors have accused Mr Pérez of

conspiring to defraud the customs service of millions of dollars. A presidential election is due on September 6th.

### The ayes have it

Barack Obama managed to secure the backing of 34 Democratic senators for the agreement with **Iran** to limit its nuclear programme, thereby ensuring that he can veto any Republican threat to alter the accord, which is adamantly opposed by Israel. The partners to the deal—Britain, China, France, Germany and Russia—have made it clear that they would not want to renegotiate with Iran if Congress rejects the agreement.

America's Supreme Court denied a hearing for a clerk in Kentucky who refuses to issue marriage licences to **gay couples** because of her religious beliefs. Lawyers for gay litigants who want to wed in Rowan County called for the clerk to be held in contempt for refusing to comply with the court's decision in June that legalised gay marriage.



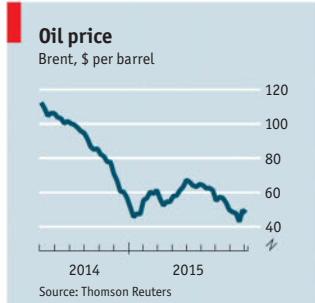
Mr Obama used his executive powers to rename Alaska's **Mount McKinley**, which is the biggest mountain in the United States. From now on it will no longer be named after America's 25th president but known simply as Denali, its Native Alaskan name. The feds also remeasured the mountain and said it stood at 20,310 feet (6,190 metres), ten feet shorter than recorded in the 1950s.

A study reported in *Nature* using ground survey data and satellite images estimated that there are 3 trillion **trees** on Earth, eight times more than had been thought.

## Business

**Stockmarkets** had another volatile week amid further worries about the slowing Chinese economy. The swings in China's share indices were less marked than of late, following speculation that the government had recommenced its stock purchases through state-owned firms to try to calm the markets. The authorities are intervening in other ways, parading on television a financial journalist who confessed to the "crime" of reporting on the market turmoil by adding his "personal judgment and subjective views" to the news. An inquiry also began into alleged market manipulation.

### Not much of a buck in a trend



**Oil prices** yo-yoed as markets absorbed data on slightly lower American oil production, higher oil stockpiles, a revision to American GDP which showed the economy roaring ahead in the second quarter by 3.7% at an annual rate and more evidence of a slackening of output in Chinese manufacturing. The price of Brent crude soared by 25% over a three-day session before falling back sharply.

**Macau's GDP** shrank by 26% in the second quarter, year on year, the fourth consecutive decline. A crackdown by the Chinese government on corruption has discouraged punters from making conspicuous bets at the territory's casinos, whose revenues have fallen by 40%. But employment in Macau remains strong and the casinos are trying to diversify by building non-gambling attractions, such as a replica of the Eiffel Tower.

After years of rapid growth by the standards of rich countries, **Canada** slipped into recession during the first half of 2015. The economy contracted by 0.5% at an annualised rate in the second quarter, following a decline of 0.8% in the first. Lower commodity prices have caused Canada's mining and energy companies to cut investment. **Australia**, another commodity-heavy economy, recorded growth of just 0.2% in the second quarter from the previous three months (or 2% on an annual basis), the slowest rate in two years.

A takeover bid for **Novo Banco** (a Portuguese bank that emerged from the wreckage of Banco Espírito Santo's collapse), submitted by Anbang, a Chinese insurance company, was said to have collapsed. Two other bidders—Fosun, a Chinese conglomerate, and Apollo, an American private-equity firm—are now back in the running.

Lower oil prices and a stronger currency were behind a 14.7% plunge in **South Korea's** exports in dollar terms in August compared with the same month last year, the steepest drop in six years (by volume, exports rose by 4%). Petroleum products account for a large

share of Korean exports. And a stronger won is battling with a weaker Japanese yen in export markets. China's devaluation of the yuan has not helped; a quarter of the country's exports go to China.

### A slow process

The **euro zone's** unemployment rate dipped to 10.9% in July, the lowest it has been since February 2012. Germany had the lowest rate, 4.7%, and Greece had the highest, 25% (for the month of May), followed by Spain at 22.2%. Unemployment in France rose slightly to 10.4%. Annual inflation in the euro zone was unchanged at 0.2%. The uninspiring economic data come despite a big stimulus package that the European Central Bank launched in March.

Natalie Massenet resigned from **Net-a-Porter**, an online luxury e-commerce firm that she founded. Her abrupt departure comes amid a merger with Yoox, an Italian rival to Net-a-Porter.

**Toshiba** delayed the release of its annual earnings again, after uncovering further irregularities. In July an independent committee found that the Japanese electronics and nuclear-power group had

overstated profits by ¥152 billion (\$1.2 billion) over seven years.

### Contract killers

A federal judge in San Francisco ruled that drivers for **Uber** who claim that the app-based taxi service owes them money for tips and mileage could bring a class-action lawsuit against the firm. The judge's decision opens the way for drivers to argue that they are employees and not independent contractors, posing a potential challenge both to Uber and the employment model of the sharing economy.

**News Corporation** confirmed that Rebekah Brooks will again head its British newspaper operations, four years after she resigned during the phone-hacking scandal that led to the closure of the *News of the World*, one of News Corp's more lurid titles. Last year a jury found Ms Brooks not guilty of the charges brought against her in the case. A friend of David Cameron, the British prime minister, and a confidante of Rupert Murdoch, News Corp's boss, Ms Brooks said it was a "privilege" to be back in journalism.

Other economic data and news can be found on pages 88-89



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# Trump's America

## Why the Donald is dangerous



**T**HIS country is a hellhole. We are going down fast," says Donald Trump. "We can't do anything right. We're a laughing-stock all over the world. The American dream is dead." It is a dismal prospect, but fear not: a solution is at hand. "I went to the Wharton School of Business. I'm, like, a really smart person," says Mr Trump. "It's very possible", he once boasted, "that I could be the first presidential candidate to run and make money on it."

When Mr Trump first announced that he was running for president, he was dismissed as a joke. A wheeler-dealer with lots of experience of reality tv but none whatsoever of elective office wants to be commander-in-chief? Surely, sophisticates scoffed, no one could want this erratic tycoon's fingers anywhere near the nuclear button. But for weeks now he has led the polls for the Republican nomination, despite saying things that would have torpedoed any normal campaign. Americans are waking up to the possibility that a man whose hobby is naming things after himself might—conceivably—be the nominee of the party of Lincoln and Reagan. It is worth spelling out why that would be a terrible thing. Fortunately, the Donald's own words provide a useful guide.

Mr Trump is not in thrall to the hobgoblins of consistency. On abortion, he has said both "I'm very pro-choice" and "I'm pro-life". On guns, he has said "Look, there's nothing I like better than nobody has them" and "[I] fully support and back up the Second Amendment" (which guarantees the right to bear arms). He used to say he wanted a single-payer health service. Now he is much vaguer, promising only to replace Obamacare with "something terrific". In 2000 he sought the presidential nomination of the Reform Party. A decade ago he said "I probably identify more as Democrat." Now he is a Republican.

### Blowing his own Trumpet

In an interview this week (see page 25) *The Economist* asked Mr Trump why Republican voters seem willing to give him a pass on so many issues they normally hold dear. He took this to be a question about religion, since he is not much of a churchgoer and struggles to cite a single verse from Scripture. "I'm strongly into the Bible, I'm strongly into God and religion," he declared. But within a few seconds he appeared to grow bored with the topic and switched to talking about how he has "a net worth of much more than \$10 billion" and "some of the greatest assets in the world", including the Trump Tower, the Trump Turnberry golf resort, and so on.

On one domestic issue, to be fair, he has staked out a clear, bold position. Alas, it is an odious one. He wants to build a wall on the Mexican border and somehow make Mexico pay for it. He would deport all 11m immigrants currently thought to be in America illegally. Apart from the misery this would cause, it would also cost \$285 billion, by one estimate—roughly \$900 in new taxes for every man, woman and child left in Mr Trump's America. This is necessary, he argues, because Mexican illegal

immigrants are "bringing drugs. They're bringing crime. They're rapists." Not only would he round them all up; he would also round up and expel their children who were born on American soil and are therefore American citizens. That this would be illegal does not bother him.

His approach to foreign affairs is equally crude. He would crush Islamic State and send American troops to "take the oil". He would "Make America great again", both militarily and economically, by being a better negotiator than all the "dummies" who represent the country today. Leave aside, for a moment, the vanity of a man who thinks that geopolitics is no harder than selling property. Ignore his constant reminders that he wrote "The Art of the Deal", which he falsely claims is "the number-one-selling business book of all time". Instead, pay attention to the paranoia of his worldview. "[E]very single country that does business with us" is ripping America off, he says. "The money [China] took out of the United States is the greatest theft in the history of our country." He is referring to the fact that Americans sometimes buy Chinese products. He blames currency manipulation by Beijing, and would slap tariffs on many imported goods. He would also, in some unspecified way, rethink how America protects allies such as South Korea and Japan, because "if we step back they will protect themselves very well. Remember when Japan used to beat China routinely in wars?"

### Towering populism

Mr Trump's secret sauce has two spices. First, he has a genius for self-promotion, unmoored from reality ("I play to people's fantasies. I call it truthful hyperbole," he once said). Second, he says things that no politician would, so people think he is not a politician. Sticklers for politeness might object when he calls someone a "fat pig" or suggests that a challenging female interviewer has "blood coming out of her wherever". His supporters, however, think his boorishness is a sign of authenticity—of a leader who can channel the rage of those who feel betrayed by the elite or left behind by social change. It turns out that there are tens of millions of such people in America.

The country has flirted with populists in the past, but none has won a major-party presidential nomination since William Jennings Bryan in 1908. The closest any true firebrand has come was in 1996, when Pat Buchanan, whose slogan was "The peasants are coming with pitchforks", won the Republican primary in New Hampshire against a dull establishment candidate, Bob Dole. (Mr Dole later won the nomination.)

Mr Trump is far more dangerous than Pitchfork Pat, for two reasons. First, as a billionaire, he will not run out of money to finance his campaign. Second, he faces so many Republican opponents that he could grab the nomination with only a modest plurality of the vote. The smart money still says that Republicans will eventually unite behind a mainstream candidate, as they always have in the past. But the world cannot take this for granted. Demagogues in other countries sometimes win elections, and there is no compelling reason why America should always be immune. Republicans should listen carefully to Mr Trump, and vote for someone else. ■

## Europe's migrant crisis

# Merkel the bold

On refugees, Germany's chancellor is brave, decisive and right



of cautious incrementalism. She has eschewed sweeping visions, put off decisions whenever possible and usually reflected, rather than shaped, public opinion. The European Union has paid a heavy price for her small-bore instincts, not least because they made the euro-zone crisis deeper and more protracted than it needed to be.

Against that background, Mrs Merkel's approach to Europe's migrant crisis is remarkable. As throngs of Africans and Arabs turn Italian and Greek islands, and eastern European railway stations, into refugee camps (and are found dead in Austrian lorries), the chancellor has taken a brave stand. She has denounced xenophobes, signalled Germany's readiness to take more Syrian refugees and set out a European solution to a politically explosive problem.

On August 31st Mrs Merkel issued a dramatic call to arms, warning that today's refugee misery will have graver consequences for the future of the EU than the euro mess. "If Europe fails on the question of refugees," she said, "it won't be the Europe we wished for." She is right. The EU was born after a devastating war, on a promise of solidarity with the persecuted and downtrodden. The biggest displacement of people since 1945 is a test of European values, and of the ability of member states to work together. The refugees from civil wars in Syria and Iraq clearly need help; and European countries can provide it only if they share the task.

That means a collective response. Unfortunately, whereas

**A**NGELA MERKEL may be the most powerful politician in Europe, but she has rarely shown much inclination for bold leadership. Both in domestic politics and, especially, during the euro crisis, the German chancellor's style has been one

external border control is (for most EU members) a common problem, migration and asylum policies remain national. Refugees are supposed to seek asylum in the European country in which they first set foot, usually Italy or Greece. But these countries are overwhelmed and most refugees want to head north to Germany, Britain or Scandinavia. That is not difficult, thanks to the dismantling of passport controls at the EU's internal borders (a system known as Schengen, encompassing 26 European countries, but not Britain).

In some ways this disparity between the European and the national mirrors the tensions in the euro crisis, where the currency is joint but countries' debts are individual. Now incomplete integration is tripping up migration policy, too. The difference is that this time Mrs Merkel is pushing hard for a proper European solution—a joint transfer system for refugees in which all Schengen members take part. Without such a system, borderless travel across the continent could become unsustainable and European integration will take a big step back.

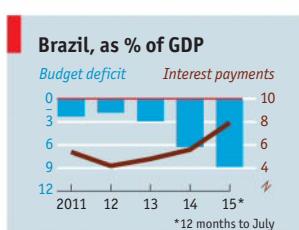
### Among Europe's craven leaders

Few other European politicians have had the courage to make such a clear link between Europe's values, its collective self-interest and bold action on refugees. David Cameron, Britain's prime minister, nonchalantly cites an opt-out agreement with the EU as an excuse to restrict the number of refugees. Many eastern European politicians have resorted to xenophobia, refusing to welcome refugees for resettlement even as their citizens enjoy the benefits of borderless travel (see page 37). No doubt Mrs Merkel is driven, in part, by domestic concerns. Germany expects to register up to 800,000 asylum-seekers this year, far more than any other country in the EU, and voter disquiet is growing. But a desire to share the burden should not be mistaken for selfishness. In a crisis where Europe has little to be proud of, Mrs Merkel's leadership is a shining exception. ■

## Brazil's disastrous budget

# All fall down

Brazil is in an economic hole—and still digging



The end of the global commodity boom and a confidence-sapping corruption scandal, after years of economic mismanagement, have extinguished growth. Brazil's GDP is expected to contract by 2.3% this year. Fast-rising joblessness, together with falling real private-sector pay and weak consumption, are

PLENTY of countries run deficits. And when recessions occur, loosening the public purse strings makes sense for many of them. But Brazil is not most countries. Its economy is in deep trouble and its fiscal credibility is crumbling fast.

squeezing tax receipts. Meanwhile rising inflation, allied to a free-falling currency, means investors demand higher returns on government debt. The result is a budgetary disaster. This year a planned primary surplus (ie, before interest payments) has vanished. Once interest payments are included, the total deficit this year is projected to be 8-9% of GDP.

Faced with the prospect of public finances slipping out of control, Brazil's policymakers have stuck their heads in the sand. The 2016 draft budget sent to Congress this week by the president, Dilma Rousseff, builds in a primary deficit for the first time in the post-hyperinflation era (see page 47). The very legality of a budget with a primary deficit has been questioned: a fiscal-responsibility law passed in 2000 has long ➤

▶ been interpreted as banning spending that outstrips receipts. But whatever the legal debate, the budget is calamitous.

First, Brazil would have to borrow to cover all its interest payments—a risk for a country with by far the highest real interest rates of any sizeable economy, at a time of recession and wider emerging-market jitters. Second, a primary deficit sends a bleak message about Brazilian economic management. Since the turn of the century Brazil's government has been guided by three principles: a credible inflation target, a floating currency and primary surpluses, ideally large enough to bring public debt down. This “tripod” allowed it to move away from its hyperinflationary past, convinced ratings agencies to grant it an investment-grade badge and underpinned growth that propelled millions out of poverty. All this is now in jeopardy.

Ms Rousseff is not the only one to blame. She had hoped to run a primary surplus, despite the recession, by resurrecting a tax on financial transactions that was abolished in 2007. But her political weakness put paid to that plan. At just 8%, her public-approval rating has hit depths unplumbed by any previous Brazilian president, undermining her authority in Congress. Lawmakers are also angered by her finance minister's attempts to rein in pork-barrel spending, and alarmed by a wide-ranging investigation into corruption at the state-controlled oil giant, Petrobras. Knowing that the new tax would be unpopular—and hoping to weaken Ms Rousseff further—they made it clear that they would block it.

Congress, Ms Rousseff's advisers say, must now find a way to pay for the spending it refuses to cut. But it is stuffed with

short-termists who are more concerned with lining their pockets than securing Brazil's future. Many, both in the opposition and among her supposed allies, are wasting their energy trying to impeach Ms Rousseff, rather than finding a way to fix the budget. Unless this impasse is resolved quickly, business and consumer confidence will fall further and foreign investors will pull out. Brazil will be headed for a multi-year slump and a ratings downgrade.

### Heaven can wait

So how might Brazil reach a primary surplus? By far the best solution would be to cut public spending, which accounts for more than 40% of GDP, much more than in other middle-income countries. Ms Rousseff has scaled back some discretionary spending, for example by promising to merge some ministries. But the 2016 budget includes plans to raise the minimum wage and many welfare payments by a whopping 10%. Congressional gridlock and a constitution that is chock-full of unaffordable spending commitments mean that only rarely have Brazilian governments managed to trim outgoings—and only under presidents endowed with remarkable political and leadership skills. Ms Rousseff falls far short of that ideal.

That leaves the sticking-plaster. The proposed financial-transaction tax would be, like so many Brazilian taxes, poorly designed and hard on growth. But it would still be better than ramping up spending with no way to pay for it. If not this tax, then some other is needed—and after that, the business of reforming Brazil's greedy and profligate government. ■

### South Africa's foreign policy

## Clueless and immoral

A country that symbolises human rights and freedom is turning its back on both



**T**O UNDERSTAND how far South Africa has strayed from Nelson Mandela's legacy, one need only peruse the latest foreign-policy paper drafted by grandes of the ruling African National Congress (ANC). The fall of the Berlin Wall, it reads, marked not the freeing of captive nations in Europe but a regrettable triumph of Western imperialism. The pro-democracy protests in Tiananmen Square in China were an American-backed counter-revolution. Russia's invasion of eastern Ukraine is a conflict “directed from Washington”. America's policies in Africa and the Middle East have “the sole intention” of toppling democratic governments. As “part of the international revolutionary movement to liberate humanity from the bondage of imperialism”, South Africa should seek to have American military bases thrown out of Africa.

If this were a spoof, it might be amusing. Yet the document is entirely serious: its contents are to be debated at the ANC's policy conference in October. Its authors include several serving and retired cabinet ministers, including a former foreign minister. South Africa risks becoming a laughing-stock, not least in Africa itself.

When Mandela became South Africa's first post-apartheid president, he led the country out of isolation. He promised a

foreign policy in which “human rights will be the light that guides”. Granted, he and his successor, Thabo Mbeki, applied the principle inconsistently. South Africa called for sanctions against Sani Abacha, Nigeria's brutal dictator, and was a vocal advocate of the International Criminal Court (ICC). Yet it also coddled dictators such as Muammar Qaddafi, whom Mandela called “my brother leader”, propped up Robert Mugabe even as he led Zimbabwe to ruin, and sided with Russia and China in opposing sanctions on Myanmar.

### Dalai Lama, no. Bloodstained despot, yes

Under Jacob Zuma, the current president, the country's foreign policy has drifted even further from its previous ideals. When the Dalai Lama was invited to attend a meeting of Nobel peace laureates in South Africa, the government refused him a visa. Yet it welcomed Omar al-Bashir, the president of Sudan, despite his indictment by the ICC for orchestrating genocide and mass rape in Darfur. And rather than let a fellow African leader face such impudent charges, Mr Zuma's officials whisked him away just before a South African court ordered his arrest.

All countries struggle to balance principles and national interests. Yet South Africa's revolutionary foreign policy serves neither. On principles: South Africans may be grateful for the Soviet Union's opposition to apartheid, but they are also proud of their constitutionally guaranteed human rights. Few buy the ANC's argument that Vladimir Putin's Russia is a vic-

► tim and Barack Obama its cruel oppressor.

What about self-interest? The ANC wants to draw closer to the BRICS, a club that also includes Brazil, Russia, India and China and seeks to create an alternative world economic force. Fair enough; trade with China, especially, is important. Yet Europe is still South Africa's biggest trading partner, and America, which gives South African textiles and manufactured goods preferential access to its markets, comes third. The ANC seems to think that commerce with China will flourish only if South Africa is hostile to the West. This is nonsense: many countries trade profitably with China while staying close to America.

The ANC thinks South Africa should stand up for Africa. But

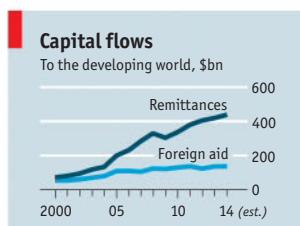
Europe and America are not Africa's enemies. Quite the opposite. A single American aid programme, the President's Emergency Plan for AIDS Relief, has saved millions of African lives. None of the BRICS can make similar claims. Nor did they step up—as Western countries did with soldiers, equipment and intelligence—when jihadist militias almost overran Mali or the north of Nigeria.

South Africa's peaceful transition to democracy offered hope to a continent long tormented by despots and ideologues. If the ANC now rejects South Africa's liberal friends and throws in its lot with some of the world's nastier regimes, it will be doing Africans a grave disservice. ■

## Remittances

# Costly cash

**Regulation is raising the cost of sending money to the world's poor. Reform it**



off by corrupt local officials. Surely every right-minded government in the world would want to encourage this and make it as cheap and easy as possible?

Alas, no. Remittances, the packets of money sent home by migrant workers from India, the Philippines and elsewhere, are individually tiny but collectively enormous. The World Bank estimates that flows to developing countries will be worth \$440 billion this year—more than twice as much as foreign aid. And that is just the payments the bank can track.

The money earned from feeding toddlers, sweeping floors or writing code in richer countries brings all sorts of benefits when it returns home (see page 71). It eases poverty and boosts consumption. When poor families begin to receive remittances, they tend to yank their children out of menial jobs and send them to school.

Yet remitting money is expensive. In 2009 the G8, a club of rich-country governments, said it would try to cut the global average cost of sending funds from 10% (as it was then) to 5% over five years. The world is not even halfway there: the average stands at 7.7%, if wide exchange-rate spreads are counted as well as transaction fees. That is despite the emergence of rivals to giant money-transfer outfits such as MoneyGram and Western Union, which use networks of agents to collect and pay out cash. Peer-to-peer transfer services have popped up, slashing the cost of shunting money around the rich world. In poor countries, especially in Africa, “mobile money”, which can be transferred from one person to another by mobile phone, has made domestic transactions virtually free.

The problem is that, even as technology boosts competition and cuts costs, regulation is pushing in the opposite direction. Guidelines intended to prevent money-laundering and the financing of terrorism imply that all sorts of cross-border transfers should be treated as very risky. The costs of complying with the rules are high, and the penalties for breaching them

**S**UPPOSE there were a way of getting money to some of the world's poorest people precisely when they need it. Suppose, too, that the flow hardly ever diminished, even during a global financial crisis. Finally, suppose the cash could not be creamed

stringent. Western Union, for example, agreed to no fewer than 73 changes to its procedures in settlement in 2010 of claims in America that it had abetted money-laundering: it now conducts background checks on its agents, and has even adapted the software it uses to scan for suspicious transactions to account for the seasonality of marijuana harvests.

For fear of red tape and ruinous fines, banks have simply withdrawn from some markets. That means less competition and prices higher than they would otherwise be. The effect is worst in war-torn countries like Somalia, which most need remittances. This is not just unfortunate; it is also counter-productive. When it becomes inconvenient and expensive to send money legitimately, money flows illegitimately. It can be stuffed into suitcases or sent through informal *hawala* networks, which are lubricated by trust and do not actually move money across borders. At that point, the paper trail disappears.

## A sharper stick

To ease the frictions that continue to make remittances costly, action is needed on two fronts. First, rich countries need to target their anti-money-laundering regulations much more precisely. Organisations like the Financial Action Task Force, an inter-governmental body, should spell out in finer detail what makes a transaction highly risky. Banks should be reassured that they will not be prosecuted so long as they follow certain procedures, such as checking wire-transfer information against lists of suspected terrorists and criminals.

Second, remittance-receiving countries should do their bit. They can invest in watertight national-identity systems, such as India's biometric one. These make it easier to track money, whether it is paid out in cash or sent to somebody's mobile account. They should also ensure that mobile money does not end up reducing competition. There are welcome signs of telecoms firms in sub-Saharan Africa allowing payments between rival mobile-money systems, even across borders. In some cases they have been prodded into so doing by courts and regulators, which should keep on prodding.

The main thing is to see remittances for what they almost always are. They are not devices for laundering drug money (which can be done more effectively in other ways) or financing terrorism. They are payments sent by loved ones, in response to need. As far as possible, they should be left alone. ■

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 PICTET  
1805

**China's history**

Your leader of August 15th and a related essay ("Xi's history lessons" and "The unquiet past") distorted history, downplayed war crimes committed by Japanese militarism and dismissed China's sacrifice, contribution and unyielding struggle for regional and world peace. The articles failed to show due respect for history or meet the journalistic norms of impartiality, objectivity and integrity expected of a serious media organisation.

The Communist Party of China (CPC) played the central role in the war of resistance against Japanese aggression. The united front formed at the initiative of the CPC was instrumental in bringing about co-operation between the Kuomintang, the ruling party at the time, and the CPC. As a result, the Chinese people united in a common fight for national survival and won a great victory over Japan. By doing so, the Chinese people made an indelible historic contribution to the victory of the international community over fascism.

The Chinese people sustained 35m casualties in the war. Hardly any family in China has not experienced separation between beloved ones or witnessed brutal killing by Japanese forces. As the Chinese people view it, the Yasukuni Shrine in Tokyo honours the souls of bloodstained war criminals. To glorify the shrine is to preach evil. A prerequisite for Japan to improve relations with China and other Asian neighbours is that it face history directly and squarely. In China, people remember history not to prolong hatred but to call for vigilance against the attempts of the Japanese right-wing forces to deny, distort or even glorify the past of aggression.

The most valuable lesson China learned from the war of resistance is the paramount importance for all nations to follow the path of peaceful development. China is committed to this path. China will make unremitting efforts to improve China-Japan rela-

tions, to safeguard regional peace and stability and to contribute to a harmonious world of common prosperity.

The purpose of China's grand commemorative events to mark the 70th anniversary of the victory against Japanese aggression and world fascism is to look at history as a guide for the future. Holding a military parade at such a commemorative event is common practice around the world and not, as you allege, a show of military muscle in Beijing to upset Asian neighbours.

As a media organisation, *The Economist* has a responsibility to help its readers have a correct understanding of the past, rather than portraying it in black and white.

ZHANG YANGWU  
Spokesman of the Chinese  
embassy  
London

**Practical science**

Never mind all those fancy scientific problems you dealt with ("Life, the multiverse and everything", August 8th). I am still waiting for some genius to come up with an app that will allow me to get cash from my printer at home rather than trudge to the nearest ATM.

ELIEZER GREISDORF  
Toronto

**Money and image**

A controversy is brewing over the proposal to replace Alexander Hamilton on the \$10 bill ("Fun with federalists", August 1st). For three decades Hamilton served as George Washington's indispensable *aide-de-camp*, laid the foundations for America's nascent industrialisation and midwifed the capitalist colossus that America would become, all the while keeping the young nation out of ruinous foreign imbroglios. Meanwhile, the slave-owning Andrew Jackson, who adorns the \$20 bill, forcibly expelled Native Americans en masse and precipitated the Panic of 1837 by resisting the renewal of the Second Bank's charter.

Surely Hamilton's cosmopolitan, meritocratic and market-oriented vision better

befits modern America than does Jackson's sanguinary sabre-rattling and pitchfork populism. *The Economist* should join Ben Bernanke and others in fighting to keep Hamilton in circulation over Jackson. Alas, \$10 says it's too late.

JUSTIN WILLIAMS  
Toronto

**The CRISPR factor**

Your article on CRISPR-Cas9, a gene-editing system, reported that Jennifer Doudna and Emmanuelle Charpentier "worked out" and demonstrated a technique for editing genomes in 2012 ("The age of the red pen", August 22nd). Actually, their paper studied the properties of a purified protein in a test tube: it involved no cells, no genomes and no editing. Rather, the paper simply highlighted the potential that genome editing might be possible. The first demonstration of genome editing was reported on January 3rd 2013 in separate papers by Feng Zhang, who began applying CRISPR-Cas9 in human cells in early 2011, and George Church. Mr Zhang's paper is the most cited in the CRISPR field.

After considering all relevant publications and patent filings, the United States and European patent offices awarded Mr Zhang and his colleagues 17 patents under both "first to invent" and "first to file" standards. Many scientists have made important contributions to the CRISPR field, and it is important to assign credit properly.

ROBERT DESIMONE  
Director  
McGovern Institute for Brain  
Research  
Massachusetts Institute of  
Technology  
Cambridge, Massachusetts

Last May around 140 delegates from 25 different countries gathered in Atlanta for BEINGS 2015 (Biotech and the Ethical Imagination: A Global Summit) to begin the process of drafting a set of global guidelines for technologies such as CRISPR, a gene-editing system, which either directly or indi-

rectly alter the human genome. The faculty included such luminaries as George Church, Steven Pinker, Arthur Caplan and Margaret Atwood, and delegates included representatives from science, the biotech industry, philosophy, ethics, law, religion, government and the arts and humanities. We hope that a consensus document will be published early next year.

The power of CRISPR and other such technologies promises to alter our future in unpredictable ways. We will become the masters of our own evolution, determining what kinds of changes to our form and function we will incorporate into our children. Such a fundamental change in the nature of our species requires deep forethought. It is imperative that we do not move blithely forward without such scrutiny.

PAUL ROOT WOLPE  
Director  
Centre for Ethics  
Emory University  
Atlanta



I was astonished that your cover on editing humanity (August 22nd) included baldness in a list of traits that could be cured by genetic enhancement, such as Alzheimer's, cancer and strokes. Are you anti-bald, maybe even a baldist? Have you no feelings for the follicly challenged? Has no one ever told you that bald is beautiful? I have never seen anything so hair-brained.

RICH ROBINSON  
London ■

# Executive Focus

The NATO International Staff (HQ Brussels) is recruiting for the following posts (m/f):

## DEPUTY ASSISTANT SECRETARY GENERAL FOR HUMAN RESOURCES (DASG/HR)

(ref. 150364 – closing on 30 September 2015)

The DASG/HR is the Organization's focal point for HR leadership and management. He/she oversees the delivery of all HR services for NATO's Brussels-based 1100-person International Staff. The incumbent also acts as the overall champion for thought leadership and policy development across all NATO entities (6000 civilian staff members). This is a senior management position that works with NATO member Nations and Organizational leadership on shaping the size, structure and capacity of NATO's civilian staff and the Organization's ability to deliver on its strategic objectives. The incumbent must be able to manage and lead the HR team during a period of change in the Organization, which will require managing ongoing business while also championing change.

NATO HQ is looking for an outstanding individual, recognised by peers as a leader in the HR field and with extensive senior management experience and knowledge of the latest theory, best practices and tools within management in general and HR in particular.

## HEAD TALENT MANAGEMENT AND ORGANIZATIONAL DEVELOPMENT (Head, TMOD)

(ref. 150366 – closing on 12 October 2015)

The TMOD Service is responsible for managing the Performance Review and Development (PRD) system, establishing and delivering the training programme of the International Staff at NATO HQ, and providing expertise and organisational consultancy, support and advice in the areas of organisational design & development and job classification throughout NATO HQ.

The incumbent is responsible for the effective operation of the Service. He/she will initiate and oversee the implementation of PRD, training, development, and Organizational Design and Development policies in line with the strategic objectives of the Organization. The incumbent manages and directs the activities of a team, oversees an outsourced training function, and is responsible for ensuring the effective functioning of the NATO HQ Training Centre.



*Selection of candidates for NATO posts is based upon the merit principle and includes different types of assessments, testing and interview. Further information concerning the positions, the requirements and details of how to apply can be found on [www.nato.int/recruitment](http://www.nato.int/recruitment).*



BANK FOR INTERNATIONAL SETTLEMENTS



## Head of Internal Audit

Basel, Switzerland

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Deadline for applications is  
20 September 2015

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*Supporting global monetary and financial stability*



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Geneva, Switzerland

The World Intellectual Property Organization (WIPO), a specialized agency of the United Nations based in Geneva, Switzerland dedicated to developing a balanced and accessible international intellectual property (IP) system, is seeking highly qualified and experienced candidates for two positions of Senior Director, within its Patents and Technology Sector. One of the positions is located in the PCT Operations Department and the other in the PCT Legal and Business Development Department.

The PCT Operations Department is responsible for the receipt, formalities examination, translation and publication of applications filed under the Patent Cooperation Treaty (PCT). It is also responsible for the information systems supporting its own work. Comprising more than 300 staff, the Division handles close to 200,000 PCT applications per year, with an annual budget of approximately 75 million Swiss francs. The Department is key to WIPO's financial well-being and ability to deliver on results to Member States. The Department is characterized by the constant need to adjust to changes in the international environment, including geographic origin (and therefore language distribution) of patent applications, and rapidly evolving technologies related to document processing and translation.

The PCT Legal and Business Department is responsible for the development of policies and the provision of strategic direction to preserve and strengthen the role of the PCT as the central node in the international patent system, and to support the PCT system stakeholders, including Member States (including as receiving offices, international searching and preliminary examining authorities, and designated and elected offices), the user community, intergovernmental and non-governmental organizations. The Department's optimal functioning is paramount to the international patent system and to supporting and encouraging the many users of that system, as well as states considering accession to the PCT.

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For complete details on the vacancy and submission of application, please log on to <https://erecruit.wipo.int/public/>. Reference: Vacancy Numbers FT/15/D2/FT081 and FT082.

Applications from qualified women candidates are encouraged.

# Executive Focus



BANK FOR INTERNATIONAL SETTLEMENTS



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Mexico City

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This is your opportunity to apply your expertise on policy issues in Latin America to support central bank cooperation in the region. We offer competitive conditions of employment and the chance to work in an international environment alongside colleagues from more than 50 countries. We are fully committed to equal opportunity employment and strive for diversity among our staff. We encourage applications from female candidates.

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#### INSTITUTIONAL DEVELOPMENT

The design, follow-up and evaluation of national development strategies, and institutional performance management

#### STATISTICIANS

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Please send a detailed CV with a supporting letter, before 25 September 2015, to [recruitment\\_experts@mdps.gov.qa](mailto:recruitment_experts@mdps.gov.qa).

Clearly state in the subject line which position you are applying for. For more information, visit [www.mdps.gov.qa](http://www.mdps.gov.qa). Only short-listed candidates will be contacted.

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# Executive Focus



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**Secretariat-General, Brussels**  
COM/2015/2009

The Regulatory Scrutiny Board (RSB) is dedicated to supporting the European Commission's Better Regulation Policy by providing central quality control of impact assessments, ex-post evaluations and regulatory fitness checks. The RSB is composed of 6 members and a chair person.

To complete its team of six members, the European Commission is seeking to appoint three temporary agents for a non-renewable period of three years. The RSB members' main responsibilities will include quality assurance of draft impact assessment reports prepared by the Commission on existing policies and new political initiatives.

**Your responsibilities:**

- Assessment of the quality of Commission services' draft impact assessment reports and regulatory fitness checks;
- Contribution to the preparation of opinions and recommendations on impact assessment reports;
- Provision of advice to Commission services with regards to particularly challenging assessments/evaluations or on methodological issues.

**Your skills:**

- Proven expertise in regulatory policy, impact assessment or ex-post evaluation processes and methodologies, demonstrated by a solid academic record and publications;
- Specific expertise in the fields of Macroeconomics, Microeconomics, Social Policy, and/or Environment Policy;
- Strong analytical skills, very good capacity for strategic thinking and excellent communication skills.

The European Commission promotes equality of opportunity and welcomes applications from all suitably qualified persons.

Please consult the Official Journal C257A of 06/08/2015 for the detailed vacancy notice as well as the eligibility and selection criteria. Applicants should register online at: <https://ec.europa.eu/dgs/human-resources/seniormanagementvacancies/>

The closing date for registration is 28/09/2015, 12.00 noon Brussels time.



**The Institute of International Finance (IIF)** is one of the world's largest global associations of financial institutions with nearly 500 members in 75 countries. We provide economic and financial analysis to our members, serve as a forum for exchanging views and developing proposals on global regulatory issues; and represent our members from the private financial community in discussions with the public sector on global economic and financial policy issues.

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This position will be responsible for producing timely and insightful analysis of global trends and risks, and contributing to and overseeing the production of a wide range of IIF research reports on the global economy. Applicants should ideally have a PhD in International Economics and at least 5-7 years relevant professional experience in the financial sector or in an economic policymaking institution. A demonstrated capacity to innovate and exceptional organizational and managerial skills are also required. Strong English oral presentation and writing skills are essential, along with sound quantitative, spreadsheet and database abilities.

*For more information about the position, please visit* <https://www.iif.com/careers/chief-economist-global-macro>.

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*For more information about the position, please visit* <https://www.iif.com/careers/policy-advisor-regulatory-affairs>.

Cover letter, including specific salary requirements, and resume are required to apply. Applications should be sent to [personnel@iif.com](mailto:personnel@iif.com). Both positions will be located in Washington, DC.

For more information on the IIF, please refer to our website at [www.iif.com](http://www.iif.com).



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INVITES APPLICATIONS FOR THE POSITION OF  
**ASSISTANT DIRECTOR-GENERAL,**  
**ECONOMIC DEVELOPMENT DEPARTMENT (ES)**

*Deadline for Applications: 21 September 2015*

**RESPONSIBILITIES:** Assists and advises the Director-General on all subjects related to the Department's mandate (food and agriculture trade and markets, food systems, agricultural and rural development policies, food security, nutrition, social protection, gender issues and women's empowerment, equity, rural employment, rural organizations, statistics, governance and policy support); serves as the Organization's Chief Economist and Social Scientist; ensures timely and adequate collection, analysis and dissemination of information; exercises overall management responsibility for all Departmental activities; provides quality assurance, ensures delivery of results and formulates the Department's programme of work and budget proposals for the Director-General; coordinates planning and implementation of the Department's budget and human resources in line with the Organization's Strategic Framework, Results Framework and Programme of Work; participates in and supports implementation of the corporate resource mobilization strategy; coordinates Departmental inputs to FAO's Governing Bodies' sessions; serves as spokesperson for the Organization, as appropriate, at policy, technical and inter-agency meetings in the Department's and Organization's fields of activity.

**GENERAL REQUIREMENTS:** Advanced university degree in economics or related social sciences (PhD or equivalent preferred); at least 15 years of increasingly responsible professional experience in the economic and social analysis of development issues, including field experience; demonstrated intellectual and strategic leadership of relevant subject areas, and a proven publication record, including in peer-reviewed outlets; demonstrated mastery of results-based management approaches and of managing programmes; strong track record in managing, motivating, mentoring and communicating with staff in large, complex, cross-disciplinary, multicultural teams and stakeholders in an international setting; excellent communication and representational skills; working knowledge of English, French or Spanish, and at least limited knowledge of one of the other official languages of the Organization.

More complete information on the responsibilities and requirements of this position, remuneration and details on how to apply remuneration are available at: <http://www.fao.org/employment/current-vacancies/senior-level/en/>.

*Please note that all candidates should adhere to FAO values of Commitment to the Organization, Respect for all and Integrity and Transparency.*



**Catalysing Financial Inclusion in Nigeria**

**Chief Executive Officer**  
**Lagos, Nigeria**

Enhancing Financial Innovation & Access (EFInA) is seeking to appoint a visionary and committed Chief Executive Officer (CEO) who will be responsible for the leadership and strategic direction of the organisation. The CEO will provide full managerial oversight of the operational team and ensure that EFInA's work remains relevant and is of high quality. Since its inception in 2007, EFInA has provided thought leadership in financial inclusion in Nigeria. It has succeeded both in highlighting its critical importance to Nigeria's future and in demonstrating how it can be made a reality. EFInA's mission is to make the Nigerian financial system work better, especially for the low-income segment of the population. EFInA views financial inclusion as the provision of a broad range of high-quality financial products that are relevant, appropriate, accessible, and affordable for the entire population. EFInA is an authoritative source of pertinent financial inclusion data, a major contributor to policy development, including Nigeria's National Financial Inclusion Strategy, and an impact investor in innovation through its grants programme. EFInA is widely recognised by all key stakeholders as playing the essential catalyst role of an honest broker and neutral facilitator in the financial inclusion industry of Nigeria. Working closely with EFInA's Board, donors and key stakeholders in the public and private sectors, the CEO will ensure that EFInA remains at the leading edge of deepening financial inclusion in Nigeria. S/he will be responsible for the prudent management of its resources and the continuous development of a high-calibre team, committed to efficient delivery and a culture of excellence. Candidates for the role will be deeply committed to promoting financial inclusion in Nigeria, and able to deliver results in this complex and dynamic environment. S/he will combine deep knowledge and understanding of the Nigerian context with in-depth understanding of research and data analysis, and a track record of leading financial inclusion programmes. The CEO will bring strong relationship management experience with the ability to effectively engage with diverse stakeholders. This will be combined with demonstrated ability to lead, inspire, manage and build a high performing organisation. S/he will be a compelling articulator of EFInA's work to a range of external audiences and be willing and able to be hands-on in the management of its day-to-day activities.

EFInA has retained Russell Reynolds Associates to assist with this appointment. For further information on the position and additional details on qualifications, requirements, terms and conditions of service and how to apply, please visit: [www.rreresponses.com](http://www.rreresponses.com)

*Please do not contact EFInA directly. Previous applicants need not apply.*

*The closing date for applications is Monday, 14th September, 2015.*



## The art of the demagogue

NORWOOD, MASSACHUSETTS, AND WASHINGTON, DC

**The Republican Party regularly sees insurgents in its primaries. A self-funding one who seems capable of saying almost anything, though, is something new**

DONALD TRUMP is not going to be America's next president. The vagaries of the electoral college notwithstanding, the next occupant of the Oval Office will be someone who wins a lion's share of the 130m or so ballots cast in November next year. And though Mr Trump has spent weeks leading the field of Republicans with White House ambitions, no survey suggests that 60m Americans, or indeed anything like that number, are willing to vote for him.

The remarkable thing is not that Mr Trump is not going to be president, but that such a thing should even need saying. This spring it would have seemed self-evident. Mr Trump was then just a rich, oft-married businessman, reality-television star and controversialist. His name conjured up associations such as "arrogant" and "blowhard"—still the words that most readily spring to the minds of voters who are asked about him, according to a Quinnipiac University poll.

But since he announced in June, after months of speculation, that he was going to seek the Republican nomination, his fortunes have changed (see chart on next page). He has not only gained a lot of support—between a quarter and a third of Republican voters back him in recent polls—but he has also gained it from across the

party. It is not just Tea Party folk and whites without a college education who like him; so do a lot of evangelical Christians, who might be expected to look askance, and many self-described moderates. And even those who do not support him see him more favourably than they did. In Iowa, which has an early voice in the process by which a candidate is selected, the number of Republicans who would "never" back Mr Trump fell from 58% in May to 29% in August.

### Billionaire with a pitchfork

Outspoken populists often disrupt the early stages of the Republican Party's search for a candidate. In 1996 "Pitchfork Pat" Buchanan nearly won the Iowa caucuses and beat the eventual candidate, Bob Dole, in the New Hampshire primary. In 2012 a series of "anyone-but-Romney" candidates passed through the limelight. But such enthusiasms normally collapse as the party establishment imposes order and the insurgents reveal their flaws. Mr Trump has flaws aplenty, including a thin skin, short temper and a policy platform of bumper-sticker depth and subtlety.

This time, though, things look different. Mr Trump is not fighting a single establishment champion, like Mr Dole or Mitt Romney, but a slate of politicians vying for that

position. Because of loosened campaign-finance rules it will be much easier for deep-pocketed backers to keep chosen candidates afloat during this election season than it has been in the past, and this means that the field, which includes big-state governors, serving senators and the establishment's supposed favourite, Jeb Bush, a former governor of Florida and the brother and son of presidents, may be winnowed out only slowly. In the meantime the focus remains on the self-funded Mr Trump. And nothing he says, no matter how outrageous, seems to alienate the voters who see him as a champion.

Party grandes still hope that Mr Trump's campaign will eventually stall or flame out. But they are beginning to accept that they cannot stop him on their own. He remains a long-shot for the nomination, but it is striking that prominent conservatives in Washington no longer dismiss the idea of a Trump candidacy out of hand. And even if it does not come to that, the Trump insurgency has already reopened wounds that party leaders do not know how to heal. Grassroots Republicans and the politicians they elect may be united in their loathing for Barack Obama and the Democrats. But many rank-and-file Republicans do not share the pro-trade, free-market ideology that dominates the party's upper echelons and the ranks of those who routinely fund its operations. The grassroots also suspect that party leaders could have done much more to thwart Mr Obama, if they were not so cowardly or inept. Mr Trump did not invent those divisions, but he is exploiting them masterfully. And when he goes—if he goes—they will be wider than ever.

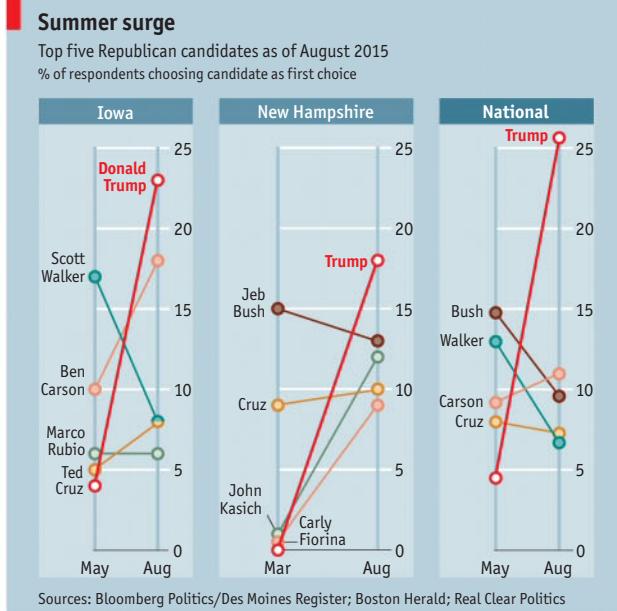
When the race for the Republican presidential nomination first got under way, conventional wisdom held that it would be a purity contest, with challengers facing grassroots wrath if they strayed from conservative orthodoxy. Until Mr Trump leapt into the fray those predictions were proving correct. The rest of the contenders sound like the chorus from a classical tragedy, offering the same account of the country's woes. The members of the chorus all lament that the American dream of upward mobility is fading; all blame Mr Obama, big-government Democrats and bossy Washington bureaucrats for smothering economic growth. The electorate's concern about immigration prompts loud rhetoric about the need to secure the border, but waffling about how best to fix a system so broken that 11m or so foreigners live in the shadows without legal status. The candidates waffle because they know that the rank-and-file conservatives who vote in their primaries are a long way to the right of the general population.

Mr Trump ignores the differing demands of the primary- and general-elec- ►

tion contests. When it comes to the border he outswaggers and outsnarls the chorus, not just calling for a wall but promising he will force Mexico to pay for it by "impounding" all remittances derived from "illegal wages" and, if needs be, cancelling visas for Mexican CEOs and diplomats. Unlike the chorus, though, he is equally forthright about what comes next. He would deport all 11m foreigners living in America without legal papers (though he would try to let the "really good" ones back in quickly), and would end automatic citizenship for children born on American soil to immigrants without legal papers. This plays well with activists incensed that Mr Obama has used his presidential powers to shield millions of migrants from deportation in what they see as a tyrannical assault on the rule of law. It will do nothing to improve the dismal 27% of the Hispanic vote won by the Republican candidate in 2012.

Often addressed to large crowds (his record to date, set in deeply conservative Alabama, has been put at 30,000), Mr Trump's swaggering, ad-libbed speeches describe an America beset by simple problems. If working Americans can no longer find jobs for life in a factory, it is not because emerging markets or robots offer unprecedented competition. It is because the country is being betrayed by chump-like politicians who let ruthless foreign governments roll over them. Mexico is accused of sending its worst criminals to America. China only undercuts America because it cheats. Who should sort such things out? Who but the author of "The Art of the Deal", the business book that he calls his second-favourite of all time. ("Do you know what my first is?" he asked fans in Michigan. "The Bible! Nothing beats the Bible!")

Mr Trump is not just throwing red meat to the right. He takes a karaoke-club approach to politics, belting out crowd-pleasing hits from across the political field. His attacks on corporate bosses seeking cheap foreign labour at the expense of unemployed Americans would not sound out of place in a rustbelt trade-union hall. He charges hedge-fund bosses with paying too little tax thanks to loopholes that he would scrap, increasing their tax bills to fund tax cuts for middle-earners. "I know hedge-fund guys, they are friends of mine, they pay no tax," he says. These positions probably explain why a poll by Bloomberg Politics and the *Des Moines Register*, a newspaper, found more Republicans in Iowa classing him as a moderate than as a conservative.



On health care Mr Trump promises to repeal Obamacare, just as the chorus does. But in a televised debate which, on August 6th, delivered Fox News the largest audience in its history, he went on to praise Canada and Scotland for their state-funded health systems—another conservative heresy. Not that he is advocating anything along those lines, or indeed anything specific at all; he just says that he will replace Obamacare with "something terrific".

Mr Trump shows no sign of caring whether he qualifies as a conservative. He is very clear, though, that he does not want to be thought of as a politician. He says that big businesses and their lobbyists bend both parties to their will through corrupting donations. Those hedge-fund friends who pay no tax, he says, "are all supporting Jeb Bush and Hillary Clinton". Why should he care, though? He does not need their money. In a deft touch, Mr Trump forgoes promises to reform Washington or clean up the corridors of power. Instead he tells the cynical, angry voters that because he is "really rich" he cannot be bought. In interviews with Trump supporters, this insider-outsider status is one of his strongest selling-points. It makes him a man who can both look the hated elites in the eye and kick them in the crotch.

#### Experience not required

Mr Trump is less interested in the size of government—which the chorus always deplores—than in who runs it: "stupid" politicians who "talk the big game" until they reach Washington. There, in his oddly sexualised telling, politicians are rendered "impotent" by their excitement of wandering the gilded, high-ceilinged halls of power. In a telephone interview with *The Economist* (see box on next page) he mimics an awestruck elected official calling his wife

from the capital and simpering: "Darling, I've arrived."

It is a scorn his supporters share. Two-thirds of Republicans in Iowa told a recent Monmouth University poll that the country needs an outsider president, rather than someone with government experience. Add Mr Trump's support to that of the two other contestants in the Republican field who have not held office, Ben Carson, a retired neurosurgeon, and Carly Fiorina, a former boss of Hewlett-Packard, a technology firm (see Lexington, page 46), and they account for more than 50% of the voters likely to make a choice in Iowa and New Hampshire.

As befits an anti-politician, Mr Trump has poured particular scorn on Mr Bush. On August 31st his campaign released a video showing mugshots of Hispanic

migrants accused of murder over a recording of Mr Bush saying that some migrants entered America illegally in an "act of love" for their families. "Forget love. It's time to get tough," the ad concluded.

Mr Bush has begun to mount a counter-attack, pounding Mr Trump as a closet liberal whose plans would increase the power of Washington. The tactic rests on a belief that the dominant force in modern American politics is intense partisanship, and that undermining Mr Trump's credentials as a Republican is thus a lethal blow.

In the past generation, the number of Americans who call themselves consistently conservative or consistently liberal has doubled. Ideology and identity have coalesced, so that partisans do not just think alike about taxes or Iran, but live in the same neighbourhoods and have like-minded friends. Partisanship may yet curb Mr Trump's rise.

An awareness of this may be why Mr Trump's tactics are becoming more conventional, and more conventionally right-wing. His campaign has started touching on themes from the late 1960s, another era of bitter politics and widespread disenchantment in Middle America. The businessman points to rising murder rates in some large cities as proof that a recent focus on police killings and abusive arrests has left officers "afraid to talk to anybody". Most police are "phenomenal people" and law and order is suffering, says Mr Trump, calling some cities "powder kegs ready to explode". He has begun using the phrase "silent majority" to describe his supporters, four decades after Richard Nixon started using it to rally conservatives.

Mr Buchanan, who as one of Nixon's speechwriters coined that phrase, hails Mr Trump for tapping into a mood of renewed nationalism. "The country is on fire," he ➤

▶ says. His main advice to Mr Trump is to rule out an independent or third-party candidacy if he fails to secure the Republican nomination—something which Mr Trump refused to do when pressed during the Fox News debate. Mr Buchanan warns that a third-party run instantly loses the support of those whose chief concern is stopping the Democrats. “If I were counselling Trump I’d tell him to stay inside the Republican Party,” he says. “It’s the only avenue that he has to the presidency of the United States.” As *The Economist* went to press it seemed possible that Mr Trump was about to make a statement on his intentions.

But appeals to partisan purity may be surprisingly ineffective in peeling away those who admire Mr Trump. His fan-base is characterised not by the fidelity of its conservatism, but by the ferocity of its rage. Frank Luntz, a Republican pollster, says he was shaken by a focus group he held on August 24th for two dozen self-declared Trump supporters. They included folk on the hard right but also ex-Obama voters. Unemployed Americans rubbed shoulders with the affluent. But the group had three things in common, says Mr Luntz. They are “mad as hell” about the state of America. Mr Trump speaks their language. And they do not care what anyone else says about him.

#### The mad prophet of the airwaves

On August 28th Mr Trump visited the Boston suburb of Norwood for a rally at the home of Ernie Boch, a wealthy car dealer. It was not an obvious stop for a Republican in primary season; Massachusetts last voted for a Republican presidential candidate when Ronald Reagan was in the White House. Several in the throng said that they rarely vote Republican. But they roared at Mr Trump’s jokes, cheered as he condemned Mr Obama’s recent deal to curb Iran’s nuclear ambitions and applauded his grumbling about America’s “third world” airports and crumbling roads. Sharon Gannon, an estate agent and Democratic voter, enthused that “He says all the things we’re all thinking.” Doug Obey, a financial adviser, relished the fact that other Republicans and the media “don’t know how to handle him”.

If Republican leaders do not know how to stop Mr Trump it is partly their own fault. Theirs is a smaller-government, pro-business party that wins elections by posing as an anti-government insurgency. Now they are facing the consequences: millions of voters dazzled by a showman who presents the next election as a hostile takeover, offering to turn America around with his dealmaking brilliance as if Congress, the Supreme Court and limits to presidential power are mere details to be negotiated. The Trump fantasy will fade at some point. It has already revealed a democracy in real trouble. ■

#### Foreign policy

## Time to strike fear

#### Talking to *The Economist*, Donald Trump promises not to be nice

THE 2016 election is going to be about competence, not a test of “niceness”, Donald Trump growls down the telephone. Judging by his vision of America’s place in the world, he means what he says. Mr Trump’s lead in the contest for the Republican nomination is due in large part to the rage felt by his supporters and he is sure that foreign governments, both hostile and friendly, are the things which have stoked that rage. The America that he described in a recent interview with *The Economist* is not a country doomed to decline, but a superpower betrayed by inept leadership. His America would be feared as a top dog again. It might not be much loved.

Mr Trump sounds ready to start a trade war to get his way. He believes that millions of Americans are “tired of being ripped off by every single country that does business with us.” In his telling, China uses its currency as a “weapon”, using exchange rates to steal American jobs, while erecting “ridiculous” barriers to American imports. “They are killing us,” says the property magnate. While China-bashing is a staple of presidential elections Mr Trump stands out for his readiness to threaten retaliatory tariffs on Chinese goods: a 12% tax should make them “stop playing games,” he says.

“By the way I love China,” he adds. Chinese tenants fill some of his grandest properties. He loves Japan too, and Mexico—even though he wants a wall built on the southern border of the United States to keep bad people out. But foreigners do not respect America’s current leaders, who are “grossly incompetent” and do not understand their country’s “tremendous” strength. President Trump would

ask deal makers such as Carl Icahn, an activist investor, to help him in trade talks.

Shooting wars appeal less. Asked about China building runways on re-claimed land in the South China Sea, he calls it a hostile move. “However, it is very far away, and we have a lot of problems, OK? And they are already built.” A President Trump would demand much more from wealthy allies who expect American protection. He cites Japan, South Korea and “all of these European countries” that want help with Russia. Asked what would happen if allies ignored his call to step up, he scoffs: “If we step back they will protect themselves very well.” Japan used to “routinely” win wars with China, he adds.

Mr Trump opposed the invasion of Iraq in 2003, calling it a “destabilising” move. But he would send ground troops to at least one place in the Middle East: the oilfields controlled by the so-called Islamic State, which he would grab, intending to use some of the proceeds to care for American casualties of a decade of war, as well as their families. “I would have American forces guarding that oil...nobody is going to take it back.”

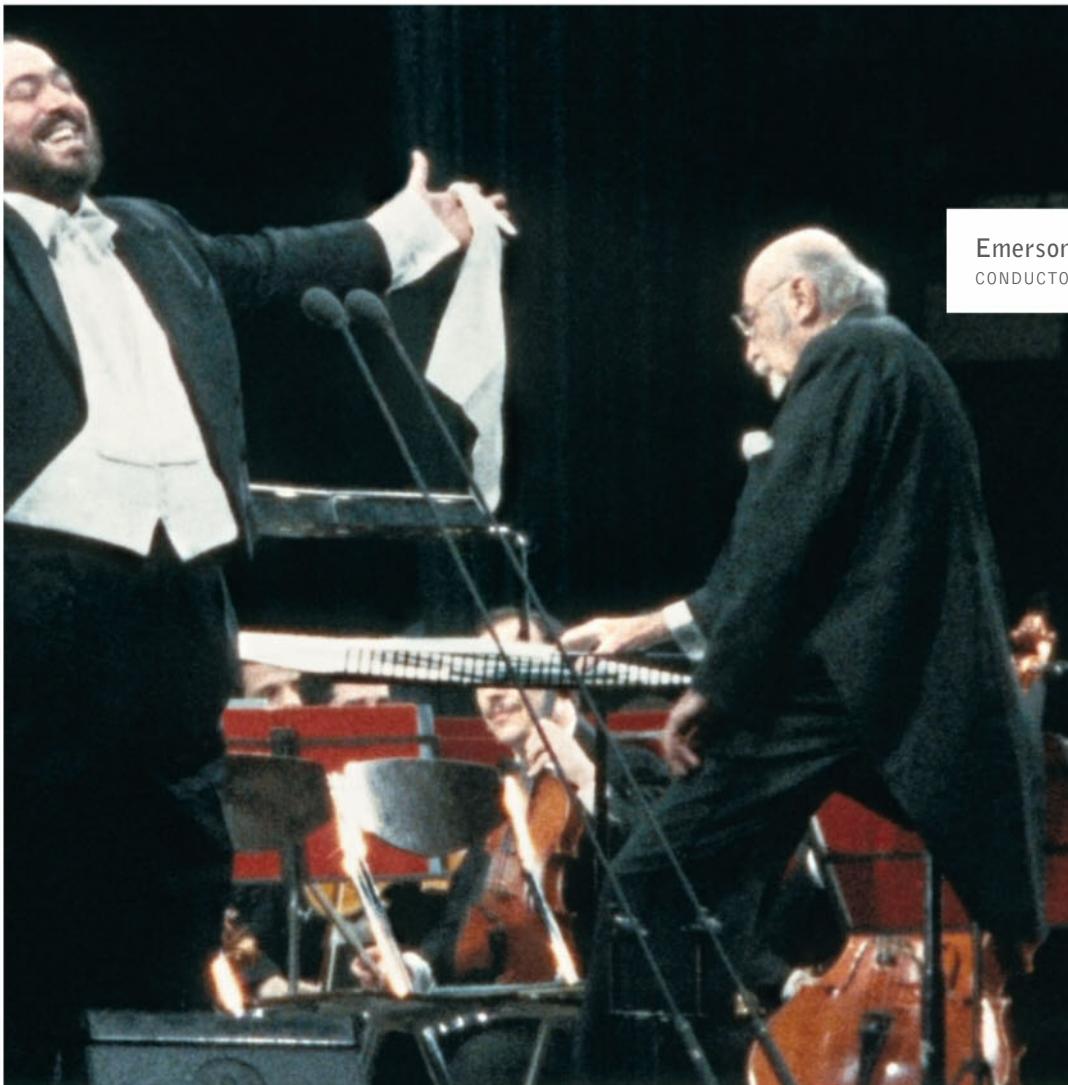
Though he likes dealmaking as an idea, he calls the deal President Barack Obama made to curb Iran’s nuclear ambitions “so stupid”. He would have “tripled up” sanctions and done a better one. “I am the most militaristic person,” he vows. His “ultimate goal” is armed forces so strong that nobody challenges them. Time for nation-building at home, he says.

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Full interview at <http://economist.com/trumpinterview>



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### Older workers

## March of the greybeards

STOKE-ON-TRENT

### Britain's workforce is ageing. To make the most of it, companies will need to adapt

FOR 26 years Ann White, a poised 58-year-old, worked in the glazing department of Steelite International, a pottery firm. It was a repetitive, mundane job; the kind where you “hung your brain on a nail”, she says. Retirement may have seemed fairly attractive. No longer. Over the past five years Ms White has taken part in further training at work, gaining qualifications in maths, English and IT. She now manages the 11 cleaners who clear up the factory site, and would like to carry on working and learning for a while yet. “It’s been life-changing,” she says.

Britain’s workforce is greying. Between 1995 and 2015 the number of working people aged over 65 more than doubled, to over 1m. During the same period the number of workers aged 50-64 increased by 60%, to 8m. During the recent recession, while employment rates for youngsters fell, the number of silver-haired workers soared (see chart). By 2020 one-third of the workforce will be over 50.

One reason is simply that people are living longer: those aged 60 today can expect to live nine years longer than those a century ago. Government policy has also kept more people in work. Since 2006 it has been possible to work while still drawing a state pension. The retirement age is due to rise to 66 by 2020 and to 67 by 2028. And poor annuity rates, coupled with a shift from defined-benefit pensions—where retirement income is linked to an employer’s final salary and years of membership—to

less generous defined-contribution schemes, which depend on the amount paid in, has kept many toiling away.

Increasingly, however, companies are courting the over-50s. Some, such as Steelite International, are retraining their ageing employees. Others are hiring older unemployed people. On August 31st Barclays, a bank, launched a “Bolder Apprentices” scheme for older workers; more than half its first cohort of 43 apprentices are over 40, with several in their 50s.

### When I'm 64

At the New Malden branch of B&Q, a large DIY store, 76-year-old Bill Macpherson works in the gardening department three days a week alongside Havva Halil, a 64-year-old former florist who works full-time. Some of their work is physically demanding, particularly around Christmas time, when large fir trees need to be lugged around. But working “keeps us young,” beams Ms Halil. B&Q has long been keen on older workers: it scrapped its retirement age in the 1990s. In 1989 its Macclesfield store was staffed by people over 50 for six months; during the experiment profits increased by 18%, while the turnover of employees was one-sixth of its usual levels.

Companies who employ older workers praise their reliability, loyalty and their “soft skills” in customer service. Some point out that as the population ages, so too do their clients. When taking out a mortgage or reporting fraud, for example,

### Also in this section

- 30 David Cameron's Euro-wobble
- 30 Music and journalism
- 31 Nuclear weapons
- 31 Commercial property's boomlet
- 32 The bicycle business
- 34 Asian women and work
- 34 The teacher shortage
- 36 Bagehot: The land that Labour forgot

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bank customers may prefer not to be served by a teenager with little experience of either. “Older customers want to be able to talk to people who look like them,” says Mike Thompson of Barclays. Small businesses and sectors such as health care and retail are particularly keen on employing older folk.

Various studies suggest that older workers can be just as productive as their younger colleagues. Although memory, attention and mental agility fade with age, older workers compensate for this with experience and better judgment. A 2013 study of a Mercedes-Benz truck-assembly plant in Germany found that although older workers were found to make slightly more mistakes than younger ones, their errors were less severe.

Older people still face barriers to employment. In 2013 almost half of unemployed over-50s had been looking for a job for a year, compared with one-third of 18-24 year olds. Discrimination may be one reason: some job-seekers report getting better responses after restyling their tell-tale O-level qualifications, which were phased out in 1988, as newfangled GCSEs. Companies may fear that grey workers ►



► will block the progress of bright young things, or that they will prove expensive and reluctant to retire. Academics at Oxford and Cambridge are often required to retire in order to allow younger dons to advance, says Stephen McNair, a former head of the Centre for Research into the Older Workforce.

But there is not a set number of jobs in the economy: older workers spend cash and increase demand, thereby creating more employment. Nor are oldsters necessarily pricey: the Institute for Fiscal Studies, a think-tank, reports that those in their 60s earn less per hour than those in their 50s, at high and low income levels alike. (Over the recession, older workers saw their earnings return to pre-crisis levels more quickly than youngsters, however.)

Those firms not already courting older workers will have to raise their game. By one estimate, if those in their 50s and 60s are not encouraged to stay in work longer, there could be 1m unfilled jobs in two decades' time. Companies prepared to offer flexible hours and retraining will be best placed to take advantage of the untapped resource that older workers represent. Getting ahead will mean going grey. ■

#### Britain and Europe

## Le wobble

#### The prime minister's European strategy suffers a series of blows

**T**O GRASP the trick David Cameron is trying to pull off by renegotiating Britain's membership of the EU and winning an in-out referendum, imagine him edging along a mountain path, a wall of rock on one side and a long drop on the other. As Westminster returns from its recess, that path—the scope for a deal that mollifies the Conservative party's Eurosceptics, satisfies voters and is palatable to Britain's European allies—is narrowing.

The prime minister has been touring Europe over the summer, buttering up fellow leaders ahead of a summit in December at which he plans to present his requests. Yet this experience has forced him to curb them. On August 31st it transpired that he had given up demanding British opt-outs from EU employment regulations (concessions Brussels and Paris are unwilling to grant). Then Werner Faymann, Austria's chancellor, warned that Britain should take in more refugees if it wanted a hearing for its "catalogue of demands". His comments were echoed in Berlin.

Mr Cameron also faced tribulations at home. On September 1st the Electoral Commission decreed that the planned

#### Music and journalism

## Public NME

#### As more music is given away, music journalism follows suit

**N**ME reading about music was as important as listening to it: back in the 1960s, the New Musical Express sold 300,000 copies a week. These days, NME sells around 15,000. From September 18th, in a bid to boost its circulation, the title will be given away free of charge.

At its peak, music journalism flourished on the back of a thriving underground scene in pubs and clubs. Young, enthusiastic journalists wrote about punk bands alongside subjects like Campaign for Nuclear Disarmament marches. But as broadsheet newspapers began to take pop music more seriously, devoting large sections and good reviewers to the task, it became harder for specialist magazines to attract readers.

With the rise of the internet, this became even trickier. Instead of turning to music magazines, youngsters today are more likely to follow new bands recommended by bloggers, particularly on video-streaming sites. Gig listings are available online or from the bands' own PR machines. The feeling of belonging to a club is now far more effectively provided by social media.

Going free is tempting: an expanded print-run will make more money from ads. NME might attract advertisers hoping to reach 15- to 25-year-old men, an elusive bunch who avoid adverts online.

But free music magazines have a grim record: *Stool Pigeon* and *the Fly* went free for a short time, only to collapse in 2013 and 2014. Successful free papers, like *Metro*, tend to have a general readership and be handed out only in big cities, keeping readership up and distribution

question for the referendum was unfair. The prime minister accepted its recommendation to change the options on ballots from "yes" and "no" to "remain" and "leave". The next day he also had to reverse his plan to put the machinery of government at the service of the In campaign.

Meanwhile, the Eurosceptics are rallying. Both Theresa May and Boris Johnson—whose chances of succeeding Mr Cameron have been damaged by the rise of George Osborne, the chancellor of the exchequer—have issued digs: the home secretary calling for immigration rules to be tightened and London's mayor (an immense asset for the Out campaign, if he decides to back it) calling the retreat on employment rules "very disappointing".

In a fillip to the Out campaign, Nigel Farage, the polarising head of the UK Independence Party, announced that he would not seek to lead it. Eurosceptic Tory MPs have started throwing their weight about, too, demanding that ministers should be allowed to campaign for the anti-EU side and preparing to hijack the party's annual conference in October with criticisms of Mr Cameron's renegotiation tactics.

Others, such as London's *Evening Standard* and *City AM*, benefit from rich readers (prised away from their smartphones for a few minutes on the Underground). NME could be given out at gigs—but these move, making them expensive to cater to.

NME's readers are nostalgists who profess to dislike the spread of free information that threatens the music industry. They may feel equally miffed about the free distribution of the magazine, which will have to broaden the range of bands it covers. The strategy will gain NME more readers, at least for now. That in itself may annoy diehard fans, for whom exclusivity was always part of its appeal.



William, it costs really nothing

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The prime minister's post-election honeymoon, then, is over. His room for negotiation in Europe is shrinking as the migrant crisis becomes more acute. And the expectations of his MPs are rising. All is not yet lost—infighting plagues the Out campaign and pro-EU groups will unveil their new, consolidated organisation later this month. But the past weeks have undoubtedly nudged Mr Cameron closer to the precipice: an Out vote that would greatly diminish Britain and wreck his legacy. ■

## Nuclear weapons

## A political torpedo

EDINBURGH

The chancellor launches a well-timed announcement at two political foes

**M**INISTERS announcing lavish spending schemes promising lots of jobs do not expect to get booed. But the few cheers that greeted George Osborne's pledge, on the banks of the Clyde on August 31st, to spend £500m (\$765m) creating "thousands" of jobs were drowned out by jeers. Why? Because the chancellor plans to spend the money on upgrading the Faslane naval base, where submarines carrying Britain's Trident nuclear deterrent are based. Many Scots, including Nicola Sturgeon, Scotland's nationalist first minister, want the boats scrapped, not replaced, as they will be on current plans.

Ms Sturgeon accuses Mr Osborne of arrogantly pre-empting a vote by MPs, expected next year, on whether to spend about £23 billion to buy the next generation of ballistic-missile submarines (she puts the cost at £100 billion). The £500m would be better spent on "reversing some of his cruel attacks on the most vulnerable", she fumed, referring to cuts in welfare spending announced in July.

Even the Scottish Trades Union Congress (STUC), which might be expected to welcome job creation, though it too wants to see the back of Trident, was unimpressed. "Any impact on jobs from the announcement this week is likely to be mi-

nor," scoffs Stephen Boyd, the STUC's assistant secretary.

Mr Boyd has a point. The money, to build lifts that can hoist submarines out of the water, and to construct sea walls and jetties, is to be spent over ten years, suggesting there may be no more than a few hundred extra jobs in any one year. Mr Osborne said that the military and civilian workforce at the Clyde base, now about 6,800 people and Scotland's biggest industrial site, was already expected to rise to 8,200 by 2022.

That, however, has little to do with replacing the Trident boats (the first is not due to come into service until 2028). It is mostly because defence ministers are planning to base the growing non-Trident submarine fleet, currently six conventionally armed nuclear-powered boats, at Faslane. Submarine activity at Plymouth Devonport will end by 2020, requiring more people and bigger facilities in Scotland (the new Astute-class subs are 40% larger than those being replaced).

Nevertheless, anti-Trident politicians rushed to assume that the £500m investment was all about the nuclear deterrent. Mr Osborne happily hit back that "an unholy alliance of Labour's left-wing insurgents and the Scottish nationalists" was

threatening Britain's security. That not only revives the Conservatives' successful election strategy of depicting Labour as being in hock to the nationalists, but also plays on divisions between the candidates in Labour's leadership election on September 12th. Three of the four candidates want to keep the deterrent; the front-runner, Jeremy Corbyn, wants to scrap it.

Mr Osborne also neatly directs a torpedo at Ms Sturgeon, who faces elections next May and will now have to deal with questions from Scots more interested in defence and jobs than disarmament. But he should not get too clever. Trident-related jobs make up only a small proportion of employment at the Clyde base. Campaigners dragged out the fact that of 3,200 civilian workers at Faslane in 2012, only 520 relied on Trident. ■

## Commercial property

## Shop 'til you drop

As wary banks pull back, foreign investors go on a shopping spree

AFTER the banking bust of 2008, lenders sharply tightened the taps on credit. Loans eventually began to flow again, helping the economy to limp back to its pre-recession size by 2013. But even as they resumed lending to consumers and businesses, British banks remained wary of one sector. Commercial property—shops, offices, warehouses and the like—is still suffering from a debt hangover that has now lasted more than half a decade.

The banks' caution is understandable. Whereas the 2008 meltdown was triggered by catastrophic losses on American mortgage lending, in Britain the house-price bust was comparatively tame; instead, it was losses on loans used to buy commercial property that sank the banks. Excessive lending to speculative property investors inflated prices by 33% in real terms between January 2004 and the peak in July 2007, while rents rose by only 3% (see chart). When the bubble popped, prices fell by nearly half.

Burned, the banks stepped back. Royal Bank of Scotland and Lloyds TSB sold off their rotten loans and commercial-property lending shrank. Outstanding bank-loans to property firms (such as developers and landlords) now total £135 billion (\$207 billion), little more than half their value in mid-2009. By contrast, residential mortgage lending has grown by 7% over the same period. Unlike house prices, which in real terms are not far off their pre-recession high, commercial property prices remain 37% below their 2007 peak. ■



Into hot water



Yet investors are cheery because prices are bouncing back, rising by 21% since their trough in 2013. With banks still reluctant to lend, foreign money has spurred the recent momentum, says Mat Oakley of Savills, an estate agent. At first the overseas investors were most interested in London, long considered an investment haven. Their purchases have driven up prices, pushing down rental yields (the annual rent on a property, divided by its price) to historic lows in some parts of the capital. Office space in London's West End (near where *The Economist* is selling its own building) now costs almost as much in real terms as in 2007 and yields just 3%. Today foreign investors are looking beyond the capital, too. Offices in the Midlands and Wales, for instance, cost 21% more than two years ago.

While some types of commercial property recover, others still look frail. Outside central London, shops are cheap because investors worry about the impact of e-commerce on high streets. Retail property in Yorkshire, for instance, has appreciated



A thrilling investment

by just 1% in real terms in the past two years. Warehouses, on the other hand, are performing well, because the likes of Amazon need distribution centres. Uneven returns, both geographically and sectorally, make the nascent recovery look very different to the pre-crisis boom, when different types of property appreciated more or less in tandem, says Peter Hobbs of MSCI, a financial-research firm.

Nonetheless, the Bank of England is monitoring the market closely for signs of another bubble. Last year's stress test of the banking system included a simulated 30% fall in commercial-property prices. All but one bank passed the test. If there were another crash much of the pain would instead be borne by the foreign buyers who have recently been piling in. Once interest rates rise, low yields may tempt investors to put their money elsewhere. The shopping spree may be coming to an end. ■

### Bicycle-making

## Wheels with soul

**Britain's bikemakers have retreated to a niche, but are making the most of it**

THE most enduring gag of the BBC's self-lampooning show, "W1A", involves the corporation's fumbling "head of values" grappling with his folding Brompton bike as he arrives at Broadcasting House. Such is the way in which everyday artefacts are transformed into icons of popular culture.

Naturally, there is no fumbling down at the Brompton factory in Brentford, in west London. Lorne Vary, the chief financial officer of the bicycle-maker, shows how he can flip open the bike to make it ready to use in seven seconds flat. A growing army of enthusiasts see the virtues of a Brompton. The company is likely to sell a record 48,000 bikes this year and will soon move to a new factory, doubling its floor space. Turnover, at about £30m (\$46m), has been growing by 16% year-on-year, says Mr Vary. Brompton hopes to double sales by 2021.

Brompton is already the country's largest bike manufacturer, yet the company did not make them on a large scale until the early 2000s. Its rise happened against a backdrop of the almost complete collapse of Britain's bicycle industry, once a world leader. Raleigh, the most famous volume bike-maker, based in Nottingham, had moved all its production to low-cost Asia by 2002. Now the vast majority of the 3.25m bikes sold in Britain annually are made abroad.

Brompton has bucked this trend by carving out a niche as a producer of high-end, handmade folding bikes with global

appeal. The bikes are pricey, but every steel frame is fitted together using brazing rather than welding. The company makes much of its "Made in London tag", as British craftsmanship is still valued overseas. About 80% of its bikes go abroad now, where Koreans, Japanese and others cherish them as fashion accessories as much as modes of transport.

All these countries suffer from clogged roads, too, making them good homes for the car-dodging Brompton. The domestic market should remain buoyant: one research firm has just declared London the most congested city in Europe.

Britain's few other remaining bike-makers have survived using similar tactics. Pashley, based in Stratford-upon-Avon, has been making classic bikes, often seen in advertisements, since 1926. The company suffered a grave blow when the Royal Mail started phasing out its large fleet of Pashley bikes in 2010. It now sells about 10,000 units a year.

The brand is all about old-world heritage. Adrian Williams, Pashley's boss, describes his products as "beautiful and useful". Like Brompton, the firm is export-focused, selling to over 50 countries, mainly in Asia. Moulton, another brand, also sells well in the Far East.

However hard they pedal, these companies will struggle to make significant inroads into the British market. More Britons cycle than ever, partly encouraged by recent successes at the Olympics and in the Tour de France. Some British firms make components, a business that Mr Williams is getting into and where he expects to do well. But with costs in Asia still considerably lower, the vast majority of Britain's bikes will continue to be made abroad. ■



Any colour as long as it's not black

# COMMISSION: IMPOSSIBLE

THE AIRPORTS COMMISSION RECOMMENDED HEATHROW FOR EXPANSION. BUT OVER A MONTH AFTER ITS PUBLICATION, THEIR REPORT IS UNRAVELLING FAST.

- BA called Heathrow "a vanity project" and said it won't contribute to the £18.6 billion price tag.
- TfL highlighted that a third runway will reduce domestic flights to 4 routes from 7 routes today.
- A condition of its expansion is "acceptable" air quality, but the air around Heathrow already breaches EU limits.
- Heathrow seem unwilling to accept the measures proposed by the Report around limiting noise and pollution, as well as the conditions ruling out a future fourth runway.



MEANWHILE, GATWICK'S EXPANSION REMAINS THE BEST OPTION FOR THE UK.

- Expanding Gatwick would cost half as much as expanding Heathrow, and would also require no public funding.
- A second runway would connect Britain to as many international destinations as Heathrow. Gatwick also projects it will connect with 15 UK airports, compared to 11 today.
- Gatwick will stay well within EU air quality limits, even after expansion.
- A second runway at Gatwick would result in far fewer people being affected by noise than at Heathrow.

**Britain needs a solution to the air capacity crisis.**

**Let's go for one we can deliver.**

## Ethnic minorities

## The XX-factor

Pakistani and Bangladeshi Britons are flourishing. The reason? Women

**I**F BRITONS suffered after the 2008 financial crash, ethnic minorities suffered most. Their earnings slipped further and their household incomes fell faster than those of whites. For two groups, however—Pakistani and Bangladeshi Britons—things got better. Household incomes went up and earnings increased (see chart), while Bangladeshi children have most improved their circumstances. Both groups have long lagged behind other Britons. Why are they catching up now?

The answer is that women from these communities have entered the workforce, and they have done so in droves. Until recently, Pakistanis and Bangladeshis had the smallest proportion of women in work: just 31% of Pakistani women and 21% of Bangladeshi women were involved in the labour market between 2001 and 2005, in contrast to 77% of white British women. Since 2008 the proportion of Bangladeshi women in work has jumped by 13 percentage points (even as the number of working Bangladeshi men has fallen), and the proportion of Pakistani women has risen by almost five percentage points. This has happened even as the share of black women in work has gone down.

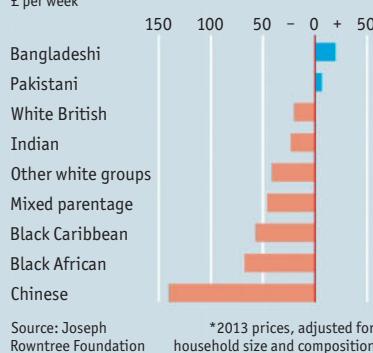
This is partly a story of delayed integration. Having arrived in Britain in the 1960s and 1970s, mostly from rural communities, Asian Muslims are belatedly shaking off traditions that kept women at home. Other groups settled in faster: Indian Sikhs, who reached Britain's shores at roughly the same time and from similar backgrounds, quickly leapt ahead of them on nearly every measure.

Pakistanis' and Bangladeshis' recent

## Minority report

Income from employment\*  
Britain, change 2010 to 2013, years ending March

£ per week



gains mark the end of a long wait for the British-born generation to grow up. Women of working age are, at last, well-educated—especially Bangladeshis who, clustered in London where schools have improved most, now do better than their white equivalents. There have been knock-on effects: with daughters at school and at university, “housewives start thinking about brushing up their English”, says Amina Chowdhury, who manages Birmingham’s Bangladesh Women’s Association. Improvements in Bangladesh have contributed: thanks partly to a government birth-control programme, female migrants are more highly qualified than they used to be.

The strong social ties that have sometimes held Pakistani and Bangladeshi women back may also be a hidden strength. If community bonds are weak, immigrants are vulnerable to the bumps and bruises involved in settling in, which can set them back, believes David Goodhart of Demos, a think-tank. Afro-Caribbeans, who came to Britain eager to integrate, have settled somewhere at the bottom of working-class culture, he says. Asian Muslims’ stronger community ties can be stifling—but the latest evidence suggests they also provide a cushion. ■



The writing on the wall

## Teacher recruitment

## School's out

Pupils return to class—only to find that the teachers haven't turned up

**A**S CHILDREN around the country returned to school this week, some will have discovered for themselves what recent statistics had suggested: there are not enough teachers to teach them. Figures published on August 17th by the Universities and Colleges Admissions Service, which handles applications to teacher training courses, showed that the number of graduates applying to be teachers will fall short of government targets for the third year running.

Last year one in 100 teaching posts in England was vacant or filled temporarily, after the number of people beginning teacher training courses fell for the sixth consecutive year, to 32,000, down from 39,000 in 2009. This year’s figures suggest that in some subjects the shortages are particularly acute: according to an analysis by John Howson, a former government adviser, the number of people applying to train as English and maths teachers in 2015 fell 11% short of the government’s target, while those applying to teach some niche subjects were in more limited supply still (less than half as many applied to teach design and technology as targets required).

Existing teachers hardly make an appealing pitch to join the profession. One in three is looking to leave teaching within five years, according to a survey by the Teacher Support Network, a charity for stressed-out schoolmasters. A heavy workload and “unreasonable demands from managers” are their main complaints. The early retirement of older, experienced teachers has left some classrooms run by staff not much older than their charges: 42% of all teachers in England are under 35.

Mr Howson says that the squeeze on public sector pay, and the drying up of public funding for the £9,000 (\$14,000) teacher training courses, are to blame. The growing school-age population has worsened the crisis, increasing demand for teachers just as supply is falling.

Solutions are scarce. Visas for foreign teachers are difficult to obtain. Teachers’ pay, already average by rich-world standards, is unlikely to rise. Mr Howson says the government could increase what it spends on advertising campaigns, at least to match that of the defence ministry (there are more trainee teachers in England each year than there are sailors in the Royal Navy, he notes). Unless more recruits apply, rates of absence will rise—and not among pupils.

# We're all thinking it, they're saying it



**Gogglebox**  
**Returns Fridays 9pm**

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# Bagehot | The land that Labour forgot

**Jeremy Corbyn's supporters misread the sceptical, consumerist country they aspire to govern**



**S**QUINT, and the People's History Museum in Manchester could be a church. Vast trade-union banners rich with symbols—masonic eyes, spanners, linked hands—hang like ecclesiastical tapestries from the walls and ceilings. Bibelots nestle in their showcases like saints' bones in their reliquaries: a handkerchief commemorating the Peterloo massacre, an Edwardian membership certificate for the old dyers' union (motto: "We dye to live"), a docker's hook belonging to a protagonist of the London port strike of 1972. The galleries echo to sermons by tribunes of the left: Nye Bevan hailing universal health care, Ernest Jones urging the crowds in Manchester to reject the "gospel of the rich". The light is low—the better to preserve the treasures of this, Britain's only museum to the struggles of the common folk.

Like many churches, the museum is also near-empty of a Sunday. Bagehot shared it with perhaps a dozen other visitors. Outside, central Manchester teemed with life. Drinkers spilled out of pubs and bars. The Arndale Centre writhed with shoppers. Canal Street, in the gay village, fizzed with the music and colour of Pride weekend. Out in the suburbs Muzak and the babble of middle-aged couples replaced the thud, whirr and hiss of the Industrial Revolution in factories now serving as furniture showrooms. In Shaw, where the last mill shut in 1989, trams from Manchester disgorged families clutching shopping bags.

This is not to disparage the museum, which is magnificent. But it is to make an observation relevant to today's Labour Party, whose archives it houses and which finds itself in the final throes of a leadership contest. A blackboard in one of the galleries provides an accurate snapshot of the race. Below an invitation to chalk up their opinions of the four candidates, visitors gush about Jeremy Corbyn (a bearded MP on the party's hard left, now storming ahead): "Back to OLD LABOUR principles—yes please," writes one. Of Liz Kendall, the most centrist, a visitor opines in colourful letters: "New Labour apologist". Another merely scrawls "h/8" (hate).

So it is in Labour at large. Exuding the romanticism of the sort of old socialist causes—nationalisation, unilateral nuclear disarmament, the hyperactive state direction of industry and public services—documented on the walls of the People's History Museum, Mr Corbyn has attracted tens of thousands of idealistic new

members and registered supporters to the party. It seems likely that their support will propel him across the finishing line on September 12th.

His electoral prospects thereafter? A clue is in the museum's name. The sort of great ideological clashes that burn on in the mind of Mr Corbyn are indeed history. Britons today do not, on the whole, spend their weekends marching behind banners, just as they tend not to join trade unions, go to church or—notwithstanding his popularity among a corybantic minority—support political movements. According to Geert Hofstede, a Dutch psychologist who has devised a means of quantifying such things, Britain is the most individualistic country in Europe; a place of "rampant consumerism" where "the route to happiness is through personal fulfilment" rather than collective endeavour. Polling by Ipsos MORI supports his claim, showing that each successive generation is more sceptical of organised religion, the welfare state and government in general.

With the notable exceptions of their sports, pets and royals, Britons tend to spurn great displays of sincerity, too: from politics to popular television, Britain's public life is striking for its sardonicism. This is not to say that it is a reactionary country. But recent decades suggest that the Conservatives are mostly best at harnessing this aversion, one eyebrow near-permanently raised, to pharaonic political visions. David Cameron is already stressing the contrast between his pragmatism and the ideological purism of Mr Corbyn and his supporters. On September 2nd, for example, he launched a new wave of self-governing "free schools" (loathed by Labour's statist left).

## We don't all want to change the world

It does not have to be thus. Under Tony Blair, Labour came to terms with the country it wanted to govern, with its white-bread preference for garden centres and loft conversions over dialectical materialism. Recognising that voters had—in the words of one Blairite—"outgrown crude collectivism and left it in the supermarket car-park", it did not fall into the traps of the old left: confusing individualism for misanthropy; a rally of frenzied lefties for the electorate at large; the country's consumerism for a passing phase. As Mr Blair always argued, the party cannot fake its accommodation with this Britain. It has to mean it.

Today, however, it is careening towards a leader who, more than any in its recent history, misreads (or worse, does not like) modern Britain and its instincts. The result, unless Labour's moderates can reclaim the party, will be electoral oblivion. Shown footage of Mr Corbyn by Ipsos MORI last month, swing voters in Croydon and Nuneaton seemed bemused: "He's got all the policies straight out of the Sixties," said one, adding: "He's a bit of a hippy." The Islington MP's supporters, in denial, promptly accused the pollsters of "programming" the participants.

Yet the gulf between Mr Corbyn's perception of Britain and the reality offers the centrists one morsel of hope. Bagehot recommends that they welcome their party's thousands of new left-wing members and encourage them to go door-knocking, particularly in the sort of marginal constituencies, like Nuneaton, Croydon and the middle-class suburbs of cities like Manchester, which the party must win from the Tories to regain power. A few weekends canvassing the views of typical Britons—unimpressed and upwardly mobile—and listening, really listening, to what they say, might open the eyes of all but the most intransigent Corbynista. To understand, they may find, is to forgive. ■



## Also in this section

- 38 Nazi gold fever in Poland
- 39 When France's National Front rules
- 40 Workers want more
- 40 The mafia return to Rome
- 41 Charlemagne: Sprechen Sie power?

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## Generation Interrail

## What Europe means to the young

ATHENS AND BRUSSELS

### Once a symbol of hope, the EU fails to inspire its most important constituency

**I**T IS Sunday night at the rooftop bar of the Wombat's Hostel in Berlin and the tequila is starting to flow. But there is still time for a quick chat about the European Union's common agricultural policy. Drew, a sparky 20-year-old University of London student, cannot abide the "mad" subsidies the EU pays to its farmers. "In many ways," he adds, "I'm an anarchist." And yet he thinks Britain would be foolish to vote to leave the European Union in the referendum the government will hold by the end of 2017.

Drew and his 19-year-old girlfriend Emma, like millions of young Europeans before them, are spending the summer in a carefree haze of travel and fun, the fruits of the freedom afforded by an Interrail pass. Launched in 1972 to mark the 50th anniversary of an international rail industry group, Interrail was a single ticket that granted access to a large part of Europe's rail network, turning much of the continent west of the Iron Curtain into a playground for youngsters as they hopped on and off trains, guzzling cheap booze and meeting like-minded souls along the way. Over the years Interrail's popularity has waned in the face of competing entertainments like low-cost flights; sales peaked in the mid-1980s at over 300,000 passes a year. Yet numbers have picked up in recent

years; last year 230,000 Europeans bought a pass, almost one-quarter of them from Britain. And for many of the young travellers whom your correspondent met during a five-day jaunt through Europe, the wide-eyed rite-of-passage quality of an Interrail trip appears as strong as ever.

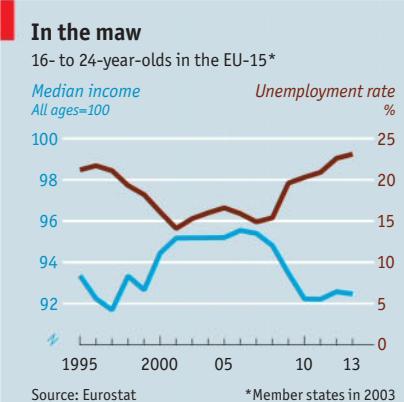
Interrail's spirit of openness long seemed to foreshadow developments within Europe itself, as walls tumbled, borders disappeared and currencies melted into one another (Interrail expanded to the ex-communist east in 1994). In today's more troubled Europe, though, tested by financial and migration crises, the summer

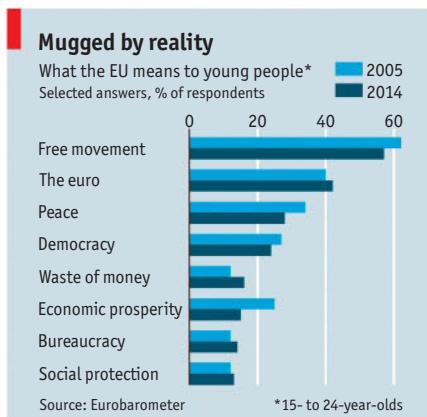
rail adventure has taken on new connotations. Europe's young have borne the brunt of recent economic woes: across the EU unemployment for those under 25, although dropping, still stands at over 20%, and in Spain and Greece around half the young workforce is jobless. In the early 2000s the median income of Europeans between 16 and 24 was growing faster than that of other generations; today the reverse is true. Home and car ownership are down and university debt is up. Particularly in southern Europe, many are facing the prospect of a standard of living worse than that of their parents.

Yet this generation is better travelled and educated than any that came before. Around two-thirds of school-leavers across the EU's 28 member states enter higher education today; just 18% did in the (much smaller) European Economic Community in 1972. Jim Hadfield, who runs the Circus Hostel in Berlin, says his guests know far more about the city's history than when he arrived in 1998.

Asked what the EU means to them, 57% of Europeans between 15 and 24 years old cite the freedom to travel, work and study anywhere they like. To many young Interrailers it seems the natural order of things; the border checks they encounter on leaving the EU, at times delivered with an impatient rap on the cabin window as their sleeper train enters the Balkans, arrive as a shock and are seen as almost impertinent.

Yet in recent weeks the travellers have in some parts of Europe encountered a sharper reminder that the freedoms they enjoy are not shared by everyone. Hamish, a 24-year-old British chemical-engineering graduate, says his "jaw dropped" when he alighted at Budapest's Keleti station to find ➤





himself confronted with the sight of thousands of migrants, mainly Syrians, waiting to be granted permission to board trains to Austria and Germany. Gregor, a thoughtful Bavarian student Interrailing from Hungary to Greece, found himself thinking about the plight of the refugees whose journey he was making in reverse. As the child of Polish parents who fled to Germany in 1988 he notes that he has more reason than many to cherish the freedoms Europe can offer.

Others fear what the migrant crisis reveals about their fellow citizens. Katharina, a 21-year-old mathematics student from Vienna travelling throughout the Balkans, is not worried about her own future. (At 10.8%, Austria's youth-unemployment rate is the third lowest in the EU.) But the xenophobic reaction of many of her fellow Austrians to the refugees spilling into the country makes her worry, she says, that one day she might no longer feel at home there.

Similarly Nico and Isa, who have travelled from Germany's east to visit a Star Wars exhibition in Cologne, cite antagonism towards foreigners as their main reason for pessimism about Europe. The fence erected by Hungary's government along its border with Serbia, says Nico, is an unhappy reminder of the old east German state.

Like most Germans the pair were surprised to hear that much of Europe admires Germany's handling of the refugee crisis. Yet not everyone takes such a liberal view. Julien, a French engineer making his way through the Balkans to Turkey, explains that he pities the refugees but doesn't think Europe can handle them all. Soon afterwards he slips into talk of Jewish conspiracies and the virtues of Marine Le Pen, the French far-right leader.

Interrailers are disproportionately educated and affluent; a multi-country pass starts at €281 (\$345). Yet they are hardly immune to economic difficulty. Hamish is frustrated to find himself living with his parents again as he prepares to begin another degree and accumulate more debt, having failed to land the right job in London. Szyman, a Polish musician encoun-

## Polish gold fever

# Waiting for the train

WARSAW

### Is one of the last mysteries of the Nazi era about to be solved?

THE hills surrounding Walbrzych, an old mining town in south-west Poland, have been a hive of activity since two men claimed last month to know the underground whereabouts of a train missing since the second world war. According to legend, the Nazis dispatched it laden with gold from the then-German city of Breslau (now called Wroclaw and in Poland) farther west in the final months of the war. It then apparently vanished near Walbrzych.

Locals are used to false alarms. The train has nonetheless become a national matter. Piotr Zuchowski, deputy minister of culture, says he is "over 99% certain" that the train has been found. He is less certain about its contents. They could include military equipment or archives.

The train has also stirred up memories of wartime loss and looting. The World Jewish Congress calls for any items stolen from Jews to be returned to their former owners or heirs. If none can

be found, the gold should go to other Polish Holocaust survivors, who have "never been adequately compensated", the congress says.

Russia could yet get involved. Some speculate that the train contains the Amber Room, famously stolen by the Nazis from a Russian palace near St Petersburg and last seen in Königsberg (now Kaliningrad) during the war. The Russian press is lapping up rumours laden with nationalist longing.

"Once we have this train full of gold, we will think about what to do with it," says Ewa Kopacz, the prime minister. Digging up the train may take months. Meanwhile, Walbrzych is enjoying the attention. A local museum has launched a three-day "golden tour" of the area, costing 1,499 złoty (€350). "We would very much like the finding to be confirmed," says Anna Zabska, the director. Train or no train, the local tourist board has already struck gold.



Armoured warfare on the eastern front

tered next to his double bass on a crowded train bound for Berlin, says he could tell something was up a few years ago when his Dutch orchestra saw its public subsidy cut by €1m a year and was forced to lay him off. Having sneaked into the first-class section of a train to Prague, four mechanical-engineering undergraduates from Aberdeen headed for careers in the offshore oil-and-gas industry are more interested in drinking cheap Czech beer than fretting about their careers. But one confides that

the drop in the oil price has cast a shadow over his prospects.

The EU's greatest cheerleaders today are to be found among those who cannot fully share its benefits. Your correspondent met Syrian refugees at Belgrade's railway station who expressed their excitement at the prospect of rejoining family in Dortmund, and young Turks on their way to Prague who contrast the freedoms of Europe with the creeping authoritarianism of their own government. ■

**France's National Front**

# From protest to power

MANTES-LA-VILLE

**Right-wingers in local government show how they might use a national mandate**

THE neat rows of polished headstones and potted geraniums in the municipal cemetery of Mantes-la-Ville speak of fresh memories and civic diligence. Yet the solemn calm masks its place in a sour struggle following the election as mayor 18 months ago of Cyril Nauth from the National Front (FN), France's far-right party.

Previously run by Socialists and Communists, Mantes-la-Ville long supplied workers for a giant power station and car factories on a stretch of the Seine valley between Paris and Normandy. Today the industrial certainties of the past have given way to disquiet, and to votes for xenophobes. The new mayor's preoccupation is stopping local Muslims, who make up an estimated third of the town's population, from buying a disused tax-collection office, which sits next to the municipal cemetery, to turn it into a mosque.

"Lots of people are hostile," declares Mr Nauth, a 33-year-old teacher with the cautious manner of a political novice. "They understand the right to a place of worship," he says. "But they don't want it near them." Instead, he proposes to use the former tax office as a municipal police station, and has used his powers to pre-empt its sale. A cemetery, Mr Nauth stresses, is a "symbolic" site; having a place of worship next door would be "disturbing".

Beside a motorway that cuts through the town, local Muslims pack into a converted bungalow for prayers. Patterned oriental mats spill out into the corridors. "Our fathers were brought to France to work in factories or public-works projects," says Abdelaziz El Jaouhari, who runs the prayer room. The new mosque, he points out, would be privately financed, and it enjoyed cross-party support in the town hall before the FN took over. But, he says, the mayor has a "fixation with Islam", and is dividing the town.

Some regard the affair as a test of *laïcité*, a strict form of secularism enshrined in a law from 1905 which keeps religion out of public bodies while protecting freedom of private worship. In August the local prefect, who represents the French state, took the town hall to court and got Mr Nauth's pre-emption suspended, pending final judgment. The prefect argued that the town was failing to protect religious rights. Opponents replied that France's secular state is "imposing" a mosque on the town.

Both sides suspect provocation. Mr Nauth insists that he is acting in the interest

of visitors to the cemetery. Local Muslims retort that he is sending a "subliminal message" to his voters about France's Christian roots. The saga has travelled far. From postings he has seen on Facebook, Mr El Jaouhari worries that radical Islamists abroad may be using the affair to whip up loathing of the West.

For the FN, too, the tale matters. Marine Le Pen, its leader, has vowed to transform the one-time protest movement into a respectable party of power. A dozen mayors from the FN, or linked to it, now run town halls. For a party that used to bellow from the sidelines, this constitutes a historic change. So far, three trends are emerging.

### Christianity, clampdowns and cuts

The first might be called a reaffirmation of Christianity in ways that test French secular rules. Mr Nauth's effort is one example. Another can be found in the southern French town of Béziers, under Robert Ménard, who is allied to the FN. Last December he installed a Christmas nativity scene in the town-hall entrance, prompting the charge that he breached secular law; a court later ruled in his favour. More recently, Mr Ménard claimed to know that 65% of his town's school pupils were Muslim, although it is illegal to collect such statistics; this time, charges against him were dropped. Both cases look like coded messages to those who fret about Islam trampling France's Catholic roots.

A second trend is security clamp-

downs. Mr Nauth in Mantes-la-Ville is recruiting more municipal policemen. In Fréjus, on the Côte d'Azur, the FN mayor has set up a local rapid-intervention force. Mr Ménard has gone further and begun to arm the municipal police. "Police officers now have a new friend," read giant posters displaying a handgun. Mr Ménard, who seems set on creating a mini-Singapore à la française, has also banned spitting, the hanging of washing on balconies and carpet-beating out of windows after 10am.

Third, and perhaps most unexpected, is spending cuts. Ms Le Pen owes much of her popularity to disillusion with lookalike mainstream parties and what she calls a self-serving elite; she vows to run a tighter operation. Her mayors, on balance, seem to be making an effort. Mantes-la-Ville, Beaucaire in the south and Hénin-Beaumont, a town in northern France, have cut town-hall running costs. A French news report suggests that seven of the 12 FN town halls have made budget savings—although critics denounce some cuts as highly political, such as Mr Nauth's decision to stop financing a human-rights group.

Some critics in Mantes-la-Ville admit that FN rule has been less eventful than feared. "He hasn't taken really scandalous decisions, but that's not a great benchmark," says Saïd Benmouffok, a philosophy teacher (and Socialist councillor). A poll finds that 74% of residents in FN-run towns are happy with their mayor, citing cleanliness and security as chief reasons.

Municipal rule, with its limited powers, is not a model for national government. The euro, Syrian refugees and feuds in the national FN executive scarcely figure in local debates. Ms Le Pen has ordered mayors to stick to her script, which aims to detoxify the party. But their cruder message may do her little harm. In a recent poll on first-round voting for the presidential election in 2017, she came out on top. ■



Build your mosque somewhere else, says Mr Nauth

## Workers and wages

# Our turn to eat

AMSTERDAM

### Trade unions are trying to find their post-austerity voice

**O**N STREET duty in Amsterdam, a 35-year-old Dutch police officer laments four years without a pay rise. "The economy is picking up, the rich are getting richer and yet we at the police continue to suffer," he says. Unhappy with new terms offered by the government (a salary increase of 5% over two years along with a possible pension cut), members of the national police union plan to stop all but essential work on September 15th and besiege government offices on the 16th.

European workers are having a decidedly discontented summer. Calls for higher wages are picking up as they sense a recovery. Airport staff in Spain, dock hands in France and crèche employees and train drivers in Germany have been on strike. More are likely to follow. In Germany the number of workdays lost to industrial action has gone up from 156,000 last year to about 1m already this year.

Maarten Keune, a labour-market expert at the University of Amsterdam, detects a feeling throughout austerity-hit Europe of "being owed". He says, "Before the downturn people were told wages had to stay low to stimulate exports, then came the crash so wages continued to stay suppressed; but now that the crisis is coming to an end there's a feeling of: 'It's our turn'."

Toothless during the financial crisis, trade unions are finding their voice again. Many are organising the first serious strikes in years. The Netherlands' largest union has given the government a stern ultimatum this month to improve public-sector pay.

And yet unions are mostly doing as poorly as their members. In southern Europe, where unemployment remains high and wages flat at best, unions have lost influence. Torsten Müller, an analyst at the European Trade Union Institute, blames governments that have restricted collective bargaining during the lean years.

In Spain, non-members see unions as part of the problem. During the crisis they defended a status quo that favoured insiders and hampered job-creation. Spanish unions were further hit by labour-market reforms and several scandals. Two former regional heads of the General Workers Union are being investigated for allegedly skimming millions of euros from training programmes, and a provincial head of the miners' union was forced to resign after an apparent tax dodge.

Across southern Europe, dissatisfied

### French surprise

Trade-union membership as % of employees  
2013 or latest



workers have shifted their allegiance away from unions to new left-wing political parties that tend to focus on protesting against austerity rather than pushing for pay rises.

When salaries started to increase again modestly in some places (see chart), it was rarely due to the efforts of unions. Zsolt Darvas from Bruegel, a Brussels-based think-tank, says: "It's the economy that's driving the rises, not the protests." Recent data put unemployment at its lowest level since 2012. In some countries, such as Germany, skills gaps have pulled up pay. Trade unions may now be trying to piggy-back on economic growth to justify their existence after years of inactivity and falling membership. ■

### Organised crime

## Ruffians in Rome

ROME

### The mafia returns to Italy's capital

**O**N AUGUST 27th the coastal district of Rome, with a population of around 230,000, became the biggest administrative unit in Italy to be put under direct government control because of mobster subversion. The chairman of its council had been arrested in June, accused of chumminess with a band of alleged gangsters who will be put on trial in November. Prosecutors claim that they developed corrupt ties involving politicians and officials not only in Ostia, Rome's recreational port and playground, but in other parts of the city too. The overall council for the metropolis only narrowly avoided being disbanded on grounds of infiltration by mafiosi.

For years Italians had assumed that although Sicily and much of the south were prey to the mafia, their beautiful capital was much less vulnerable: the last criminal syndicate to win notoriety in Rome was

the so-called Banda della Magliana in the 1970s and 1980s. Recent events have shown that comforting vision to be wrong on two counts. Italy's southern mafias have been quietly building stakes in the capital's economy, and Rome has been revealed to host an autonomous underworld more extensive, organised and powerful than anyone knew.

In January police raided and closed a chain of more than 20 pizzerias allegedly belonging to the Camorra, the mafia of the southern city of Naples and its surrounding area, Campania. Since March, three well-known restaurants in Rome have been sequestered amid claims that they were owned by the 'Ndrangheta, a criminal group originating in Calabria, another southern region.

Most recently, on August 20th, members of the Casamonica family, a Roman clan accused of extortion and loan-sharking in the capital, staged a blatant display of their wealth and sense of impunity. For the funeral of one of their elders—a vast affair—a band played the theme music from "The Godfather" (a gangster movie) and dropped rose petals on a horse-drawn hearse from a helicopter.

Unsurprisingly, the event spurred keen media interest in the Casamonicas—little of it wanted. A television camera team that tried to film houses belonging to suspected clan associates was assaulted, while a comedian who recorded a satirical song about the funeral received death threats on social media.

Against this background the central government decided to give broad new powers to the prefect, the interior ministry's representative in the capital, Franco Gabrielli. Humiliatingly for local officials, Mr Gabrielli now has the authority to intervene in areas of municipal authority vulnerable to penetration by organised crime, including rubbish collection, park management and housing.

The move by the central government also reflects growing doubts over the abilities of Rome's inexperienced mayor, Ignazio Marino. The city is in visible disarray. Rubbish bins are overflowing, while parks often remain untended and roads potholed (though not all, or even most, of its woes can be blamed on the mayor).

Mr Marino's cash-strapped administration now faces the additional challenge of having to deal with millions of Catholic pilgrims after Pope Francis declared a Jubilee year, starting in December.

Rome will need all the help it can get. Whether putting it under the control of two separate officials with overlapping responsibilities is the best way of providing it remains to be seen. But as a former mayor, Francesco Rutelli, noted, it is not unprecedented. Republican Rome was governed by two consuls. And it worked. Two thousand years ago. ■

# Charlemagne | Sprechen Sie power?

Once the language of Schiller and Goethe, then of Hitler, German is hip again



**S**UCH was the status of German in the 19th century—for Europeans generally and for Jews in particular—that Theodor Herzl, the founder of Zionism, once proposed making it the official language of a future state of Israel. In the event, devotees of Hebrew won out. After the Holocaust, German was particularly despised. But times change. Israeli 14- to 15-year-olds going back to school after the summer holidays now have the option of German as a foreign language for the first time at five public schools, to be followed by more.

German is also becoming popular among adult Israelis, and not only the more than 20,000 who have moved to Berlin in recent years. This reflects a broader shift in perceptions. Fifty years after Germany and Israel established diplomatic relations, 70% of Israelis have a positive view of the country, according to a poll by the Konrad Adenauer Foundation, a German think-tank. Many find Germans honest and trustworthy. With the possible exception (at least lately) of Greece, people elsewhere agree, polls show.

This suggests a big gain for Germany in “soft power”. Joseph Nye of Harvard University, who coined the term in 1990, defines it as the ability of a country to hold international sway not by brandishing hard (military) power but by getting others to want what it wants. It is the value of being attractive culturally, commercially, gastronomically, ideologically, or indeed linguistically.

Germans, who are forever coping with their dark past, are thrilled by any suggestion that they are popular. They have come to distrust hard power since 1945 (to a fault, if you ask Germany’s partners in NATO). The country’s political dominance in Europe during the euro-zone crisis discomfits many Germans. Economic prowess and soft power is (almost) all they will allow themselves. And now they have it. *Monocle*, a British magazine, ranks countries by soft power and had Germany as the surprise winner in 2013 and runner-up in 2014, wedged between anglophone America in first place and Britain in third.

In a chicken-and-egg way, language both reflects and generates soft power, says Ulrich Ammon, author of “The Status of the German Language in the World”, published this year. German ranks tenth in the number of native speakers. But it is fourth in the economic output produced by them (including Austrians, Belgians, Liechtensteiners, Luxembourgers, Swiss and others). Ger-

man is also fourth by number of learners, trailing English, Chinese and French and roughly tied with Spanish, according to Mr Ammon. Some 15.5m people now study German, 4% more than five years ago.

In the slow-moving world of language that is a steep rise, says Mr Ammon. The overall increase is especially impressive since teaching of German is collapsing in Russia, where privileges given to German over English during the cold war have been phased out. Interest is growing fastest in Africa, Asia and eastern Europe, with the Balkans a hotspot. Many learn it mostly to boost their careers. Some hope to get a job in Germany, where certain industries are short of labour because the population is shrinking. Others want to engage Germany’s prodigious exporters. An interest in German culture develops along the way.

Germany’s government tries to promote the trend. But compared with, say, China, which is aggressively pushing its Confucius Institutes, Germany seems shy about it. It does not share France’s prickly obsession with defending the national tongue. And when France talked of a school reform that would have the (unintended) consequence of reducing German teaching, officials in Berlin merely muttered. German is hardly ever taught as a first foreign language in schools anywhere. Officials simply hope to make German the second or third on offer in more places.

Moreover, ordinary Germans seem blasé about pushing their language on others. Linguistically ambitious expats in Germany complain that many locals prefer to reply in English. And even when Germans speak *Deutsch*, it is so littered with Anglicisms that purists fret about a spreading patois called *Denglisch*. (Beware false friends, foreigners: *Handy* is not an adjective but a mobile phone.)

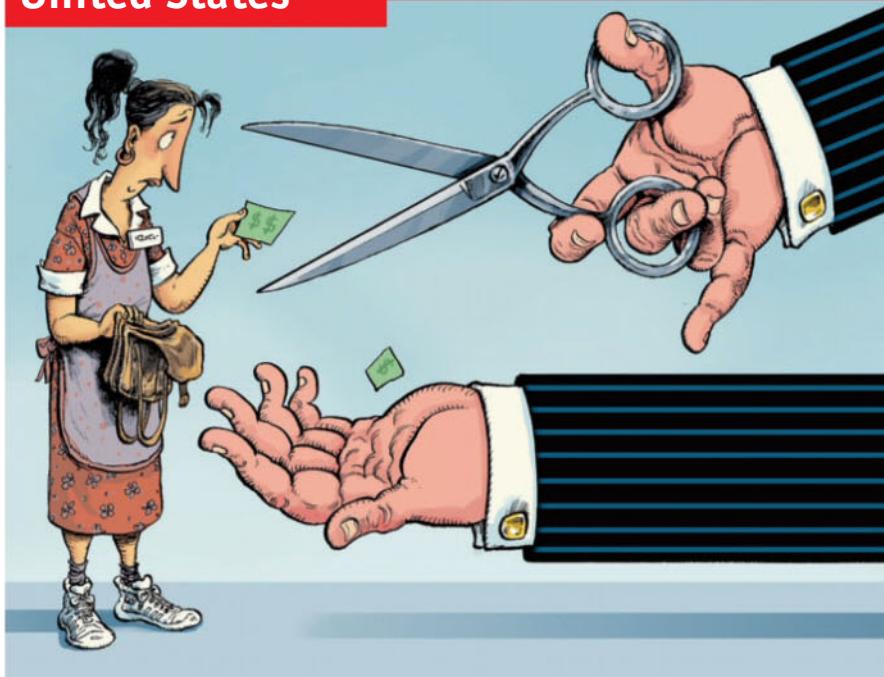
An even older gripe is that German is too hard to bother with. In 1880 Mark Twain complained in “The Awful German Language” that the treatment of gender—so that “a young lady has no sex, while a turnip has”—borders on perverse. And nouns “are not words, they are alphabetical processions”. Twain sensibly suggested the language should be “trimmed down and repaired”.

Foolishly, the Germans have not heeded his advice (changes to spelling in the 1990s, many think, made matters worse). Fortunately, however, the task is not as futile as Twain suggested. With its predictable spelling and pronunciation, German can be mastered, whereas English, with its protean spelling and word order, may seem easy but prove treacherous.

## Cunning linguists?

It is obviously beneficial to a country if more people speak its language. At best, that language becomes a *lingua franca*, as English is. German never will be. But its growing use still helps. It equips more people around the world to work in Germany, which the country needs as it ages.

Proficiency lets more foreigners understand how Germans think. It may convey, for example, the moralistic approach Germans have towards debt (*Schulden*), which is etymologically close to guilt (*Schuld*). The word for nipple (*Brustwarze*, or “breast wart”) may point to export limitations in the romantic genre. But no other language matches German’s capacity to describe *Fahrvergnügen* (driving pleasure). And though many languages have polite forms of address, the awkwardness over when to switch from the formal *Sie* to the informal *du* says much about German social norms. Even as German power grows, more may see in each German the whole human, or rather the *Mensch*. ■



### Tackling poverty

## It's expensive to be poor

WASHINGTON, DC

### Why low-income Americans often have to pay more

**W**HEN Ken Martin, a hat-seller, pays his monthly child-support bill, he uses a money order rather than writing a cheque. Money orders, he says, carry no risk of going overdrawn, which would incur a \$40 bank fee. They cost \$7 at the bank. At the post office they are only \$1.25 but getting there is inconvenient. Despite this, while he was recently homeless, Mr Martin preferred to sleep on the streets with hundreds of dollars in cash—the result of missing closing time at the post office—rather than risk incurring the overdraft fee. The hefty charge, he says, "would kill me".

Life is expensive for America's poor, with financial services the primary culprit, something that also afflicts migrants sending money home (see page 72). Mr Martin at least has a bank account. Some 8% of American households—and nearly one in three whose income is less than \$15,000 a year—do not (see chart). More than half of this group say banking is too expensive for them. Many cannot maintain the minimum balance necessary to avoid monthly fees; for others, the risk of being walloped with unexpected fees looms too large.

Doing without banks makes life costlier, but in a routine way. Cashing a pay cheque at a credit union or similar outlet typically costs 2-5% of the cheque's value. The unbanked often end up paying two sets of fees—one to turn their pay cheque

into cash, another to turn their cash into a money order—says Joe Valenti of the Centre for American Progress, a left-leaning think-tank. In 2008 the Brookings Institution, another think-tank, estimated that such fees can accumulate to \$40,000 over the career of a full-time worker.

Pre-paid debit cards are growing in popularity as an alternative to bank accounts. The Mercator Advisory Group, a consultancy, estimates that deposits on such cards rose by 5% to \$570 billion in 2014. Though receiving wages or benefits on pre-paid cards is cheaper than cashing

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cheques, such cards typically charge plenty of other fees.

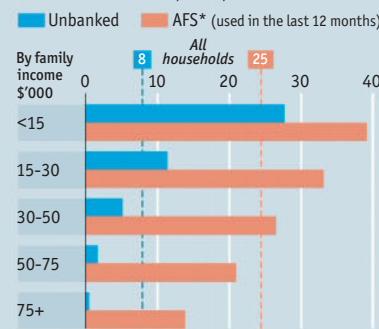
Many states issue their own pre-paid cards to dispense welfare payments. As a result, those who do not live near the right bank lose out, either from ATM withdrawal charges or from a long trek to make a withdrawal. Other terms can rankle; in Indiana, welfare cards allow only one free ATM withdrawal a month. If claimants check their balance at a machine it costs 40 cents. (Kansas recently abandoned, at the last minute, a plan to limit cash withdrawals to \$25 a day, which would have required many costly trips to the cashpoint.)

To access credit, the poor typically rely on high-cost payday lenders. In 2013 the median such loan was \$350, lasted two weeks and carried a charge of \$15 per \$100 borrowed—an interest rate of 322% (a typical credit card charges 15%). Nearly half those who borrowed using payday loans did so more than ten times in 2013, with the median borrower paying \$458 in fees. In 2014 nearly half of American households said they could not cover an unexpected \$400 expense without borrowing or selling something; 2% said this would cause them to resort to payday lending.

Costly credit does not mix well with lumpy welfare payments. The earned-income tax credit (EITC), an income top-up for poor families, is paid annually, as part of a tax refund. The total refund can run into thousands of dollars, making it worth more than many families' monthly pay cheque. Unsurprisingly, cash-strapped households seek to borrow against this windfall in advance. Regulators have recently nudged banks away from issuing high-cost short-term loans secured against imminent tax refunds. But it is still common to borrow to cover the cost of apply- ►

### Poor substitute

American households, 2013, %



\*Alternative financial services include cheque-cashing outlets, money transmitters, car-title lenders, payday loan stores, pawnshops and rent-to-own stores

### Also in this section

43 Arguing over Iran

44 Dairy farming

45 Arctic America

46 Lexington: Carly Fiorina

ing for the EITC. In 2014 almost 22m consumers used “refund anticipation cheques”, which offer a loan to pay the filing costs and collect repayment automatically when the refund arrives. These products typically cost between \$25 and \$60 for credit that lasts only a few weeks, according to Chi Chi Wu of the National Consumer Law Centre, an advocacy group.

How might financial services be made cheaper for the poor? Mr Valenti sees promise in mobile banking. But the poor are not yet well placed to benefit from the mobile revolution, in financial services or otherwise. Only half of those earning less than \$30,000 per year own a smartphone, compared with 70% or more of those in higher income groups. Nearly half those who do manage it have had to temporarily cancel their service for financial reasons. That might itself be the result of disparate prices: those with poor credit ratings rely on pre-paid SIM cards, which unlike normal monthly contracts do not come with a hefty discount for the handset.

Low smartphone penetration in turn makes life more expensive in other ways. The unconnected do not benefit from the cheap communication, education, and even transport the app economy provides. A quarter of poor households do not use the internet at all, which makes seeking out low prices harder.

#### Price discrimination

Inflation has also squeezed the poor more in recent years. The prices of items which soak up much of their budgets—such as rent, food and energy—have risen faster than other goods and services. Falling oil and energy prices may be reversing that trend, though typically the poor own fewer cars, so benefit less from cheaper petrol.

From 2000 to 2013—the latest year for which figures are available—inflation has been higher for those in poverty for 139 of 168 months, according the Chicago Federal Reserve. As a result of this inflation premium, prices rose 3.2% more for the poor over this period. These figures may understate the disparity, because they do not include employer contributions to health insurance, which are widely thought to hold down pay cheques, and make up a bigger proportion of the total pay of the poor.

The high cost of being poor has two main implications. First, inequality is worse than income figures alone suggest. This is true even before non-financial disparities, such as the implications for health of living on a low income, are considered. Second, finding ways to reduce these costs, for instance by making it easier to claim the EITC without borrowing, or by changing the rules on overdraft fees (which at the moment are used to cross-subsidise banking for other customers), would be a cheap way of helping low earners—and bargains are rare for the poor. ■

#### Arguing over Iran

## Fighting talk

ATLANTA

### It hasn't derailed the deal. But American Jews' rancour over Iran still matters

**A**CCORDING to the Talmud, the Romans were able to conquer Jerusalem and drive the Jews into exile because of the debilitating rifts among them. Some aghast rabbis have cited this ancient warning to temper the rancour among American Jews over the deal to constrain Iran's nuclear programme, struck in July by Barack Obama and five other governments. Opposition from some Jews (and many others), based on anxieties about Israeli security and Iran's genocidal rhetoric, has not derailed the agreement, which this week secured enough support in the Senate to survive. But the debate has divided synagogues across the country, a spasm of infighting that may yet prove momentous, albeit not as Mr Obama's critics intended.

Most of America's main Jewish organisations, including the American Israel Public Affairs Committee (AIPAC), and some philanthropists, join the Republicans in opposing the agreement; so, noisily, does Binyamin Netanyahu, Israel's bellicose prime minister, who pre-emptively denounced it in a controversial speech to Congress in March. So do the Jewish federations of several cities (though not the biggest, New York's, which has opted for neutrality). David Harris, of the (rejectionist) American Jewish Committee, says a webcast by Mr Obama on August 28th, while “gracious”, came too late to change most minds. A few other groups, such as the left-leaning J Street, endorse the deal—as, ac-

cording to a poll published in the *Jewish Journal* shortly after it was reached, do most individual American Jews. Jews, it concluded, are actually more enthusiastic about it than Americans overall.

If the mainstream debate is robust, its penumbra is toxic. A Facebook post that advises Jerry Nadler, a Jewish Democratic congressman from New York who backs the deal, to repent on Yom Kippur is among the more civil feedback he has had. He and other like-minded Jews have been vilified as “kapos”, a term for prisoners obliged to aid the Nazis in concentration camps. Conversely some Jewish opponents, such as Charles Schumer, a Democratic senator from New York, have been labelled traitors to America and warmongers, calumnies with their own anti-Semitic undertones.

Mr Obama characterised his disagreement with Israel and some American Jews as a family row; the insults being traded between some Jews would cause outrage if they emanated from outside the tribe. Indeed, the Anti-Defamation League, which combats anti-Semitism, has been moved to denounce its Jew-on-Jew manifestations: “a new, and deeply troubling, phenomenon”, says Jonathan Greenblatt, the ADL's director. In the angry allegations of complicity and betrayal, Samuel Freedman—author of “*Jew vs Jew*”, a book about strife within American Jewry—hears echoes of clashes over Franklin D. Roosevelt's limited response to the Holocaust and American Jews' relationship with him.

The sense that preventing an Iranian bomb is, like the Holocaust, a question of survival, contributes to the vitriol. The caustic mores of the internet don't help. Whatever the acrimony's origins, worries Rabbi Rick Jacobs of the Union for Reform Judaism, it may leave “lasting scars”.

Nixing the deal can no longer be one of them. After Barbara Mikulski, a Democrat-►



The disputatious diaspora

► ic senator from Maryland, came out in favour of it on September 2nd, Mr Obama had enough support in the Senate to stop a resolution of disapproval becoming law; he may even muster enough to avoid a Senate vote altogether. AIPAC and other groups opposed to the deal seem to have lobbied in vain.

### Zion sighing

Mark McNulty of the Republican Jewish Coalition thinks Iran will sway another sort of vote: Jewish choices in next year's presidential election, in particular in swing states such as Florida, Nevada and Ohio. Republicans have grounds for optimism: fewer Jews supported Mr Obama in 2012 than in 2008, and polling by Gallup suggests Jewish voters' approval of him has fallen further than has the country's overall. Nevertheless, it remains high—more American Jews voted for Mr Obama than Israeli Jews did for Mr Netanyahu—and Jews' attachment to the Democrats is deep and old. For many Jews who back Mr Obama on Iran, party loyalty seems to determine views on foreign policy, rather than the other way around. In any case, he won't be on the ballot.

On the other hand, the damage within the Jewish community may endure. The Iran row, says Peter Berg, rabbi of the Temple, the oldest and largest synagogue in Atlanta, "has ripped the community apart". Many Jews feel disenfranchised and alienated from their leadership; Jewish organisations' ability to speak for them has been undermined. Yet rather than creating a fresh schism, this episode has revealed and exacerbated some that already existed.

In part those splits concern American Jews' relationship with Israel. That has been strained by the disdain of Israel's religious authorities for liberal denominations of Judaism that are popular in America. But generational differences are loosening it, too. According to the Pew Research Centre, younger American Jews are much less likely than older ones to regard caring about Israel as essential to their Jewish identity. They are more inclined to regard America's support for Israel as excessive, perhaps because, being born after Israel's existential wars, they are less apt to regard it as an embattled underdog. (Orthodox Jews, a minority that is thoroughly attached to Israel, are an exception.)

The attitudes of Jewish youngsters may evolve with age. But another trend—towards more intermarriage and less strict religious observance, a factor that is also associated with disengagement from Israel and greater criticism of its leadership—implies that the overall attitude of the American diaspora is set to become more sceptical. Thoughtful American Jews worry that the bitter Iranian stand-off, and Mr Netanyahu's rash meddling in American politics, could accelerate that drift. ■



### Dairy farming

## From moo to you

FAIR OAKS FARMS, INDIANA

**What goes on at one of the country's biggest dairy farms**

AT FIRST the calf's front hooves appear, then disappear from view again, as the cow stoically pushes and the contractions get faster. The head follows and then the shoulders, the broadest part of the newborn and the most uncomfortable moment for its mother. Visitors can watch the birth, which usually takes an hour, in an amphitheatre through floor-to-ceiling glass. Outside the birthing barn a traffic light indicates an impending delivery (an orange light reads "hooves").

Between 80 and 100 calves are born every day to around 36,000 cows on 11 farms covering 35,000 acres at Fair Oaks Farms, one of America's biggest and most modern dairy operations. It is also the country's only dairy theme park (though many other farms are open to the public). Its milking parlour attracts more than 400,000 visitors a year, who watch from a balcony as cows step onto a slow-motion merry-go-round to be milked three times a day. Afterwards spectators are whisked off in a bus painted like a black-and-white Holstein cow for a tour of the barns. Children can clamber up a "Calcium Climber" magnetic wall, ascend "udder heights" on a 25-foot milk bottle, milk a robotic cow and watch the making of 12 varieties of cheese and ice cream.

The bosses of Fair Oaks Farms, conveniently sited on the interstate highway between Chicago and Indianapolis, have big plans for the future. The farms recently teamed up with Coca-Cola in a venture called Fairlife, to make milk-derived drinks which, they claim, contain more calcium and protein than ordinary milk (as well as less sugar and no lactose). "And we intend to take manure to the next level," says Mike McCloskey, co-owner of the mega-dairy.

Fair Oaks Farms reuses everything in sight. Three times a day the manure is

vacuumed from the cows' barns while they are being milked. It then sits for 21 days in a methane digester, while anaerobic bacteria get to work producing gas that is used to generate electricity or as fuel. The electricity powers all the farm buildings and machines and the excess is sold into the grid. Any unused gas is compressed and used to power the farms' fleet of 42 lorries, which deliver their milk around the Midwest and as far as Tennessee. The use of compressed natural gas replaced the 2m gallons of diesel that farm trailers used every year.

Once the manure comes out of the digester it runs through sieves to capture the long fibres, which are used to fertilise the farms' soil. Since the water that goes through the screens still contains lots of nourishing chemicals, it is sent through a nutrient-recovery system, which removes 80% of the phosphorous and 75% of the organic nitrogen, compressed into dry matter and reused on the farms. The water that comes out of the recovery system could be used for irrigation, says Mr McCloskey, who is now looking at what to do with this tea-coloured liquid. One idea is to try to make it drinkable by using duckweed to absorb the remaining nitrogen and phosphorous. The weed could be used as a feed high in protein for the cows.

American dairy farmers see labour shortages as their biggest challenge. "It's so hard to find people willing to work on a dairy farm," says Paul Rovey, who runs a family farm with 2,000 cows in Arizona. It's hard physical work every day of the year, come rain or shine, in a pungent environment. "I am a bit racist, I don't hire gringos," jokes Mr McCloskey, who is fluent in Spanish thanks to his Puerto Rican mother. He hires only Hispanics to work on his farms.

## Arctic America

## Tales of Atlantis

ANCHORAGE

## The president's visit to the Arctic will not prevent villages sliding into the sea

**I**N HAIDA legend, Ground Hog despairs when Beaver abandons him on an island off Alaska's coast. Confused and hungry, he sings for freezing weather—an ingenious plan, as an ice-covered sea will let him escape. At last, the ice forms and Ground Hog decides he will have no more to do with Beaver. No amount of singing will freeze waters now. The Arctic is warming twice as fast as the rest of the world; summer sea-ice cover there has declined more than 40% over the past 36 years. Since America bought Alaska from Russia in the 19th century, the average sea level has risen by more than eight inches. The sea is expected to rise another foot by 2050.

Thirty Alaskan native villages on the coast are about to disappear into frigid waters; 12 are considering moving altogether. As sea ice melts earlier and forms later, more open water is left in the Chukchi and Bering Seas and the Arctic Ocean (which surround Alaska). Storms are larger and wreak more damage as a result (because ice protects the shoreline). And thawing permafrost, on which many villages are built, worsens matters by causing homes to sink towards calamity and releasing methane into the atmosphere. "Climate is changing faster than our efforts to address it," Barack Obama said at a conference on climate change in the Arctic on August 31st. Lee Stephan, president of the Tribal Council of Eklutna, a native village, agreed: "If

all the ice on Mother Earth melts we will all live in water," he said.

Greenhouse gases bear the blame; America alone produces 15% of global carbon-dioxide emissions. Nevertheless, Alaska's first residents profit from much of the oil and gas drilling in their state, as do others. The oil and gas industry provides a third of Alaskans with jobs and, through taxes, once covered 90% of state expenses. Plunging prices mean Alaska now faces a \$3.5 billion deficit.

When America's biggest oilfield was discovered at Prudhoe Bay in 1968, the federal government had to settle land claims with native communities in order to pipe oil south. They received 44m acres of land, \$1 billion and shares in 12 regional corporations and more than 200 village ones under a law signed in 1971. Thirteen regional corporations currently exist, tasked with turning a profit for their shareholders while also safeguarding native Alaskan societies and cultures.

Mining and drilling have enriched many, as have rules requiring government to favour native corporations with contracts. "We don't see any reason to allow the federal government to determine how we develop the land," argues Greg Razo, vice-president of the Cook Inlet regional corporation, which he says distributes a \$23m annual dividend to its 8,400 shareholders. Tribal elders believe their long his-

tory of environmental stewardship—in the days when big projects were impossible—justifies their thirst for development now. "Alaska did not cause global warming," argues Mr Stephan.

The profits made by native corporations help pay for local health and social services. But corporations cannot afford to support communities affected by flooding, and cannot give their shareholders in places under threat handouts that they do not offer all others. "They aren't charities," explains Julie Kitka, president of the Alaska Federation of Natives. And besides, corporations have their work cut out to reduce the rates of infant mortality, sexual assault and suicide among natives, which are far higher than among other Alaskans.

Relocation is expensive, and painful for people who depend on hunting reindeer and catching salmon to survive. As most of America's largest state cannot be reached by road, getting materials to remote villages requires fine flying weather, too. Newtok's 400-odd residents will cost about \$380,000 each to move. Kivalina needs \$123m to up sticks. It has been trying to do so since 1994—but no mechanism for deciding how and when a community should move exist, according to Robin Bronen of the Alaska Immigration Justice Project, an NGO. Where it should go is complicated, too; the federal government owns 60% of Alaska's land, the state 28%.

Shaktoolik, another village, wants to stay put despite losing 38,000 square feet to the sea each year. "When we first said we wanted to relocate they pulled funding for our clinic," explains one resident. The mayor obtained money, instead, for a sea wall made of driftwood to stem the water's onslaught. If and when a storm overwhelms it, emergency funding will help pay for the damage because Shaktoolik is an established village. But neither the state nor the federal government wants to pay for infrastructure that will be abandoned. Nor can residents do without the roads, bridges and airstrips needed to keep villages functioning until their inhabitants are relocated.

When he visited Kotzebue on September 2nd, Mr Obama became the first sitting president to visit Alaska's Arctic. His travels will encourage efforts to save threatened native villages. But money must be found for federal agencies in Alaska. The president's budget for 2016 will not cover the re-siting of a single village threatened by storms and floods. As the state's budget weakens, thanks to cheap oil, federal involvement will become increasingly vital. Offering federal land in trust to those determined to move could speed up the process. Chuck Degan, a former Democratic state representative from Unalakleet, sees land transfers as a way to escape the sea's clutches. "I don't even like swimming," he says. Neither did Ground Hog. ■



The life aquatic

# Lexington | Is there an app for that?

Explaining the rise of Carly Fiorina, Republican presidential hopeful and former tech CEO



**T**ECHNOLOGY has disrupted so many institutions that the American presidency was never likely to escape. Sure enough, a candidate has emerged from the business world, pledging to fix Washington with a smartphone. Carly Fiorina, a former CEO best known for running Hewlett-Packard (HP), a computing giant, with mixed results, has never held political office. A few weeks ago a majority of Republicans had not heard of her. But a punchy performance in a TV debate for second-tier presidential candidates on August 6th, held before a clash among top-tier contenders, propelled her up through the 17-strong field. Now Ms Fiorina is on a roll, overtaking rivals like an Uber hybrid passing a taxi rank full of snoozing drivers.

On September 1st CNN, with the Republican National Committee's blessing, bowed to days of fierce lobbying and changed the entry criteria for an all-important second debate for Republican front-runners, on September 16th. Ms Fiorina will find herself on a stage next to Donald Trump, Jeb Bush and other household names. Expect to hear a lot about high technology and its power to liberate America from big government's clumsy embrace.

This message sells rather well, even at rallies full of voters for whom Spotify may sound like a good name for a stain remover. A recent evening found Ms Fiorina on the campaign trail in New Hampshire, the state that hosts the first primary election of each presidential cycle. The candidate, who is the only woman among those seeking her party's nomination, was greeted with reserved chivalry by a mostly older crowd gathering at the Veterans of Foreign Wars hall in Littleton. New Hampshire residents take seriously their role as early judges of White House potential. "Still kicking the tyres?" Ms Fiorina asked a couple, after they told her they had yet to choose a candidate.

Yet the room responded warmly when a question-and-answer session turned to the inefficiency of government. Every Saturday presidents deliver a weekly radio address, Ms Fiorina told the crowd. If elected she would ask the country to take out smartphones and prepare to answer a specific, timely question. For instance, she explained, she might ask whether the federal government should have the right to sack employees who fail to do their jobs, or whether it is important for Americans to know where their federal tax dollars go. Press 1 for Yes, and 2 for No. This

prompted banter in the crowd with a snowy-haired man who would have to upgrade his flip-phone to take part.

Talk of instant e-plebiscites may be a bit gimmicky (and hardly anyone listens to presidential radio addresses). But Ms Fiorina's political intent is serious. In essence, she argues that presidents need new ways to make use of public opinion and employ it to impose their will on a fractious Congress. Interviewed in a pizza parlour on Littleton's Main Street, the former CEO expanded on her plan. Even in a divided Washington, politicians are capable of responding swiftly when they "feel the heat" of public pressure, she noted. Asked to explain the febrile nature of this election cycle, Ms Fiorina picked up Lexington's iPhone. "I think there is a connection between people getting so angry and this," she said. It is a case that has been made in Silicon Valley for some time. According to this argument, citizens in the 21st century are used to being super-consumers, obtaining everything from a blind date to a four-course meal with a few swipes on a screen. Then they try to renew a driving licence at their local Department of Motor Vehicles (DMV), apply for planning permission or carry a baby through an airport security line, and find themselves at the mercy of inept government functionaries.

Ms Fiorina is the first high-profile candidate to make that theory the core of a presidential campaign. With their mania for control, bureaucracies cannot cope with a new world powered by innovation and creativity, she says flatly. She predicts that ordinary voters' frustrations can be harnessed by Republicans to beat government back. "We don't have to go to the DMV and sit in this bureaucratic mess and be disrespected," she says. Ms Fiorina applies the same philosophy to questions of global public policy. Most scientists agree that man is changing the climate, she said in New Hampshire. But her favoured solution is innovation, not big inter-governmental meetings or unilateral plans to cut American greenhouse-gas emissions by "destroying industry" (and besides, she argued, one country alone cannot heal the planet).

## The digital bully pulpit

How far can disruption take a Fiorina candidacy? The last time a major party picked a business boss with no political experience as its presidential nominee was in 1940, when Republicans chose Wendell Willkie, the chief of an electricity utility. He was thumped by President Franklin Roosevelt. True, this is an unusual election. New Hampshire voters praised Ms Fiorina's outsider status, though some raised questions about her business career, which ended with her firing from HP after an ill-judged merger (she presents her sacking as the result of a "boardroom brawl", after she shook up a stagnating business). Nobody asked about her unsuccessful run in 2010 to represent California in the Senate.

Even fans know that Ms Fiorina is more likely to secure a place in the cabinet, or at a pinch a vice-presidential slot, than the top job. Oddly, her greatest strengths are probably rooted in the analogue world. She is better than lots of senators at working a room. She is a sharper speaker than many of her rivals in grey suits. But look hard at her digital vision, and it is mostly a clever way of presenting long-standing conservative preferences. The Republican Party is full of business types who dislike bossy bureaucrats, distrust environmentalists and want to curb government spending. Ms Fiorina is an eloquent advocate for their views. She takes a sternly conservative take on such issues as abortion. Silicon Valley libertarians dreaming of digital revolution will have to wait a while longer for a champion from the tech world. ■

# Technology Quarterly

September 5th 2015

## THE NUKE DETECTIVES

Hi-tech ways to find covert weapons





“We envisioned Office 365 uniting our 50,000 employees and 400 locations on one cloud-based campus. **Riverbed** made it possible.”

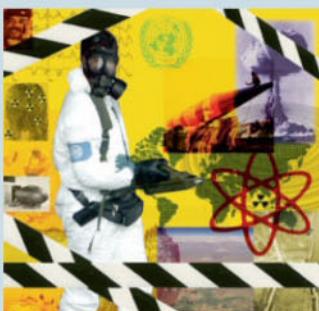
Uwe Wirtz, IT Director



Seamless collaboration. It's the formula for success at Henkel, the maker of Persil®, Schwarzkopf, and Loctite®. But for this global company, slow apps were a hindrance. Enter the cloud. Now, by bringing visibility, optimisation, and control to Henkel's new Office 365 deployment, Riverbed gives all Henkel employees secure, high-performance access to cloud-based collaboration. More than 26,000 companies rely on Riverbed to maximise application and business performance. [gb.Riverbed.com/performance](http://gb.Riverbed.com/performance)

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**Contents****On the cover**

New ways to detect clandestine nuclear weapons will help non-proliferation and aid inspectors monitoring Iran's nuclear deal, page 8

**Monitor**

- 3** Pills that stick around in the body, touchscreens that use multiple finger and hand gestures, preventing solar power from upsetting the grid and flapping fins for boats

**Difference engine**

- 7** More from Moore  
Rules change, but computer chips still get cheaper

**Monitoring nuclear weapons**

- 8** The nuke detectives  
New ways to detect secret nuclear-weapons development

**Monitoring nuclear weapons**

- 11** Lasering the fuel  
Another method of enriching uranium is hard to spot

**Rational consumer**

- 12** Driving on camera  
A guide to dashboard cameras for filming the road ahead

**3D printing**

- 13** A bridge to the future  
Constructing buildings with additive techniques

**3D printing**

- 14** Wonderful widgets  
Making elegant components with optimisation software

**Brain scan**

- 15** Teaching tomorrow  
Sebastian Thrun: from driverless cars to online education



## In for the long haul

**Medical technology: New devices that regulate the steady delivery of drugs within the body are on the way**

**T**HE problem with most pills is that their benefits do not last long. Chemicals get released into the body, they have their effect and then they get flushed out. For acute disorders, such short-term tactics may work well, but for chronic diseases they are far from ideal. Over months and years people struggle to take their medicines on time, get their dosages mixed up and may forget to take their pills at all.

The situation is worse with chemotherapy, where toxic chemicals are put into the body. Such treatments usually require regular hospital visits for the toxins to be administered and, to maximise their impact on cancer cells, the drugs are often released in such great concentrations that they cause a lot of collateral damage to healthy tissues.

For all these reasons, techniques that increase the longevity of medications in the body would be a tremendous boon. Several technologies are now being developed to do just that.

**Down the hatch**

One way is to combine pills and needles. Such devices are a development of the microneedle patch, a small strip of medicated material that adheres to the skin like a plaster. The patch has microscopic needles coated in dried drugs. When the needles pierce the skin the medication leaks slowly into the body.

The patches can be effective, but they

have only a restricted ability to deliver delicate drugs, like insulin, due to a limit in the size of the total dose that can be delivered across a relatively small area of skin. However, Giovanni Traverso, a gastroenterologist at Harvard Medical School, reckons that microneedle technology could be improved if he could somehow get a patch into the intestines, which, being rich in blood vessels, would provide greater absorption.

To explore the idea, Dr Traverso and his colleagues designed a tiny device coated in microneedles that could be surrounded by a soft capsule, which would dissolve and release the device once inside the stomach. From there, the researchers theorised, it would move into the intestines where the needles would painlessly bump into soft tissues and release whatever drugs were on board as it made its long journey through the body.

The team first arranged for microneedles of insulin to be poked into the intestines of pigs to see if the idea would work. Then, they dropped their microneedle pills into the stomachs of pigs to determine how long the devices would stick around. As they reported in the *Journal of Pharmaceutical Sciences* in September 2014, the administration of insulin this way proved to be faster-acting than ordinary injections of insulin into the skin, and their devices appeared to cause no harm. Crucially, they discovered that the devices ►

► remained inside one pig for seven days, another for 19 days and one for 56 days. The researchers are now developing a new generation of microneedles to deliver a broad range of therapeutics this way.

As part of this work, Dr Traverso's team have also developed a material that can help deliver devices into the intestines and prevent them being destroyed by the acidity of the stomach. This material is made from a novel rubber-like polymer that is both viscous and elastic. It remains solid in a highly acidic environment but breaks apart in a more neutral one. It can be used to shepherd a microneedle device safely into the intestines where it can deliver drugs for at least a week before breaking up and passing harmlessly out of the body, the group reported in *Nature Materials* in July.

#### Under pressure

A different sort of material, known as a hydrogel, also shows promise as a delivery coating. Hydrogels too can be engineered to be robust in one sort of an environment and soluble in another, but in addition they have the ability to heal themselves if they are damaged. This means a hydrogel coating should be able to endure the high pressure of being injected through a needle into a patient. Once in place, it could repair any tears that might have occurred. The problem with hydrogel self-healing has been the speed at which the process typically takes place. Until recently, any damage incurred during injection has taken one or two weeks to be fixed, by which time any medications carried within would leak before they can be properly utilised.

Eric Appel and Robert Langer at the Koch Institute for Integrative Cancer Research in Cambridge, Massachusetts, have worked with a team of colleagues to see if they could build a hydrogel that suffered less damage as it passed through a needle and, if it did sustain damage, would heal itself faster. They found that combining a derivative of hydroxypropyl methyl cellulose, an inert polymer long used in medicine as a lubricant, with nanoparticles from polystyrene—the polymer commonly found in foam coffee cups—created a remarkably adaptable hydrogel. The polymer chains from the methyl cellulose and the nanoparticles interacted with one another in such a way that they would readily form relaxed bonds under pressure, which allowed the hydrogel to flow easily when pushed through a needle, but form solidified bonds within seconds of the pressure being released. This allows the hydrogel to transform into a very useful drug-storage capsule once it is placed in the body.

When the researchers tested their creation inside mice, they loaded it with both bovine serum albumin, a compound

that readily mixes with water, and Oil Red, a proprietary colouring compound that does not mix well with water. The researchers reported in *Nature Communications* in February that the hydrogel was perfectly capable of carrying chemicals and leaking them into surrounding tissues. Crucially, they discovered that Oil Red exited the hydrogel via diffusion while the serum albumin did so as the edges of the hydrogel were gradually eroded by exposure to water inside the body. Dr Appel and Dr Langer suggest this feature could be used to deliver multiple medicines at different rates over the course of months or even years. Which medicines might be used needs to be explored further, but prime candidates are likely to be VEGF inhibitors, which fight macular degeneration in eyes, and Risperidol, which helps to treat schizophrenia.

Another approach to long-lasting drugs involves the use of tiny tubes. Patients with ovarian cancer usually have to be regularly turned over to give toxic chemicals, which are put into part of the abdomen, a chance to maximise the number of cancer cells that they kill. Discomfort also arises from a procedure commonly used to treat bladder cancer, where the bladder is filled with aggressive chemicals and patients told to avoid going to the toilet for as long as they possibly can.

Drug-delivery technologies could help in these cases too. One example is being developed by Heejin Lee at the Massachusetts Institute of Technology and Michael Cima at the Koch Institute for Integrative Cancer Research. They use a fine coil of silicone tubing filled with drugs and inserted without surgery using a cystoscope passed through the urethra and into the bladder. When tested on rabbits it was found that as water gradually migrated through the silicone via osmosis, it slowly forced out the drugs within through a minute hole in the tubing which had been drilled with a laser. The team have established a startup called TARIS Biomedical to develop the device for clinical use.

Dr Cima is also working with Michael Birrer and Marcela del Carmen, oncologists at the Massachusetts General Hospital in Boston, to see if a similar technology can be used to treat ovarian cancer. Although such an application would require keyhole surgery to put the device in place, it might relieve patients of some of the intense chemotherapy sessions that they must currently undertake.

As with many technologies, the devices which are being developed to deliver endurance drugs need further development and testing before they can be widely used. Microneedle capsules and hydrogels, for instance, may begin testing in humans in four or five years. The device to treat bladder cancer, however, is already in clinical trials. ■

## Escape from flatland

**Touchscreens:** Multiple finger and hand gestures, above and around as well as on the screen, may soon be used to operate devices

THE third dimension is everywhere these days. Powerful computer programs allow designers to work in 3D; virtual-reality goggles immerse users in an ultra-realistic illusion in which they can walk around and pick up objects; and 3D printers are being used to make an increasing variety of things, including buildings (see page 13). But manipulating and shaping objects in 3D in a computer can be tricky, typically requiring a piece of dedicated hardware used as a pointing device, such as a mouse, stylus pad or a specialist controller operated with joysticks.

A number of companies are, though, developing ways to use hand and finger gestures to produce true 3D interaction with computers and other digital devices. This might even produce a successor to the mouse—which is prehistoric in computer terms, having emerged in the 1960s.

Some systems have come to market already, such as a plug-in 3D controller produced by Leap Motion, a Californian firm. This tracks the movement of hands using infra-red cameras. Others are working on incorporating gesture-based sensors into devices. Google's Project Soli, for instance, uses radar to detect specific



▶ movements, such as pressing a finger and thumb together to indicate pressing a button. Google says the sensor could be contained in a tiny chip.

Instead of having to adopt an entirely new input device, Fogale Sensation, a small engineering startup in Geneva, has come up with a way to integrate gesture control into existing touchscreens.

Today's touchscreens are printed with a grid of transparent conductors. When nothing is nearby, the electrostatic field created between the conductors is smooth and even. When a conductive object, like your finger, is brought very close (touching or within a few millimetres) the field becomes disturbed, which shows up as a small change in the capacitance (a measure of the ability to store a charge) between specific conductors in the grid. This provides the co-ordinates of the finger immediately above or on the screen. It is also possible to detect some gestures, like "pinch and zoom", but only if the fingers are on the surface of the display. On a typical smartphone screen, however, Fogale's technology can simultaneously track the location and movement of up to five fingers as high as 5cm above the screen. It can also detect touch and grip along the edges of the screen, and in other applications up to ten fingers at a greater distance above a larger screen.

The Fogale system replaces the grid of conductors with an array of sensitive transparent sensors, each microscopically connected to the ends of the screen. These effectively "triangulate" the location of a finger or hand above the screen by measuring the change in capacitance between nearby sensors. A number of techniques are used to eliminate false signals and "noise" caused by the hotbed of hard-working electronics below the screen.

#### **Smile, please**

As the system is able to detect and track multiple points above, on and around the screen, it could bring new capabilities to mobile devices. At its simplest, it allows a user to zoom in on a small icon, which grows in size as their finger gets closer.

Smartphone screens have been growing steadily larger, but this has been at the expense of becoming increasingly difficult to use with only one hand. Side-touch sensing would detect when a user is stretching their thumb across the screen, and bring the on-screen button they are trying to reach closer.

The 3D capabilities of the screen open up new possibilities for developers of games and other applications. Instead of simply being able to identify where a finger touches the screen, it becomes possible to work out from what direction the finger came from and how fast it got there. So, instead of a simple tap it would be possible to, say, kick a ball or fire a

weapon in a specific direction at increasing levels of power. With a finger hovering above the screen, users will be able to zoom in and out of libraries of music or pictures, or control the speed of scrolling through a list of contacts by changing the altitude of their finger.

The screen can also track gestures, opening up the possibility of unlocking a phone with a complex hand movement accompanied by speaking a security word: "alohomora", as Harry Potter might

say. The magic could go further. Although Fogale Sensation is concentrating on breaking into the highly-competitive mobile market, it also sees possibilities in other areas, such as allowing people to use their fingers and hands in more natural and intuitive ways to assemble, shape and manipulate virtual objects in computer systems. Making such software even easier to use would no doubt improve the handiwork of those creating things in the third dimension. ■



## Sunshine and clouds

#### **Solar power: The growth in renewable energy requires new ways to manage the distribution of electricity**

**E**ARLIER this year, after months of planning, the managers of Europe's electricity grid were ready for the biggest test so far of an energy system that increasingly relies on renewable power. That event was a partial solar eclipse on March 20th—and the "worst case scenario" was that it would take place on a sunny day, causing a sudden disruption of solar power, creating fluctuations that could damage the grid and anything connected to it.

At the centre of concern was Germany, with some of the world's biggest solar installations. In 2014, almost 7% of Germany's electricity was generated by solar panels, although on sunny weekdays the proportion can reach 35% and even 50% at weekends. The passing of the Moon between the Earth and the sun could have been equivalent to the loss of 80 medium-sized European power stations.

As it turned out, although the sun shone in southern Germany and northern Italy, cloudy skies elsewhere limited the

eclipse's impact. Even so, the European grid operators had to greatly increase the backup supplies normally on hand and turn off some energy-intensive processes, such as aluminium smelting. And then it had to cope with the surge in solar generation as the eclipse passed.

An eclipse is an extreme event, but as more homes, offices and factories fit solar panels and become, in effect, mini power plants feeding surplus electricity into the grid, engineers are having to perform a similar balancing act every day. Without careful monitoring, the intermittent nature of solar power—even with the sun passing briefly in and out of clouds—can lead to voltage surges and drops, causing brownouts and power cuts.

Moreover, maintaining a consistent level of power is now vital as modern digital devices, such as computers, televisions and equipment in factories, hospitals and offices, demand a steady voltage and frequency, unlike the clunky electron-

ics of a few decades back.

To protect power quality some countries have placed restrictions on new solar installations. In Hawaii, for instance, sudden swings in electrical output have led to a slowdown in the issuing of solar permits. Australia has also placed constraints on new installations. Even some utilities in all-too-often overcast Britain have limited the amount of solar electricity which can be fed into the grid.

Companies are coming up with ways to maintain power quality. Some of the gear is based on inverters, which are used to convert the variable direct current produced by a solar panel into the alternating current on the grid. Renewable Energy Solutions Australia, for instance, makes a system called VoltLogic which can limit the amount of power exported to the grid from solar panels. This, the company says, allows new solar installations to be automatically approved by a number of Australian utilities.

Some utilities want such solar export-limiting equipment to respond to demand changes on the grid in less than one second, says Fraser Durham, commercial director of Argand Solutions, a British company. His firm produces a control system called GridGEM for companies using solar panels. This constantly analyses an organisation's power use to determine when to buy electricity or to export any surplus according to a utility's constraints. The system can also switch equipment on or off, channel any surplus renewable power into batteries and operate "private lines", which are independent distribution networks which might be set up by a group of neighbouring companies to share locally produced solar power.

#### Saving some for later

Surplus renewable power could also be stored on the grid with beefier battery systems. Various technologies, from giant lead-acid batteries to pumping compressed air into caverns and letting it out to drive turbines, are being developed (see *Technology Quarterly* December 6th 2014).

Better batteries will also let businesses and homes store more of the power they generate instead of having to export it. Some of the advanced lithium-ion batteries Tesla will make for its electric cars at a giant factory in Nevada will also be sold as 10kwh and 7kwh storage units for domestic solar installations. Delivery of the first batteries, which will be contained in a unit called Powerwall, are scheduled to begin next year. Multiple Powerwalls can be connected together for sites with greater energy needs.

Instead of being a one-way line to deliver electricity, grids of the future will need to be smarter and more flexible to handle the distributed power systems being created by renewable energy. ■

## Flapping about

### Biomechanics: Replacing a propeller with a flapping fin could help a team of zoologists set a new speed record on the water

**L**ATER this year a team led by Adrian Thomas, a professor of biomechanics at the University of Oxford's Department of Zoology, will try to break the human-powered water speed record. The aim is to reach 20 knots (37kph, 23mph) over 100 metres, and beat the existing record of 18.5 knots, set in 1993 by a group from the Massachusetts Institute of Technology. They used a catamaran-style hydrofoil pushed along by a pedal-powered rear-mounted propeller. Dr Thomas's craft looks more conventional, much like a canoe. But it has a hydrofoil under its bow and instead of being paddled is propelled by an underwater fin which is flapped up and down, in much the same way as a dolphin or whale swims.

The occupant (Dr Thomas will try for the record himself if he is fit enough) uses a pedalling mechanism to drive the fin. As the leg goes through the bottom third of the downward pedal cycle, the fin is driven down, generating the most thrust through the water. The fin goes up in the recovery phase as the leg moves back to the top of the cycle. The action is aided by rubber bands, which smooth out the flapping cycle and act as a suspension system. Getting the craft to ride up onto the hydrofoil in order to pass more efficiently over the water is the hard part. It requires some hefty pedalling.

The fin itself is also being finely tuned



into a highly efficient aerofoil shape. The idea, says Dr Thomas, is for the shape of the fin to match the natural flow pattern of the water passing over it, rather than disrupt the flow, as a propeller does. This is where the zoology comes in. Dr Thomas and his colleague Graham Taylor have found that oscillation patterns caused by the fins, wings and tails of flapping animals, such as birds, bats, insects, fish and whales, are similar to one another. They believe this is an example of "convergent evolution", a process whereby organisms not closely related to one another evolve similar traits independently.

The team reckon that a flapping fin could be better than a propeller—possibly up to 20% more efficient over a broad range of speeds, according to some research. Whereas the whole surface of the fin can be used to produce thrust, not all of the surface of a spinning propeller is available to do that: the hub adds nothing and the tips of the blades are probably turning too fast to do much good.

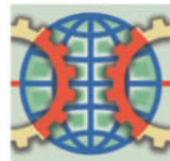
#### Animal lessons

A prototype craft has been built for testing and, if all goes well, a series of other versions will be made out of lightweight composite materials for the record attempt. Dr Thomas thinks there might be a market for the flapping craft. Along with Alex Caccia, a business partner, he has set up a company called Animal Dynamics, with the help of Isis Innovation, the university's commercialisation arm. The idea is to use the understanding of animal movement gained from studies to develop more efficient machines.

The flapping technology, for instance, might be scaled up to propel ships. And if fins were put on the side of a ship they could extract energy from its rolling motion and use that to help drive a propulsion fin at the stern. As the aerofoil shape of the fin is designed to move slowly and efficiently it might also be employed for power generation in slow-moving and shallow water. Such a set-up would not require a huge amount of expensive construction to keep it anchored to a river bed, and being quiet and slow, would allow fish to keep out of its way.

Dr Thomas and his colleagues have other biologically inspired ideas that might be put to work on the land and in the air, too. These range from building a drone that uses flapping wings instead of rapidly spinning rotors to hover. It would, they think, be better able to cope with strong and gusty winds, which can keep some drones grounded. Another idea is to build a multi-legged machine that walks a bit like an ant. It could be used to transport cargo across rough terrain. So, regardless of who has the strongest legs to flap along in the record attempt, there will be a lot potentially riding on this technology. ■

# More from Moore



## Chipmaking: Moore's law may be running out of steam, but chip costs will continue to fall

HERE is a popular belief that Moore's law is coming to an end. The doubling of transistors on a chip every two years, for the same cost, has continued apace since Gordon Moore, one of Intel's founders, noted it back in 1965. At the time, a few hundred transistors could be crammed onto a sliver of silicon. Today's powerful chips contain billions.

Having become smaller and smaller over the decades, the crucial features within transistors are now approaching the size of atoms. Quantum and thermodynamic effects that occur at such microscopic dimensions have loomed large for several years, and these threaten to place physical limits on further shrinkage.

Until now, the integrated circuits in a chip have used a two-dimensional (planar) structure, with a metal gate mounted across a flat, conductive channel of silicon. The gate controls the current flowing from a source electrode at one end of the channel to a drain electrode at the other end. A small voltage applied to the gate lets current flow through the transistor. When there is no voltage, the transistor is switched off. These two binary states (on and off) are the ones and zeros of digital language.

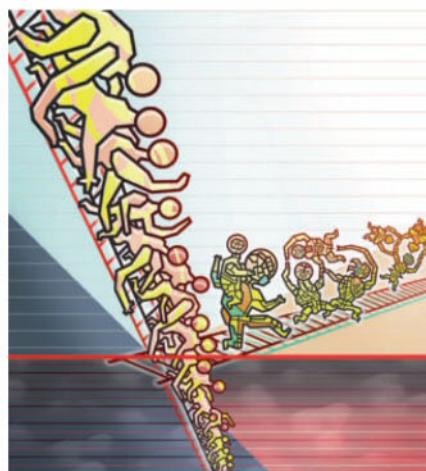
However, when transistors are shrunk beyond a certain point, electrons flowing from the source can tunnel through the insulator protecting the gate, instead of flowing in a controlled manner direct to the drain. This wastes energy, raises the temperature and can cause the device to fail. Leakage becomes a serious problem when insulating barriers within transistors approach a few nanometres (billions of a metre, or nm) in thickness. Below that, leakage increases exponentially, rendering the device almost useless.

Features this small are increasingly common in today's transistors. Intel's Broadwell chips, introduced in 2014, are made using 14nm process technology (which refers to the smallest "half-pitch" between identical features on a chip). Three-dimensional architecture helps to reduce leakage. Within the transistor itself, some features are considerably smaller than their half-pitch. The gate's insulating layer in Intel's chip is reckoned to be no more than 0.5nm thick—little more than a couple of silicon atoms across.

According to the tick-tock of Moore's law, Intel's next generation of processors, code-named Cannonlake, were to be fabricated using a 10nm technology and arrive in mid-2016. But the company recently admitted that the migration from 22nm to 14nm had been far more difficult than expected. As a result, 10nm chips are to be delayed until later in 2017. Suddenly, the doubling of processor performance is to take more than three years instead of two.

Many have declared this to be the end of Moore's law. But that is mistaken. If truth be told, Moore's law was never anything more than a rule of thumb for scheduling manufacturing targets. As such, it served as a metronome that helped Intel set the tempo of product announcements—and thereby encourage computer-makers to keep coming back every couple of years for increasingly powerful processors. Like it or not, the rest of the chip industry, usually a generation or two behind, was obliged to follow suit.

Moreover, Moore's law has always been as much about reduc-



ing the cost of transistors as about increasing performance. By doubling transistor density, individual chips got smaller, allowing more of them to be printed on a silicon wafer. After the wafer was sliced and diced, individual chips then cost less. Because leads and contacts on a chip cannot be shrunk as easily, doubling the density of transistors does not quite halve the price of individual devices. But it comes close.

Unfortunately, as transistors get smaller, more defects creep in. There is thus a trade-off between complexity and cost. And, while the cost per transistor is almost inversely proportional to the number of transistors crammed in a chip, there comes a point where the decrease in yield (percentage of good chips on a wafer) begins to outweigh the benefits of the chip's increasing complexity. In short, a minimum transistor cost exists for each particular generation of processing technology.

And here's the crunch: that minimum cost per transistor has been rising since 28nm chips hit the market five years or so ago. That is partly a result of decreasing yields, but also because of the escalating cost of the photolithography equipment needed to fabricate ever-smaller circuits. In short, the cost-effectiveness of chip manufacturing seems to have hit a sweet spot at about 28nm.

There is a lot to be said for sticking with legacy technology like 28nm. Transistor shrinkage over the years has left spare room on the chip to add specialised processing units for handling such services as graphics, video and cryptography.

### The new system

As it is, the popularity of mobile communications and computing has encouraged semiconductor firms to embed as many features as possible in their processors. Such devices, known as "systems on a chip" (soc), tend to devote around 65% of their real estate to memory, with the rest for everything else—including all the processor's logic gates, the necessary input/output circuitry, and numerous analogue functions needed to run a phone, tablet, laptop or whatever. While it is possible to shrink the size of the logic on an soc, the memory components do not scale anything like as well, and the analogue circuitry barely at all.

That means Moore's law affects only a small portion of an soc. As such a device is never going to gain significant cost or performance benefits from shrinking further, there is good reason to stick with mature processes like 28nm, with their minimal cost.

If transistor densities no longer double, will engineers continue to see chip costs halve every few years? With soc devices based on mature technology, that is a distinct possibility. Eventually silicon will cede its semiconductor leadership to gallium arsenide or some other material, such as titanium trisulphide, being developed for the role. But that is probably years into the future.

In the meantime, the 50-year era of pushing down semiconductor costs through improvements in manufacturing know-how is about to be superseded by a new age of making chips cheaper, faster and better through smarter design, including systems on a chip. In so doing, Moore's law could get a new lease of life. ■



## The nuke detectives

### Clandestine weapons: New ways to detect covert nuclear weapons are being developed, which could help inspectors monitor Iran's nuclear deal

AS NUCLEAR blasts go, North Korea's first test in 2006 was small. The detonation of an underground device produced an explosive force well below one kiloton (less than a tenth of the size of the bomb dropped on Hiroshima in 1945). Even so, the vibrations it caused were recorded half a world away in the centre of Africa. Advances in the sensitivity of seismic sensors and monitoring software are now good enough to distinguish between a distant nuclear detonation and, say, a building being demolished with conventional explosives, says Lassina Zerbo, head of the Preparatory Commission for the Comprehensive Test-Ban-Treaty Organisation (CTBTO), the international organisation that seeks to enforce the agreement ratified, so far, by 163 nations.

The CTBTO operates 170 seismic stations worldwide, 11 underwater hydro-acoustic centres detecting sound waves in the oceans, 60 listening stations for atmospheric infrasound (low-frequency acoustic waves that can travel long distances) and 96 labs and radionuclide-sampling facilities. More sensors are being installed. Crucially, however, the optimal number for global coverage was recently reached. It is now impossible, reckons Dr Zerbo, to test even a small nuclear weapon in secret any-

where on Earth. And on top of that, the United States Air Force runs a detection network that includes satellites that can spot nuclear-weapons tests.

It is better, though, to discover a secret weapons programme before testing. Once a country has a nuclear bomb or two, there is not much other governments can do to stop it from making more, says Ilan Goldenberg, a former head of the Iran team at the Pentagon. Plenty of states want such capabilities. The Defence Science Board, an advisory body to the Pentagon, concluded in a report last year that the number of countries that might seek nuclear weapons is higher now than at any time since the cold war. Those states include Saudi Arabia and other Sunni-Arab rivals of Iran, which in July, after long and tortuous negotiations, signed a nuclear deal with America and other nations to restrict its nuclear activities, and to allow enhanced monitoring and inspection of its facilities.

Some wonder how effective such monitoring measures will be—and that is with the benefit of agreed access to Iran's facilities. The West's record on detecting more covert nuclear work is spotty. A large North Korean centrifuge facility for uranium enrichment remained hidden until the regime gave a Stanford University professor

a tour in 2010, letting the cat out of the bag. This troubles many. Enrichment is the biggest, trickiest step in bombmaking, so it should create the most evidence. By contrast, a roomful of scientists running mathematics software on offline computers to calculate the best way to detonate enriched uranium can keep a low profile, says Mr Goldenberg. It doesn't help, he adds, that A.Q. Kahn, a metallurgist who made Pakistan's nuclear weapons, circulated his designs.

#### The latest kit

As the technologies to unearth work on clandestine nuclear weapons become more diverse and more powerful, however, the odds of being detected are improving. Innovation is benefiting detection capabilities, says Ramesh Thakur, a former UN assistant secretary-general. The products under development range from spy software that sifts through electronic communications and financial transactions to new scanners that can detect even heavily shielded nuclear material.

Start with intelligence-gathering. Western spooks were mostly clueless about the network Mr Kahn built to traffic bomb expertise and equipment, until Libya, a Kahn client, surrendered its programme in 2003. No one using the same approach today would get very far, reckons Mr Thakur, now head of the Centre for Nuclear Non-Proliferation & Disarmament at the Australian National University in Canberra. This, ➤

# North Korea helped to keep its centrifuge facility secret by using mostly black-market or domestically manufactured components

he says, is thanks to advances in “network analysis” software.

After the September 11th terrorist attacks in 2001 America poured money into developing software for counter-terrorism. When fed with information, such as people’s e-mails, schooling, web surfing, phone calls, banking transactions and purchases, the programs try to work out who might be a terrorist. A person could pop up on an intelligence agency’s computer screen if, say, he downloads podcasts of a radical Sunni cleric, visits the city where that cleric preaches, and then takes calls from a town held by Islamic State. Now America is making a big effort to adapt this software to sniff out nuclear shenanigans too, says William Tobey, a former head of counter-proliferation strategy on the White House’s National Security Council.

Software used for this type of analysis include i2 Analyst’s Notebook from IBM, Palantir from a Californian firm of the same name, and ORA, which was developed with Pentagon funds at Carnegie Mellon University in Pennsylvania. ORA has crunched data on more than 30,000 nuclear experts’ work and institutional affiliations, research collaborations and academic publications, says Kathleen Carley, who leads the ORA work at Carnegie Mellon. Changes, such as a halt in publishing, can tell stories: scientists recruited into a weapons programme typically cannot publish freely. Greater insights appear when classified or publicly unavailable information is sifted too. Credit-card transactions can reveal that, say, a disproportionate number of doctors specialising in radiation poisoning are moving to the same area.

## Who’s who in the zoo

The software uses combinatorial mathematics, the analysis of combinations of discrete items, to score individuals on criteria including “centrality” (a person’s importance), “between-ness” (their access to others), and “degree” (the number of people they interact with). Network members with high between-ness and low degree tend to be central figures: they have access to lots of people, but like many senior figures may not interact with that many. Their removal messes things up for everybody. Five or more Iranian nuclear scientists assassinated in recent years—by Israel’s Mossad, some suspect—were no doubt chosen with help from such software, says Thomas Reed, a former secretary of the United States Air Force and co-author of “The Nuclear Express”, a history of proliferation.

Importantly, the software can also evaluate objects that might play a role in a nuclear programme. This is easier than it sounds, says a former analyst (who asked not to be named) at the Pentagon’s Central Command in Tampa, Florida. Ingredients for homemade conventional bombs and even biological weapons are available from many sources, but building nukes requires rare kit. The software can reveal a manageable number of “chokepoints” to monitor closely, he says. These include links, for instance, between the few firms that produce special ceramic composites for centrifuges and the handful of companies that process the material.

A number of countries, including Japan and Russia, use network analysis. Japan’s intelligence apparatus does so with help from the Ministry of Economy, Trade and Industry, which assists in deciding which “dual use” items that might have both peaceful and military purposes should not be exported. Such work is tricky, says a member of the advisory board (who also

asked not to be named) to the security council of the Russian Federation, a body chaired by Vladimir Putin. Individual items might seem innocent enough, he says, and things can be mislabelled.

Data sources are diverse, so the work takes time. Intelligence often coalesces after a ship has left port, so foreign authorities are sometimes asked to board and search, says Rose Gottemoeller, undersecretary for arms control at America’s State Department. The speed of analysis is increasing, however. Software that converts phone conversations into computer-readable text has been “extremely helpful”, says John Carlson, a former head of the Australian foreign ministry’s Safeguards and Non-Proliferation Office.

## The known unknowns

Network analysis has limitations. Adapting terrorist-identifying software to pick out people in a covert nuclear programme is hard. Proliferators are outnumbered by terrorists, so there is less nuke-specific data to calibrate the software. Beyond this, computers struggle to calculate the astronomical number of potential links in a network. The problem is made worse as analysts realise that new types of data, such as details of metal or chemical imports, prove useful.

Would-be nuclear states can also reduce their networks. North Korea helped to keep its centrifuge facility secret by using mostly black-market or domestically manufactured components. Iran is also indigenising its nuclear programme, which undermines what network analysis can reveal, says Alexander Montgomery, a political scientist at Reed College in Portland, Oregon. Iran mines uranium domestically and has produced centrifuge rotors with carbon fibre, instead of importing special maraging steel which is usually required.

A big computer system to make sense of all this would help, says Miriam John, vice-chairman of the Pentagon’s Threat Reduction Advisory Committee. Which is why the Pentagon is building one, called Constellation. Dr John describes it as a “fusion engine” that merges all sorts of data. For instance, computers can comb through years of satellite photos and infra-red readings of buildings to detect changes that might reveal nuclear facilities. Constellation aims to increase the value of such nuggets of information by joining them with myriad other findings. For example, the whereabouts of nuclear engineers who have stopped teaching before retirement age become more interesting if those people now happen to live within commuting ➤





► distance of a suspect building.

Yet photographs and temperature readings taken from satellites, even in low Earth orbit, only reveal so much. With help from North Korea, Syria disguised construction of a nuclear reactor by assembling it inside a building in which the floor had been lowered. From the outside the roof line appeared to be too low to house such a facility. To sidestep the need for a cooling tower, water pipes ran underground to a reservoir near a river. The concealment was so good the site was discovered not with remote sensing but only thanks to human intelligence, says Dr Tobej, the former National Security Council official. (Israel bombed the building in 2007 before it could be completed.)

Some chemical emissions, such as traces of hydrofluoric acid and fluorine, can escape from even well-built enrichment facilities and, with certain sensors, have been detectable from space for about a decade, says Mr Carlson, the Australian expert. But detecting signs of enrichment via radiation emissions requires using different sorts of devices and getting much closer to suspected sources.

The “beauty” of neutrons and alpha, beta and gamma radiation, is that the energy levels involved also reveal if the source is fit for a weapon, says Kai Vetter, a physicist at the University of California, Berkeley. But air absorbs enough radiation from uranium and plutonium bomb fuel to render today’s detectors mostly useless unless they are placed just a few dozen metres away. (Radiological material for a “dirty bomb” made with conventional explosives is detectable much farther away.) Lead shielding makes detection even harder. Not one of the more than 20 confirmed cases of trafficking in bomb-usable uranium or plutonium has been discovered by a detector’s alarm, says Elena Sokova, head of the Vienna Centre for Disarma-

ment and Non-Proliferation, a think-tank.

Ground-based detectors are becoming more sensitive. Some new machines can discover a stash only a fifth of the mass required five years ago at a similar distance, Dr Vetter notes. Better algorithms help identify and disregard naturally occurring background radiation. Detectors are becoming more useful, too, thanks to simpler interfaces, including applications that now run on iPads, says Ann Harrington at the Department of Energy’s National Nuclear Security Administration (NNSA) in America. Many field workers would not have been qualified to interpret the readouts from previous equipment.

#### Range rovers

Such improvements have yet to translate into much greater range, however. Detectors still need to be close to whatever it is they are monitoring, which mostly restricts their use to transport nodes, such as ports and borders. The range the detectors operate over might stretch to about 100 metres in a decade or so, but this depends on uncertain advances in “active interrogation”—the bombardment of an object with high-energy neutrons or protons to produce other particles which are easier to pick up. One problem is that such detectors might harm stowaways hiding in cargo.

That risk has now been solved, claims Decision Sciences, a Californian company spun out of the Los Alamos National Laboratory in America. It uses 16,000 aluminium tubes containing a secret gas to record the trajectory of muons. These are charged particles created naturally in the atmosphere and which pass harmlessly through people and anything else in their path. However, materials deflect their path in different ways. By measuring their change in trajectory, a computer can identify, in just 90 seconds, plutonium and uranium as well as “drugs, tobacco, explo-

sives, alcohol, people, fill in the blank”, says Jay Cohen, the company’s chief operating officer and a former chief of research for the United States Navy. The ability to unearth common contraband will make the machine’s \$5m price tag more palatable for border officials. A prototype is being tested in Freeport, Bahamas.

Other groups are also working on muon detectors, some using technology developed for particle physics experiments at the Large Hadron Collider in Switzerland. Another approach involves detecting neutrinos, which are produced by the sun and nuclear reactors, and seeing how they interact with other forms of matter. The NNSA and other organisations are backing the construction of a prototype device called WATCHMAN in an old salt mine (to shield it from cosmic rays and other interference) in Painesville, Ohio. It will be used to detect neutrinos from limited plutonium production at a nuclear power station 13km away. Such a system might have a 1,000km range, eventually. But even that means it would require a friendly neighbour to house such a facility on the borders of a country being monitored.

Once nuclear facilities have been discovered, declared or made available for inspection as part of a deal, like that signed with Iran, the job of checking what is going on falls to experts from the UN’s International Atomic Energy Agency (IAEA). The equipment available to them is improving, too. The Canadian Nuclear Safety Commission has built a prototype hand-held spectrometer for determining if traces of uranium collected on a cotton swab and blasted with a laser emit a spectral signature that reveals enrichment beyond that allowed for generating electricity. Within three years it will provide an unprecedented ability to assess enrichment without shipping samples back to a lab, says Raoul Awad, director-general of security and safeguards at the commission.

Laser scanning can also reveal other signs of enrichment. A decade ago inspectors began scanning intricate centrifuge piping with surveying lasers. A change between visits can reveal any reconfiguration of the sort necessary for the higher levels of enrichment needed for bombmaking. Secret underground facilities might also be found by wheeling around new versions of ground-penetrating radar.

The remote monitoring of sites made available to inspectors is also getting better. Cameras used to record on videotape, which was prone to breaking—sometimes after less than three months’ use, says Ju-

lian Whichello, a former head of the IAEA's surveillance unit. Today's digital cameras last longer and they can be programmed to take additional pictures if any movement is detected or certain equipment is touched. Images are encrypted and stamped with sequential codes. If technicians at a monitored facility delete any pictures, the trickery will be noticed by software and the inspectors informed.

Such technology, however, only goes so far. The IAEA cannot inspect computers and countries can veto the use of some equipment. It does seem that inspectors sent to Iran will get access to Parchin, a site near Tehran where intelligence agencies say tests related to nuclear-weapons making took place. (Iran denies it has a military programme.) But even the best tech wizardry can only reveal so much when buildings have been demolished and earth moved, as in Parchin.

#### The big question

Could nuclear weapons be built in secret today? Riaz Mohammad Khan, a former foreign secretary of Pakistan, says not. A senior American State Department counter-proliferation official (whose asked to remain anonymous), however, says that it is not impossible. Others agree. Australia's Mr Carlson suggests one danger is that spies can end up hunting for the wrong clues. Iraq's use of a process called electromagnetic isotope separation, to enrich uranium for bombs before the 1991 Gulf war, remained undetected for years. That is because, says Mr Carlson, analysts were not looking for signs of an inefficient 1940s process that was so low-tech it did not require any telltale imports.

And processes are changing. Companies, including a General Electric consortium, are making progress enriching uranium with lasers (see box). If this becomes practical, some worry that it might be possible to make the fuel for a nuclear bomb in smaller facilities with less fancy kit than centrifuges. It is telling that the authors of the Defence Science Board report—which warned that the number of states which might seek nuclear weapons is higher than since the end of the cold war—were less optimistic upon finishing their research last year than when they began in 2010, says Dr John, its co-chair. That is also the year Iran boasted about advances in enriching uranium with lasers. If the new deal with Iran is to work, and other would-be bombmakers are to be spotted, then the technology available to the world's nuke detectives needs to keep improving. ■

## Lasing the fuel

### Another way to enrich uranium may impair efforts to detect secret nuclear programmes

**T**RYING to find facilities that conceal uranium enrichment is hindered by the vast number of buildings worldwide. It has at least been possible to narrow the search down to big structures. Using spinning gas centrifuges to enrich fuel for nuclear bombs requires a structure the size of a department store, and enough electricity for some 10,000 homes. An alternative method being developed would make the search far more difficult.

Enrichment extracts  $^{235}\text{U}$ , the main fissile isotope which makes up 0.7% of natural uranium. A 4% concentration of  $^{235}\text{U}$  will fuel a power plant; 90% is bombmaking grade. In a centrifuge uranium is heated into a gas and passed through thousands of rapidly spinning tubes. The alternative is to zap the uranium vapour with a powerful infra-red beam from a laser. The beam is tuned to "excite" only  $^{235}\text{U}$  atoms and thereby separate them from other atoms. At least 27 countries, by one tally, have worked on laser enrichment since the 1970s. Most gave up, largely because production batches were tiny. Now, however, two firms say that they have learned how to scale up the process.

Jeffrey Eerkens of Neutrek, a Californian research firm, says its laser process requires around half the space and

electricity that centrifuges need. A competing laser method is offered by Global Laser Enrichment (GLE), a consortium of General Electric, Hitachi and Cameco, a Canadian uranium producer. It, too, requires less space. In 2012 GLE was awarded a licence to build a facility in North Carolina for the commercial production of reactor fuel.

America has classified the technology, but that may not stop it spreading. The most important bit of laser-enrichment know-how has already leaked, says Charles Ferguson, head of the Federation of American Scientists—namely, that companies now consider it to be practical. This will reinvigorate efforts by other countries to develop the technology for themselves.

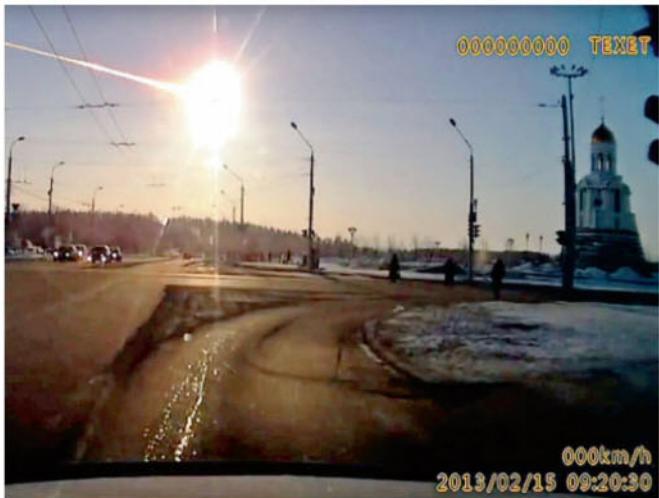
Laser enrichment is fiendishly difficult, says Ryan Snyder, a nuclear physicist at Princeton University, who is working on an assessment of its impact on proliferation. Nevertheless, far more engineers work with lasers than with centrifuges, he adds, so advances are constantly being made.

Non-proliferation optimists think laser-enrichment might not work as well as advertised, because GLE has still not begun commercial production. But this may be only temporary, because the company says the price of enriched uranium is too low to justify completing the project. A regime keen for a more discreet path to the bomb would not bother with such considerations.



# Driving on camera

**Dash cams:** Small video cameras that film the road ahead are being used by motorists to help keep them out of trouble and avoid bogus insurance claims



THE idea of fitting a car with a video camera only struck many motorists as a good idea in February 2013. That was when a meteor streaked over Chelyabinsk in Russia before exploding, injuring more than 1,000 people and damaging thousands of buildings. Soon after, videos of the giant fire ball began to appear online—which in an age of ubiquitous smartphones is, perhaps, not surprising. But what was rather unusual is that a dozen or so were filmed by small cameras mounted on the dashboards of cars—dash cams, as they are called. Such devices are growing in popularity as increasingly sophisticated cameras come to market. But why would motorists want them and what do they do?

The reason so many Russian drivers use dash cams is lax and sometimes corrupt law enforcement. They have become an essential accessory in a country with a high number of traffic accidents and uncertain resolution in apportioning blame. Indeed, thousands of Russian videos of horrific crashes, remarkable near misses and blatant attempts at insurance fraud by drivers and pedestrians have become a staple on YouTube and other websites. The cameras are also popular in China and are now being promoted more widely in Europe and America.

The ready availability of inexpensive digital-camera technology and flash-memory cards, some based on small “action” cameras used by sportsmen, led a number of relatively unknown Chinese, Taiwanese and South Korean producers into the dash-cam market. But now big consumer brands have started making them too, including America’s Hewlett-Packard, Japan’s Panasonic and Garmin, a large Swiss-based manufacturer of GPS-based products.

Cyclists and motorcyclists were among the first to use small cameras to film their ride and to collect evidence of clashes with motorists. Police and drivers of commercial vehicles also employ them. Many newer dash cams are engineered specifically for cars and range in price from less than \$100 to \$300 and more. They usually attach to the windscreens with a suction cup, like a portable sat nav. Although most contain a small battery for a short period of operation, dash cams need to be powered by a lead plugged into the vehicle’s power socket. Turning the ignition on and off automatically starts and stops the recording. They can also be wired

into the vehicle’s electronics.

Most companies produce a range of dash cams with the more expensive ones offering additional features, such as high-definition recording. Some have built-in GPS chips, which on playback can plot the vehicle’s route on a map. This might prove a mixed blessing: the GPS chip can also calculate and record speed, which could be incriminating. Many insurance companies will accept video as evidence in a claim, but rules vary around the world—dash cams are illegal for privacy reasons in Austria, for instance.

Nextbase, a British company, produces a dash cam called the 402G with GPS. A screen on the device is a useful way to check the camera is working and to change settings. The screen can be timed to go off after a few seconds to avoid distracting the driver and, once installed, the device can largely be forgotten about. Like other dash cams it constantly records segments of video with sound and stores them on a memory card, operating in a “loop”. Once the capacity of the card is full, it overwrites older segments. Dash cams typically have a sensor which prevents the latest video from being erased after a jolt from a crash.

Dash cams come in various styles. Mio, a Taiwanese company, makes one that works through a rear-view mirror. BlackVue, a South Korean firm, produces a combined forward and rear-view camera. The GPS-equipped nüviCam from Garmin also uses the camera to alert drivers, if, say, they are drifting out of the lanes on a motorway or getting too close to the vehicle in front.

Kirsty Quartley, a Garmin product manager, says one reason drivers buy dash cams is to protect themselves not just in the event of a disputed accident claim but also from faked crashes. This includes so-called “flash-for-cash” scams: a driver flashes their headlights to invite someone to pull out in front of them at a junction, but then deliberately drives into the other vehicle—the driver of which is then promptly blamed for failing to stop. This usually results in an inflated claim for “whiplash” injuries.

## A standard feature

In time dash cams could be included as optional or even standard equipment in cars, much as sat navs are now. Reversing cameras will be mandatory in new cars in America after May 2018, and an increasing number of new vehicles are being fitted with side-view cameras that help drivers see around blind junctions when pulling out. So, adding a relatively low-cost forward-facing camera and combining it with a recording function—even one that monitors the car’s other cameras—would not be difficult.

Carmakers may already be moving in that direction. General Motor’s new Corvette Stingray has a dash cam fitted as part of a system that logs its performance. Dash cams might one day be connected to event data recorders (EDRS), which are already fitted to most new vehicles. Originally intended to monitor the deployment of airbags, EDRS can record vehicle information, such as speed and braking, in the final seconds leading up to a crash. They have been used by police as evidence in prosecutions.

Some safety authorities have proposed using EDRS as part of a “black box” system in cars, much like that in aircraft. Equipped with video, such a system would provide useful detail for crash investigators. As cars become autonomous, such systems may well be needed to help apportion blame—not just to drivers but also to the cars themselves. ■



# A bridge to the future

**Civil engineering:** 3D printing technologies are being adapted for use by the construction industry to create buildings and other structures

INDUSTRY continues to find multiple uses for 3D printing, especially in rapid prototyping and for high-value, low-volume production in businesses such as aerospace. But one of the limiting factors is the size of the 3D printer itself: objects need to fit inside the machine to be built up layer-by-layer. Now some 3D printing systems are moving, so to speak, out of the box. That way they can be scaled up and used by the construction industry to print buildings and other structures.

A Dutch startup is even planning to print a bridge. MX3D, a company spun out by a furniture-maker, will use an external 3D printing system it has developed to print a footbridge across a canal in Amsterdam, once the city authorities have identified a suitable site and granted the necessary construction permits. The bridge (illustrated above) would have a span of up to 15 metres (49 feet) and be printed in steel in one go, rather than assembled from prefabricated sections.

For now the most common method of printing metal structures is selective laser melting, sometimes called laser sintering. This takes place inside a machine—the biggest is about the size of a car—which works autonomously. The process spreads a layer of metallic powder onto a base and then uses a high-powered laser to fuse particles together in the shape required for the first layer. The base is then lowered, a new layer

of powder added and the process repeated, melting the second layer onto the first, and so on until the object emerges.

Each stage is controlled by computer software, which takes “slices” through a virtual version of the object and uses that information to run the printer. “Without such software, it would be impossible to print a complex bridge like this,” says Tim Geurtjens, MX3D’s co-founder.

The MX3D system employs industrial robots to build structures additively. The robot’s arms are fitted with specially developed welding heads. Instead of producing blobs of molten metal to join parts together, the robots, in effect, keep welding—adding one drop of weld on top of another, and “drawing” out long rods of steel. To print the bridge, the robots will either sit on it, printing their own support structure as they go, or operate from barges moored on the canal below. Either way, the process is likely to take about three months. The project is being supported by Autodesk, an American producer of design and engineering software; Heijmans, a Dutch construction firm; and ABB, a Swiss-based maker of industrial robots.

The bridge will have a strong filigree-like structure that has been “optimised” by engineering software into its most efficient shape. This optimisation process (see box on next page) is becoming increasingly common in manufacturing because it re-

sults in lighter parts that require less material, but remain as strong as those they replace. However, the designs often cannot be realised with conventional methods and can be made only with a 3D printer.

It is yet to be decided what type of steel to use to print the bridge. It could, says Mr Geurtjens, be standard or stainless steel. A “weathering” steel is also a possibility. This is a mixture of alloys which quickly forms a coating of brown oxidation to give a “rusty” look. Apart from the ageing effect, the coating inhibits further corrosion, in effect obviating the need for painting.

## Homemaking

The use of 3D printing in construction is “no longer a novelty” in providing customised interior-decoration features, lighting effects and furniture, according to a recent report by Lux Research, a Boston consultancy. Interest is growing in printing large structural parts or even entire buildings because of the opportunities to save construction time and achieve a greater flexibility in design, the report found. But challenges remain, in particular developing printable construction materials and meeting building codes.

A number of collaborative projects, besides MX3D’s bridge, could provide answers. Skanska, a giant Swedish construction company, is working with Loughborough University in Britain to develop a high-performance concrete-printing robot. A group of 3D-printed office buildings are planned for the Museum of the Future, which is being built in Dubai. And in America, Neri Oxman and her col- ►

► leagues at the Massachusetts Institute of Technology's Media Lab are investigating a variety of 3D printing systems for construction, including one which uses swarms of small robots that extrude fast-setting materials to fabricate large structures.

Winsun, a Chinese company, has built a number of 3D-printed houses, including a five-storey apartment building. It uses a six-metre-high 3D printer to ooze a fast-drying paste made from a mixture of cement and recycled waste from construction sites. Under computer control, the giant machine deposits the paste layer-by-layer to create walls and other prefabricated sections of the building. These parts are then joined together at the construction site using steel reinforcing bars.

Printing complete buildings on site is the ultimate goal. A self-contained process to do that is being developed by Behrokh Khoshnevis at the University of Southern California. Called contour crafting, the process uses robots to print an entire building using locally gathered materials. Dr Khoshnevis is working with NASA on the project; the American space agency sees 3D printing as a way to construct accommodation and other infrastructure, such as landing pads and roads, on the Moon and Mars. The enormous cost of sending construction materials into space would be avoided by extracting useful stuff, including water, from the lunar and Martian surfaces. This would be mixed to produce a building material that could be deposited by the robots to form structures.

Instead of squeezing materials out like piping icing on a cake, contour crafting also shapes them with a pair of trowels next to the extrusion nozzle. It allows a greater variety of shapes to be formed. The printer can also produce the internal features of a building, such as tables and chairs. Dr Khoshnevis believes the technology could have a role back on Earth building structures in remote and hostile regions.

NASA is not alone in thinking that 3D printing may be the only practical way to build beyond the Earth. Foster + Partners, a London firm of architects, is working with the European Space Agency on a different system. It would use a rocket to transport to the Moon a tubular module that would unfurl to provide a domed support over which a robotic 3D printer would fabricate a protective shell using lunar material.

It will be some time before the multiplicity of skills used by labourers on a building site are replaced by a 3D printer. But in construction, as in other industries, the robots have begun to march. ■

## Wonderful widgets

**Components become more elegant with software that produces the most efficient shape**

MANUFACTURING revolves around components. These come in all shapes and sizes, but some are starting to look surprisingly different—elegant, even. That transformation is graphically illustrated by the three widgets pictured below. They all perform the same job, but the two on the right have been re-designed by a combination of software and 3D printing.

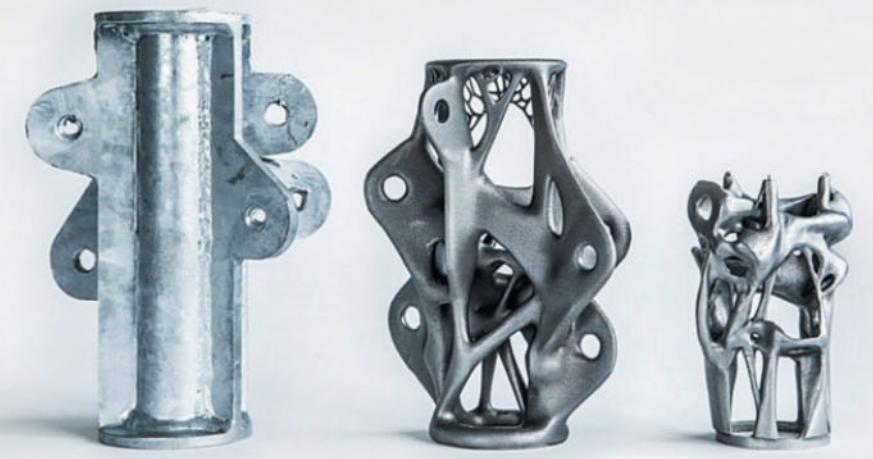
The component on the left, which is about a metre (39 inches) tall, was designed as one of 1,600 parts to hold the support cables and arms for a giant outdoor lighting system. It is made from stainless steel in the traditional manner by cutting and drilling sections, which are then welded together. The work was done largely by hand—and was something of a chore because each of 1,200 of the brackets had to be different.

The other two components have been analysed by a computer to find the optimal design that is able to provide the same strength, but from the least amount of material. The middle component was optimised to keep the fixing points for the arms and cables in much the same place, and resulted in a 40% weight saving. Moreover, it could be printed in one go and design variations automatically handled by the software. The third version was obtained by

allowing the system to completely rejig the entire structure. It produced a 75% weight saving.

The work was carried out by the Amsterdam office of Arup, a global firm of consulting engineers, as a research project. Optimisation software typically comes up with natural-looking shapes that seem to mimic nature—which is not surprising as nature has had a few million years' head start designing structures like bones, stems and leaves. Salomé Galjaard, the team leader at Arup, thinks optimised 3D-printed components could be widely used in civil engineering to save weight and materials, provided contractors and standards authorities accept them.

That seems to be happening. Stratasys, an American producer of 3D printers, said recently that one of its machines had been used by Airbus to make more than 1,000 parts, typically for interior use, for the first A350 XWB airliner. Stratasys said the parts, printed in a resin-type material, had met aerospace certification standards and, besides being lighter, helped Airbus meet its delivery commitments. GE says only 3D printing will be able to make the fuel nozzles for its next generation of jet engines. And instead of being constructed from 18 individual parts, they will be printed as single items. Besides providing enhanced performance, the nozzles will be 25% lighter and should last five times longer.





# Teaching tomorrow

**Sebastian Thrun:** The pioneer of Google's autonomous cars wants to teach people how to face the future

**B**ECAUSE of the increased efficiency of machines, it is getting harder and harder for a human to make a productive contribution to society," says Sebastian Thrun. This is what you might expect to hear from the man who suggested Google's controversial Street View project to photograph the world's roadsides, who developed the company's eerie self-driving cars and who founded the secretive Google "skunk-works" project responsible for Glass, a wearable computer that resembles spectacles. Yet that does not mean Mr Thrun is in thrall to the march of the machines. "To the extent we are seeing the beginning of a battle between artificial intelligence (AI) and humanity, I am 100% loyal to people," he says.

Long before he felt compelled to pledge his allegiance to the human race, Mr Thrun was fascinated by the interaction of people and robots. Mr Thrun was born in Germany in 1967 and as a graduate student at the University of Bonn designed RHINO, a cleaning robot that could explore an office it had never been in before, build a digital map of its floors and locate items such as drinks cans or balls of paper. Lacking arms, it simply barked out its intention to clean up the mess—or perhaps to encourage humans nearby to muck in.

In 1994 Mr Thrun entered RHINO into a competition organised by the Association for the Advancement of Artificial Intelligence, in Seattle. The robot was a success, not only helping tidy up the contest's intended conference room but venturing out into hallways to find more rubbish. RHINO was succeeded by a brace of experimental robotic guides, complete with voices and faces that smiled and frowned, to interpret exhibits for museum visitors in Bonn and Washington, D.C.

These innovations attracted the attention of Stanford University in California, which in 2004 invited Mr Thrun to become the head of its revitalised Stanford Artificial Intelligence Laboratory (SAIL). Given a throng of enthusiastic students and free rein to "change the way we understand the world", Mr Thrun chose to focus on a follow up to the Grand Challenge, an off-road race for self-driving vehicles organised by DARPA, the Pentagon's R&D wing.

"At the time, there were a few, little-

noticed people who had this vision to transform the world by making cars drive themselves," says Mr Thrun. They consisted mostly of university researchers and enthusiasts with little funding and even less exposure. Their cars were equally uninspiring. One flipped itself over before the first DARPA race in 2004 started and soon others broke down or became stuck. Even the best completed just seven miles of the 150-mile course.

The follow-up event in 2005 was a different story. Mr Thrun's SAIL group modified a Volkswagen sports-utility vehicle with lidar, which works like radar but uses light waves to bounce off features and thereby build up a much more detailed picture of its surroundings. The car, nicknamed Stanley, also had video cameras, wheel sensors and GPS navigation. It crossed the finish line of a (slightly easier) 132-mile course first, in under seven hours. It was also during this desert race that Mr Thrun met and befriended Larry Page, co-founder of Google.

Stanley and its rivals proved so competent that in 2007 DARPA held a third contest for autonomous cars, the Urban Challenge. This required vehicles to navigate 60 miles of city streets, avoiding traffic and obeying all the rules of the road. This time around, SAIL's car, a Volkswagen estate dubbed Junior, took only second place. But in developing it, Mr Thrun discovered that car-mounted cameras pointing in all directions enabled his team more easily to understand and debug Junior's performance. "And then at some point we realised the images alone were really interesting, that they might allow you to travel to distant places," says Mr Thrun.

## Picture this

Mr Page agreed, and lured Mr Thrun out of academia to work on Google's project to photograph the world. Google Street View quickly became the biggest image database ever built. In the process, it captured more than just landmarks and shopfronts; it immortalised individuals leaving strip clubs, political protesters, sunbathers and people being arrested. Street View vehicles also illegally (but inadvertently, says Google) collected Wi-Fi data transmissions from millions of private users. The company subsequently faced legal and regulatory action around the world.

By this time, Mr Thrun had moved on. "The obvious next thing was to use these methods for something other than just sightseeing and helping people find their way around," he says. Google had decided ►►

## Imagine how many weeks of your life you waste being in traffic jams

► to build its own self-driving car. Mr Thrun assembled a team of engineers from Silicon Valley, and Google purchased a small startup from Berkeley, called 510 Systems, that had demonstrated a self-driving Toyota Prius. This formed the nucleus of a fleet of autonomous Prius hybrids that were soon criss-crossing the Bay Area, using Mr Thrun's mapping technology.

Unlike traditional carmakers, which were inching their way towards autonomy with collision avoidance and lane-keeping systems, Mr Thrun's vision was always a fully self-driving car. "Imagine how many weeks of your life you waste being in traffic jams, that you could use productively, or watch a movie or sleep," he says. "Then think, if a car could come to you empty, would you still own one? We could live in a much better society if there was less personal car ownership."

Mr Thrun points out that cars are typically being driven on the road for just a fraction of time, and that even motorways that appear jam-packed are only 5-10% physically occupied. Intelligent, self-driving cars could unlock existing capacity in cities, meaning less road-building and fewer cars and car parks. But the great promise of self-driving cars is their supposed ability to reduce accidents that now kill over 1m people globally each year. "At this point, I can happily and proudly say that Google's cars are clearly better drivers than me," says Mr Thrun.

With his self-driving cars making rapid progress, Mr Thrun was given responsibility for nurturing other innovative concepts at a secretive new division of Google that came to be known as Google [x]. Google [x] projects that have been publicly announced include airborne wind turbines, diagnostic contact lenses, wireless internet for remote areas using high-altitude balloons and surgical robotics. "We ran a whole bunch of experiments, crazy moonshots that rational people would probably agree could never be done, just to see how far we could get," he says. "While not every project has been a success [and] there have been many failures, I still believe we made substantial progress."

Mr Thrun says that the biggest difference between Google[x] and a research institute is Google's drive to take ideas from the drawing board to a finished product. The only example, so far, is Google Glass—lauded and derided in equal measure for its miniaturised heads-up display, speech control and pervasive video capture. Despite the public's tepid reaction to Glass, Mr Thrun believes that

prosthetic devices capable of recording, digitising and transcribing a person's entire life are already technically feasible.

Recently, however, Mr Thrun has come to realise that such things come at a price. "Machines will eventually outsmart people in every dimension. They are becoming more capable at a faster pace than people and therefore will effectively outsmart us in a short amount of time," he says. Professional drivers may be among the first to be displaced by robots but few professions are safe, he says: "There are already robotic journalists. Sure, they aren't very good but they're getting better faster than human journalists are."

Mr Thrun now believes that education is the best way to tackle the big upheavals that are likely to spring from the widespread adoption of artificial intelligence and robotics. But not education as you might know it. "We are still living with an educational system that was developed in the 1800s and 1900s," he says. "Needs have shifted in the modern age and what's also shifted is our ability to use digital media. We can now deliver a top-notch education at home in a way that was never possible before."

### The nano alternative

In 2012 Mr Thrun left full-time work at Google to found Udacity, a startup dedicated to reinventing education for the 21st century. Udacity's "nanodegrees" combine on-demand video lessons, short online quizzes and longer projects, and are designed in collaboration with high-tech companies desperate for skilled workers. The idea is that anyone with a few minutes to spare can log on and work through a programming course at their own pace.

Mr Thrun insists that nanodegrees are distinct from massive open online courses (MOOCs), the digital lecture series which are now offered by many higher educational institutions. Udacity analyses individual students' learning data (using AI) in an attempt to increase their retention and completion rates. "We effectively reverse-engineer the human learning brain to find out what it means for a person to engage," says Mr Thrun. "It's my dream to make learning as addictive as a video game."

Online lessons and automated tests are free, although students pay for feedback from real humans and to obtain a certificate on completion. Because the teachers are usually recent nanodegree graduates rather than traditional professors, Udacity can keep prices to just a couple of hundred dollars a month, which is about a tenth of



the price of a university. Mr Thrun also claims that over 60% of Udacity students finish their courses, compared with around 10% for MOOCs.

Depending on their complexity, nanodegrees are designed to take just 4-12 months to complete. Shorter courses like these are appropriate for today's high-paced workplace, says Mr Thrun. "The dream of lifetime employment has gone. In my field, whatever you've learned becomes obsolete within five years. If you only spend six months on your first degree, as opposed to the average six years for a bachelor's degree today, you can afford to get more education when you need it again later on."

Udacity has some 4m registered users worldwide, and about 60,000 students working on nanodegrees at any one time—more in all than the largest university in America. However, at the moment it only offers six nanodegrees, all of which relate to computer programming. Mr Thrun says this reflects a big demand for computer-science courses. He refers to a report by McKinsey Global Institute, a research arm of the consultancy firm, which estimates that by 2020 the world will have 95m more low-skilled workers than employers require, and 85m too few educated workers to fill jobs.

"We have a situation where the gap between well-skilled people and unskilled people is widening," he says. "Udacity is my response to the development of AI. The mission I have to educate everybody is really an attempt to delay what AI will eventually do to us, because I honestly believe people should have a chance." ■

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## Also in this section

48 Guatemala's president

48 Canada's pot-loving church

Bello is on holiday

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## Brazil's economy

## Desperate times, desperate moves

RIO DE JANEIRO

## Beset by dismal economic data, Dilma Rousseff tosses Congress a challenge

**W**HEN a president has single-figure approval ratings, faces calls for her impeachment, and has lost control of her political base, is she in a position to play hardball with the country's legislators? Brazilians will soon find out.

On August 31st Dilma Rousseff, their president, sent Congress a budget for 2016 with a gaping primary deficit (before interest payments) of 30.5 billion reais (\$8 billion), or 0.5% of GDP, challenging its members to close the gap. It was a break with the sound-money practices that have underpinned Brazil's economy. It was, some critics say, illegal. Certainly nothing similar has happened since at least 2000, when Fernando Henrique Cardoso, then the president, transformed public finances.

On a charitable view, Ms Rousseff was

shocking legislators into making hard decisions rather than simply blocking her fiscal proposals. A harsher reading is that she does not know how to lead Brazil out of recession. The markets took that view. The day after the budget bombshell, the Ibovespa stock index fell over 2% and the currency closed at 3.7 per dollar, its lowest since December 2002. On September 2nd, the central bank held steady a key interest rate it had been raising since last year.

Public finances have already deteriorated this year. Having originally planned a primary surplus of 1.1%, in July the government cut that target to just 0.15%, as interest rates rose and tax receipts fell. The total deficit this year will be 8.9% of GDP. In August Moody's, a rating agency, cut its assessment of Brazil by a notch to just above junk status. It hinted at worse to come by calling the latest news a sign of "the fiscal challenges that Brazil continues to face".

The risk of a downgrade is one reason for the pessimism which, some pundits think, is now the prevailing mood in the corridors of power. "The government is basically throwing in the towel," says Alberto Ramos, an economist with Goldman Sachs, an investment bank.

Ms Rousseff is in a tight corner. She issued her budget after scrapping a plan to reinstate a tax on financial transactions that would have brought in 80 billion reais in 2016. She retreated after her vice-president, Michel Temer, rejected the idea and told her Congress would block it. Several

opposition figures say that, far from finding a way to make Congress do homework, the president has broken a fiscal-responsibility law enacted in 2000 as part of an effort to mend Brazil's finances after decades of chaos. They say they may take her to court.

On this point, the president may be right. Mansueto Almeida, an economist who is critical of Ms Rousseff, says that though the law requires the executive to show how its spending will be funded, it allows a rise in debt. Júlio Marcelo de Oliveira, a prosecutor for the Federal Court of Accounts, agreed that the president, whose alleged budgetary misdeeds he has previously investigated, acted legally this time.

Legal or not, the president's move weakens her American-trained finance minister, Joaquim Levy, who was reported to have lobbied for further spending cuts and was a reassuring figure for markets. Ms Rousseff has consistently failed to hit economic targets since being elected in 2010, but in the early days she dodged the political flak. Many people blamed her then finance minister, Guido Mantega, who was known for over-promising. Replacing him ►

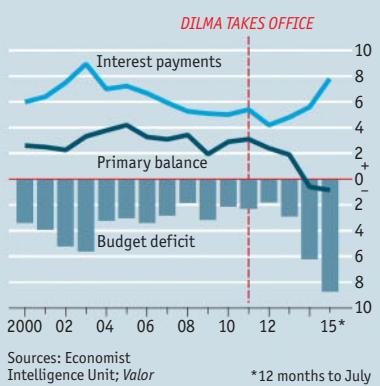
## Boom goes bang

Brazil



## In a hole, still digging

Brazil's budget balance, as % of GDP



► with Mr Levy was supposed to fix that problem; his loss of face bodes ill.

To restore credibility, Mr Ramos argues, the government needs to end up with a primary surplus of 3.0-3.5% of GDP. Simply stabilising the debt-to-GDP ratio is not good enough, he says: it is already too high. At a minimum, tough horse-trading with Congress looms. Renan Calheiros, the president of Brazil's Senate who has had several rows with Ms Rousseff this year, said on September 1st he would not send the budget back to her, as many opposition people want. "It is up to Congress to improve it," he accepted. And on any fair assessment, Congress shares a lot of blame for Brazil's economic woes; for example, it neutered many of Mr Levy's better ideas.

Is there any way out? It looks unlikely that tax rises can be avoided: about 90% of the budget is ring-fenced, leaving little discretion for spending cuts. If the government were strong and confident, it might acknowledge the need for a short-term rise in debt while seeking ways to limit spending on pensions, health and education, and laying out a long-term plan to restore fiscal health. But pushing such reforms through Congress would take political will and capital, and this was not done during Brazil's boom years when it would have been easier. Now, says Mr Almeida, "We are paying for all of the mistakes [of] the past five years." The mystery, he adds, is why Brazil has not lost its investment grade already. ■

#### Guatemala's president

## Not so serene

**In a regional breakthrough, a leader is forced out by charges of graft**

"I AM completely calm," declared Otto Pérez Molina, stoutly, at a press conference on August 31st. He was referring to the corruption allegations he faced. By the next evening, he had much less reason to be sanguine, because the country's lawmakers voted to end his immunity from prosecution. Hours later, he was barred from leaving the country; then an arrest warrant was issued, and he resigned.

Mr Pérez becomes the first leader of Guatemala to be forced out of office and made to face legal proceedings because of sleaze. For anti-corruption campaigners throughout Latin America, the news was a rare and sweet breakthrough for the principle that holders of high office must be held to account like everybody else. In Guatemala, a land which is still riven by social divisions and demands for justice after a long civil war which ended in 1996, street protesters cheered enthusiastically.

#### Canada's pot-loving church

## Dope springs eternal

VANCOUVER

#### A divine distributor of drugs

ROBIN DOUGLAS apologises for not putting on his shirt while giving a sermon to a parishioner via Skype. His listener doesn't mind; she doesn't feel well enough to drive the hour from her home to the Church of the Holy Smoke in White Rock, a seaside town near Canada's border with the United States. So she gets his rambling advice via a laptop.

Even in the Vancouver area, mocked by Canadians from elsewhere as a nest of decadence, Pastor Douglas, as he calls himself, leaves nobody indifferent. His parish office is a wooden house with hand-written signs at the front and old pizza boxes inside. His central place of "worship" is a tatty tent; the main liturgical practice is smoking marijuana.

The rich folk who share the beach-front rejoiced in midsummer when the council told him to fold the tent and put an end to the smoke, garbage and noise. He is unrepentant. "We are a church," he insists. "We do good works, we help cancer patients with free marijuana. I could be a millionaire if I sold it."

How strong is his legal case? Canadian courts, like American ones, have been

asked whether inhaling intoxicants is a religious practice which merits protection; judges have usually been sceptical. Canada's indigenous faiths use sage and tobacco in their rites, but not marijuana.

Still, the pastor got a secular fillip in June when Canada's Supreme Court affirmed that medically prescribed marijuana could be taken in cookies, brownies and teas as well as in dried form. For now, his smoke is still rising.



A new opium for the people

The president stands accused of involvement in "La Línea", a scheme named after the hotline it used, in which customs officials are alleged to have accepted kick-backs in exchange for reducing the import duties companies were required to pay.

Allegations linking the president to La Línea are not new. Congressmen had already voted once before on removing Mr Pérez's immunity, but supporters of the move did not reach the two-thirds threshold required by the constitution. On August 21st, though, the attorney-general's office together with the International Commission Against Impunity in Guatemala (CICIG), a United Nations-backed institution created in 2007 to investigate high-level crime, again presented the case. The vice-president, Roxana Baldetti, was arrested that same day on charges linked to La Línea. She had resigned earlier in the year after a former aide was accused of being the scam's ringleader. According to Iván Velásquez, the Colombian head of CICIG, the "number 1" and "number 2" mentioned in tapped conversations between La Línea's players may have been Mr Pérez and Ms Baldetti.

The move to strip immunity was approved by the Supreme Court and by a congressional committee, before Congress as a body reconsidered the matter. This

time all those present at the vote—132 lawmakers, including several from Mr Pérez's own Patriot Party—voted in favour.

The scheme is believed to have started before Mr Pérez became president. He has apologised for the fact that it continued during his tenure, but strongly denies any personal involvement. The attorney-general's office has insisted all along that the head of state must be investigated like an ordinary citizen.

This latest brouhaha happened in the week before a presidential election that Mr Pérez is constitutionally barred from contesting. The favourite to top the polls on September 6th is Manuel Baldizón of the populist Lider party.

If no clear winner emerges the man most likely to be joining Mr Baldizón in a run-off election in October is Jimmy Morales, a comedian-turned-politician who has benefited from many voters' disenchantment with the political class. But the fate suffered by Mr Pérez overturns many assumptions. Guatemalans who are cheered by the news could turn out to vote in far bigger numbers than expected. They may reward Lider for supporting the anti-immunity move and securing the president's removal; on the other hand, they may back Mr Morales as the candidate of change. ■



### The Middle East and oil

## The perils of relying on the sticky stuff

CAIRO

### Persistent low prices threaten the entire region

**F**OR too long, the news from the Middle East has been of nothing but war, terror and revolution. Yet for some countries recent times have quietly been, until very lately, pretty comfortable. A decade of high oil prices has left the region's oil exporters with more than \$2.5 trillion in accumulated sovereign assets along with scads of fancy toys: whole new cities, new highways, railways, factories, ports and airports, not to mention heaving arsenals of the latest weaponry.

That pile has cushioned them so far against serious fallout from last year's collapse in global oil prices. Overall, the finances of Middle Eastern oil producers are in far better shape than those of shakier oil rivals such as Venezuela and Nigeria. But with no signs of an end to the world's current oil glut, fears are mounting of a sustained trough. Behind closed doors and in social media, the talk in the region is of a repeat of the 1980s, a grim era for oil producers when revenues not only crashed, but stayed depressed for nearly 20 years.

It is impossible to predict that far ahead, and the effects of even a far shorter slump are likely to differ from country to country. Qatar, for example, has so few citizens and so much money that it could, at a pinch, survive for years on income from overseas investments, such as its estimated \$10 billion-worth of London property. By contrast Algeria, with 40m people, faces a far more immediate squeeze. It ran a trade deficit of

\$8 billion in the seven months to August (roughly 7% of GDP when annualised) compared with a \$4 billion surplus in the same period last year; its currency has lost a quarter of its value against the dollar.

Algeria also harbours dark memories of that earlier slump. The oil-price collapse of the 1980s put an end to the social contract whereby the government provided jobs and generous welfare in exchange for neutered politics. As wages dropped and inflation and unemployment surged, riots erupted, followed by political turmoil and then, during the 1990s, civil war.

Algeria's generals eventually won the upper hand, decimating and exhausting

### Also in this section

- 50 Iran's elusive General Suleimani
- 51 The difficulties of investing in Iran
- 51 Smartphones and Haredi Jews
- 52 Hurting tourism in South Africa
- 52 How Boko Haram hides

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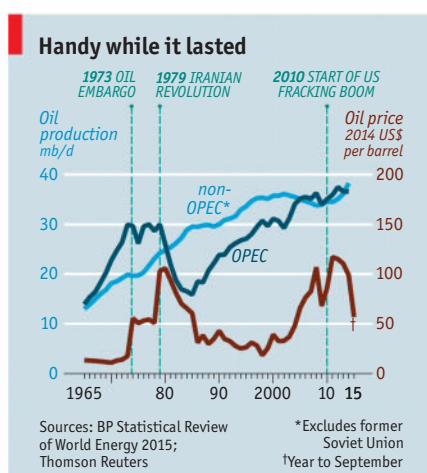
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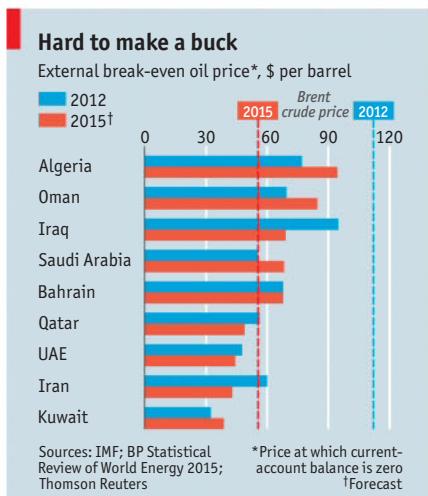
their Islamist opponents. But what sealed the fragile peace was the return of the same social contract, made possible by an upturn in oil prices. When the Arab spring broke out in 2011, Algeria stayed quiet. This was not only because its people knew all too well the danger of revolt, but because the *pouvoir*—as Algerians call the cabal of generals and apparatchiks who run the country—could afford a big boost in wages and public spending on infrastructure.

Despite chronic unrest and an ageing leadership—President Abdelaziz Bouteflika is a very frail 78—Algeria is not in immediate danger of a relapse. The oil boom left it with little debt and hefty reserves. Yet these have already declined by nearly \$20 billion from a peak of \$194 billion last year. Algeria still relies on oil and gas for 95% of its exports and the vast bulk of its state revenue. Last year, when the price collapse from triple digits to under \$50 per barrel was just setting in, the government ran a deficit of 6.8% of GDP. With its income likely to fall by half this year, a burden of state subsidies that consumes 13% of GDP, and youth unemployment already pushing 25%, it is no wonder that Algeria's government recently called for an emergency meeting of OPEC, the oil-export cartel, to find a way to boost prices.

The big Arab Gulf producers, led by Saudi Arabia, ignored the call. They not only have a far larger buffer of savings. They are, in effect, driving the price plunge in pursuit of a long-term strategy. This, too, is based on experience from the 1970s and 1980s. As our first chart shows, oil producers learned then that when the cartel pushed prices too high, consumers rushed to find other sources of energy. As a result, it took OPEC nearly 20 years to regain the market share it eventually lost.

Already, the latest price crash has sharply scaled back plans to expand oil explora-





tion and development elsewhere, but this has not yet affected production. A recent report by Saudi Arabia's central bank bemoaned the fact that non-OPEC producers have proved "not as responsive to low oil prices as had been thought". It called for more patience by OPEC "and a willingness to sustain current production until the demand catches up with the current supply levels". That advice has not fallen on deaf ears: Saudi Arabia, along with Iraq and Oman, is pumping oil at record levels.

The question is, how long can Saudi Arabia and its oil allies afford to wait, and at how great a cost? Like Algeria, the kingdom has drawn deeply on its reserves, which have shrunk by 11% from around \$740 billion a year ago. It has started to issue debt for the first time in years. The IMF, in a recent report, predicts a Saudi budget shortfall this year of 20%, at a time when the kingdom is sustaining defence outlays bigger than Russia's and is simultaneously pursuing a war in Yemen, giant infrastructure projects such as a six-line metro for its capital, Riyadh, and providing billions to prop up the government of Abdel-Fattah al-Sisi in Egypt.

Yet Saudi Arabia, along with the richer-per-head satellites of Kuwait, the UAE and Qatar, can keep this up for some time. With the world's lowest debt-to-GDP ratio last year (an enviable 1.6%), it has enormous room to borrow. It also has room to save. Simple measures such as imposing sales and property taxes, or raising absurdly low local energy prices, could quickly help fund budget shortfalls.

Even so, the wealthiest oil exporters should be worried. They may have learned many lessons from the past, but there is one that remains largely undigested. Despite innumerable warnings and innumerable failed attempts to diversify their economies away from oil, nearly all of them still rely on the sticky stuff to get by. With relentlessly growing populations and public expectations, it is still only a matter of time before the crunch comes. ■

## Iranian politics

# A lion in winter

TEHRAN

### The intriguing eclipse of a military hero

AS IRAN'S most prominent security operative, Major-General Qassem Suleimani has long been respected at home; but as a creature of the shadows. That changed when pictures of him appeared on social media from the battlefields in Iraq, directing the fight against Islamic State and pushing its jihadists back from the approaches to Baghdad. The 58-year-old commander of the Quds Force, the foreign wing of Iran's Revolutionary Guards Corps (IRGC), quickly became a celebrity, even winning a Man of the Year poll. With Iran keen to project its growing influence in the Middle East, the pictures of General Suleimani were at first tolerated and then actively encouraged in state-run newspapers. He even acquired a parody Twitter account, and some admirers fawningly dubbed him "Supermani".

This has all changed again. In recent months General Suleimani has all but vanished from view, only appearing this week to give his scheduled annual report on regional affairs to Iran's powerful Assembly of Experts. Not only are the selfies of him posing with Shia militias now seen as unhelpful, but much of his strategy has also been called into question. "He put too much pressure on Iraq's Sunnis. There

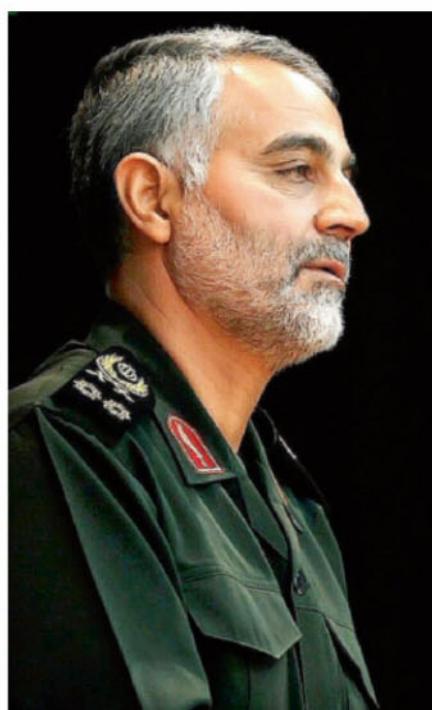
were a lot of complaints about him," says a political analyst in Tehran. Chief of the critics, it is said, is Grand Ayatollah Ali al-Sistani, Iraq's most senior Shia cleric. A public rebuke by the ayatollah, issued on March 13th, followed a series of boastful remarks by the general about Iran's mighty influence in Iraq, Syria, Lebanon and Bahrain. A private message of concern from Mr Sistani even reached Iran's supreme leader, Ayatollah Ali Khamenei, according to a well-placed source in Tehran. But it was comments made shortly afterwards attributed to General Suleimani, about the so-called Shia crescent reaching a fifth Arab state, Jordan, that proved the final straw. "He is under the control of a council now and can no longer act as a *de facto* foreign minister," the source says.

Saudi Arabia's push into Yemen this summer also seems to have been part of General Suleimani's undoing. The Saudi action, at the head of an Arab coalition, came in response to Iran's involvement in backing and supplying the Houthi rebels, a group that follows a form of Shia Islam and that drove the internationally-recognised government from the country in March. "The Quds Force gave a very bad estimation in Yemen," says the Tehran source. "They assured the supreme leader that Saudi Arabia would not attack. That is why Mr Rezaei is back in uniform."

The last-mentioned man is Mohsen Rezaei, a former chief of the IRGC. He tried politics, but failed three times to become president after his retirement from the armed forces in 1997. General Rezaei is regarded in Tehran as reliable, but lacking in charisma; he seems to have been brought back into the IRGC to keep an eye on General Suleimani. "The Quds Force does not have a public-relations department and by its nature is quiet. The pictures were too much, and that's why the regime stopped them," says the source.

As General Suleimani has retreated to the shadows, a new front-man with a very different persona has emerged: Mohammad Javad Zarif, the foreign minister. Iran, fresh from a nuclear deal with America and five other world powers, is now favouring diplomacy rather than military action in Iraq and Syria. This being so, it is Mr Zarif who now dominates Iran's foreign policy—a break with recent years, when General Suleimani was often seen as Iran's power-broker abroad.

In recent weeks Mr Zarif has travelled to Russia, Iraq, Oman, Qatar, Kuwait, Lebanon and, this week, Tunisia. His latest task, insiders say, is to find an endgame in Syria that limits, rather than increases, Iran's armed involvement in the civil war there. Tehran admits only to providing military advisers to Bashar Assad's regime, but several generals have been killed in Syria, along with many soldiers. The cost, in treasure as well as blood, is getting too high. ■



In and out of the limelight



## Investment in Iran

### Not so fast

ZURICH

**Enthusiasm for post-sanctions Iran is being tempered by realism**

**A**CROSS Europe, businessmen pack conference halls to discover how to unlock Iran's vast potential after three decades of isolation. Four hundred of them piled into a hotel in Zurich on August 27th for a day of briefings which, if on the subject of other similar-sized countries, might attract 50. Others are filling the flights to Iran. Austria's president is planning to take 240 businessmen with him when he visits later this month. "Welcome to a country with the population of Turkey, the size of western Europe with the world's largest reserves of gas," gushed a speaker at the Zurich event. Not only would they enjoy access to Iran's 80m people, but to a hub for trading with hundreds of millions more in Iran's troubled neighbours.

Why, then, are the Iranian markets so glum? The Tehran stock exchange, which rallied after the interim nuclear deal in Lausanne in April, stuttered and fell after the final one in Vienna in July. Businessmen there moan of unshiftable inventories and sharply overdrawn balance-sheets. Property prices and construction are flat. "Outside Iran there's hubris, inside there's misery," says a London-based Iran consultant.

Sanctions have indeed created pent-up demand, but they have also dried up the liquidity needed to finance it. The price-tags delegates place on Iran's needs—\$15 billion for its railways, \$200 billion for its energy sector, \$30 billion for tourism—look exciting, but paying for them is a different matter. Oil prices are down by half, sharply re-

## Smartphones and ultra-Orthodox Jews Digital temptations

JERUSALEM

### Haredi rabbis face an impossible battle

**T**HE Council of Torah Greats, a forum of some of the most distinguished ultra-Orthodox (or Haredi) rabbis in Israel, gathered on June 30th to discuss a "great spiritual danger". WhatsApp, a messaging app for smartphones, it turns out, has become a popular method for their followers to form groups for exchanging gossip and even "immodest" images and video clips.

So the rabbis issued a long list of edicts including an injunction to stop using WhatsApp, and instructions to purchase only specially programmed smartphones with filters keeping out all but rabbincally-approved data services. To enforce the prohibitions, they declared that those who are found to own non-kosher devices will have their children expelled from ultra-Orthodox schools and will not be allowed to work in their institutions.

This is only the latest round in a long struggle by the rabbis to keep modern media from corrupting their community. It used to be simple, for the spiritual leaders of the section of religious Judaism that believes in cutting itself off from the secular world, to keep hostile influences out. Televisions were large cumbersome appliances, which needed prominent antennae and could not be hidden away. Owning one was immediate grounds for ostracism. Secular newspapers could be bought only outside Haredi neighbourhoods, and had to be read on the sly.

Without competition from television, print journalism has continued to flourish among the Haredim; three daily

newspapers and dozens of weekly and monthly magazines cater specifically for them. All these publications are subject to rabbinical supervision and often censorship. They adhere to a strict code. Photographs of women (even modestly dressed), are banned, as are references to sexual issues or reporting on violent crime. Deference towards rabbis is compulsory. So, too, is a clear conviction that a God-fearing and Torah-observant life is the only one, while a secular lifestyle is a one-way path to depravity. The internet has changed all that.

The rabbis tried banning computers from homes. But they were forced to concede that these were necessary for work purposes, so they next tried to forbid them from being connected to the internet. In recent years, though, these prohibitions have become irrelevant; mobile web-connected devices have largely replaced the earlier generations of cellular phones.

The ultra-Orthodox community's purchasing power is such that Israeli mobile-phone providers agreed to market special "kosher connection" smartphones, without the offending apps and allowing only carefully regulated information services. To make sure the faithful use them, these devices have their own group of phone numbers and a distinctive ringtone. But many younger Haredim have ignored the edict, or instead buy two mobile devices: one for calls within the community, while tucked away in another pocket is a smartphone to keep up with the outside world. The path of righteousness is not easy.

ducing revenues as well as the incentives to invest when reopening happens.

In the meantime nepotism, legal unpredictability and state companies masquerading as private ones will all bedevil business. "The corruption is still at unbelievable rates," says Sharif Nezam-Mafi, one of the organisers of the Zurich conference. Financial experts insist that President Hassan Rohani remains on track to privatise the *inhisarat*, or state monopolies, which dominate the economy, are blacklisted by sanctions and often have close ties to the Revolutionary Guards. Mr Rouhani has sharply squeezed the money supply to cut inflation. And for all the sanctions relief, some American financial sanctions will remain. Western ministers travel back and forth to Tehran but no one yet knows when bank transfers will do the

same. Some wonder whether the Supreme Leader's call for "a resistance economy" could herald a new bout of protectionism.

Not all is gloom. Sanctions relief should release \$50 billion-120 billion (estimates vary wildly) of Iranian assets frozen abroad. Repatriation from the diaspora might add \$20 billion more. Mercedes and Volkswagen are said to be gearing up to replace Peugeot, which once ranked Iran as its second largest market, until sanctions forced its withdrawal. Coca-Cola is planning a major expansion in 2016. American grain exporters, who are already Iran's largest supplier of wheat, munched merrily at the Zurich lunch. Politicians and businessmen again speak excitedly of the Persian Gulf. But the reality is that the Iranian phoenix may take some time yet to become airborne. ■

## Tourism in South Africa

# Beware of good intentions

JOHANNESBURG

## New rules are driving tourists away

A HOLIDAY in South Africa should be an easy sell, offering pleasures from lion-watching and diving with sharks to sipping Pinotage in front of breathtaking mountain views. With the rand at record lows, South Africa is cheerfully cheap to visit, too, for travellers with dollars or euros in their pockets. But the government's stubborn adherence to new immigration rules is hurting tourism just when the economy needs a boost.

The new rules, which came into force in June, require minors to carry "unabridged birth certificates" when entering or leaving South Africa: an unusual requirement, since usually a passport will do. Although this is meant to prevent child-trafficking, it discourages family holidays. If children travel with only one parent, the written consent of the other is also required.

Under separate rules, visitors from countries requiring visas, including China, must apply in person at a South African mission in their home country so that biometric data may be taken, rather than on arrival, the easier option offered in many other countries. This forces the many tourists from China to make a long and costly trip to Beijing, Shanghai, or two other visa offices more recently opened.

As widely expected, many prospective visitors are simply choosing to go elsewhere. Foreign tourist arrivals for April were down 11% against a year earlier, according to Statistics South Africa. Chinese tourism has been especially hard-hit, down by 45% in 2014 compared with 2013. A study by Grant Thornton, commissioned by the Tourism Business Council of South Africa, said the country's tourism industry lost 886m rand (\$82m) in direct spending last year because of the new visa regulation—as well as other factors, including fears that Ebola might spread from west Africa. It estimated that South Africa would lose 100,000 tourists this year, translating into 1.4 billion rand in lost tourist spending.

Malusi Gigaba, the home affairs minister, has doggedly pursued the new regulations despite criticism from many quarters, including his government's own tourism minister. Arguing for the "unabridged birth certificate", his officials say that 30,000 children are trafficked in South Africa every year, though the ministry itself has recorded only 23 cases in the past three years. Mmatsatsi Ramawela, CEO of the tourism council, talks of a "standoff" between industry and the ministry.

So South Africa's frustrated tour operators cheered when President Jacob Zuma recently admitted his "concern" about the "unintended consequences" of the new rules. He announced a ministerial committee under his deputy, Cyril Ramaphosa, dubbed "Mr Fix-It", to try to solve the mess. But it is unclear how soon the changes may be made or how much damage will have been done by then.

The unintended consequences come at a bad time for South Africa; the economy shrank by an unexpected 1.3% (annualised) in the second quarter. Solidarity, a labour union, says 60,000 jobs will be lost this year, most of them in mining. Unemployment is already hovering around 35%. "This is more than just an 'unintended consequence,'" says Mmusi Maimane, leader of South Africa's main opposition party, the Democratic Alliance. It is, he says, "an economic catastrophe". ■

## Boko Haram

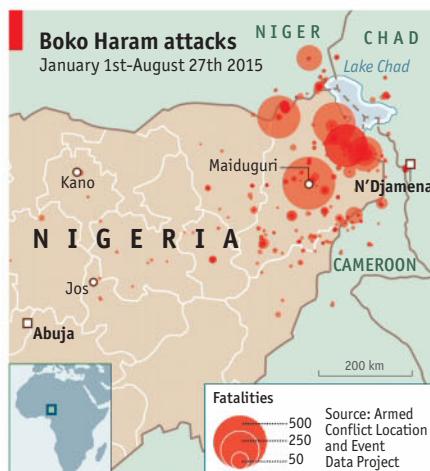
## Shadow army

LAGOS

## Nigeria has surprisingly little idea of what it is fighting against

HOW many times can one man die? At least four, in the case of Abubakar Shekau, the slippery leader of Boko Haram. Nigerian security forces celebrated his demise in 2009, 2013 and 2014, only for him to pop up again, disconcertingly animate, on camera. When Chad's president said in August that his troops had killed Mr Shekau, the jihadist was resurrected once again, this time with a voice recording. "Woe unto liars that had claimed I am dead," said the voice. "Nobody can kill me."

This relatively mild-mannered dispatch raised questions of its own. Most of what is known about Africa's most notorious terrorist derives from his gun-wielding, slave-



touting videos. If he were still at large, would he not release a film in his usual more robust style? Most probably, he is indeed alive. Whether he is injured is impossible to say. Experts dispute how old he is, or how religiously scholarly. Perhaps he is not one man at all. The army accused Boko Haram of using body doubles after he was "killed" last year.

The organisation Mr Shekau presides over is shrouded in more mystery still. Nigeria's insurgency has grown a lot bloodier since Mr Shekau took over from Mohammed Yusuf, who was (verifiably) shot dead by police in 2009. In theory a more conciliatory leader might offer some hope for compromise and peace. But what if many of Boko Haram's bomb-blasting ideologues answer to different bosses altogether? Even the most knowledgeable experts cannot agree on whether the organisation consists of one army or several.

This is a worry, to say the least. Nigeria has spent six years and billions of dollars battling the terrorists, who have killed over 15,000 people in their bid to establish a caliphate in the north-east. As attacks spill across borders, Chad, Cameroon and Niger have been drawn in. A regional army is set to deploy soon. Without basic intelligence, they are shooting in the dark.

One explanation for the sect's opacity is geography. Boko Haram's fighters hole up in the forests and mountains near the border with Cameroon, or along the desert fringes of Lake Chad. Telephone lines are often cut. Members communicate vital information in person. Fulan Nasrullah, a Nigerian security analyst, says Boko Haram conscripts only from families known to its spies, so it is not easily infiltrated.

A second view is that those who could solve the enigma do not try hard to do so. America designated Boko Haram as a terrorist organisation only in 2013. With a bounty of \$7m on his head, Mr Shekau is worth more to the Americans than any other outlaw in Africa. Yet there have been only modest efforts to train local soldiers and gather intelligence. Western governments do not view Nigeria's Islamists as a threat to their interests. Compared with Islamic State, Boko Haram is not a priority.

Within Nigeria, meanwhile, the war has made some generals and security agents very rich. They would perhaps rather not see it end. The official line seems to be that questions about what Boko Haram wants and how its forces are structured are peripheral. "Even if there is a split [between factions], we are not looking at it that way," says Mike Omeri, a government spokesman.

It had better start. The stringent new president, Muhammadu Buhari, recently gave the army three months to snuff out Boko Haram. Before they stand a chance of doing that, they will need to work out what they are fighting. ■



### Marriage in India

## Love (and money) conquer caste

MUMBAI

### More and more young Indians are choosing their own spouses

**H**ALF a dozen young technology workers are gathered around a table in south Mumbai. In between checking their smartphones, they describe an Indian social revolution of which they are in the vanguard. Marriage, one woman explains, is becoming freer and easier—"less stiff-necked", as she puts it. All have far more choice when it comes to picking a marriage partner than their parents knew: two of the women have even married men from another religion. The old-fashioned marriages that they see on television and in films seem deeply peculiar. "It's a different world," one says.

Marriage is a central institution in all societies. In India it often seems more important than anything else. Witness the extravagant, days-long weddings, the lavish gifts of saris and jewellery, and the columns of spouse-wanted ads in newspapers—or just watch any Bollywood romantic comedy. Yet marriage in India is also changing, in ways that are liberating and exciting but also often confusing.

Nearly all Indian women marry by their late 20s, and births out of wedlock are vanishingly rare. Marriages are almost always arranged. Dowry payments are widespread. About 90–95% of the time Hindus marry within their broad caste group. But if the basic rules of the game are fixed, the style of play is different these days.

Gourav Rakshit, the chief executive of a popular website for seeking marriage partners, Shaadi.com, spies a subtle but momentous change. It used to be that parents

and older siblings drove the matchmaking process, he says, lining up potential partners whom the spouse-to-be might veto. These days the offspring tend to be in charge of finding their own partners, but parents may veto them. "What has not changed is that marriage is a family decision," he explains. "What has changed is who is driving the process."

Fully 73% of the profiles on Shaadi.com have been put there by people who are seeking partners for themselves, not by their parents or brothers. These days most new users (about 12,000 to 15,000 people sign up each day) access the website via smartphones. Those phones, which are bringing the internet to millions of new users, are themselves changing the matchmaking process. Tech-savvy Indians can now find out all about potential partners

### Also in this section

54 A crackdown in Karachi

55 Indonesia's gentle leader

55 The Koreas woo China

56 Bullying pregnant women in Japan

For daily analysis and debate on Asia, visit  
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by tracking their digital traces through social media, or just by texting and telephoning. Parents need never know.

If small numbers of highly educated urbanites were becoming more individualistic, it would be little more than an interesting wrinkle in Indian life. However, the change is much more widespread than that. To begin with, this group is no longer small. Fully a quarter of young Indians were in tertiary education in 2013, according to the World Bank, up from 11% a decade earlier. Education and control over marriage go together (see chart).

And it is not just the wealthy who see marriage differently. The teenagers who live in Dharavi, a long-established slum between two railway lines in Mumbai, feel themselves to be just as culturally distinct from rural Indians as the technology workers do. Young men from Dharavi sometimes marry village women, who come to live with them. Asked about this, one teenage slum girl launches into a wicked impersonation of a rural bride, all *namastes* and scraping deference to her husband. (A Muslim boy is more equivocal: Mumbai girls know how to handle technology, he says, but rural girls know how to handle mothers-in-law.)

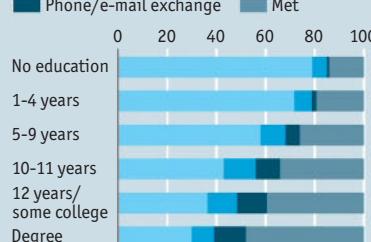
Although caste is still powerful in Dharavi, it is gradually giving way to the money god. Teenage boys insist that good jobs—government jobs especially—are now more important, both for snagging good partners and for asserting control over marriage decisions. One of the boys, an orphan, has a girlfriend and wants to marry her. Her parents object to his caste, but he reckons he can wear down their objections by finishing his education and getting a better job.

Dipankar Gupta, a sociologist at Shiv Nadar University, says that caste is crumbling as India urbanises. Nearly a third of Indians now live in cities or towns, while villages are tied increasingly to urban ➤

### Blind dates

Wife's pre-marriage contact with husband  
India, by education, 2011–12, %

None      Only saw photograph      Phone/e-mail exchange      Met



Source: India Human Development Survey

► economies. The village bosses who enforce caste rules have less power than they did. Some north Indian village elders have chosen to relax the rules anyway, because so many single men are in search of wives—a consequence of sex-selective abortions. Caste is now less an institution than a mess of prejudices about the superiority of one's own group.

Popular culture is driving change too. In parts of Dharavi the greatest hazard for a pedestrian is not the open sewer beneath your feet but the tangle of wires around your head. Many of these wires carry cable-television signals. They transmit soap operas and movies which often depict the struggle between love and tradition. Though these seem stuffy to the upper middle classes, they can be a revelation to the poor. Nayreen Daruwala of SNEHA, a Mumbai charity, has heard women complain that their husbands do not sing to them, as men do in Bollywood films.

One big thing stands in the way of fur-

ther change, says Sonal Desai, another academic. Indian parents still assume they will live with their sons. That explains why they exert so much control over marriage: they are in effect choosing a cook and a future carer. Yet this too is beginning to weaken. Ms Desai conducted a huge survey of Indians in 2011-12, which found that 77% of women over 60 lived with their married children—still a big proportion, but lower than the 83% who did so in 2004-05. Small houses and high-rise flats are shooting up in Indian suburbs, suggesting the share is going to fall further.

Indian marriage still looks very different from the Western kind (which is changing too). Yet prosperity and technology are eroding tradition. People Group, which owns Shaadi.com, even invested in a dating app earlier this year. Such apps, which were unimaginable in India until recently, have not taken off yet. "The guys are all keen," says Mr Rakshit, "but the girls aren't there yet." ■

lied to the party. Public anger is strong over allegations that PPP leaders have used control of the Sindh provincial government to enrich themselves.

Both parties are grappling with long-term decline. The MQM's once-unassailable grip on urban Sindh is melting as its base of "Mohajirs"—descendants of Muslims who moved from India in 1947—is being challenged by a fast-rising Pushtun population with their own political leaders. Altaf Hussain, who rules the MQM from self-imposed exile in London, is a subject of inquiry in investigations into alleged money-laundering and murder being carried out by British police. Some within the party regard him as a liability. As for the PPP, it has a well-deserved reputation for incompetence and no charismatic leader to compare to Benazir Bhutto, Mr Zardari's wife, who was assassinated in 2007. Since its electoral defeat in 2013 the party has shrunk from a national movement to being the voice of rural Sindh.

Crackdowns on political parties are not new: in the 1990s the MQM weathered an operation that at times descended into urban warfare. But the politicians are cornered as never before. The Rangers, unlike the police, are not under their control, but the army's. The corruption probes cannot be dismissed as partisan politicking.

Both Mr Zardari and Mr Hussain have lashed out at the army, threatening to expose its corruption. But its head, General Raheel Sharif, is wildly popular—not just for actions in Karachi but because he has declared war on the abhorrent Pakistani Taliban. The two men are now turning their ire on the prime minister, Nawaz Sharif (no relation of the general).

On August 31st Mr Zardari threatened to renounce his party's informal mutual non-aggression pact with Mr Sharif's Pakistan Muslim League-N (PML-N), in place since the two parties joined hands a decade ago against the former military rule of General ►

## Pakistani politics

# Upsetting the apple cart

KARACHI

**A crackdown on gangs in the country's most populous city threatens to upset national politics**

**A** YEAR or two ago only a handful of customers would brave a trip to Muhammad Arshad's shop in Karachi's jewellery quarter. They were highly likely to be robbed of cash on the way in or of purchases on the way out. Now, Mr Arshad says, business is up by 70% thanks to an army-directed crackdown in Pakistan's commercial hub by a paramilitary force, the Rangers, who are not shy of brutal tactics. Their operations have led to a sharp fall in serious crime. But not only kidnappers and murderers are feeling the heat in a city rife with criminality. So are two of the country's biggest political parties.

The Rangers launched their operations in September 2013, but have recently shifted focus. Scores of people from the Muttahida Qaumi Movement (MQM), which holds nearly all the parliamentary seats in Karachi, have been arrested, have disappeared, or have been bumped off in extrajudicial killings. The party headquarters has twice been raided this year. Attention is now turning to the Pakistan Peoples Party (PPP), in national office until 2013. On August 26th Asim Hussain, a former minister who owns one of Karachi's best hospitals and is a close associate of a former president, Asif Ali Zardari, was arrested under new terror laws.

The Rangers' actions are popular; Karachi has long needed cleaning up. The MQM

has run a huge and violent criminal racket in the city alongside its political wing. Mr Arshad dares not name the heavies who would demand payments of up to \$10,000 from shopkeepers every few months. But, operating street by street, the MQM had become a master of the extortion game. The PPP too has links to the underworld through its fief in Lyari, a troubled slum in the heart of the city where both politics and business are dominated by a gang al-



The Rangers take charge

► Pervez Musharraf. A return to the partisanship of the 1990s could imperil Mr Sharif's position. As it is, he is being harassed by the Pakistan Tehreek-e-Insaf, a rising opposition party led by Imran Khan. His attempt last year to topple the government through street protests in Islamabad, the capital, was thwarted by other opposition parties that feared the country was slipping back towards military rule. The former cricketer now senses a fresh opportunity.

As for the MQM, last month it announced the resignation of all its MPs. It is now negotiating with the government to withdraw the resignations in return for a let-up in the Rangers' campaign—even though the general, not the prime minister, is the Sharif with sway over them. Nasreen Jalil, a veteran MQM senator, says that although her party has nothing to do with extorting men like Mr Arshad, it is not above threatening to overturn the "apple cart" of Pakistani politics in the hope of getting what it wants. ■

## Indonesia

# Too mild?

UBUD

**Concerns grow about Jokowi's gentle style of leadership**

THE currency has fallen by over a tenth against the dollar this year, and Indonesian shares are near bear-market territory. Foreign trade is down by a fifth compared with a year earlier, while bad loans are rising. With growth at a six-year low and foreign money leaving, Indonesia's economy provides plenty to worry about.

It is perhaps a measure of the change in perceptions over Indonesian prospects that the president, Joko Widodo, feels bound to reassure foreigners that things are nothing like as dire as during the Asian financial crisis of 1997-98, when the rupiah lost four-fifths of its value, or in 2008, when the global financial crisis crashed onto Indonesia's shores. He is surely right that Indonesia's challenges are not nearly so acute. But the slowdown nonetheless highlights a chronic problem. With global trade growth slowing and Chinese demand for commodities falling, Indonesia can no longer count on exporting resources, whether coal, oil, palm oil or nickel. A years-long commodity boom let Indonesia delay reforms and investment in such difficult and capital-intensive areas as infrastructure. Too little emphasis was put on better schooling for young Indonesians. Like other exporters of resources, Indonesia could coast along, corrupt and inefficient. Mr Joko knows this must change. Whether he has the right political ap-



proach remains unclear.

The president, usually known as Jokowi, began promisingly. Not three months in office, in late December he scrapped budget-crippling fuel subsidies that predecessors had not dared touch. A month later he launched a one-stop service for business licensing, eliminating the need to spend weeks racing from ministry to ministry getting documents stamped and signed. It showed that Jokowi was not afraid to shake things up.

But since then, businessmen complain, his government has moved too slowly, particularly on infrastructure. True, on August 28th Jokowi broke ground on a \$4 billion, 2,000-megawatt (MW) power plant in central Java. He called it "a model" for future projects. Yet it took a decade of wrangling over land rights before construction could start. To meet Jokowi's ambitious targets for electricity consumption, Indonesia would need to build nearly 20 such plants in the next five years—a tall order, considering that it has built just 50,000MW of capacity since independence.

Elsewhere a policy laid out in Jokowi's inaugural address to promote maritime infrastructure—ports, fishing facilities and the like—has yet to see real progress, beyond grand plans for 24 new ports and the theatre of the navy destroying foreign vessels caught fishing in Indonesian waters. This has reduced illegal fishing. But it will not boost seafood exports or make its ports more efficient.

No one expects Jokowi to reverse decades of underinvestment in infrastructure in a single year, or even a presidential term. Yet too many projects remain mired in bureaucracy and political infighting—precisely the sort of problems Jokowi earned a reputation for getting to grips with when he was mayor of Solo, a mid-sized city in Java, and later governor of Jakarta, the capital. The gap has widened between ambitious plans and middling progress. Concerns have grown about Jokowi's leadership style. Modest, unassuming and hardly confrontational, he has found it hard to shake off the impression that he re-

mains beholden to Megawati Sukarnoputri, a former president, daughter of Indonesia's founding president and top boss of his PDI-P party.

Meanwhile the government too often pursues contradictory policies. Though Jokowi this year sought a 30% increase in tax revenues in order to finance new infrastructure, his finance minister recently announced expanded tax holidays for manufacturing investors. And despite Jokowi's promise to make Indonesia more business-friendly and to push vigorously for foreign investment, ministers have resorted to the old toolkit of tariffs, import bans and other forms of protectionism. Jokowi sometimes rescinds especially obnoxious measures. But it would be better for policy to flow more clearly from the president's office in the first place.

Jokowi has long held that the political skills that served him well as mayor and governor—popular appeal, patience and a pragmatic flair for getting things implemented—would work as well at the national level. But more than anything, a president needs to chart a course.

No one doubts Jokowi's good intentions, his integrity or the scale of the challenges he faces. Indonesia lacks the streamlined technocracy of its smaller neighbour, Singapore. It is a fractious, noisy democracy. Spreading prosperity across a vast archipelago is frightfully hard. But in an uncertain economic environment with footloose capital, a diffident leadership carries costs. ■

## The Koreas and China

# He shells, she shells

SEOUL

**The shooting has stopped, but China is fed up with its ally, North Korea**

KERFUFFLES between the Koreas tend to involve few surprises. The latest military spat between the democratic South and the despotic North ended on August 25th after 43 hours of talks concluded with an agreement to have more. The truce bound North Korea to hardly anything. The only commitment was for a resumption of cross-border reunions of families separated by the Korean war of 1950-53, in late September. (The North scuppered the last planned reunions, last year.) So far, so predictable. But, intriguingly, this time North Korea did not appear to demand new concessions, a staple of its old formula of threats in exchange for handouts.

Tensions had risen in early August, when a landmine maimed two South Korean soldiers. In response the South resumed loudspeaker broadcasts of propa-

▶ganda blaring across the demilitarised zone. North Korea fired four artillery rounds over the border between the two countries. The South retaliated with 29. North Korea puts its armed forces on a semi-war footing but then called for high-level talks. In these, atypically, it expressed "regret" for the two soldiers' injuries.

Both sides claimed credit for the entente. Approval ratings for Park Geun-hye, South Korea's president, jumped by 15 points to around 50%. North Korea does not allow filthy imperialist practices such as opinion polls, but Kim Jong Un, the North's leader, declared that the country had cleared "the dark clouds of war that hung over the Korean nation" by proposing the talks "on its own initiative".

That was a quiet message to China, says John Delury of Yonsei University in Seoul. Since Xi Jinping came to power three years ago, official communication between China and North Korea, its supposed ally, has slowed to a "trickle" as the relationship worsened over the North's nuclear posturing and over Mr Kim's mercurial petulance. China's chief nuclear envoy, Wu Dawei, told the South that it would play a "constructive role" in cooling tempers. When its foreign ministry urged "restraint" on all sides, North Korea shot back through its state media that it had exercised self-restraint for decades and that such talk was unhelpful.

South Korea has been keen to present China's stance as evidence that it is on the South's side—and indeed much was made of Ms Park standing not far from Mr Xi at a military parade in Beijing on September 3rd to commemorate China's role in the victory over Japan in 1945 (see page 57). Much less visible was Choe Ryong Hae representing North Korea, a close and trusted adviser to Mr Kim (who has not yet met Mr Xi); his attendance was announced shortly after the inter-Korean talks ended. Mr Choe's presence suggests that the North

is keen to improve relations, possibly including the discussion of thorny topics such as its nuclear programme, says Chung Jae-ho, an expert on Korea-China relations at Seoul National University.

For Ms Park, it was an opportunity to forge closer ties with China. The two countries have bonded over a shared grievance: both think Japan has failed to apologise enough for its wartime aggression. It was their sixth meeting since Ms Park took office in early 2013. In that time the two leaders have started to talk about the possibility of Korean unification, long a taboo subject for China, since to broach it implies that North Korea might one day collapse. In China's "master narrative" of the region, says Adam Cathcart, a historian, North Ko-

rea's role has waned.

Ju Chul-ki, Ms Park's secretary for foreign affairs, says he expects China to play a part in resolving the squabble over North Korea's nuclear weapons. If Ms Park can show progress in encouraging a resumption of moribund talks on denuclearisation, it could help to ease American concerns over her chumminess with China. Ms Park is due to meet Barack Obama in Washington in October. North Korea, for its part, is preparing for its own 70th anniversary, of the founding of the ruling Workers' Party of Korea, on October 10th. Many expect it will mark the day with a show of strength: a missile launch, perhaps, or even a fourth nuclear test. That would give Ms Park and Mr Obama plenty to talk about. ■

## Women and work in Japan

# We're busy. Get an abortion

TOKYO

**Pregnant women are furious about how they are treated at the office**

“**A**BENOMICS is womenomics,” Japan’s prime minister declared, marrying two atrocious words in a single phrase, at a glamorous shindig called *waw!*, or the “World Assembly for Women in Tokyo”, on August 28th-29th. Before an international audience of high-powered female leaders and businesswomen, Shinzo Abe promised to help women “shine” at work as a way to boost Japan’s talent pool and economy. As the conference opened, the Diet (parliament) passed a long-awaited law calling on companies to find ways to promote more women.

Yet such grand visions are beside the point for most working women. Sayaka Osakabe, founder of a new non-profit outfit called Matahara Net, which campaigns for the rights of pregnant women at work, says that before “shining” women just need to be allowed to work without being harassed. *Matahara*, (a contraction of “maternity” and “harassment”), is illegal but rife.

The worst examples involve bosses urging pregnant women to have abortions. One woman who now works for Matahara Net landed a prized “career-track” job at a big bank alongside her boyfriend, who worked in another department. After she became pregnant, a manager told her he would “crush” both her own career and that of her boyfriend if she went ahead and had the baby. In 2011 she took the hint and had an abortion.

Ms Osakabe herself suffered two miscarriages. She says that stress caused by ill-treatment at work was partly to blame. Other women have had to apologise in front of co-workers for becoming

pregnant. Those on precarious part-time contracts are particularly vulnerable to being fired while on maternity leave. A fifth of young mothers experience some kind of office harassment, according to Rengo, Japan’s biggest trade union confederation.

Part of the problem is the country’s culture of pointless workaholism—office workers are expected to stay late even if they have no work to do. Anyone exempted from this ordeal—mothers with young children, for instance—is envied. Also, since companies seldom hire cover for women on maternity leave, colleagues have to pick up the burden. Twice as many female as male colleagues dish out verbal criticism of pregnant women. It is one reason why seven out of ten women give up their jobs on having their first child.

Not all women think this is a problem. Ayako Sono, a conservative who was once on a government panel on education, calls *matahara* a “dirty” expression that signifies women’s overreaction to minor social discomforts. Yet it is hard for the government to ignore the harassment, since it contributes to the relentless decline in the Japanese population, policymakers’ biggest headache. Women who find it hard to combine work and motherhood often forgo the latter.

Last year the Supreme Court ruled for the first time on *matahara*. It found in favour of a mother who had sued a medical practice in Hiroshima for demoting her. This judgment, and Mr Abe’s championing of working-women’s rights, have emboldened more women to speak out. Those expecting are starting to expect better treatment.



Xi makes a fist of things with Park



### Victory Day celebrations

## Parade's end

BEIJING

### The real purpose of a rare military display was to show who is in charge

AFTER weeks of market mayhem, it must have made a nice change for Xi Jinping, China's president, to be reviewing ranks of smartly-dressed people who move in perfect synchronicity and do exactly what he tells them. Vast military parades may have gone out of fashion elsewhere, but Asian countries still like to strut their stuff. After displays of hardware and prowess in India, Pakistan, Russia and Taiwan this year, China held the most vain-glorious march-past yet under clear blue skies (especially seeded for the purpose) in Tiananmen Square on September 3rd.

The event marked Victory Day, which was invented as a holiday only in 2014 to mark the end of the People's War of Resistance against Japanese Aggression, as the years leading up to and during the second world war are known in China. It was China's first large-scale military parade since 2009, the first to celebrate anything other than the Communist Party's rule and the first involving foreign troops. But Mr Xi (pictured above) did not have to hold it. Such parades had always been reserved for the decennial anniversaries of the founding of the People's Republic on October 1st 1949. This one came out of sequence, four years early. Why?

The government described the display as an international celebration, befitting the 70th anniversary of an Allied victory. But an online article in the *People's Daily*, the party's mouthpiece, earlier this year made clear what this meant. The parade's purpose, it said, was to "deter Japan" and

"show off China's military might". This was promptly toned down to "conveying to the world that China is devoted to safeguarding international order after world war two, rather than challenging it". China argues that the main threat to the international status quo is the desire of Shinzo Abe, Japan's prime minister, to rewrite his country's pacifist constitution. So the polite version is not, in fact, all that different from the blunt one.

Thirty heads of state or government joined Mr Xi on the reviewing stand, in-

### Also in this section

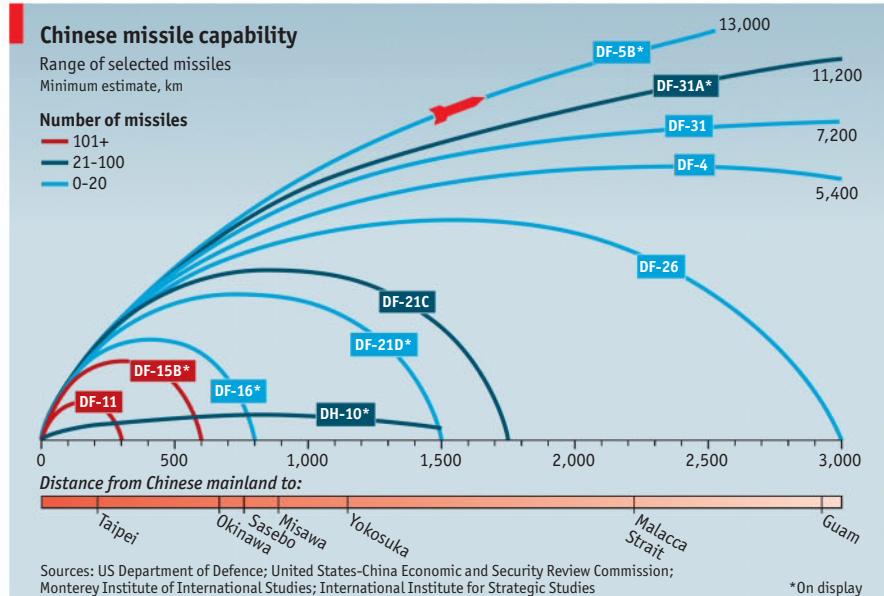
58 The price of pomp

59 Banyan: Unnatural aristocrats in China and Singapore

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cluding Vladimir Putin (hardly a notable guardian of the international order, but never mind). Their countries form a map of those parts of the world where China's clout is strong: Central Asia (leaders of four of its five "stans" turned up), parts of South-East Asia (Vietnam, Cambodia, Laos); Africa (South Africa, Egypt, Sudan); as well as, increasingly, eastern Europe. The only surprising visitor was South Korea's Park Geun-hye, fresh from a tense stand-off with the North. She resisted American pressure to turn down the invitation, presumably in the hope of persuading China to exert some moderating influence on its capricious North Korean client.

But no other presidents or prime ministers came from democracies which fought on the same side as China during the war: that is, America and its Western allies. The prospect of watching Chinese soldiers goose-stepping in a square around which, 26 years ago, the army had slaughtered ►►



► hundreds if not thousands of pro-democracy demonstrators proved too much for Westerners to stomach. Earlier this year the Chinese had toyed with the idea of laying on an accompanying civilian bash, which Europeans and Americans could have attended. But nothing came of that.

Mr Xi is unlikely to have been surprised or disappointed by the West's absence. Standing with Mr Putin enabled him to show a defiance of the West, which the party likes to portray as bent on keeping China weak. Soon after he assumed power, Mr Xi and fellow leaders visited a museum next to Tiananmen Square to see an exhibition called "The Road to Rejuvenation". It purports to show how the Chinese people, having been "reduced to a semi-colonial, semi-feudal society since the Opium War of 1840, rose in resistance against humiliation and misery." On Victory Day last year, the same leaders did much the same thing, this time visiting a museum in Beijing commemorating the war. Its displays aim to show that China's wartime resistance to Japan was its first victory after the "century of humiliation".

At the parade, Mr Xi spelled out the contemporary significance of such visits. Rather as America and the Soviet Union had become superpowers because of what they did in the war, the president argued, so China's wartime role had "re-established China as a major country".

A huge display of weaponry reinforced the point. Twelve thousand troops marched past, with attack helicopters roaring overhead in a formation spelling out the number 70. China gave the world a first sight of new tanks, fighters and bombers, and of several new missile systems. These included the DF-16 medium-range ballistic missile, two nuclear-capable intercontinental types (the DF-5B and DF-31A) and the so-called "carrier killer", the DF-21D that can destroy an aircraft-carrier in one blow (see chart, previous page). All these are of concern to America.

A hefty dose of historical revisionism was also on display, aimed at burnishing the party's wartime achievements. Chinese historians often complain that the sacrifices of their soldiers and people during the second world war are shamefully neglected. Their complaint is justified: 14m Chinese people perished at the hands of Japanese troops or as a result of famine. But there is a problem. Although Communist forces engaged in guerrilla fighting, the brunt of the battlefield campaign was borne, as Rana Mitter of Oxford University points out, by Chiang Kai-shek's Kuomintang (the KMT, which now rules Taiwan). China glosses over the KMT's role.

The parade was also aimed at showing off Mr Xi himself. For the president it was an opportunity, nearly three years after taking over as China's leader and amid a fierce campaign against corruption in the

party and army, to show that he is truly in charge (and not at all anxious about the country's economy: keeping the air clean for the parade involved stifling swathes of northern China's industry, see box). The foreign dignitaries were his spear-carriers.

Mr Xi has closer links with the 2.3m-strong armed forces than any recent president. Early in his career he was a personal secretary to the defence minister. Unlike his predecessors, he took over the party's main instrument for controlling the armed forces, the Central Military Commission (CMC), immediately upon taking office.

He has displayed muscle to his commanders in a way that earlier party leaders rarely dared to do—charging numerous generals with corruption, including the two highest-ranking officers under his predecessor: Xu Caihou (now dead) and Guo Boxiong. Mr Xi is now filling senior ranks with his own protégés. In an intriguing re-

cent example, an order promoting to full general the head of the People's Armed Police (PAP), a paramilitary force, bore Mr Xi's signature first. Normally, the prime minister's name comes first on PAP promotions.

How Mr Xi is viewed by senior officers is hard to judge. Many of them must be grumbling about the erosion of their privileges as a result of his anti-corruption efforts. Mr Xi will want to ensure their support with more than just morale-boosting parades—one reason why he is unlikely to scale down the double-digit increases in military spending in which he and his predecessors have indulged for many years (though, as he announced at the parade, he will continue efforts to trim the ranks—this time by 300,000). But the message he wanted to send with the show was as clear as the skies: China is resurgent and so are the armed forces, of which Mr Xi is the undisputed commander-in-chief. ■

### Parade preparations

## Tanks a lot

BEIJING

### The high price of pomp

EVERY city suffers some inconvenience for the sake of pageantry. The authorities in Beijing show little restraint in inflicting it. Residents are used to coping with road closures, car-use bans and the suspension of subway and bus services before large events. But aggravation related to the staging of a military parade through the city centre on September 3rd—the first in six years—went much further. Occupants of buildings overlooking the procession were told not to open windows or take photos, much less line the streets. Some hospitals stopped admitting new patients for the day, lest the

movement of the sick disrupt that of the thousands of troops. Offices along the main route were told to shut for most of August. Flights to Beijing were subject to delays for an entire month while military aircraft trained for their flypast.

The biggest disruption resulted from efforts to ensure that Beijing's ever-present smog gave way to what state media call *yuebing lan*, or "parade blue" skies. Outdoor barbecues (a popular Beijing cuisine) were shut down. Road transport fell by 35-50% thanks to a rule limiting car owners to driving their vehicles only every other day. Factories as far away as Inner Mongolia were shut; in all, the government ordered 10,000 firms to halt or curb production and nearly 9,000 construction sites to stop work. The measures seemed to pay off—in the days preceding the display, air pollution fell to its lowest level since city authorities officially began measuring it in 2012. But it was a blow to business amid worries about slowing economic growth.

To prevent any disorder, officials mobilised around 850,000 "volunteers" (see picture) to patrol the streets, wearing blue t-shirts and red armbands. Grumblers were swiftly silenced. Criticisms of the parade were deleted from Weibo, China's version of Twitter. Internet controls were tightened. The *Global Times*, a state-run newspaper, claimed that the parade would showcase "the spirit of Chinese modern society". Judging by the level of lockdown, that spirit can be summed up in a single word: restricted.



Greetings, now go home

# Banyan | Unnatural aristocrats

In China and its role model, Singapore, “meritocratic” leaders are under scrutiny



**C**LOSELY tracking the Shanghai Composite Index in its downward slide in August was the reputation of China's government for consistency, competence and even common sense. Worse, its hapless response to the bursting of a stockmarket bubble, which its own propaganda had helped to inflate, was only one of a number of bungles. It mismanaged a modest devaluation of its currency, the yuan. And a catastrophic explosion in the northern port city of Tianjin revealed appalling lapses in the enforcement of regulations. All governments make mistakes. But China's bases its legitimacy on its performance rather than a popular mandate. Now foreigners and citizens alike are asking whether the Chinese authorities have lost the plot.

Despite the rash of bad news, the Chinese Communist Party can still boast more than three decades of success in fostering spectacular economic growth and in raising China's global standing. A few rough weeks do not give the lie to “the China model”—in which authoritarian one-party rule is said to be justified because it produces the social order and wise leadership that beget economic growth. Supporters of this idea like to point to the career paths of China's leaders compared with those of democracies such as America. Barack Obama, they say, became president on the strength of little else but stirring oratory and effective fundraising. In contrast, by the time he became Communist Party leader in 2012, Xi Jinping had worked his way up through party and government hierarchies and had served in both the party's central bureaucracy and four provinces, each one bigger than many countries.

To the party's admirers, Mr Xi sits at the apex of a pyramid in which cadres are promoted through proven excellence in doing their jobs and passing exams. It is a political system that aspires to meritocracy, offering a number of advantages over electoral democracy. It is not prey to short-term populist temptations when the next poll looms. Nor has it any interest in exploiting social tensions to win votes. And it is not inherently biased against those without a vote, such as future generations and foreigners. These advantages are discussed in a recent book by Daniel Bell, a Canadian academic who teaches at Tsinghua University in Beijing (“The China Model: Political Meritocracy and the Limits of Democracy”). Mr Bell concedes that the practice of meritocracy in

China “often deviates from the ideal”. Mr Xi himself is a “princeling”, the “born-red” son of a party grandee. Some officials are promoted because of their loyalty to a patron; some positions are bought; some exams are sat by ringers. But Mr Bell holds up meritocracy as a valid ideal for China to be pursuing, as opposed to the “democratisation” urged by the West.

Meritocracy, it is argued, would also appear more in tune with traditional Chinese political culture. As George Yeo, a former foreign minister of Singapore, claims in his endorsement of Mr Bell's book: “Over many centuries...the institution that Chinese people have held in highest regard is their examination system, because it is meritocratic and objective.” In fact it was always prone to abuse, but it at least held out the illusion of fair criteria for promotion. And it is mirrored today in the public-service examinations that candidates for government jobs must sit. But just as in imperial times, when knowledge of classical texts was “not a sufficient test for political virtue”, so today, updated exams have significantly failed to produce an ethical bureaucracy.

China's leaders themselves prefer not to harp on about the virtues of imperial rule; the party prides itself, after all, on having created a “new China”. But they are not shy of showing admiration for Chinese-majority Singapore, despite its different ideological moorings. Singapore, they believe, is a meritocracy that works. In an election on September 11th Singapore's ruling People's Action Party (PAP), in power since before full independence in 1965, is all but certain to win again. That will be taken in Beijing as yet another vindication of Singapore's authoritarian but meritocratic style. Incumbency (and much else) gives the PAP an electoral advantage. But the PAP can also point to a record of stellar economic success, social order and clean government.

Even in Singapore, however, not everybody feels meritocracy is working. In a lecture in April Ho Kwon Ping, a tycoon and prominent intellectual, fretted that the Singapore model risks becoming a “static meritocracy” which “creates a self-perpetuating elite class”. He cited statistics showing that 63% of university-educated fathers had children with university degrees, compared with 12% of fathers with no more than a primary education.

## Demerit points

In the previous election in 2011 the PAP won in its usual landslide, but its share of the vote, 60%, was its lowest since independence. A number of concerns dented its popularity: property prices; the rate of immigration; crowded public transport. But perhaps its biggest problem is the perception that it has become a self-serving elite. It may not have helped that the prime minister, Lee Hsien Loong, referred in July to the need for a “natural aristocracy”. It was a reference to Thomas Jefferson, who contrasted such a class, based on “virtue and talents”, with an “artificial” aristocracy grounded in birth and wealth. But it touched a nerve: in Singapore, as in China and elsewhere, the children of the successful do better than others. (Mr Lee's father, Singapore's founding prime minister, Lee Kuan Yew, argued that talent is hereditary, but that cannot be more than part of the story.) Even a second-generation elite can become an artificial aristocracy.

Singapore at least gives voters the chance to purge the ruling elite through elections. In 2011 Mr Yeo, a respected minister, lost his seat. China's system, however, offers its citizens no such hope. Without democratic accountability, its meritocratic pretensions are no more than what they were to the imperial dynasties: a way of making dictatorship more efficient and more palatable. ■

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## Urban planning

## Streetwise

GURGAON

**Cities are starting to put pedestrians and cyclists before motorists. That makes them nicer—and healthier—to live in**

**A**T 6am on a sweltering Sunday the centre of Gurgaon, a city in northern India, is abuzz. Children queue for free bicycles to ride on a 4km stretch of road that will be cordoned off from traffic for the next five hours. Teenagers pedal about, taking selfies; middle-aged men and women jog by. On a stage, a black-belt demonstrates karate; yoga practice is on a quieter patch down the street. Weaving through the crowd dispensing road-safety tips is a traffic cop with a majestic moustache.

Gurgaon's weekly jamboree is called *Raahgiri*, ("reclaim your streets"). Amit Bhatt of EMBARQ, a green think-tank, started it in 2013, inspired by Bogotá's ciclovía, pictured above, for which Colombia's capital closes 120km of streets on Sundays and holidays. Such events are part of a movement that is accelerating around the world.

From Guangzhou to Brussels to Chicago, cities are shifting their attention from keeping cars moving to making it easier to walk, cycle and play on their streets. Some central roads are being converted into pedestrian promenades, others flanked with cycle lanes. Speed limits are being slashed. More than 700 cities in 50 countries now have bike-share schemes; the number has grown by about half in the past three years.

Cyclists and motorists have never liked sharing the road. In "A Cool and Logical Analysis of the Bicycle Menace", P.J. O'Rourke, a car-loving comic, grumbles that "one cannot drive around a curve" without meeting a "suicidal phalanx" of

"huffing bicyclers". Casey Neistat, a New York cyclist who was fined \$50 for not riding in a bike lane, made a film of himself crashing into some of the unkindly parked cars that so often make that impossible.

Many cities are exploring ways to keep petrolheads and pedalophiles apart. Over 100, particularly in Latin America, close some roads to cars on weekends. Paris is leading the way in Europe, closing over 30km; Dublin and Milan plan to banish cars from their centres. Even Los Angeles, (a city Steve Martin, a comic actor, satirised by getting in his car to drive three paces to his neighbour's house in "LA Story") recently announced plans for hundreds of miles of bus and cycle lanes.

In the rich world, these measures follow improvements in public transport—and congestion charges and other policies that make driving and parking in many cities a misery. The number of cars entering central London has dropped by a third since 2002. Three-fifths of Parisians owned a car in 2001; now two-fifths do. And some people are shifting from public transport to walking or cycling: a fifth as many journeys in London are now made by bike as on the Underground; 15 years ago, only a tenth were. All this makes cities safer and nicer, planners say. London hopes to attract footloose talent this way, says Isabel Dodington, its deputy mayor for transport.

The International Transport Forum, a think-tank, predicts that by 2050 the world's roads will have to cope with 2.5 bil-

## Also in this section

**62 The spread of the couch potato**

lion cars and light trucks, three times as many as today. Almost all the growth will be in developing countries. Some cities are building rail and subway systems; others are creating rapid-bus lanes. India plans to expand or launch rapid transit in 50 cities. But safety is often neglected.

The best way to get more people walking is to slow down traffic citywide, says Guillermo Peñalosa of 8 80 Cities, a Canadian lobby group. Slower traffic makes neighbourhoods quieter and safer. More than 80% of pedestrians hit by cars moving at 65kph die; at half that speed only 5% die. A 25mph (40kph) speed limit went into effect in New York last year. London recently cut the speed limit to 20mph on more than 280km of its roads and is getting rid of pedestrian-unfriendly giant roundabouts. In September Toronto will slow down traffic on more than 300km of its roads.

**Four wheels bad, two wheels good**

In cycling, Amsterdam and Copenhagen are the pacesetters, with a third of trips made by bicycle. More than half of Amsterdam's residents use their bikes daily. London, New York and Paris all have plans to challenge them. All three cities are expanding their bike-share schemes and building new bike lanes, some on quiet roads with new, lower speed limits for cars, and others running through central areas and separated from motorised traffic.

Such schemes can quickly convince more people to start pedalling. They are particularly popular with women, who transport planners say are more nervous than men about sharing roads with roaring traffic and typically make up less than a quarter of urban cyclists. In 2007-2010 the Spanish city of Seville built an 80km network of separated two-way bicycle lanes; the share of trips in the city that were by bicycle went from nearly zero to 7%. In Taipei few women cycled before its YouBike ➤

► share scheme started in 2009; now they are half of the city's cyclists.

Bike-shares are spreading out beyond city centres and being linked with public transport, says Kevin Mayne of the European Cyclists' Federation. In Belgium, Germany and the Netherlands some schemes are run by the railways. More than 100 cities have smartphone apps that show which docking stations have bicycles available. Riders of Copenhagen's GoBike can plot routes and check travel bookings from an on-board GPS. Both bikes and public transport are more likely to be used when bike racks are placed on the front of buses, as in Boston and Washington, DC, and secure parking is provided at rail stations.

In 2014 Britain's transport ministry looked at recently built cycling and walking infrastructure in eight cities. Standard cost-benefit analyses for planned transport infrastructure include a value for the lives saved (or lost) through changes in the number of accidents. Using the same figures for the lives prolonged by increased activity, it found that the cost of the schemes was repaid three-fold—and again in reduced congestion. London's authorities calculate that if every Londoner switched to walking for trips under 2km, and to cycling for trips of 2-8km, the share who got enough exercise to remain healthy simply by getting around would rise from 25% to 60%. That would amount to 61,500 years of healthy life gained each year.

Even once-a-week exercise fiestas can boost health. A 2009 survey of participants in Bogotá's Sunday ciclovías found that 42% of adults did as much exercise during the event as the World Health Organisation recommends for a week. (It ranks Colombia the world's most sedentary country: see box.) Only 12% would have done so otherwise.

Yet the health gains from walking and cycling rarely feature in transport plans—partly because the benefits are reaped by national health ministries (and the people who get fitter, of course), rather than the cities that build the infrastructure. Britain is trying to align incentives better. Last year London's transport authority published a "transport health action plan": a ten-year scheme, backed by £4 billion of government money, that will redesign streets along lines recommended by public-health experts. And the country's National Health Service (NHS) wants to help cities that are building cheap housing complexes to include health-promoting features, such as cycle routes and playgrounds.

As rich cities are, at last, undoing their past planning mistakes, activists in developing ones are trying to ensure that they are not repeated. They are lobbying for safe walking and cycling routes as well as better public transport, and for traffic laws to be enforced—before pollution and inactivity take their full toll. Convincing officials pre-

occupied with keeping cars moving can be tough: "This won't work here," one told Mr Bhatt when he proposed the Raahgiri and other ways to make Gurgaon's streets more pedestrian-friendly. He persisted, getting 200 schoolchildren to cycle up to the city administration's headquarters to demonstrate public support. His team has since also convinced the city to paint cycling lanes at the side of some streets; barriers

will soon protect them from cars.

One user is Dilip Grover, a 62-year-old manager of a small firm. Not having cycled since college, he rediscovered its joys after hopping on a free bike at the Raahgiri. He now cycles 10km to work. The Raahgiri has changed attitudes, he thinks: many drivers also participate and now think twice before honking at a pedestrian or jumping a traffic light. It is a small start. ■

### Physical inactivity

## You have waked me too soon...

### Sedentary living has reached epidemic proportions

**B**RITAIN'S health department calls it "the silent killer". Others have labelled it "the new smoking". Lack of physical activity has crept up the list of global causes of death to fourth place, after high blood pressure, smoking and high blood sugar—not least because it helps waistlines expand.

Even a little exercise has a huge health effect, whether or not people shed their extra pounds. Research presented on August 30th at a cardiology conference in London suggests that walking fast for 25 minutes a day can buy three to seven years of extra life. A bigger study by a team at Cambridge University tracked 300,000 Europeans over 12 years, and found that a brisk daily 20-minute walk, or the equivalent, cut the annual death rate for people of normal weight by a quarter, and for the obese by 16%. Getting everyone sedentary to do this would save twice as many lives as ending obesity, says Ulf Ekelund, the lead researcher.

Walking 20 minutes a day falls just short of the minimum exercise that the World Health Organisation (WHO) recommends. Adults, it says, should do at

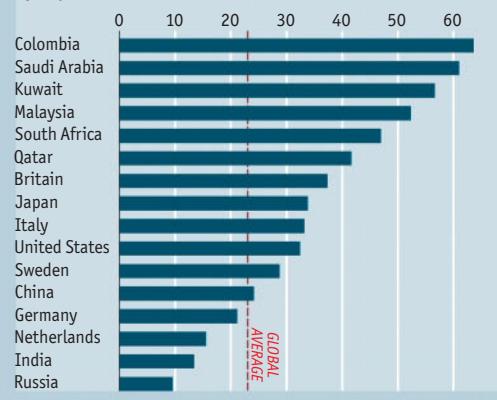
least 150 minutes weekly of moderate exercise, such as walking or cycling (to the point when "you can still talk but you can't sing the words to a song", as Britain's National Health Service helpfully clarifies), or 75 minutes of a more vigorous kind such as running or swimming. Adolescents need at least an hour a day.

On these measures, much of the world falls short. A comparison that adjusts for differing age profiles puts Colombia and rich parts of the Middle East at the top of the world couch-potato rankings (see chart). The Dutch, Europe's keenest cyclists, do far better.

Dangerous streets and restrictive cultural norms mean that almost everywhere, women are the sedentary sex. Many avoid walking, particularly after dark, and activities such as cycling and street football are often men-only. Just a fifth of 11- to 17-year-olds globally do the minimum recommended for their age, and even where that share is rising, including in Germany, France and the Netherlands, most youngsters move far too little. The voice of the slaggard, it seems, is only going to grow louder.

### ...I must slumber again!

% of adults who are physically inactive\*  
Age-adjusted, 2010, selected countries



% of adolescents who are physically inactive†



Sources: World Health Organisation; European Journal of Public Health \*Less than 150 minutes of moderate-intensity activity or 75 minutes of vigorous activity per week †11-, 13- and 15-year-olds, less than an hour of moderate-to-vigorous activity per day



## Primark

# Faster, cheaper fashion

NEW YORK

**A rapidly rising, super-cheap Irish clothes retailer prepares to conquer America. Rivals should be fearful**

STAFF line a wide aisle, cheering. Blue balloons bob in anticipation. Then the doors open and throngs of women rush in, clutching shopping bags to gather up their bounty—dresses, jumpers, shoes and other treasure. The scene, captured in a video of a store opening in France last year, is common for Primark—the company dubs such exuberance “Primania”. The Irish retailer, owned by Associated British Foods (ABF), now sells more clothes than any other retailer in Britain. In 2006 Primark opened its first store in Spain. Since then it has marched steadily across the continent, establishing outposts in the Netherlands, Portugal, Germany, Belgium, Austria and France. Sales rose by 150% between 2009 and 2014, making Primark a new force in the global rag trade (see chart, next page).

Now the retailer is plotting its boldest invasion. On September 10th it will open its first shop in America, the world's biggest clothing market. Boston will be first to get a Primark, to be followed shortly by seven other sites in the north-east.

Triumph is not guaranteed. Primark may be the most successful brand Americans have never heard of, and changing that will take time. Nevertheless, ABF, which also sells sugar, tea and Ovaltine, has reason to be optimistic. For many shoppers, Primark has an irresistible offer: trendy clothes at astonishingly low prices.

The result is a new and even faster kind of fast fashion, which encourages consumers to buy heaps of items, discard them after a few wears and then come back for another batch of new outfits.

Primark's rise comes at a tricky moment for some mainstream clothes firms, or “specialty-apparel” companies, as analysts call them. Famous American brands such as J.Crew and Abercrombie & Fitch have struggled. Gap, once the world's leading specialty-apparel company, has had a particularly rough patch. With its bland styles and frequent sales promotions, the company's Gap-branded chain has suffered an 8% fall in sales over the past decade, reckons Euromonitor, a data firm, even as the overall market has grown strongly. In June Gap said it would close one-quarter of its shops in North America.

As some clothing chains have suffered, the world's four largest brands have cemented their lead by pursuing different strategies. Two American retailers, T.J. Maxx and Ross, sell discounted items bearing designer labels, usually from previous seasons. Two European retailers, H&M and Zara, sell own-label clothes in the latest styles, constantly updating their ranges. Zara remains the leading innovator in fast fashion, introducing more than 18,000 designs each year and producing them within an average of three weeks.

## Also in this section

- 64 What it means to be an employee
- 65 Univision goes public
- 65 ENI's big gas find in Egypt
- 66 Hon Hai diversifies
- 68 Schumpeter: The Trump in every leader

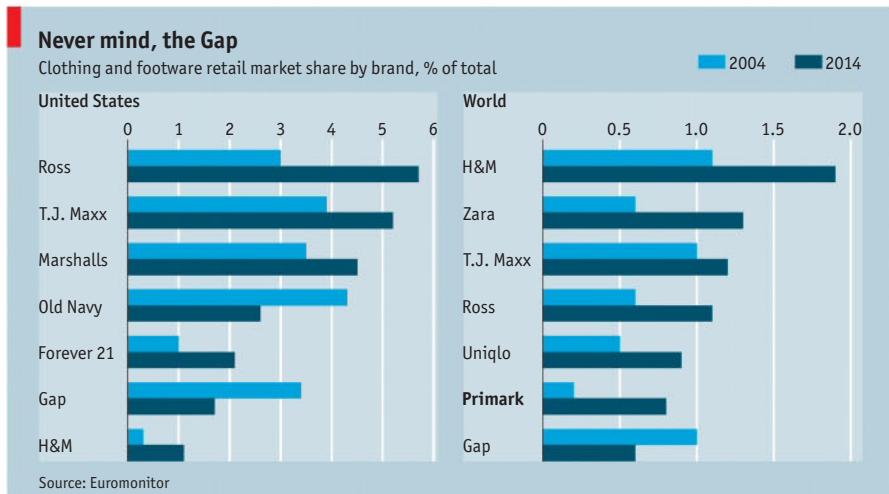
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Gap is trying to catch up. Its lower-price Old Navy chain, led by a veteran of H&M, is relatively nimble. For example, Old Navy chooses the same fabric for several styles of garment, monitors which styles sell best, then adjusts production accordingly. Art Peck, Gap's chief executive, is now using Old Navy's strategy as a template for the group's Gap and Banana Republic chains. Results will begin to appear next year.

By then Primark will be a more serious threat—and not just to Gap. Maureen Hinton of Conlumino, a retail consultant, argues that Primark has a winning combination: cool clothes, attractive stores and, most important, rock-bottom prices. In Britain, the average selling price of women's clothes at H&M was £10.69 (\$16.37) for the year to May 10th, according to Sanford C. Bernstein, a research firm. At Primark, the average selling price was £3.87. For Asos, a young and hitherto vigorous online fashion retailer, such bargains are hard to match. The need to keep cutting prices and stay competitive has forced Asos to issue a series of profit warnings. And on September 2nd the British firm's founder and chief executive, Nick Robertson, resigned.

John Bason, ABF's finance director, says Primark achieves its low prices thanks to sleek logistics, a meagre marketing budget and its scale, which helps win bargains from suppliers. The company withstands tiny margins, making its money on volume. It has bet successfully that demand for clothes is as elastic as the waistband in a pair of plus-size sweatpants: the cheaper they are, the more shoppers buy of them. It is also benefiting from the “Instagram effect”, in which fashion-conscious young consumers post snaps of themselves wearing another new outfit on social media. ➤



“Consumers shop at Primark differently than they shop at a lot of retailers,” says Bernstein’s Jamie Merriman. “It’s almost like shopping at a Costco,”—which sells buckets of peanuts and vats of detergent—“where you’re thinking about it in terms of volume.” H&M sells an annual average of £3,400-worth of clothes per square metre in Britain, according to Bernstein. Primark sells £5,300-worth.

There are a few threats to this model. Primark may find, as Tesco has recently done, that breaking into America is no walkover for foreign retailers. Two markets that appear so similar may prove to have unexpected differences. Indeed, Target, a once-soaring American retailer of clothes and other goods, has recently had to retreat from Canada on discovering that its formula just didn’t fly north of the border.

Then again, Primark’s ultra-cheap prices could prove as tempting in the United States as they are elsewhere. The same young Americans who have flocked to Forever 21, another seller of affordable, trendy gear, may now come rushing to Primark. An early sampling of Primark’s American product line-up showed that goods were 22% cheaper than similar fare at Forever 21.

Another possible problem is Primark’s online business, or lack of it. Its prices are too low to justify the shipping costs of e-commerce. If consumers in America and elsewhere switch in large numbers to buying clothes through, say, social networks and messaging services, Primark might get left behind.

Other concerns pose a challenge not just to Primark but to its peers too. A culture of disposable fashion rattles environmentalists. Americans threw away 11.1m tonnes of clothes and shoes in 2013. That amounts to 4.4% of the country’s rubbish, more than twice the share in 1990. Just as worrying are the conditions in which cheap clothes are made. In 2013 more than 1,100 people were crushed when a factory complex collapsed in Bangladesh. The victims included workers stitching clothes for Primark.

The company has paid \$14m to victims’ families. It is one of many firms to have signed an agreement to promote safety at textile factories.

The sad truth, however, is that most consumers soon forgot about the tragedy. In 2014, the year after the factory collapse, Primark’s sales jumped by more than 20%. It will take some stopping. ■

#### Employers in America

## Work to rule

#### Judges and regulators ponder what it means to be an employee

EVERY few decades there is a sea change in the rules governing labour relations in the United States. In the 1930s Franklin Roosevelt shifted the balance of power towards labour. In the 1980s Ronald Reagan shifted it back towards employers. Two new legal rulings raise the possibility that the balance of power is changing again.

On August 27th the National Labour Relations Board (NLRB) ruled that Browning-Ferris Industries, a Californian recycling company, was the “joint employer” of people hired by one of its contractors, thereby obliging it to engage in collective bargaining with the Teamsters union. On September 1st a federal judge allowed a class-action lawsuit to proceed against Uber, a taxi-hailing service, in which three drivers argue they should be treated as employees.

The NLRB, which has a 3-2 Democratic majority, has been getting more assertive since 2011, when it issued a (still ongoing) complaint against Boeing for transferring an aircraft production line to a non-union factory. It is currently mulling a ruling that could define McDonald’s as a joint employer of staff in its franchised restaurants. In June FedEx agreed to pay \$228m to settle

a court case brought by Californian drivers who complained of being misclassified as contractors. In the same month an Uber driver won a ruling from California’s labour commission that she is an employee (Uber is appealing).

These cases all have a single big question at their heart: what does it mean to be an employee in modern America, with its extensive use of contractors and franchisees, and armies of temporary workers? If rulings go against them, firms like McDonald’s may have to reconsider their business models. Those in the “on-demand economy”, which help freelancers provide rides, cleaning services and food delivery, may face higher costs and less flexibility.

The cases come amid discontent at growing inequality and wage stagnation. And the backlash is already having an effect. Some on-demand firms, such as Luxe, a car-parking service, and Instacart, a delivery outfit, are reclassifying their freelances as employees. Homejoy, a cleaning service, blamed its decision to shut down on uncertainty over labour laws.

Whether there will be a wholesale shift is more doubtful. The Democrats are not united behind radical re-regulation of labour markets, as they were under FDR. Barack Obama has left it to the NLRB to make the running; and Hillary Clinton has stuck to mouthing platitudes. The Republicans, who are likely to control the House for the foreseeable future, are deeply opposed to change, and are plotting legislation to overturn the Browning-Ferris decision.

Both FDR and Reagan worked with the grain of economic change: FDR’s policies were suited to an age of big employers and big unions; and Reagan’s chimed with an age of flexibility and enterprise. Jerry Davis of the University of Michigan’s Ross School of Business notes that in the days when far more people worked in manufacturing, and a few workers could close down an entire assembly line, the advan-



Not everyone’s favourite ride

►tage lay with labour. Today far more people work in shops and fast-food joints, where devastating strikes are harder to coordinate. Mobile technology makes it easy to create spot markets in talent. Globalisation enables all sorts of jobs to move abroad. The proportion of private-sector workers who belong to a union has declined from 20.1% in 1980 to just 6.6% now.

The trouble with the latest flurry of cases is that regulators and courts are trying to apply 20th-century solutions to 21st-century problems. Current labour law, still rooted in FDR's Fair Labour Standards Act of 1938, is based on the idea that there is a binary distinction between employers and employees, and that the typical worker is a full-timer who is his family's sole breadwinner. That is not, by and large, how the world of work looks these days. ■

### Hispanic broadcasting

## Univision's blurry picture

NEW YORK

**The Spanish-language broadcaster is going public at a difficult time**

THE strongest selling-point for Univision is that it is the most popular Spanish-language broadcaster in America, where the Hispanic population is young, 57m-strong and growing. However, the company is heavily in debt, and losing both money and viewers. What is more, it is going for an initial public offering at a time when shares in several of America's main English-language broadcasters are being savaged, amid worries about the future of the television business, not to mention general stockmarket turmoil.

The company's flagship Univision network is available in 92% of Hispanic households in the United States. With its mix of telenovelas and other light entertainment, it has 13 of the country's top 20 prime-time shows in Spanish. The group's Univision Deportes network is the most-watched Spanish-language sports channel on cable, and it has local television stations in most of America's biggest markets.

However, a leveraged buy-out in 2007 led by Haim Saban, an American-Israeli entrepreneur, has left it with so much debt that it struggles to turn a profit. It now owes \$10.5 billion, and in the first six months of this year it had a net loss of \$178m. Industry sources say Univision's private-equity owners tried putting the company up for sale last year but could find no takers. Now the public will be asked instead.

Investors may be discouraged by the challenges Univision faces, from competitors and from changing audience tastes. Its main rival, Telemundo, which is owned by

NBC, counters Univision's diet of imported soaps with slick, upmarket drama series. It has also won the Spanish-language rights to broadcast in America the next three football World Cup tournaments, long a centrepiece of Univision's offering. The expanding universe of high-quality English-language dramas is drawing away younger Hispanic viewers. These are the ones most coveted by advertisers but they are much less likely than their parents to watch the sort of shows Univision offers. "English-oriented" Hispanic viewers are younger, better off and spend more on television and internet services. But just 10% of them are regular viewers of Spanish-language content, according to Horowitz Research, a consulting firm, compared with 62% of "Spanish-dominant" Hispanics, who tend to be older.

The loss of young viewers has been precipitous. In five years the number of those aged 18 to 34 who watched Univision's prime-time schedule has dropped by 45%, from more than 1m in 2010 to less than 600,000 now, according to Nielsen, an audience-measurement firm. (Prime-time viewing of Univision by all age groups fell by 25% in the same period.)

Even so, the remaining audience is still attractive to advertisers, and Univision has a strong sales pitch for them. In its prospectus, filed on August 14th, it argued that its viewers are much more likely to watch commercials than the average non-Hispanic viewer: 92% of its audience watches its non-sports programmes as they are being broadcast, which is an extremely high figure in this age of on-demand and time-shift viewing. When shows are watched live, of course, one cannot fast-forward through the adverts. Univision's revenues, which mostly come from ads, have grown as its audience has shrunk, from \$2.4 bil-



Entertaining the masses in Spanish

lion in 2012 to \$2.9 billion in 2014, though they will slip this year, in part because there is no World Cup.

Univision's sworn enemy, Donald Trump (yes, him again), is inadvertently lending it a hand. The Republican contender is suing the broadcaster after it scrapped a deal to televise his "Miss Universe" and "Miss USA" pageants, over his comments about Mexican immigrants. On August 25th Mr Trump had Jorge Ramos, Univision's chief newscaster, shown out of one of his press conferences. But Mr Trump's outrageous statements have invigorated the presidential campaign, a big source of ads for TV stations. And his spats with Univision have put the broadcaster in the spotlight just when it could use the buzz. As the Donald knows as well as anyone, there is no such thing as bad publicity. ■

### ENI in Egypt

## Euregas!

MILAN

**The Italian energy giant's strategy seems to be paying off**

ITALY'S state-controlled oil and gas company, ENI, has been in Egypt since it signed deals with Gamal Abdel Nasser, the country's then dictator, in 1954. Now one of the world's biggest oil firms and the largest foreign oil and gas producer in Africa, ENI said on August 30th that it had discovered a vast gasfield off the Egyptian coast. The Zohr field is thought to contain 30 trillion cubic feet of gas, equivalent to 5.5 billion barrels of oil. If so, Zohr will almost double Egypt's reserves, and be the largest gas discovery in the Mediterranean. More may be found on further exploration.

The find is a boon for ENI at a time of plunging oil prices, and for Egypt, which has gone from being an exporter to an importer of gas. It may prove positive for other energy firms operating in Egypt, though it undermines Israel's plans to develop its own fields and export gas to its neighbour.

Claudio Descalzi, ENI's boss, says the discovery vindicates the firm's strategy of focusing on developing markets in which it has long been present, and on conventional production rather than newer methods such as the fracking of shale beds. He expects production at the new field to offset the negative impact on ENI of weak oil prices, which are troubling companies and governments across the Middle East (see page 49).

ENI's last big find was in Mozambique in 2011. That contains 75 trillion cubic feet, but developing it is a much costlier endeavour because all the infrastructure needs to be built from scratch. Egypt, by contrast, al-

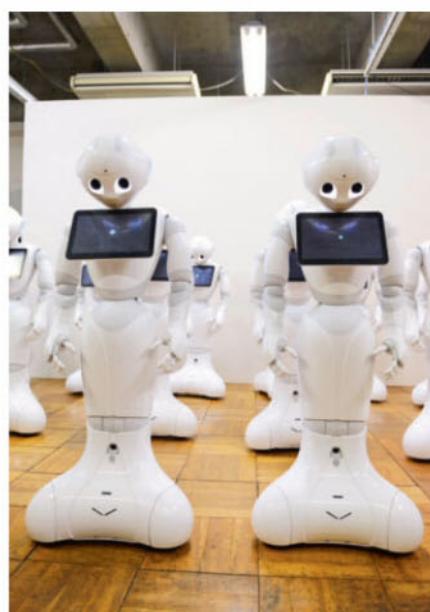
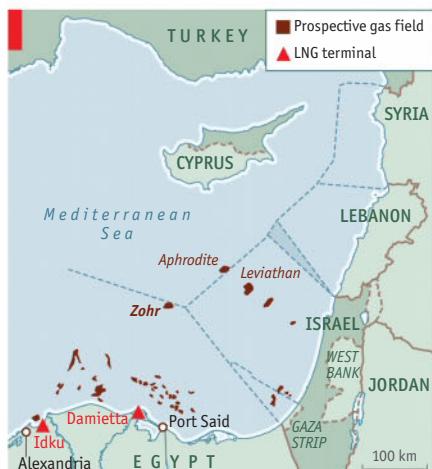
▶ ready has an established oil and gas industry and cheap, skilled labour. Drilling is expected to start early next year, and production should begin in 2017.

At first, most production will be for domestic use. Demand for gas has soared as Egypt's population has grown, and as the government has lured industrial firms to the country with cheap energy prices. But production has not kept up, and Egyptians have had to get used to power cuts.

If all goes to plan, Egypt's gas production may surpass its consumption by 2020, according to some estimates, leaving a surplus for export. ENI will then be able to make use of its dormant liquefied natural gas (LNG) terminal in Damietta. BG, a British firm being taken over by Shell, may also be able to restart its LNG terminal at Idku, east of Alexandria.

That said, Egypt has been in political tumult for several years, and successive governments have repeatedly sought to renegotiate contracts with oil firms, while failing to make agreed payments. Elsewhere in Africa ENI has become entangled in two corruption scandals—in Nigeria and Algeria. The firm denies any wrongdoing. Still, Mediobanca, an investment bank, believes ENI may be better placed than many rivals to ride out the current storm in the oil industry. In March ENI became the first big oil company to cut its dividend. Investors accepted this as a sensible move, and now they are cheered by hopes that it can be raised again in 2016.

Even as ENI's shares rose on news of its big gas find, those of Israeli gas firms plunged. Investors in Israel's aptly named Leviathan field have been pinning their hopes on preliminary agreements to supply gas to Egypt and Jordan. Those could now fall through. Francesco Galietti of Policy Sonar, a political-risk consultant, nonetheless suggests Israelis should be pleased at their neighbour's good fortune. In the long run Israel may gain more from a financially secure Egypt that is not dependent on Saudi funding than it would have done from selling the Egyptians gas. ■



**Hon Hai**

## Kicking the Apple addiction

SHENZHEN

**The Taiwanese firm strives to avoid over-dependence on its main client**

INSIDE an obscure warehouse in the southern Chinese city of Shenzhen, the robot revolution is under way, but it is far from glamorous. The test lab is hot, steamy and a bit dusty. Dozens of giant, aquamarine-coloured units are whirring and gyrating in patterns designed to test their endurance as they do polishing, machining and assembly. And forget about artificial intelligence: these tireless drudges will not move autonomously or learn by doing.

"We are a business," explains Day Chia-Peng of the robotics group at Foxconn, the contract-manufacturing arm of Hon Hai of Taiwan. And his frugal bosses will not pay for his team to make flashy kit that does not add value. Foxconn says it already has more than 30,000 robots in use, including thousands at a factory in Chengdu that has fewer than 100 workers. Besides making bespoke robots in-house, the firm has also invested \$118m in a division of Softbank, the Japanese firm that makes Pepper, an advanced automaton (pictured).

The push into robotics as a producer, not just a user, is just one part of Hon Hai's strenuous attempts to diversify. Foxconn is so good at high-quality, high-volume manufacturing that it has long been the contractor of choice for Apple, which provides around half of the Taiwanese firm's revenues. However, the American tech giant is trying to reduce its reliance on Foxconn, which once made 90% of the firm's handheld devices but now makes perhaps

two-thirds of them.

So, Hon Hai has been trying lots of new things. Its latest effort is in chip-packaging, a profitable business that bundles semiconductors into products like wearable bands and smart watches. On August 28th it said it would take a 21.2% stake in Siliconware Precision Industries (SPIL), a Taiwanese chip-packager, which in return will get a 2.2% stake in Hon Hai. Their agreement thwarted an effort by another compatriot, Advanced Semiconductor Engineering (ASE), to take a big stake in SPIL. ASE has said that it has not yet given up.

Last month Foxconn agreed to invest \$5 billion to build an electronics factory in India—giving little detail on what it would make—and hinted that it might open up a dozen more across the country. Hon Hai is also said to be in talks to take a stake in a division of Sharp, an ailing Japanese firm that makes liquid-crystal displays (LCDs), or to form a joint venture with it. A deal in 2012 between the two parties fell through.

Nicolas Baratte of CLSA, a stockbroker, says branching out makes sense for the group. Foxconn, which is 95% of Hon Hai's core business, has margins below 4%. Over-reliance on Apple is not its only problem. Around two-fifths of Foxconn's revenues come from making servers and networking equipment for just a few firms, such as Cisco, Juniper, HP, Huawei and Dell. "It's maxed out its market share in this area, too," Mr Baratte says.

But diversifying successfully is not easy. Moving into chip-packaging seems sensible, but ASE, assuming it cannot unpick Hon Hai's deal with SPIL, will be a formidable rival, and margins may well fall. Getting into other semiconductor-heavy sectors, such as LCDs, could in theory bring higher margins, but in practice Sharp has bled red ink. Entering factory automation also seems a good way to add value, but Mr Baratte thinks the mass manufacturer is not capable of selling customised bits of kit to thousands of small customers. "Today, it has just fifteen big clients," he says.

Still, at least all these efforts have some connection with Hon Hai's core capabilities. Some of its other initiatives do not. It has made a big push into mass-market retailing in China and Taiwan, which has not taken off. It has splashed out to win a 4G mobile-telecoms licence in Taiwan, on the dubious ground that this would help it sell equipment to telecoms providers. It has been throwing money at e-commerce ventures without a clear strategy. It even has plans to start making solar panels.

Alberto Moel of Sanford C. Bernstein, a research firm, calls these efforts "diworsification," and urges the firm to stick to deals that have industrial logic. He points out that the biggest success Hon Hai has had so far in cutting its reliance on Apple has come from making handsets for the American firm's rising Chinese rival, Xiaomi. ■



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# Schumpeter | The Trump in every leader

**Bosses must learn how to deal with the egomania that comes with power**



DONALD TRUMP cheerfully breaks all the rules of good leadership, as codified in management books and taught in business schools. The modern CEO is supposed to be a consummate team player, modest and self-effacing, committed to equality and diversity, good at handling risk and adept at dealing with the press. Mr Trump flies around in a private plane with his name emblazoned on it. He humiliates job applicants in his television show, "The Apprentice". Four Trump-themed businesses have declared bankruptcy since 1991. He refers to women as "pieces of ass" and boasts about how well he gets on with "the blacks". NBC and Univision have stopped broadcasting his "Miss USA" and "Miss Universe" competitions over his comments on Mexican immigrants. He has also faced a firestorm of criticism for his misogynist comments on a Fox News journalist, Megyn Kelly.

But is there a little bit of Mr Trump in all powerful people? This question kept occurring to your columnist while reading a new book, "Friend and Foe", by Adam Galinsky and Maurice Schweitzer. The two academics are among the pioneers of a technique called "power priming", that helps people feel more masterful. They find that, once primed for power, even the most reticent people experience significant changes in their behaviour.

The book explains that you can prime people for power in a number of ways. You can get them to remember a time when they had power over other people. You get them to adopt a power posture—putting their hands on their hips or thrusting out their chests like gorillas (a technique developed by Dana Carney of the University of California, Berkeley). Or you can get them to listen to power anthems such as "In Da Club" by 50 Cent. This is a technique favoured by sports stars such as Serena Williams, a tennis player, who often wears headphones when she walks on court.

Making people more self-confident is good. But power also makes them more self-centred. In one study, researchers asked people to draw a capital "E" on their foreheads. People who had been power-primed were almost three times as likely to draw the E backwards—that is, from their own perspective rather than the perspective of onlookers—than those who had not. In another study, researchers asked people to play the role of boss and employee for a while, and then gave them a budget to buy chocolates, first for themselves and then for other people. The "bosses"

bought 32 chocolates when buying for themselves but only 11 chocolates when buying for others. The "employees" bought 37 chocolates when buying for others but only 14 for themselves.

Power makes people more willing to take risks. For example, people who are primed for power, women as well as men, are less likely to have sex without a condom. Power also makes people more likely to break rules, for example by manipulating evidence to suit their purposes. Researchers asked people to roll a set of dice to determine the number of lottery tickets they would receive—a roll of two would earn two tickets—and then report the roll of their dice to the invigilator. People who were primed were more likely to over-report their scores. Finally, power turns people into hypocrites: not only are powerful people more likely to cheat, they are also more likely to condemn cheating or other forms of moral failure in other people.

Some people regard all this as an argument for seeking to do away with strong leaders. A number of firms have introduced "co-CEOs" to make their leadership less Trump-ety and more democratic; others have replaced all their internal hierarchy with a "holacracy"—a set of overlapping, self-organising teams. But companies led by co-CEOs, such as Deutsche Bank, have usually ended up regretting it. And holacracy is hollow: everybody who works for Zappos, an internet retailer that pioneered the idea, knows that the firm is really run by its founder, Tony Hsieh.

Jeffrey Pfeffer of Stanford Business School has much more sensible advice in another new book, "Leadership BS". Recognise that organisations need hierarchy if they are not to descend into dithering anarchy. Accept that powerful people have a dark side. And adjust your thinking to deal with reality.

## Speaking truth to power

Companies need to introduce structures that compel bosses to listen to others' opinions. The least they can do is to divide the jobs of CEO and chairman, and to appoint a powerful "lead" director to their boards. But there are more radical ideas floating around. One is to appoint a maverick director whose main job is to dispute the boss's arguments, somewhat like the "leader of the official opposition", who gets paid to hound British prime ministers across the debating chamber. Another is to make it possible for low-status workers to question the boss's decisions without suffering consequences: the Johns Hopkins Hospital, in Baltimore, encourages nurses to speak up if they think a surgeon has missed out a step in a pre-op checklist. But procedures can only go so far, given the boss's ability to write the rules. The most important thing firms can do is to make sure they appoint somebody who can handle power. Messrs Galinsky and Schweitzer recommend a simple test: watch carefully how a prospective boss addresses powerless people such as security guards and waiters.

Bosses themselves need to recognise that power can be a poison as well as an aphrodisiac. They should spend as much of their spare time as possible with their families rather than hobnobbing with other powerful people. They ought to establish a relationship with a mentor who is licensed to speak to them frankly: Mark Zuckerberg of Facebook has formed such a bond with Donald Graham, a former publisher of the *Washington Post*. Mr Trump has built a successful career by flouting the rules of good management. Most other people will find that, if they let their inner Trump get out of control, they will end up in the same position as the unsuccessful candidates on his television programme, humiliated and fired. ■



## India's economy

## Still in business

MUMBAI

### Growth has proved resistant to external shocks, but not to local politics

**F**INANCIAL markets started September as they ended August, with share prices falling and investors fretting about China's cooling economy. The latest sell-off was triggered by a survey of Chinese purchasing managers which suggested that manufacturing had contracted in August. Nerves were further pinched by grim data on exports from South Korea, on manufacturing from Taiwan and on growth from Brazil. Rich countries are also affected: GDP in Australia, a big exporter of raw materials to China, slowed almost to a standstill.

Amid the misery in emerging markets, one economy stands out for its comparative resilience. Figures released at the end of August showed that GDP rose by 7% in the second quarter, year on year. India's official growth rate is thus on a par with China's and much stronger than that of trouble spots such as Brazil, Russia and South Africa (see chart).

As in China, the GDP figures probably overstate how well the economy is doing (in India's case, thanks to a change in the calculations that may exaggerate the growth of small firms). Yet it still looks in decent shape. Indicators such as car sales and imports of capital goods suggest it is gathering steam. This is partly down to luck: India is hurt far less than other emerging markets by what is happening in China. Manufacturing supply chains tie Singapore, South Korea and Taiwan to the Chinese economy; India exports little

there, by comparison. Oil exporters, such as Nigeria, Russia and Venezuela, have been hurt by the collapse in crude prices. But India imports 70-80% of the oil it uses so benefits greatly from cheap energy. India's current-account deficit has narrowed to 0.2% of GDP, thanks in part to a cheaper bill for oil and other raw-material imports. In contrast Brazil, Colombia, South Africa and other commodity exporters need jittery foreigners to fund ever-bigger current-account deficits, since their foreign earnings have slumped. And downward pressure on prices is more welcome in inflation-prone India than in most places. Consumer-price inflation fell to just 3.8% in July; in 2013 it was in double digits.

India is not immune to all emerging-market afflictions, however. Exports have been shrinking for eight months. Falling factory-gate prices across Asia (see Free exchange) have placed additional pressure on firms in heavy industry that are already struggling to service their debts. Imports of cheap steel from China have more than doubled in the past year.

India's economy also suffers from a few locally incubated ailments. Its public-sector banks, which account for 70% of outstanding loans, are weighed down with bad debts accumulated in an investment boom in 2008-12. Overall stressed assets, including loans whose terms have been softened to make repayment easier, have risen to 11.1% of total bank loans, according

### Also in this section

**70** Buttonwood: Taming markets**71** Emerging-market fallout at banks**71** The benefits of remittances...**72** ...and why they are not bigger**73** Free exchange: Is China exporting deflation?

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to the Reserve Bank of India (RBI). Credit growth is feeble. The RBI's governor, Raghuram Rajan, has grumbled that recent cuts in the central bank's main interest rate, from 8% to 7.25%, have not been fully passed on in lower bank-lending rates.

Cheaper money is nevertheless finding its way to borrowers. Indian firms typically turn to banks for 80% of their borrowing and to bond markets for the rest. In the past year, the split has been roughly 50-50, says Rakesh Shah of Edelweiss, a finance company. Bond yields have fallen by more than the RBI's benchmark, in part because more rate cuts are expected. Insurance firms are keen buyers. Until recently, at least, so were foreigners in search of higher yields than they could find at home. Money has also flowed into bond funds as local investors turn away from property and gold. The growing use of bond-market funding helps to explain why investment is perking up despite India's crippled banks.

India's economy is doing well enough to prompt officials to speak of taking on China's mantle. That is overly optimistic. India is a long way from having the sort of muscle to add much to global growth. Its ►

### Some other BRICS in a fall

GDP, % change on a year earlier



Source: Haver Analytics

► population of 1.25 billion is similar in size to China's and is much younger (the median age is 27). But it is also much poorer. At current prices and exchange rates, India's economy is worth around \$2 trillion, whereas China's is worth \$11 trillion.

If India is to follow China's path, more of its people need to escape a hardscrabble life in farming for better-paid work in factories and offices. That, in turn, requires reforms to make it easier to buy land and to employ workers. Yet in recent weeks the government of Narendra Modi, who won an election last year on a pledge to pep up the economy, backtracked on efforts to

make compulsory land purchases easier. He seems to be worried that the change would dim his party's prospects in elections in Bihar, a largely rural state of 100m where it has been depicted as anti-farmer. On September 2nd ten of India's 12 biggest trade-union alliances joined a nationwide strike. They hope to force a similar climb-down on proposals to tidy up India's Byzantine labour laws and to make it slightly easier for smallish firms to lay off workers. A bill to establish a nationwide goods-and-services tax, to replace myriad federal, state and city taxes, is stuck between parliament's two houses. Even modest

changes, such as the privatisation of some airports, have been put on ice.

Mr Modi controls parliament's lower house, but his legislative plans have been thwarted because his party and its allies are a minority in the upper chamber. India's 29 states may advance some reforms; Arun Jaitley, the finance minister, has said the federal government will bless any softening of state-level land laws, allowing them to supersede national law. Rajasthan, a northern state, has already liberalised its labour laws by this route. But that is far short of the expectations generated by Mr Modi's election. ■

## Buttonwood | With great power

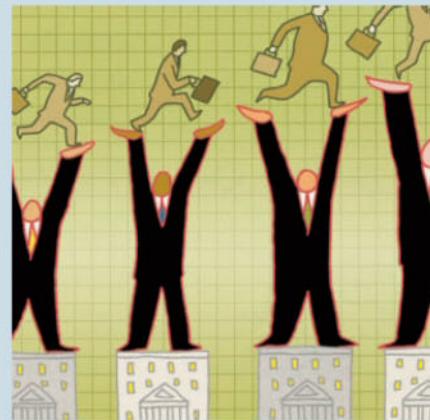
### Markets are dangerously dependent on central banks

**W**ELOCOME back from the holidays. After suffering their worst month in more than three years in August, American equities again fell sharply on September 1st, along with shares in Europe and Japan. This sudden bout of turmoil owes much to doubts about the continuation of two great economic experiments. And it also reflects the aftermath of a huge philosophical change about the role that governments should play in the markets.

The first experiment is the Chinese attempt to shift their economy away from an investment- and export-led model towards one based on consumption. The Chinese are also grappling with the consequences of a debt-fuelled boom and with the effect of volatility in their property, equity and currency markets. Many investors fear they will be unable to manage this transition successfully, and the impact on other economies (a sharp fall in South Korea's exports, disappointing second-quarter growth in Australia) is becoming clear.

Quantitative easing (QE) in the developed world is the other great experiment. Holding down bond yields may have prevented the financial crisis from turning into another Depression. But interest rates have been at rock-bottom for six years now and, in America and Britain, central banks seem keen to tighten monetary policy. Investors appear nervous that the authorities are underestimating the damage premature tightening might cause, particularly given the upheaval in China. Whenever markets have reason to think that the Federal Reserve might postpone a rate increase, they rally.

Back in the 1980s, Margaret Thatcher argued that it was impossible to "buck the market"—that attempts by the authorities to interfere in the price-setting mechanism would eventually come unstuck.



Since 2008 "You can't trust the markets" has become the dominant philosophy. Central banks worried that, if they did not take action, bond yields would rise too fast, reducing the incentive for companies and consumers to borrow, and thus harming the economy. Furthermore, to the extent that lower bond yields boosted equities, that was good for consumer confidence; if QE pushed down the currency, that was good for exporters.

However, market support, once given, is hard to take away. When the Fed hinted at a slowdown in its asset purchases in 2013, bond yields rose sharply—an episode known as the "taper tantrum". Even now, with unemployment having fallen dramatically and both the American and British economies growing at a 2-3% annual rate, neither the Fed nor the Bank of England has sold off any of the assets they acquired under their QE programmes.

With overall debt levels in developed economies still high, a big rise in borrowing costs would be a nasty shock to debtors. So central banks have emphasised that any tightening in monetary policy would be slow and steady, and that the "normal"

level for rates may well be below those prevailing before 2007.

Central banks are clearly worried about the ability of the developed world to achieve pre-crisis levels of economic growth. That ought to be bad news for equities, since it should restrict profits. Until recently, however, American corporate profits had been remarkably strong, in part because of firms' foreign sales and in part because margins had been boosted by subdued wages. The impetus from both factors seems to have faded. The earnings per share of S&P 500 companies were just 1.7% higher in the second quarter than they were a year ago; forecasts for the third quarter suggest a decline of 3.8%. Secular stagnation appears to be catching up with the stockmarket.

Meanwhile, investors are not the only people who have noticed the enormous power of central banks. Although central bankers may see themselves as disinterested technocrats, some politicians view them with suspicion. In Greece, the European Central Bank is part of the hated "troika" that is imposing austerity. In America, some Republicans think that QE is debasing the currency and will eventually lead to inflation. In Britain, Richard Murphy, an economic adviser to Jeremy Corbyn, Labour's likely next leader, thinks that QE has been a handout to the banks and should be diverted to funding infrastructure. Central banks need to be brought formally back under democratic control, in his view.

Central banks have done the lion's share of steering the global economy through the financial crisis. Markets everywhere depend on them more than ever. Should they appear to falter, they will face an enormous backlash.

## Global banks

# Emerging troubles

### Banks that financed the boom in emerging markets are in a tricky spot

**I**N THEORY, HSBC and Standard Chartered, two British banks with large Asian operations, are still mulling whether they should relocate their headquarters somewhere east of Suez. Given the turmoil that has afflicted emerging markets in recent weeks—and a useful tax break from the British government—few now expect the duo to decamp. Having been celebrated by investors for global networks spanning the likes of China, India and Brazil, banks are now being punished for them.

Emerging markets boomed partly on the back of cheap funds that Citigroup, HSBC, StanChart and others helped shovel their way—a flow now operating in reverse. Bankers battled to lend money to firms digging mines, erecting skyscrapers and building factories on the assumption that growth in China would never falter.

Those loans look less canny now that China's slowing economy and tumbling commodity prices have dimmed the currencies and prospects of many emerging markets. A few customers will undoubtedly default, starting with firms which borrowed in dollars but relied on income in ringgit, rand or rupiah to meet repayments.

Loan losses are starting to creep up. StanChart, whose biggest line of corporate business is lending to the energy sector, announced a near-doubling of impairments for bad debts at its latest quarterly results. Bill Winters, a boss parachuted in earlier this year amid suspicions that money had gone out the door uncontrollably, said it was not at the end of the bad-debt cycle. Worse, it has no rich-world unit to cushion the shortfall from emerging markets.

Like StanChart, HSBC makes around three-quarters of its profits in Asia. It is thought to have been more disciplined in the loans it has made. But trade finance, a reliable engine of growth, now looks to be sputtering. Global trade suffered its biggest fall in six years in the first half of 2015. And the business is heavily linked to commodities: given price falls, even financing the same volumes of metals or pork bellies will mean smaller loans.

In line with local peers, HSBC's loan book in Asia grew at 15% a year between 2010 and 2014. Such increases are now unthinkable, if only because lending levels have to bear some sort of resemblance to available collateral—the value of which is sinking. And banks have to run just to stand still: even a stable loan book would mean smaller profits once gains are con-

verted from sagging local currencies to dollars, the unit of account for most big banks. A fifth of StanChart's and a quarter of HSBC's profits are in "potentially weak" currencies, according to analysts at Citi.

Share prices have been hammered (see chart). For the first time in years, HSBC is trading below the value of its tangible net assets, a fate it avoided throughout the financial crisis. StanChart is valued by investors at just 64% of tangible net assets, down from nearly 300% after the financial crisis. The emerging-market rout derailed a steady recovery in Citi's share price, too.

All this is unpleasant but still some distance from the chaos of 1997 or 2008. That could change if local banks start toppling: StanChart, for example, has \$87.5 billion of loans and advances to banks, a third of them in China. A deterioration in the property market there would send banks scrambling to cut lending lines, or force them to foreclose on iffy assets.

Banks are far from the only industry re-

### Eastern reproaches

Share prices, March 1st 2015=100



Source: Bloomberg

thinking their positioning. But emerging markets have provided a struggling sector with two scarce resources: growth and profits. HSBC's Hong Kong unit made returns on equity of 35% last year, for example, compared with 8% outside Asia. That sort of oomph is not easily replaced. ■

### Remittances

## Like manna from heaven

### How a torrent of money from workers abroad reshapes an economy

“GULF house”, says Dinesh Kumar every few seconds, gesturing out of the window of a car as it drives through Vennicode, in south-west India. His commentary is hardly necessary. The new houses, built with money sent home by people working in Dubai, Oman and other Gulf countries, flash like gold teeth in this backwater village surrounded by coconut palms. Vennicode has a brand new private

school, too, as well as huge advertisements for jewellery shops and much more traffic than its narrow roads can handle. It is a tribute to emigration.

Last year India received \$70 billion in remittances—more than any other country in the world. The state of Kerala, where Vennicode is located, got far more than its fair share. A comprehensive household survey organised by Irudaya Rajan of the Centre for Development Studies, a local academic institution, finds that 2.4m Keralites were living and working overseas in 2014. The money they send home is equivalent to fully 36% of the state's domestic product. “For all practical purposes, it's a remittance economy,” says C.P.John of the state government.

Economic migration has become so widespread that global remittances are now worth more than twice as much as foreign aid (see chart on next page). Many countries depend on them: remittances are worth 10% of the Philippines' GDP and 42% of Tajikistan's. But Kerala has been hooked on remittances longer than most. It shows how they can reshape an economy.

The most obvious effect, evidenced by the fancy houses of Vennicode, is to make a place richer. Kerala was already one of the better-off states in India when mass migration to the Gulf began, in the 1970s. It is now about 50% wealthier per head than ➤



From Arabia with love



► the national average. Migrants are disproportionately Muslim and well-educated; their families have done best. The poorest have mostly stayed put. Partly as a result, Kerala is now one of the most unequal states in India—rather embarrassingly, given its socialist political traditions.

Mr Rajan's survey shows that households are much more likely to own refrigerators and the like if a family member works abroad. Above all, though, remittances are spent on new homes. Saji Thomas of Heera, a construction firm, says that about 70% of his customers are emigrants or returned emigrants. Some move their ageing parents out of the countryside and into new high-rise flats close to good hospitals. Partly as a result, Kerala has become India's fastest-urbanising large state. In 2001, 74% of Keralites lived in rural areas. By 2011 the proportion had fallen to 52%.

Something similar is happening in Nepal, where remittances have risen quickly and now amount to 29% of the economy. The Kathmandu metropolitan area is growing by about 4% a year—faster than almost any other large city in South Asia. Even though agricultural wages are rising, rural Nepal is losing workers.

When money flows from abroad, people not surprisingly stop working back-breaking jobs. This shift is especially beneficial for children. During the Asian financial crisis in 1997–98, the Philippine peso collapsed, increasing the value of remittances to that country. Dean Yang of the University of Michigan has shown that families responded by pulling their children out of jobs and sending them back to school. Girls benefited more than boys. Western Union, a giant money-transfer firm, reckons 30% of the money that flows through its system is spent on education.

As the supply of willing workers diminishes, wages rise. Mr Thomas reckons that construction costs in Kerala are 20–25% higher than elsewhere, mostly because labour is so expensive. This imbalance has encouraged a large internal migration. Many of Mr Thomas's builders are from Bengal and Orissa, in north-east India, though Keralites still do skilled jobs such as

### The cost of international transfers

## A tax on the poor

### Regulation is keeping remittances unnecessarily expensive

After sweating through a day's work under the hot Dubai sun, the last thing an Indian construction worker wants is to donate a slug of his earnings to a bank or money-transfer outfit. Yet that is what he must do. On average, 6.9 cents of every dollar remitted to India from another country is eaten up by fees and foreign-exchange margins, according to the World Bank. Indians get off relatively lightly. A sub-Saharan African migrant loses an average of 9.7 cents.

In 2009 the G8 pledged to cut the average cost of international remittances to 5% of the sum sent within five years. Rates have since come down, but not by much: the average is now 7.7%. And the implicit tax on remittances is even higher than these figures suggest, since they are based on transfers of \$200, but many payments are smaller.

In part, Dilip Ratha of the World Bank blames the exclusive agreements signed by banks and other companies involved in handling remittances. By reducing competition, these keep prices high. Some countries, including India, have banned such tie-ups, but they remain common in Africa. In 2014 the Overseas Development Institute, a think-tank, estimated that if the average cost of sending money to Africa could be cut to 5%, it would mean \$1.8 billion more for the continent every year.

Still, Mr Ratha is optimistic. Challengers to the banks and big money-transfer firms are popping up, particularly in

London. Flush with venture capital, they claim they can use technology to cut costs. TransferWise began as a peer-to-peer foreign-exchange service for the rich world; Taavet Hinrikus, one of its founders, says India is now the firm's fastest-growing destination. It plans to offer transfers to Mexico soon.

Sending money abroad is comparatively simple. The difficulty lies in getting the cash to spouses and parents in poor countries, who probably do not have bank accounts and may live a long way from a bank branch. Big money-transfer outfits like MoneyGram and Western Union have hundreds of thousands of agents and thus a colossal advantage in the cash market. But Ismail Ahmed, of WorldRemit, an online transfer service, reckons the rapid growth of mobile money in places like Kenya, Somaliland and Zimbabwe is eroding this advantage. Most of the money sent to Africa through WorldRemit goes to mobile accounts.

Technology can do less to tackle another problem. Anti-money-laundering and counter-terrorism regulations are making banks reluctant to clear transfers to conflict- or crime-racked spots such as Somalia, which depends on remittances. "Derisking", as this trend is known, is spreading to bigger countries. Odilon Almeida of Western Union says this is bound to reduce competition and thus drive up prices. It is also, probably, pushing remittances into obscure and illegal channels, which is no good for anybody.

installing air conditioning.

It is oddly hard to work out how emigration affects a country's long-term economic prospects. Data are patchy: an apparent global surge in remittances since the 1990s is mostly the result of better reporting. And it is hard to separate cause from effect. When a country's economy slumps, emigrants might well send more money home, making it seem as though the payments have caused the problem.

In Kerala, some suspect that remittances have fostered complacency; at the least, they have opened an embarrassing gap between the state's wealth and the vigour of its businesses. Mr John looks enviously at nearby Karnataka and Tamil Nadu, with their factories and IT office parks, and asks why Kerala has been unable to provide more jobs for ambitious young people.

With its lovely climate and educated populace, Kerala might have created a lead-

ing university, but has not. Some believe there might be a future in medical tourism: perhaps Gulf Arabs have become so accustomed to Keralites that they will travel to the state for treatment.

Still, the biggest danger posed by remittances is that they may dry up. Gulf countries are always talking about pushing migrants out of skilled jobs to make way for natives. And Keralan migrants face rising competition from compatriots from the north and Nepalis, among others. The states of Bihar and Uttar Pradesh now export more people, at least as measured by India's border authorities, though Kerala still sends a greater share of its population.

That might not be the end of it, though. Keralans are a coastal, outward-looking people, seemingly addicted to migration. They were pioneers in the Gulf and ought to be able to find new destinations with even better prospects. Mr John has a child in Britain; the promised land is America. ■

# Free exchange | Inflated claims

## Deflation in China has relatively little impact abroad

AS THE world's biggest exporter, China dominates global shipments of everything from smartphones to sofas. Recently, attention has turned to another Chinese export that appears to be washing up on distant shores: deflation. China's producer-price index (PPI) has been falling for 41 months straight. Economic growth is slowing; many Chinese industries are suffering from overcapacity; its ravenous appetite for commodities is waning. All that slack must surely be putting downward pressure on prices across much of the world.

It is not the first time that China has been accused of exporting deflation. Before the global financial crisis, China's impact on world prices seemed a good thing, making televisions and fridges more affordable. Now, it is seen as baleful. The worry is that anaemic inflation is hurting the world economy. Consumers have less incentive to spend, companies have less reason to invest and debts, fixed in nominal terms, remain onerous.

Yet several studies show that China was never quite the deflationary force that it was said to be before the crisis—or at least that it caused both inflation and deflation. By the same token, a closer examination of the data over the past year also suggests that the current, unusually low level of global inflation cannot, for the most part, be traced back to China.

A paper\* published in 2006 by Tarhan Feyzioglu of the IMF and Luke Willard of Princeton University cast doubt on the idea of China-led deflation when it first emerged as a big exporter. They showed that although Chinese manufacturers helped bring down the price of household appliances in America and Japan, rising Chinese food consumption, a by-product of its growing wealth, contributed to higher food prices abroad. The trends cancelled each other out, with the result that China had only a small, fleeting impact on foreign inflation.

A paper published in 2013 by Sandra Eickmeier and Markus Kühnlenz of Germany's central bank reached a similar but starker conclusion. They found that the "supply shock" from cheap Chinese goods explained, on average, 1% of changes in consumer prices outside China from 2002-11. The "demand shock" from China's rapid growth was nearly four times bigger, accounting for 3.6% of changes in global consumer prices, thanks mainly to China's hunger for commodities. About 95% of swings in global inflation were thus down to non-Chinese factors.

These results shed light on the country's impact now. One way it might push prices down is by dumping excess output on

other countries. Global steelmakers complain, for instance, that China's state-subsidised companies are undercutting them. But the broader deflationary impact of cheap China-made goods is almost certainly smaller than many assume. The kinds of products in which China excels form a relatively minor part of consumer-price indices. In America, for instance, computers and smartphones account for less than 1% of the index, whereas the share of food is about 15%. Just as cheap Chinese labour did not lead to serious deflation in the early 2000s, so its excess manufacturing capacity is not the main cause of low inflation today.

The demand shortfall arising from China's slowing growth is sure to be more important. This is especially true of its impact on commodities. However, even this should not be exaggerated. According to the Bundesbank paper, China drove about 11% of commodity-price inflation from 2002-11. That is a big impact for a single country, but it still means that other things such as supply-side constraints and demand from other countries, explained the majority of price changes.

This points to an under-appreciated fact about China's role in commodity markets: for all the talk of its far-reaching impact, its demand is actually very concentrated. It consumes as much as 60% of the world's production of certain metals, but accounts for just a tenth of global imports of fuel and a twentieth of food imports. Food and fuel loom far larger in price indices than metals. Although Chinese PPI and commodity prices are closely related, they have been so since China was a much smaller importer (see chart). This suggests that commodity prices help determine the path of inflation in China more than the other way around. China is more a price-taker than a price-maker.

## Money matters

In normal times central banks can deflect deflationary winds from abroad by cutting interest rates. But with rates around much of the rich world stuck near zero, economies are more at the mercy of the weather. That helps explain why China's current wobbles make investors and central bankers around the world nervous. But once again, the international impact of shifts within China can be exaggerated.

To slow the yuan's recent fall, for example, China has started to dip into its vast holdings of foreign-exchange reserves, selling off American Treasury bonds. For years, critics warned that China would drive up global interest rates by dumping Treasuries. In practice, though, strong global demand for American assets has negated the effect of China's selling.

A depreciating yuan should be deflationary for the rest of the world, reducing China's demand for imports and forcing those competing with Chinese exports to cut costs. That helps explain some of the alarm last month when an abrupt change in the central bank's policy first sent the yuan sliding. But it has lost just 3% against the dollar in recent weeks. At the end of July it was still 13% stronger than a year before on a trade-weighted basis.

Central bankers and investors are right to keep a wary eye on China. A sharper deterioration in its economy would weigh on commodities, stockmarkets and the yuan, adding to downward pressure on prices. But uncomfortably low inflation is a global phenomenon: it does not carry a made-in-China label. ■

### Not exporting, but importing

% change on a year earlier

China's producer-price index



Sources: Wind Info; The Economist

\* Studies cited in this article can be found at [www.economist.com/deflation15](http://www.economist.com/deflation15)

# CEO Perspective

## INVESTMENT OPPORTUNITIES IN EGYPT

*Hisham Ezz Al-Arab, chairperson and managing director of Commercial International Bank (CIB)*

**A**s business booms in a recovering Egypt, investors are vying to capitalise on a portfolio of lucrative opportunities spearheaded by the public and private sectors.

This increased appetite has been fed by reform plans to increase the tax base, streamline spending on energy subsidies, leverage capital spending and reallocate public service and social security resources. Even international rating agencies have given their approval and annual growth across key industries has seen the main manufacturing sectors increase 27 per cent and tourism 60 per cent.

In 2002, the private sector's contribution to total investments stood at 50 per cent; by 2013/4 it had reached 62.2 per cent and underpinned the security of the entire economy - a feat only made possible by the resilience of a well-capitalised banking industry that produces one of the best risk-adjusted returns globally.

Chairperson and managing director of Commercial International Bank (CIB), Hisham Ezz Al-Arab says: "In light of prevailing conditions, opportunities in Egypt are limitless across all sectors including but not limited to the services sector, tourism, and shipping (Suez Canal logistics services), among others. We view the infrastructure sector as the backbone of the economy that will facilitate progress and growth in various sectors across the board. It all comes down to the cabinet and their stance of focusing on the economy and commitment to revitalising the private sector, ultimately leading to private sector investment and consequently foreign direct investment."

Over the last decade, the banking sector withstood the stress of international financial turmoil and the Arab Spring through a long-term process of consolidation, privatisation, increased foreign ownership of banks, and recapitalisation from the early 2000s.

The measures were led by the Central Bank of Egypt (CBE) and accompanied by a raft of new regulations aimed at strengthening the sector.

While inflation sits in double figures, BMI Research reports deposit and loan growth at 23 per cent and nine per cent respectively in 2014, and predicts a convergence at 14.2 per cent and 10.5 per cent in 2015 - figures which are notably higher than trend growth.

The rapid growth in deposits comes on the back of higher interest rates and increased confidence in the Egyptian pound. For the first time since 2011, it is believed the risk of dollarisation is now highly unlikely.

The government is saving no effort to implement its rigid reform plans to support and nurture the growth, by incentivising investment in projects conducive to its own economic agenda, opening up new industries to the private sector, such as power grids, renewable fuels, infrastructure projects and many other plans in the pipeline.

Regarding the electricity grid projects, Egypt has set a goal to double its current power capacity of about 30,000MW by 2020, to avoid continuing power shortages. According to Saleh al-Awaji, an undersecretary in the Kingdom's Ministry of Water and Electricity, the Saudi-Egyptian Electricity Grid project is planned to start this year at a minimum cost of \$1.5bn and 14 Arab states will join the power linkage system between Saudi Arabia and Egypt, when the project is complete in 2018.

International players are flocking to contribute. Siemens has awarded record energy orders that will boost Egypt's power generation by 50 per cent through a combination of high-efficiency natural gas-fired power plants and wind power installations.

### THE PROJECTS:

**\$8BN**  
SUEZ CANAL  
DEVELOPMENT  
PROJECT

**\$10BN**  
EGYPT NATIONAL DEVELOPMENT  
PLAN ALLOCATION TO TRANSPORT

**\$1.5BN** MINIMUM ESTIMATED COST OF SAUDI-EGYPTIAN ELECTRICITY GRID PROJECT

GE, which states a commitment to addressing Egypt's increasing energy needs, has partnered with the government to add 2.6 gigawatts of power to the nation's grid by this summer.

The influx in FDI such development has bolstered, has heightened the pace of regeneration in Egypt's major cities, with an emphasis on mega projects such as those seen across the Gulf in recent years. In a post-crisis country, few could ask for more.

As for the new Suez Canal, this government-led development project is designed to capitalise on the country's ability to trade, by amalgamating other ports and establishing a large-scale logistics district to create the fastest shipping route between Europe and Asia.

Last year, the work began on a project worth \$8bn and is due to be officially inaugurated on August 6. In 2014 the canal generated \$5.5bn for Egypt and officials have said the new canal will boost annual revenues to \$13.5bn by 2023.

Investors in the surrounding new Suez industrial hub, which is hoped to realise an additional \$100bn in annual revenues, will benefit from legal reforms to support their establishment and growth.

Moreover, new roads and highways are planned to strengthen the transport network and also support the new canal development.

Egypt's National Development Plan has allocated more than \$10bn to establishing a multi-modal transport system through several financed projects. Interest from China and Russia is strong, with Chinese contractors already committed to delivering 15 projects. Gradually, the continuous work will renovate the country's entire road network.

The ambition doesn't end there, with work already underway to relocate the country's capital for the 24th time in its 5,000 year history, creating the biggest purpose-built capital in population terms, in human history.

The Capital Cairo project, designed to create a city fit to accommodate a growth in population from 18 to 40 million by 2050, will span 700sqkm (consider it as near the size of Singapore) and will be completed within seven years.

The project's developers opine of a new destination, designed to "adapt and embrace its natural setting, while being diverse in uses and welcoming to all income levels and cultures".

Al-Arab adds: "Egypt is presenting many lucrative investment opportunities to investors and these groups in turn, receive abundant support from the banking sector, which has been a pillar of the country's stability. Liquidity is strong and these opportunities are seen as profitable and attractive on an international stage, fuelling a demand for credit."

# CHOOSING EGYPT IS SMART, CHOOSING CIB IS GENIUS

A more than 5,000 years old wonder continues to hold so much mystery & potential. At CIB we see the potential in our nation and strive daily to realize it.



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**Why does time pass?**

## The moving finger writes

In our fifth brief on scientific mysteries we ask why travelling through time, unlike travelling through space, is irreversible

**F**UGIT inreparabile tempus." Time flies irretrievably. But why? The question of why time flies; why it has direction; why, in other words, you cannot remember the future, is one of the most profound there is. Indeed, it is so profound that few would even think to ask it of reality. It is, though, asked all the time in fiction. Since H.G. Wells's novel "The Time Machine" was published in 1895, writers and dramatists have grappled with the possibility of actively travelling through time rather than merely being swept along by it. As the success of things like the BBC's long-running serial "Doctor Who"—in which the hero travels in a time machine called a Tardis, whimsically stuck in the shape of a police telephone box—attests, that thought is one which has engaged audiences ever since.

Wells wrote at a moment when time was beginning to be analysed scientifically in a way that it had not been before. Scientists had always seen time as important, but had usually regarded it—as most people still do—as something that is just there. A thing ticking away in the background. A means by which other things may be measured, but not something to be investigated in its own right.

This began to change in 1887. That was the year two American physicists, Albert Michelson and Edward Morley, tried to measure the Earth's velocity relative to the aether, a substance in which theory then supposed that waves of light vibrate. They used an interferometer to work out the difference between light's speed in the direction Earth was travelling and its speed at right angles to that direction. They found none. This suggests Earth's speed is not being added to the speed of light. Since speed is distance travelled divided by time, the implication is that distance, or time, or both, are mutable.

It may be no coincidence, then, that Wells's first fictional treatment of time travel, a short story on which he based the

subsequent novel, was published a year after the Michelson-Morley experiment, in 1888. The elasticity of time (and, indeed, of distance), meanwhile, was confirmed, quantified and explained in 1905, by Albert Einstein, in his special theory of relativity. Starting with Michelson's and Morley's discovery that the speed of light is invariable, he showed that time is not a constant background tick. It is malleable, passing differently in different places, depending on how those places are moving with respect to one another. Indeed, at the speed of light, it stops altogether.

### A dance to the music of time

Over the next ten years Einstein went further. In the general theory of relativity, published in 1915, he showed that to explain gravity it is necessary to stop thinking of space and time as being distinct, and instead to conceive of the universe's fabric as being a four-dimensional composite of both, a "space-time" continuum. Time was now not only malleable, but manipulable. In particular, Einstein showed that heavy objects slow it down.

None of Einstein's equations, though, suggests time has an arrow. They work equally well whether you run them for-

wards or backwards—as did their predecessors in classical physics. That sounds contrary to common sense. Einstein, proverbially, had little time for common sense. It is, he said, "a deposit of prejudices laid down in the mind before you reach 18." Even so, the directionality of time is, in contradistinction to what the equations suggest, a prejudice shared more or less universally—and another branch of physics, thermodynamics, is happy with that.

Arthur Eddington was the man who, by photographing the stars surrounding the sun during a total eclipse in 1919, bolstered a crucial prediction of general relativity. This is that massive bodies such as the sun bend light as well as slowing time. Both phenomena are consequences of the fact that such bodies warp the space-time continuum, and the images of those stars nearest the sun in Eddington's photographic plates were indeed closer to it than they would have been if their light had not been bent by the sun's gravity.

Despite being hailed for vindicating general relativity's equations, Eddington saw that those equations failed, where the direction of time was concerned, to mesh with everyday reality. He preferred a different explanation for this reality: one that relied on thermodynamics.

The second law of thermodynamics puts into mathematics the commonplace observation that heat flows from hot things to cold ones, and not the other way around. This mathematical treatment, though, has many consequences. One of the best-known is that any system will become more disordered as time passes. That applies as much to two gases mixing as it does to a teenager's bedroom. This is because there are many more ways for a system to be disorderly than orderly.

That observation was made in 1877, by Ludwig Boltzmann. But it was not until half a century later, in 1927, that Eddington introduced the idea of time's arrow:

Let us draw an arrow arbitrarily. If as we follow the arrow we find more and more of the random element in the state of the world, then the arrow is pointing towards the future; if the random element decreases the arrow points towards the past...I shall use the phrase "time's arrow" to express this one-way property of time which has no analogue in space.



Morley and Michelson: the first Time Lords

Since Eddington's day, other versions of





## IN THIS SERIES

- 1 How did life begin?
- 2 Is the universe alone?
- 3 What is the universe really made of?
- 4 What caused the Cambrian explosion?
- 5 Why does time pass?
- 6 What is consciousness?

► the arrow have been postulated: the expansion of the universe, for example, or the radiation of light waves away from a source. Deep down, though, these are all examples of systems evolving in ways that have an unmistakable direction to them.

This is also true of the arrow most pertinent to human beings, which is that you can remember only the past. Memory results from changes in the nerve cells of the brain. In this case, the result is more order in the system, rather than less. (The second law of thermodynamics is not broken here, because the heat generated by the chemistry of these changes creates counterbalancing disorder.) But the same general principle applies. Watching a brain “unlearn” things at a molecular level would look so different from watching it learn them that an observer would have no doubt which was which, and would therefore perceive time’s arrow.

**No time like the present**

The problem, though, with these explanations—whether an increase in disorder or an increase in personal history—is that they describe phenomena by which the arrow of time can be detected. They do not get to the heart of what makes time so different from the other three dimensions.

Time’s arrow, as described by Eddington, is an emergent property. Put together lots of small things, such as atoms, for which no arrow exists individually, let them interact, and an arrow does indeed emerge. There are, however, a few, teasing examples of things that do not require emergence from complexity to reveal an asymmetry in the way time works. These involve certain sorts of subatomic particle and their antimatter equivalents.

The first to be demonstrated, in 1998, was that particles called kaons transform themselves spontaneously into their antimatter equivalents, antikaons, more slowly than antikaons make the opposite transition. The only coherent explanation of this asymmetry is that kaons and antikaons experience time differently. A similar phenomenon has subsequently been observed in  $\pi$ -mesons and anti- $\pi$ -mesons.

These two observations show that, in special circumstances (which also involve the compensatory violation of another phenomenon, called charge-parity symmetry), the equations of time are not the same going forwards and going back-

wards. However, nothing is actually travelling back in time so, although these observations are of huge interest to physicists investigating the difference between matter and antimatter, they are of only marginal value to their colleagues who want to understand time’s arrow at more than just a thermodynamic level—and even, perhaps, to use that knowledge to create a real, Tardis-like time machine.

Whether such a machine is possible depends on what you want to do with it. Making one that can visit the future is quite easy, at least in principle. Making one that can visit the past is trickier.

The simplest way to travel to the future is to accelerate away from Earth in a spaceship, and then turn around and come back. Some of Einstein’s equations describe the relationship between the time experienced by two bodies, one of which is accelerating while the other is not. They show it passes more slowly on the accelerating body. If a craft made what was, from its crew’s point of view, a 40-year journey away from Earth at a steady acceleration of 1g (speeding up for the first half of the outward leg, then slowing down, again at 1g, to reach the turning point before repeating the procedure for the return leg), that crew would find on their return that 58,000 years had passed on Earth.

Such a journey to the future would be a

one-way trip. A more fantastical machine might, however, be able to manage a trip to the past as well—though the time-traveller could not go further back than the date of the time machine’s creation.

Einstein’s equations permit, in certain circumstances, the formation of what have come to be known as wormholes. These are shortcuts that link otherwise distant parts of the space-time continuum, creating corridors through which objects may be able to travel. If the astronauts described above carried one end of such a wormhole with them, while leaving the other behind, the end they were carrying would finish up 58,000 years in the future. If something, or someone, could then pass intact through the wormhole (a matter of dispute, but some models of reality suggest it is possible), it or he would be able to go back and forth between the two ends, traversing the millennia separating them.

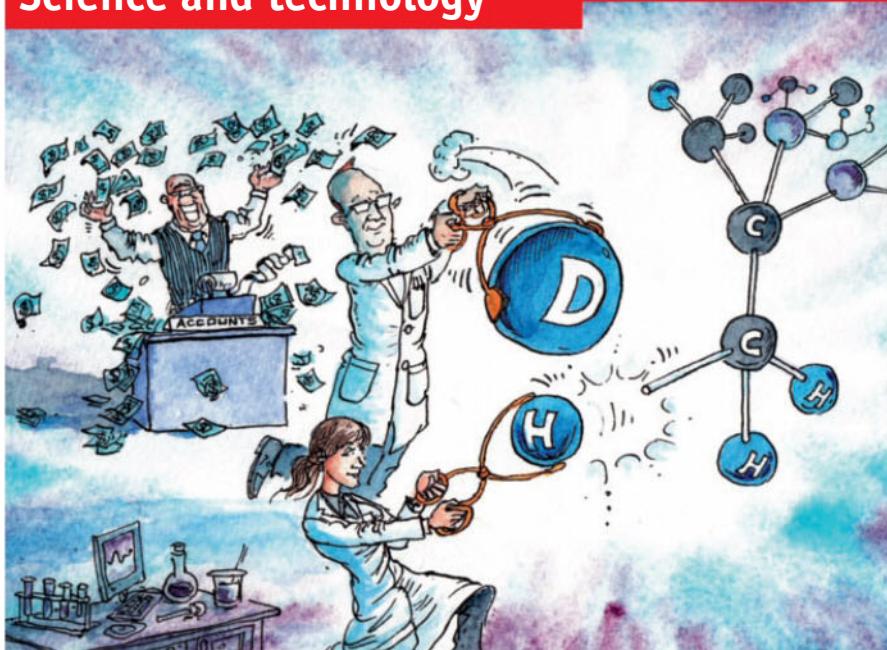
**The past is prologue**

That would, though, require a wormhole to be brought under control—an implausible proposition given the enormous masses (some of which might have to be negative) and energies that the equations suggest would be required for the creation and manipulation of such a beast. What remains, then, is a mystery. Theory fails to forbid travelling backwards in time. But practice suggests it might just as well be forbidden. Perhaps that is for the best. If backward time travel were possible, some fool would no doubt try testing the grandfather paradox, another invention of time-travelling fiction writers. In this, a visitor to the past kills his or her grandfather before the conception of the protagonist’s own parent, meaning the protagonist could never have been born, and the murder could not have taken place.

The grandfather paradox—the observation that causality cannot work backwards—is probably crucial to an understanding of the arrow of time. It is implicit in explanations that rely on thermodynamics and the like, but has not yet been translated into a coherent mathematical theory. For the person who does translate it, however, or who otherwise solves the conundrum of time’s arrow, a Nobel prize surely beckons. ■



**Wormhole's end?**



## Also in this section

79 Better mosquito nets

80 Protecting fisheries

80 An animal with no nerves

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## Medicinal chemistry

## Drugs that live long will prosper

A simple change to some pharmaceuticals might boost their efficacy, and make a few firms a packet along the way

WHATEVER ails you, if you have to take two pills a day for it instead of one, you can blame metabolic clearance. Before they can get busy, drug molecules must run a biochemical gauntlet as the body's machinery tries to break them down. As a result, much of what is in a pill may be excreted in useless pieces before it has had a chance to work its wonders.

Last month, though, America's pharmaceutical regulator, the Food and Drug Administration, received a request to approve a drug, currently called SD-809, that could change this. SD-809 is intended to treat the palsy caused by Huntington's chorea—a rare and terrible genetic illness. If approved, it will open the gates for a new type of drug that, thanks to a few well-placed atoms of a variant of hydrogen called deuterium, is able to evade metabolic clearance, and thus remain active longer.

An atom's chemical properties are determined by its electrons, which interact with those of other atoms. Those electrons are equal in number to the protons in an atom's nucleus (electrons are negative and protons positive, so the atom's overall charge is zero), and this number in turn defines an atom's elementary nature.

Most atomic nuclei also contain neutrons, which have no electric charge. Atoms of the same element may have different numbers of neutrons. That changes their mass a little, but generally leaves their

chemical behaviour unaffected. The exception is hydrogen. Most hydrogen atoms' nuclei are lone protons. Adding a neutron, to create deuterium, doubles the mass. This is such a big change that it has an appreciable chemical effect. For instance, the bonds deuterium forms with carbon atoms are stronger than those formed between carbon and normal hydrogen.

In many cases, metabolic clearance depends on breaking particular carbon-hydrogen bonds. Replacing a few of a drug's hydrogen atoms with deuterium can slow that process. Add some deuterium, then, and a drug may last longer.

### The deuterated abides

All this was first noted in a couple of obscure patents granted in the 1970s, but the idea lay dormant until the middle of the last decade. Then, a few medicinal chemists pounced on it simultaneously as a way of making molecules that were novel, potentially useful and (at least at that time) non-obvious: in other words, patentable.

A series of startup companies intent on making money from these facts duly followed. Most took the route of deuterating established drugs—starting, as Roger Tung, the boss of one of them, puts it, "with a molecule that you know is going to be effective, and has a high likelihood of being safe." His firm, Concert, is based in Massachusetts. It has created a deuterated ver-

sion of a drug intended to treat agitation in those with Alzheimer's disease. This drug, licensed to Otsuka Pharmaceuticals, in Tokyo, is now being put through large-scale clinical trials. Concert is also working on, among other things, a deuterated version of GHB, a substance notoriously used by rapists to spike drinks, but which is actually useful for treating sleep disorders.

SD-809 itself was developed by Auspex, a Californian firm that sold itself in May, for \$3.5 billion, to an Israeli outfit called Teva. It is a deuterated version of tetrabenazine, made by Roche, a large Swiss company. A third firm, DeuteRx, also based in Massachusetts, has a drug called CC-122 which is now being tested against a number of different cancers. And these are only some of the most advanced products. Several hundred other patents for deuterated versions of existing drugs have been granted. However, the time lag between applying for a patent and getting a drug to market means that only now are the first of these approaching the point where they can be used and sold.

Not every deuteration will lead to an improvement. Some deuterated drugs will merely be equivalent to their existing frères. Some will fail even to be as good as that. Many, like Concert's deuterated version of GHB, will work best only when partially deuterated in a specific way. But Graham Timmins, a medicinal chemist at the University of New Mexico who has been studying the field, reckons that when all is done and dusted, perhaps 5-10% of drugs on the market will be deuterated. The question is by whom?

For some, this question may ring bells, for there is an intriguing historical example of the essential idea involved: taking existing drugs and improving them by a trick that preserves their essence while altering ▶

► their substance. That example is the case of optical isomerism.

Many molecules, including many drug molecules, come in two forms, known as optical isomers, that are mirror images of one another. Often, only one of these isomers is clinically effective. But in the 1980s it emerged that the other can in fact be harmful. In those days, though, patent applications rarely mentioned isomerism, and manufacturing processes usually turned out mixtures of the two.

The founders of a company called Sepracor (now Sunovian) noticed this and began developing a set of single-isomer drugs that were not covered by existing patents, and were also often better than the existing versions. At the time it was revolutionary, but separating isomers quickly became standard practice among medicinal chemists, and thus eventually ceased to be patentable. It became, in patent par-

lance, "obvious to one skilled in the art."

A similar fate surely awaits deuterated drugs. In the decade since the idea got going, big pharma firms have learned to mention the effects of deuteration in their new-drug patent applications, so the game is now pretty much up. Moreover, Dr Timmins' examination of the patent literature found that the American patent office has started rejecting applications for deuterated versions of existing drugs. Deuterating, too, has become an obvious practice.

That, and the fact the drugs are now so close to market, spells legal battles ahead. Where exactly the line between innovative and obvious will get drawn, and therefore who, apart from patients, will profit from the new medicines remains to be seen. But whoever does end up winning in court, it will not change a basic fact: deuterated drugs will soon be widespread, and the result will be fewer pills to swallow. ■

tive charge. This induces an equal and opposite charge in particles of powdered insecticide, holding them in place if they are scattered over the net. The positively charged substance, crucially, stays put when a net is washed. And because the particles of insecticide themselves pick up an electrostatic charge, they are more likely to stick to a mosquito that dislodges them—as experiments using fluorescent particles show (see picture).

Further experiments demonstrated that the new nets do, indeed, have the desired effect. When the team tested them on mosquitoes resistant to a pyrethroid insecticide called deltamethrin, between 63% and 100% of the insects died within 24 hours of contact with a deltamethrin-dosed version of their invention. When they repeated the process using conventionally impregnated nets, only 10% died.

The new net does have one unfortunate constraint. Contact with human bodies reduces its potency, because the static-enhanced insecticide sticks to human skin as well as insect cuticle. It cannot, therefore, be used for making bed nets.

Beds, though, are not the only places where nets are useful. Window and door screens also play an important part in keeping mosquitoes at bay. Nor is there any reason why the coating could not be sprayed onto walls, making the deployment of insecticide on these favoured resting sites of mosquitoes more effective.

One inevitable side-effect of the new net's efficacy is that it needs regular resupplies of insecticide. But that is not a problem. In the field the researchers simply sealed a net and some powdered insecticide in a bucket and shook it up for 15 seconds. This was enough to recoat the net.

The upshot, then, is another useful weapon in the war on malaria. It will not win that war by itself. But it might bring victory closer. ■

## The war on malaria

# A charge that sticks

## Static electricity may lead to better mosquito nets

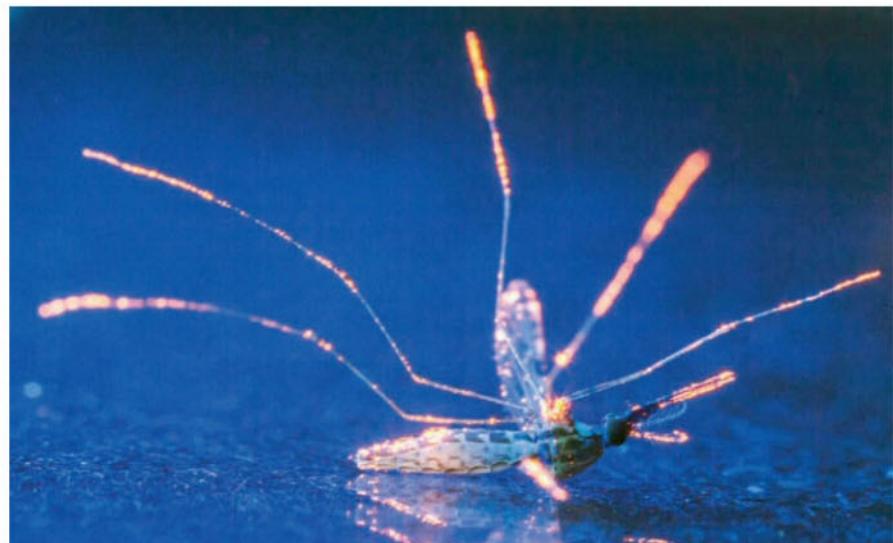
**T**HE widespread use in recent years of nets, insecticides and new drugs has helped to bring malaria under a measure of control—but evolution is constantly pushing back by generating resistant strains of both the parasite that causes the disease and the mosquito that spreads it. Even resistant mosquitoes, however, can take only so much chemical abuse, and Marit Farenhorst, a researcher at In2Care, a Dutch mosquito-control firm, and her colleagues think they have devised a way to dish out more of it.

Their method, as they report in the *Proceedings of the National Academy of Sciences*, is a version of the party trick of making a balloon stick to a wall by imbuing it with static electricity. Substituting mosquito nets and insecticide particles for walls and balloons, Dr Farenhorst believes, yields a way of delivering more, and more diverse, insecticides, and really making them stick where they are needed—on the cuticle of the target insect.

Current mosquito nets are woven from fibres impregnated throughout with an insecticide. This permits them to be washed and used for years without loss of potency. But it also means this potency is not as great as it could be, because the insecticide is released only slowly by the fibres. The impregnation, moreover, requires high temperatures, and only one class of insecticide, pyrethroids, can withstand these. In this case, therefore, natural selection has

only one type of enemy to evolve around. Using static electricity, by contrast, means all of the insecticide is held on the surface of a net's fibres. Much larger doses can thus be transferred to an insect which blunders into the net. In addition, a wide range of insecticides—and even, possibly, the spores of a fungus harmless to people but lethal to mosquitoes—can be applied to the fibres.

To make her nets electrically attractive, Dr Farenhorst coats their fibres with a proprietary substance that maintains a posi-



The road to dusty death

## Fisheries

# Drawing the line

**When regulating fishing, it always helps to have data**

OCEAN fishermen are constantly on the lookout for new places to ply their trade, as they exhaust the old ones. Thus, in the 1970s, Europe's trawlers turned to the deep seabed of the north-east Atlantic to replace the shallow continental-shelf fisheries closer to home that they had stripped near-bare.

But those replacement grounds, too, are not what they were. A study published in 2009 suggested that in all but the deepest of their waters—those with a seabed closer than 1,500 metres to the surface—yields had dropped by 70% over 25 years. Even in the abyss below that depth, the fall was 20%. To try to stem this decline the European Union, which regulates fishing in much of the area, is proposing to limit the depth at which trawling can take place. This would, in effect, create a marine reservoir below that level, a form of protection additional to the system of species-specific quotas that already exists. The question is where the line below which trawl-gear is forbidden should be drawn. And, until now, there have been few scientific data to inform that decision.

This has just changed, however, with the timely publication, in *Current Biology*, of a study by Jo Clarke of Glasgow University and Francis Neat of Marine Scotland Science, a government agency. Their work suggests that the appropriate cut-off would be at a depth of 600 metres—below which the ecological damage caused by trawling increases substantially.

Ms Clarke and Dr Neat derive their conclusion from data collected between 1978 and 2013 by Marine Scotland Science and the Universities of Aberdeen and St Andrews. These data record species caught, and also the depths of the trawls that caught them, which ranged from 250 to 1,500 metres.

The researchers note that biodiversity increases with depth. On average, an extra 18 fish species show up with each 100-metre increase. Many of these, though, are of little commercial value. Such so-called by-catch gets thrown back, but by then most of it is dead. And that, particularly because deep-sea species tend to grow more slowly than those which live near the surface, and have lower fecundity rates, can have profound effects on ocean ecology.

Trawls at 300 metres, Ms Clarke and Dr Neat found, have a ratio of catch to by-catch (in terms of weight) of five to one. At 600 metres the ratio is around three to one.

## Evolution

# Slippery customers

**A leftover from the Precambrian may illuminate the origin of nerves**

THE flip side of evolution is extinction. The fossil record is replete with groups, once mighty, that are no more. But sometimes the Darwinian reaper misses a species or two within such a group and these, the last of their kind, cling on to existence to remind the world of the way it once was.

The coelacanth, a fish from the Indian Ocean; the tuatara, a reptile from New Zealand; the pearly nautilus, a tentacled mollusc of the tropical seas—all are “living fossils” of this sort. And so is *Trichoplax*, a flat, sheet-like creature about half a millimetre across that is the only known member of a phylum called the Placozoa. This species seems little changed from the Ediacaran period, before the Cambrian explosion of animal life.

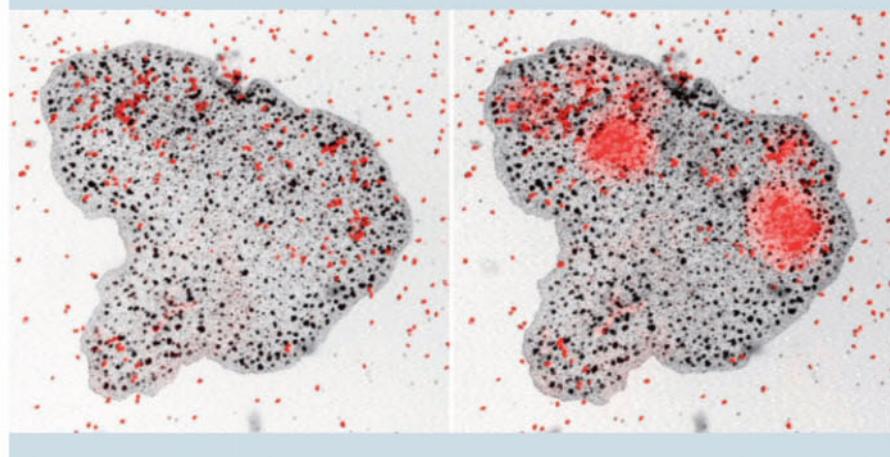
The Ediacarans are a mystery, not least because none of those known from fossils has any sign of a gut, or any other obvious way of feeding itself. But a study of *Trichoplax*, just published in *PLOS One*, by Carolyn Smith of the National Institute of Neurological Diseases and Stroke, in Bethesda, Maryland, and her colleagues, may explain how they did it.

*Trichoplax*'s six cell types do not include muscles. Instead, the animal moves around using whip-like cilia that grow out of one of these cell types. Their

beating permits it to glide smoothly over surfaces, in search of prey.

The prey Dr Smith fed it were single-celled algae. When it came across a patch of them its cilia stopped beating and cells called lipophils secreted enzymes that broke the algae open, releasing their contents—some of which were fluorescent, so that what was going on could be observed by shining ultraviolet light onto the scene (see the “before” and “after” pictures below). What most intrigued Dr Smith was that lipophils from all over the animal's body start secreting simultaneously. Moreover other cells, also acting in concert, then stirred up the broken-down algae, presumably to make their contents easier to absorb.

This was impressive behaviour for a creature that has no nerves to carry signals around its body. It does, though, have “fibre cells” that are connected by junctions which may be precursors of the synaptic junctions of actual nerves. It also has gland cells that contain peptides of the sort used by nerve cells for signalling. Perhaps these fibre cells and gland cells are precursors of nervous systems. Studying *Trichoplax* may thus help explain how nerve cells, the things that permit higher animals to be animate, and institutes of neurology to exist, evolved.



At 800 metres, though, it is ten to nine; at 1,000 metres one to one; and at 1,200 metres, one to two.

Based on these findings, Ms Clarke and Dr Neat suggest that a trawl limit of 600 metres would be a suitable compromise between commercial reality and ecological necessity. Such a cut-and-dried value would have the bonus that any fishing boat caught in the north-east Atlantic with gear whose ropes were long enough to let it

trawl more deeply than this would automatically be breaking the law, making enforcement easier.

Whether anyone in Brussels is listening remains to be seen. Fishery regulations are notoriously driven by vested interests first, and science a distant second. But the rule Ms Clarke and Dr Neat are proposing has the virtues of clarity and simplicity, as well as ecological logic, and would certainly be a good basis for negotiations. ■



### Gay rights in America

## The arc of history

A half-century of tenacious struggle has paid off slowly, but surely

**O**F THE quarter of a million people who massed in Washington, DC, on August 28th 1963 to hear Martin Luther King proclaim "I have a dream", few would have noticed—much less known what to make of—the six white men who stood in the crowd with signs identifying them as members of the "Mattachine Society". One of them surveyed the vast ocean of faces and later asked his fellows, "Why aren't we gays having civil-rights marches too?"

With gay Americans' astonishing strides in the past decade, it is easy to forget that just a half-century ago the very notion of gay or transgender civil rights was as strange to most Americans as black civil rights had been a century earlier. Until the early 1960s government employees were fired for being homosexual, and the American Civil Liberties Union generally sided with the government. The few "homophile" organisations took deliberately obscure names; Mattachine was supposedly a French medieval secret fraternity.

Lillian Faderman's new book, "The Gay Revolution", is the most comprehensive history to date of America's gay-rights movement. The story usually begins one hot night in 1969, when the drinkers at New York City's Stonewall Inn responded to a routine police raid with a riot, waking the consciousness of many across the country. But Ms Faderman goes far beyond Stonewall, cataloguing the wearying political

**The Gay Revolution: The Story of the Struggle.** By Lillian Faderman. *Simon and Schuster*; 816 pages; \$35 and £25

and legal battles that began two decades before and continue still.

A quarter of the book covers the little known pre-Stonewall years. Homophile organisations met in private homes and sympathetic churches, but after 1963 began marching. Their plaintiveness arouses pity now: small groups in business attire, picketing government buildings with signs reading, "Love and let love". It is easy to forget what a rare breed they were, rejecting society's view of them as deviants, and filing anti-discrimination lawsuits when no law recognised their right to do so.

### Over the wall

Nobody will ever be sure why the Stonewall's denizens chose that night to riot. It might have been the summer heat, the death a few days earlier of a gay icon, Judy Garland, or the one particularly querulous lesbian who refused to go quietly when the cops tried to push her into the paddy wagon. Either way, a decade of seeing other minorities loudly demand their own rights had surely played a part. After Stonewall, the book's story courses past the milestones familiar to any casual student of American gay history: the assassination in 1978 of Harvey Milk, a gay San

### Also in this section

- 82 Money and American college football
- 82 Religion and violence
- 83 The history of herring
- 84 Jonathan Franzen's new novel
- 84 Art at the cultural crossroads

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Francisco politician, which led to the first mass march on Washington the next year; the AIDS crisis, which ravaged the community but also mobilised it; and the long battles to let gays serve openly in the armed forces and to overturn state bans on same-sex marriage.

The activists' opponents included Leviticus-quoting preachers and the likes of Anita Bryant, a Miss America runner-up: "Homosexuals will recruit our children," she told a 1977 hearing in Miami, when the city was considering an anti-discrimination ordinance. "They will use money, drugs, alcohol, any means to get what they want." But the campaigners remained determined. They included Miriam Ben-Shalom, an army drill-sergeant who spent some 15 years contesting her dishonourable discharge, and Karen Thompson, who spent the 1980s suing to be allowed to care for her partner, crippled by a car crash, as her partner expressly wished.

Several themes recur. One is the peculiar nature of a civil-rights struggle in America, continually finding ways to imbue a brief 18th-century constitution, rarely formally amended, with ever-changing contemporary values, and the particular forms of lobbying and legal argumentation that entails. Another is the tension between unity and diversity in political movements. The early homophiles, no less than the more numerous post-Stonewall campaigners, were given to rivalries and splits—an alphabet soup of organisations, frequently divided between the "streets" (direct-action campaigners) and the "suits" (lobbyists and lawyers). There were also divisions between gay men and lesbians, who tended to socialise separately, and typically faced different problems (AIDS devastated men, for example, whereas lesbians led the struggle for gay parenting) and had different tactics. Yet again and ►

► again, these groups proved symbiotic, relying on one another's complementary brands of activism to advance the cause.

Ms Faderman's account is more narrative than analytical. And since it is a story of activism rather than of culture, transgender people appear only late in the book, when they first started winning legal recognition (though, as an already-established historian of lesbian America, Ms Faderman gives women a welcome prominence that is often lacking in other accounts). The book does not dwell much, after the early pages, on how the struggles for black and women's rights influenced the gay movement's own.

Another under-explored element is the connection between the American movement and those abroad. Almost the only nod to the outside world comes when the author recounts how, in 2010, Barney Frank, a gay congressman from Massachusetts, reminded his colleagues during a debate on the army's "Don't Ask, Don't Tell" policy that 26 other countries already allowed openly gay troops to serve. As a result, the book is silent on another big issue: why America, so gung-ho about individual rights, has been one of the slowest among Western countries to extend them to gay people (it was the 22nd country to legalise same-sex marriage nationwide).

But others will wrestle with these questions. Ms Faderman has ably drawn the map that future historians of the struggle will use to chart their courses. ■

#### American college football

## Punishingly profitable

**Billion Dollar Ball: A Journey Through the Big-Money Culture of College Football.** By Gilbert Gaul. *Viking; 272 pages; \$27.95*

OUTSIDE the United States, university is where you study. But for thousands of supersized American males, it is where you go to run into other men of similar proportions like particles in the Large Hadron Collider. College football has been a cornerstone of American sports culture for over a century, and inspires nearly religious fervour in the Deep South. In recent years critics have accused American universities, which together earn \$10 billion a year in athletic revenue, of exploiting an unpaid labour force. Moreover, numerous players have filed lawsuits demanding a piece of the pie. In "Billion Dollar Ball" Gilbert Gaul, a journalist, eschews these criticisms in favour of a more fundamental angle of attack: that running such large entertainment businesses is incompatible with the core task of universities.



The South's other megachurches

Mr Gaul is dumbfounded by the giant sums of money coursing through these nominally amateur contests, and diligently walks the reader through their jaw-dropping growth over just the past few years. For example, in 2012 the University of Texas's football programme pulled in \$104m, mostly from ticket sales, broadcast rights and merchandise licensing, and kept \$78m as profit. As recently as 1999, those figures were just \$19m and \$10m. Rather than subsidising, say, bursaries for needy students or cutting-edge academic research, these funds remain exclusively within athletic departments (though they do cover the cost of maintaining unprofitable teams in other sports).

The author gawks at gargantuan stadiums, lavish practice facilities and omnipresent corporate sponsorships—even the rubbish bins at the University of Oregon are emblazoned with the Nike swoosh. He bemoans the tax breaks politicians have lavished on football: ticket price increases are classified as "seat donations", 80% of which can be used to reduce the "benefactor's" taxable income. He mocks the millions of dollars schools squander on golden parachutes for coaches with losing records. And he explores the far reaches of the infrastructure necessary to sustain big-time college football, like the "walkers" who escort players to classes to ensure they attend, and the enormous women's rowing teams universities now support, overstuffing them in order to comply with federal laws and regulations about gender equality in sport.

But given the richness of his subject matter, Mr Gaul seems to have settled for a conservative field goal rather than pushing more boldly for a touchdown. The story often loses narrative drive: most chapters focus on a visit to a campus and an interview with a university administrator. The voices of the central characters, the football play-

ers and coaches themselves, are conspicuous by their scarcity.

A bigger flaw is the author's superficial treatment of the issues presented by the industry's runaway growth. The book contains little about the damage this brutal game wreaks on young men's brains, which scientists have linked ever more closely to dementia and early death. And Mr Gaul downplays the criticism of unfair labour practices in college sports, writing that "the argument that [players] were underpaid...made sense only if you accepted that the sprawling financial model of college football was not broken or absurd." He mentions the "swag", such as sunglasses and iPads, that some players get as evidence that "maybe the players weren't victims." In a sport where coaches can make \$6.5m a year, does Mr Gaul really expect the athletes to derive much consolation from free video-game consoles?

Mr Gaul's decision to shift the focus from the "narrative du jour" of harm to players to the huge resources universities pour into football could conceivably provide a valuable contrarian perspective. But he produces little evidence that college sports actually harm education and research. Nor does he propose any solutions to the alleged problem of football tarnishing the university's educational mission. Does Mr Gaul think universities should simply scrap these \$100m businesses? Should they be downsized, or spun off? Saying that "student athletes" should spend more time grappling with their studies and less with their on-field opponents is a safe play, but it leaves the reader wishing Mr Gaul had been a bit more daring. ■

#### Religious conflict

## Bloodied brothers

**Not in God's Name: Confronting Religious Violence.** By Jonathan Sacks. *Hodder & Stoughton; 305 pages; £20. To be published in America in October by Schocken; \$28.95*

THE Western world is less and less capable of offering any coherent spiritual alternative to the grim certainties of the terrorist groups which commit atrocities in the name of religion. That stark warning comes as a shock in the final pages of a book by a former chief rabbi of Britain whose earlier chapters have addressed, with diligence and sensitivity, an old conundrum. The puzzle that Lord Sacks sets out to solve is why a broadly similar set of narratives and role-models (in this case, the patriarchal figures shared by the Abrahamic faiths) can in some circumstances inspire compassionate humanism, and in ►

▶ others terrible and destructive sectarian hatred.

In an intelligent analysis of old and new connections between religion and violence, he dissects stories like those of Cain and Abel, Isaac and Ishmael, Esau and Jacob, and of course, Abraham himself. He tackles this task with the tenderness of a believer and the rigour of a scholar, drawing both on a thorough knowledge of ancient texts and history and on modern insights like those of Sigmund Freud and a French literary critic and authority on sacred violence, René Girard. As Lord Sacks repeatedly shows, stories that superficially describe deadly sibling rivalry also contain counter-narratives which stress the deep, unbreakable bonds which common parenthood implies. Thus Ishmael and Isaac, the sons of Abraham, have sharply differing destinies but come together to bury their father. Elsewhere in the Book of Genesis, Joseph and his brothers deal ruthlessly with one another before the tearful reconciliation upon their father's death.

The detail-crunching caution of these chapters makes the pessimism of his conclusion all the more shocking; but this variance in tone reflects two different aspects of the career of Lord Sacks. On the one hand, he is a good scholar. His doctorate at King's College London could have led to a full-time academic career, and his later role as a theology professor at his alma mater involved active teaching, not just a ceremonial honour. On the other, he managed during his time as chief rabbi, from 1991 to 2013, to develop a more prophetic voice as a public intellectual. (He made waves in 2002 by saying Israel's behaviour was short of its highest ideals; more recently he has denounced growing anti-Semitism and the campaign to boycott Israel.)

In support of his grim conclusion, Lord Sacks makes an argument which, coming from a religious office-holder, will strike some people as self-serving. He says the West is losing the distinctive values that used to attract outsiders: ideals like human dignity and public service, which in his view are at least subliminally religious. It has replaced them with the market, consumerism and relativism, a world that accepts "whatever works for you". This creates a vacuum in which brute force backed by the certainty of a cohesive group can be terrifyingly effective. Lord Sacks argues that the violent Islamist senses this; to this extent he is not a medieval throwback but a "faithful child of the 21st century".

That raises the question of how to connect the rabbi's generous view of the Abrahamic texts with the need he discerns to construct a meaningful alternative to Islamic State's seductive nihilism. Winkling out the more generous, universalist messages in those texts, in a way that convinces

and inspires believing Christians, Jews and Muslims, may be part of the answer. But it cannot be the whole answer; there are many people in zones of conflict who follow non-Abrahamic faiths like Hinduism or Buddhism, and plenty who follow no faith at all. Whatever mixture of beliefs their citizens profess, most democracies also have a kind of civic religion in which common values are ritually affirmed with the likes of presidential inaugurations and war memorials. Perhaps civic creeds and celebrations should be imbued with more passion, beauty and content. The rabbi, who has written 25 books in all, could make that the subject of his next work. ■

has almost as many facets as his slippery subjects have scales. His tale offers fillets of history, culture and zoology, with an emphasis on the eclectic—not to say wilfully eccentric. Yet his approach faithfully reflects our relationship with *Clupea harengus*, which has never been straightforward.

Part of the herring's attraction for mankind lies in its sociability. It forms vast shoals, a trail of silver below the ocean's surface that is irresistible for fishermen. But this is a notoriously fickle fish. Until the 15th century herring thronged the Baltic, enriching many of the cities of the Hanseatic League. Then they vanished from the area, never to return in such huge numbers, leaving fishermen bereft and baffled in their wake. The fish later tarried for long enough around Scotland to become an important part of the country's income. At the industry's high point there, in the period immediately before the first world war, 2m-3m barrels were caught each year.

Soon after, overfishing started to take its toll on herring populations. Factory ships were built by the Dutch as early as the 15th century, to salt the fish while still at sea, but it was in the late 20th century that boats became big and efficient enough to run down the stocks. Enormous, dilapidated vessels from Iron Curtain countries hunted down the remaining fish, thus speeding the industry's decline (though it has since made a partial recovery). Life aboard these gigantic rust-buckets was strange; Mr Murray recounts that no fewer than 40 crew members on one Romanian vessel were secret policemen.

The fish's culinary charms extend far beyond kippers and rollmops. Jewish communities have been notably inventive with recipes, reaching a creative peak with the likes of chopped herring topped with crushed chocolate biscuits. Even more of an acquired taste is the foul-smelling fermented herring, called *surstromming*, which Swedes have relished since at least the 16th century.

Nowadays the herring's role is as much cultural as economic. Mr Murray tours former fishing villages which today have become homes to artists, writers and musicians who use their work to celebrating the silver darlings. The fish remains a focus for national and regional pride, with lively annual festivals in France, the Netherlands and Norway.

The herring also provides classic arguments for conservation, not least thanks to its many uses beyond direct nutrition. The guts make fine fertiliser, and herring oil was used for lighting until the mid-19th century. As evidence accumulates about the dangers of using fossil fuels, old ways of this sort may become fashionable again. In the meantime, Mr Murray is a gregarious and engaging raconteur as he flips between the diverse aspects of this versatile little creature. ■

### Herring's history

## Net worth

**Herring Tales: How the Silver Darlings Shaped Human Taste and History.** By Donald Murray. Bloomsbury Publishing; 272 pages; \$26 and £16.99

THE herring is hardly the grandest of fish, but as a cheap source of protein it is hard to beat, and herring-fishing was a way of life for many communities around the North Atlantic from the Middle Ages up to the 20th century. Trade in the fish made merchants wealthy. In Scotland herring are known as "the silver darlings"; in Norway they are called, even more lovingly, "the gold of the sea".

A new account of the herring industry by Donald Murray, a journalist and poet,



New American fiction

## Being Franzen's friends

**Purity.** By Jonathan Franzen. *Farrar, Straus and Giroux*; 576 pages; \$28. *Fourth Estate*; £20

“THE reader is a friend, not an adversary, not a spectator,” Jonathan Franzen, an American novelist, has said. Following this rule, he has written two exceptional books that bring readers deep into the lives of troubled Midwestern families. “The Corrections”, about grown-up children home for Christmas, won a National Book Award in 2001, and “Freedom”, about a troubled marriage in the George Bush era, was even more emotionally deft and haunting.

“Purity”, his latest novel, follows a now-familiar formula, tracing the interlocking lives and personal musings of a cast of broken characters. The protagonist Pip, whose real name is Purity, is a lost young woman with \$130,000 in student loans, searching for the identity of her father. Like Pip in Dickens’s “Great Expectations”, she evolves from innocent to worldly wise through a novel full of twists and unlikely coincidences. Pip moves from Oakland to Bolivia to be an intern for Andreas Wolf, a German internet activist who runs the Sunlight Project, a non-profit that exposes political and social misdeeds. Far from the hero the press portrays, Mr Wolf is a neurotic, womanising criminal, one of many realities Pip is forced to confront.

“Purity” explores themes that Mr Franzen has evoked in previous works: the tension between children and parents, the sexual undertones of male friendship, people’s instinct for self-preservation and their search for greater meaning. It also follows a similar structure. Like “Freedom”, this book has a long first-person account “written” by a main character.

In “Purity”, the cynical Mr Franzen is at his most authentic when writing about writers. Leila, a journalist so talented she has won a Pulitzer prize, resents the superficiality of her profession: “Reporting was imitation life, imitation expertise, imitation worldliness, imitation intimacy; mastering a subject only to forget it, befriending people only to drop them.” “Purity” feels like an imitation of Mr Franzen’s earlier novels, without the emotional resonance and subtlety. Navigating its illegitimate children, seduction, covered-up crime, international espionage and a secret billionaire feels like being a spectator to, not a friend in, the melodrama. It is testament to Mr Franzen’s talent that he has created his own great works to measure up to. Unfortunately, though, “Purity” does not manage to do so. ■



Cross-cultural art

## East meets West

A show about European views of Asia as realised in the Americas

CULTURAL appropriation has become unfashionable. Since the publication of Edward Said’s “Orientalism” in 1978, using Western visions of the “mysterious East” is frowned on as a way to spice up the familiar with a hint of the exotic. Said, who was a professor at Columbia University, argued that a romanticised account of Asia as the alluring “other” facilitated exploitation, domination and conquest.

In July, the Museum of Fine Arts (MFA) in Boston got its own lesson in the perils of cultural appropriation when it held a series entitled “Kimono Wednesdays”. As part of a month-long programme, visitors were invited to put on traditional Japanese robes and pose for photographs next to Monet’s “La Japonaise”, a portrait of the artist’s wife holding a paper fan and dressed in a red robe that features a glowering samurai warrior. After days of protests, the museum was forced to rethink the concept, cancelling the element of dressing-up that critics found particularly offensive.

In this context, the MFA’s exhibition “Made in the Americas: the New World Discovers Asia”, on view until February 15th, comes as a relief. Although it is in no way a response to the protests, having been organised long before the controversy erupted, it does make a compelling case for a more nuanced understanding of the East-meets-West dynamic. Through a range of objects—from the luxurious to the humble, from oil paintings to furniture and fabrics—“Made in the Americas” tells the story of the centuries of cross-fertilisation that followed the opening of trade be-

tween Europe and Asia; the Americas, in the middle of many oceanic routes, was the place where traditions melded in the most imaginative ways.

Many of the objects on view are hybrid forms, made for those of European descent living in a new environment, exposed to indigenous peoples and with elements freely borrowed from Asian cultures. Among the most striking pieces are the desks and cabinets (mostly from late-17th- and early-18th-century Mexico) encrusted with ivory, mother-of-pearl and tortoise-shell in a style known as *enconchado* (from the Spanish for “shell”). These over-the-top confections are creative adaptations of Asian originals made by Latin American craftsmen to cater to European tastes. Although they were originally made as less expensive alternatives to imported inlaid furniture, they have a distinctive opulence of their own.

A taste on the part of Europeans and their American descendants for “chinoiserie” and for lacquered furniture, using a technique known as “japaning”, demonstrates the enduring demand for Asian artistry, which fuelled much of the worldwide trade in luxury goods. This kind of cultural borrowing is embodied in a 17th-century lacquered desk and stand (pictured) in an Anglo-Dutch form, painted in the Chinese style by the Mexican furniture-maker José Manuel de la Cerdá—the kind of creative hybrid possible only when civilisations open up to one another.

Of course, attempts to copy art forms from another culture inevitably involve some misunderstanding. But this can sometimes light a creative spark. One striking example is a woven table cover from Peru of the late 17th or early 18th century. Traditional Chinese motifs like phoenixes and peonies merge seamlessly (and improbably) with indigenous flora and fauna. The fabric itself is a blend, combining strands of local alpaca wool with silk threads from China. A particularly amusing example of creative misunderstanding is an 18th-century bed curtain from Boston, which transports “exotic” figures from the Chinese countryside to a pastoral New England complete with shepherdess and rustic cabin, as if they were all characters in an absurdist drama.

If Western adaptation of Eastern forms often demonstrates an ignorance of context, misunderstanding can work both ways. A folding screen by the Japanese painter Kano Naizen titled “Southern Barbarians Come to Trade”, made around 1600, shows the same mix of curiosity and caricature that marks many European attempts to mimic Asian forms. Placed prominently at the entrance to the exhibition, its depiction of European traders as odd, strangely attired creatures reveals both fascination and befuddlement—an apt metaphor for such exchanges. ■

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Government of Ghana ("GoG") acting through the Ministry of Trade and Industry ("MoTI") has appointed PwC to assist with the revitalisation of VSTL as part of efforts to enhance the status of VSTL as a leading textile processing company in West Africa and to improve the economic prospects of Juapong and its surrounding communities.

To achieve this objective, GoG through MoTI is inviting prospective bidders to submit an Expression of Interest ("EoI") to acquire 70% of the shares of VSTL.

The deadline for the submission of the EoI is **Friday, 25 September 2015 at 4pm**.

Expressions of Interest should be marked **CONFIDENTIAL – PROJECT STAR** and addressed to;

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**INVITATION TO TENDER:  
PRE-QUALIFICATION FOR CRUDE OIL OFFSHORE PROCESSING ARRANGEMENT**

**1. INTRODUCTION**

The Pipelines and Products Marketing Company Limited(PPMC) is the NNPC Subsidiary Company responsible for the Crude Oil deliveries to the Refineries, supply and distribution of petroleum products through a network of pipelines and storage depots as well as marine movement of petroleum products by vessels.

In compliance with the Public Procurement Act 2007 and the Bureau of Public Procurement guidelines, PPMC intends to engage the services of qualified and reputable Companies.

**2. BRIEF DESCRIPTION OF SERVICE (SCOPE)**

Processing of Crude Oil and delivery of Petroleum products in consideration of processing fee subject to terms and conditions as will be advised in the term sheets and general form of agreement.

**NB:** Term Sheets and General Form of Agreement shall be made available to pre-qualified applicants.

**3. PRE-QUALIFICATION REQUIREMENTS**

- 3.1 Full details of company profile with Certificate of Registration/Incorporation, certified true copies of memorandum and article of Association of the company.
- 3.2 Company Tax Clearance Certificate for the last (3) years (2012, 2013 and 2014).
- 3.3 Evidence of VAT registration and Remittance (where applicable).
- 3.4 Proof of ownership of or Affiliation to a designated Refinery or proven contractual arrangements with a Refinery to be backed by NNPC's due diligence enquiry.
- 3.5 Demonstration of minimum annual turnover of US\$1 billion and net worth of at least US\$ 500 million.
- 3.6 Ability to produce an irrevocable Letter of Credit to cover the value of any crude cargo allocated under the program.
- 3.7 Evidence of compliance with the Industrial Training Fund (ITF) Amendment Act 2011 by inclusion of copy of Compliance Certificate from the Industrial Training Fund (where applicable).
- 3.8 Audited account for three (3) years (2011, 2012 & 2013).
- 3.9 Compliance with Nigerian Oil and Gas Industry Content Development Act. 2010.
- 3.10 Commitment to training and development of Nigerian personnel.
- 3.11 Evidence of verifiable similar services carried out within the last five years.
- 3.12 Any additional information relevant to enhance the bid/tender process.
- 3.13 Certainty of business integrity and pre-signed

undertaking to strictly comply with Nigerian Anti-Corruption laws in processing the bid and executing the contract if successful.

**4. SUBMISSION OF BID DOCUMENTS**

All prospective companies wishing to tender for the service described in 2.0 above shall submit relevant documentation as stipulated in 3.0 above.

The requested information and any supporting documents in respect of these requirements should be submitted in ONE original plus TWO hard copies and two electronic copies (CD ROM). The documents which should be in separate packages shall be sealed and clearly marked "**INVITATION TO TENDER FOR CRUDE OIL OFFSHORE PROCESSING**" to be delivered as follows:

- a. Bids to be submitted on or before **4.00pm on Wednesday, 14th October, 2015**.
- b. Venue: Block D, First (1st) Floor, Room 45B, Herbert Macaulay Way, NNPC Towers, Central Business District, Abuja, FCT.
- c. Bids shall be opened on **Thursday, 15th October, 2015 at 10.00am** in the Amphitheatre, 1st Floor, Block A, NNPC Towers.

**5. IMPORTANT INFORMATION**

It must be noted that:

- a. Only shortlisted companies will be contacted thereafter to submit commercial bids.
- b. Late submission shall be rejected.
- c. Your company shall provide NNPC with a Letter of Authority to verify all claims made in your submissions.
- d. NNPC reserves the absolute discretion and right to either accept or reject any documents and it shall not be required to assign a reason for refusal to invite your company to participate in the bidding exercise or to enter into any correspondence concerning the selection of any contract for the services.
- e. All claims must be adequately substantiated and verifiable. NNPC shall deal directly with only authorized officers of the interested companies and not through individuals or agents (ownership is therefore essential).
- f. All costs incurred by your company as a result of this pre-qualification exercise and any subsequent request for information shall be to your account.
- g. The pre-qualification and any related process neither creates any commitment by NNPC nor establish any legal relationship.

**SIGNED: MANAGEMENT**

**Economic data**

% change on year ago

	Gross domestic product			Industrial production latest	Consumer prices latest 2015†	Unemployment rate, %	Current-account balance			Budget balance % of GDP 2015†	Interest rates, % 10-year gov't bonds, latest	Currency units, per \$ Sep 1st	Year ago	
	latest	qtr*	2015†				latest	months, \$bn	% of GDP 2015†					
United States	+2.7	Q2	+3.7	+2.4	+1.3 Jul	+0.2 Jul	+0.4	5.3 Jul	-406.4 Q1	-2.6	-2.6	2.18	- -	
China	+7.0	Q2	+7.0	+6.9	+6.0 Jul	+1.6 Jul	+1.5	4.0 Q2§	+291.4 Q2	+3.0	-2.7	3.14§§	6.36	6.14
Japan	+0.7	Q2	-1.6	+0.8	+0.2 Jul	+0.3 Jul	+0.7	3.3 Jul	+97.1 Jun	+2.7	-6.8	0.36	119	104
Britain	+2.6	Q2	+2.7	+2.5	+1.5 Jun	+0.1 Jul	+0.2	5.6 May††	-180.5 Q1	-4.8	-4.4	1.99	0.65	0.60
Canada	+1.0	Q2	-0.5	+1.4	-2.7 Jun	+1.3 Jul	+1.1	6.8 Jul	-48.5 Q2	-2.9	-1.8	1.43	1.33	1.09
Euro area	+1.2	Q2	+1.3	+1.4	+1.2 Jun	+0.2 Aug	+0.2	10.9 Jul	+317.6 Jun	+2.6	-2.1	0.80	0.88	0.76
Austria	+0.5	Q2	-2.6	+0.7	-0.1 Jun	+1.2 Jul	+1.0	5.8 Jul	+6.5 Q1	+1.4	-2.1	1.12	0.88	0.76
Belgium	+1.3	Q2	+1.7	+1.3	-4.5 Jun	+0.9 Aug	+0.4	8.5 Jul	+12.1 Mar	+1.7	-2.6	1.15	0.88	0.76
France	+1.0	Q2	nil	+1.1	+0.6 Jun	+0.2 Jul	+0.2	10.4 Jul	-4.2 Jun‡	-0.7	-4.1	1.16	0.88	0.76
Germany	+1.6	Q2	+1.8	+1.7	+0.6 Jun	+0.2 Aug	+0.4	6.4 Aug	+283.1 Jun	+7.6	+0.7	0.80	0.88	0.76
Greece	+1.7	Q2	+3.7	+0.5	-4.3 Jun	-2.2 Jul	-1.0	25.0 May	+2.1 Jun	+2.6	-3.8	9.33	0.88	0.76
Italy	+0.7	Q2	+1.3	+0.6	-0.3 Jun	+0.2 Aug	+0.2	12.0 Jul	+45.6 Jun	+2.0	-2.9	2.00	0.88	0.76
Netherlands	+1.6	Q2	+0.3	+1.8	+3.6 Jun	+1.0 Jul	+0.4	8.5 Jul	+91.4 Q1	+9.2	-1.8	0.96	0.88	0.76
Spain	+3.1	Q2	+4.1	+3.0	+7.4 Jun	-0.4 Aug	-0.3	22.2 Jul	+15.8 Jun	+0.8	-4.4	2.14	0.88	0.76
Czech Republic	+4.4	Q2	+4.0	+3.1	+8.0 Jun	+0.5 Jul	+0.3	6.3 Jul§	+0.8 Q1	-0.1	-1.8	0.91	23.9	21.1
Denmark	+2.0	Q2	+0.9	+1.8	+10.6 Jun	+0.7 Jul	+0.7	4.6 Jul	+21.4 Jun	+6.8	-2.9	1.04	6.60	5.67
Norway	+2.2	Q2	-0.4	+0.7	+5.7 Jun	+1.8 Jul	+1.6	4.5 Jun††	+37.8 Q2	+9.3	+6.0	1.62	8.29	6.19
Poland	+3.6	Q2	+3.6	+3.4	+3.7 Jul	-0.7 Jul	+0.2	10.1 Jul§	-1.0 Jun	-1.4	-1.5	3.01	3.76	3.20
Russia	-4.6	Q2	na	-3.6	-4.6 Jul	+15.6 Jul	+14.8	5.3 Jul§	+68.7 Q2	+4.9	-2.8	11.50	66.6	37.3
Sweden	+2.9	Q2	+4.0	+2.7	+1.2 Jun	-0.1 Jul	+0.1	6.5 Jul§	+35.1 Q2	+6.5	-1.2	0.74	8.42	7.01
Switzerland	+1.2	Q2	+1.0	+0.7	-2.5 Q2	-1.3 Jul	-1.0	3.3 Jul	+53.6 Q1	+7.2	+0.2	-0.10	0.96	0.92
Turkey	+2.3	Q1	na	+2.8	+7.4 Jun	+6.8 Jul	+7.3	9.3 May§	-44.7 Jun	-4.7	-1.6	10.21	2.93	2.16
Australia	+2.0	Q2	+0.7	+2.4	+1.2 Q2	+1.5 Q2	+1.7	6.3 Jul	-47.4 Q2	-3.2	-2.4	2.64	1.42	1.07
Hong Kong	+2.8	Q2	+1.6	+2.3	-1.6 Q1	+2.5 Jul	+3.1	3.3 Jul‡‡	+5.9 Q1	+2.8	nil	1.88	7.75	7.75
India	+7.0	Q2	+7.0	+7.5	+3.8 Jun	+3.8 Jul	+5.3	4.9 2013	-27.5 Q1	-1.2	-4.1	7.75	66.4	60.5
Indonesia	+4.7	Q2	na	+4.8	+5.8 Jun	+7.2 Aug	+6.4	5.8 Q3§	-21.6 Q2	-2.4	-2.0	8.76	14,092	11,718
Malaysia	+4.9	Q2	na	+5.5	+4.4 Jun	+3.3 Jul	+2.6	3.1 Jun§	+8.8 Q2	+3.4	-4.1	4.23	4.19	3.16
Pakistan	+5.5	2015**	na	+5.7	+3.9 Jun	+1.7 Aug	+4.1	6.0 2014	-2.2 Q2	-0.6	-5.1	9.20†††	104	102
Philippines	+5.6	Q2	+7.4	+6.6	-3.6 Jun	+0.8 Jul	+2.6	6.4 Q2§	+14.5 Mar	+4.1	-1.9	4.36	46.8	43.5
Singapore	+1.8	Q2	-4.0	+3.1	-6.1 Jul	-0.4 Jul	+0.4	2.0 Q2	+69.5 Q2	+21.3	-0.7	2.79	1.41	1.25
South Korea	+2.2	Q2	+1.2	+2.6	-3.3 Jul	+0.7 Aug	+0.9	3.7 Jul§	+104.3 Jul	+7.8	+0.4	2.32	1,180	1,013
Taiwan	+0.5	Q2	-6.6	+3.4	-3.0 Jul	-0.7 Jul	+0.2	3.7 Jul	+72.8 Q2	+12.8	-1.1	1.17	32.4	30.0
Thailand	+2.2	Q4	+7.1	+3.5	-5.3 Jul	-1.2 Aug	+0.8	1.0 Jul§	+20.8 Q2	+2.4	-2.0	2.68	35.7	32.0
Argentina	+1.1	Q1	+0.8	nil	+0.6 Jul	— ***	—	6.6 Q2§	-6.0 Q1	-1.4	-3.3	na	9.31	8.40
Brazil	-2.6	Q2	-7.2	-1.9	-9.0 Jul	+9.6 Jul	+8.6	7.5 Jul§	-89.4 Jul	-4.1	-5.8	14.56	3.70	2.25
Chile	+1.9	Q2	nil	+2.9	-1.7 Jul	+4.6 Jul	+3.8	6.6 Jul§††	-0.3 Q2	-1.3	-2.0	4.49	693	591
Colombia	+2.8	Q1	+3.3	+3.3	+1.5 Jun	+4.5 Jul	+4.2	8.8 Jul§	-20.7 Q1	-6.6	-2.1	7.76	3,115	1,921
Mexico	+2.2	Q2	+2.0	+2.5	+1.4 Jun	+2.7 Jul	+2.9	4.3 Jul	-25.3 Q2	-2.5	-3.4	6.02	17.0	13.1
Venezuela	-2.3	Q3	+10.0	-4.2	na	+68.5 Dec	+76.4	6.6 May§	+10.3 Q3	-1.8	-16.5	10.49	6.31	6.35
Egypt	+4.3	Q4	na	+4.2	-12.0 Jun	+8.3 Jul	+9.9	12.7 Q2§	-10.2 Q1	-1.4	-11.0	na	7.83	7.15
Israel	+1.9	Q2	+0.3	+3.4	+5.0 Jun	-0.3 Jul	-0.2	5.3 Jul	+11.7 Q1	+4.8	-2.9	2.19	3.93	3.57
Saudi Arabia	+3.5	2014	na	+2.7	na	+2.2 Jul	+2.7	5.7 2014	+39.7 Q1	-2.4	-12.1	na	3.75	3.75
South Africa	+1.2	Q2	-1.3	+1.8	-1.0 Jun	+5.0 Jul	+4.8	25.0 Q2§	-18.7 Q1	-5.1	-3.8	8.44	13.4	10.7

Source: Haver Analytics. \*% change on previous quarter, annual rate. †The Economist poll or Economist Intelligence Unit estimate/forecast. §Not seasonally adjusted. ¶New series. \*\*Year ending June. ††Latest 3 months. ‡‡3-month moving average. §§5-year yield. \*\*\*Official number not yet proven to be reliable; The State Street PriceStats Inflation Index, July 27.18%; year ago 37.89%. †††Dollar-denominated bonds.

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## Markets

	% change on			
	Index Sep 2nd	one week	Dec 31st 2014 in local currency terms	in \$
United States (DJIA)	16,351.4	+0.4	-8.3	-8.3
China (SSEA)	3,311.4	+8.0	-2.3	-4.6
Japan (Nikkei 225)	18,095.4	-1.5	+3.7	+3.5
Britain (FTSE 100)	6,083.3	+1.7	-7.4	-9.1
Canada (S&P TSX)	13,545.3	+1.2	-7.4	-19.4
Euro area (FTSE Euro 100)	1,063.4	+0.7	+2.6	-4.8
Euro area (EURO STOXX 50)	3,198.9	+0.9	+1.7	-5.6
Austria (ATX)	2,261.8	-0.2	+4.7	-2.8
Belgium (Bel 20)	3,410.4	+1.9	+3.8	-3.7
France (CAC 40)	4,554.9	+1.2	+6.6	-1.1
Germany (DAX)*	10,048.1	+0.5	+2.5	-4.9
Greece (Athex Comp)	626.5	+0.6	-24.2	-29.6
Italy (FTSE MIB)	21,612.0	+0.6	+13.7	+5.5
Netherlands (AEX)	433.6	+1.1	+2.1	-5.2
Spain (Madrid SE)	1,007.1	-0.5	-3.4	-10.3
Czech Republic (PX)	1,001.9	+1.7	+5.8	+0.7
Denmark (OMXCB)	836.3	+2.1	+23.8	+14.7
Hungary (BUX)	21,173.1	-0.1	+27.3	+18.8
Norway (OSEAX)	623.3	+1.3	+0.6	-8.9
Poland (WIG)	50,136.0	+1.7	-2.5	-8.2
Russia (RTS, \$ terms)	789.4	+4.6	+12.8	-0.2
Sweden (OMX30)	1,471.5	+0.9	+0.5	-6.7
Switzerland (SMI)	8,626.3	+0.9	-4.0	-1.6
Turkey (BIST)	73,656.1	+0.1	-14.1	-32.0
Australia (All Ord.)	5,119.4	-1.1	-5.0	-18.4
Hong Kong (Hang Seng)	20,934.9	-0.7	-11.3	-11.3
India (BSE)	25,453.6	-1.0	-7.4	-11.7
Indonesia (JSX)	4,401.3	+3.9	-15.8	-26.2
Malaysia (KLCSE)	1,590.2	+0.6	-9.7	-25.0
Pakistan (KSE)	34,309.8	+2.3	+6.8	+3.0
Singapore (STI)	2,878.1	+0.2	-14.5	-20.1
South Korea (KOSPI)	1,915.2	+1.1	nil	-6.9
Taiwan (TWI)	8,035.3	+4.1	-13.7	-15.9
Thailand (SET)	1,372.5	+4.0	-8.4	-15.7
Argentina (MERV)	10,800.2	+5.0	+25.9	+14.5
Brazil (BVSP)	46,464.0	+0.9	-7.1	-34.2
Chile (IGPA)	18,536.8	+2.9	-1.8	-13.6
Colombia (IGBC)	9,431.5	+6.1	-18.9	-38.8
Mexico (IPC)	42,969.9	+1.5	-0.4	-13.4
Venezuela (IBC)	14,831.1	-0.6	+284	na
Egypt (Case 30)	7,150.5	+4.0	-19.9	-26.9
Israel (TA-100)	1,392.3	+0.1	+8.0	+6.9
Saudi Arabia (Tadawul)	7,367.6	-0.2	-11.6	-11.5
South Africa (JSE AS)	49,228.8	+1.8	-1.1	-15.1

*The Economist* poll of forecasters, September averages (previous month's, if changed)

	Real GDP, % change		Consumer prices		Current account	
	Low/high range	average	2015	2016	2015	2016
Australia	1.8/2.7	1.8/3.3	2.4	2.7 (2.8)	1.7	2.5 (2.6)
Brazil	-2.8/-1.1	-1.2/1.3	-1.9 (-1.7)	0.2 (0.6)	8.6 (8.7)	6.1 (6.0)
Britain	2.2/2.8	1.9/3.0	2.5 (2.6)	2.4	0.2	1.5 (1.6)
Canada	0.9/2.0	1.4/2.7	1.4 (1.5)	2.0 (2.1)	1.1	2.0 (2.1)
China	6.6/7.2	6.2/7.4	6.9	6.7	1.5	2.0
France	0.9/1.3	0.8/1.8	1.1 (1.2)	1.5	0.2 (0.3)	1.1 (1.2)
Germany	1.4/2.1	1.5/2.7	1.7	2.0	0.4 (0.5)	1.6 (1.7)
India	6.8/8.1	6.5/8.4	7.5 (7.6)	7.8	5.3 (5.4)	5.5
Italy	0.5/0.8	0.4/1.7	0.6	1.2	0.2	1.0 (1.1)
Japan	0.5/1.4	0.9/2.0	0.8 (0.9)	1.5 (1.6)	0.7	1.0 (1.1)
Russia	-5.0/-2.5	-1.6/1.6	-3.6	0.3 (0.4)	14.8	6.7
Spain	2.6/3.3	2.2/3.0	3.0 (2.9)	2.6	-0.3	1.0 (1.1)
United States	2.1/2.6	1.9/3.0	2.4	2.6 (2.7)	0.4	2.0 (2.1)
Euro area	1.3/1.7	1.1/2.2	1.4	1.7	0.2	1.2 (1.3)

Sources: Bank of America, Barclays, BNP Paribas, Citigroup, Commerzbank, Credit Suisse, Decision Economics, Deutsche Bank, EU, Goldman Sachs, HSBC Securities, ING, Itaú BBA, JPMorgan, Morgan Stanley, Nomura, RBS, Royal Bank of Canada, Schroders, Scotia Capital, Société Générale, Standard Chartered, UBS. For more countries, go to: [Economist.com/markets](http://Economist.com/markets)

## Other markets

	% change on			
	Index Sep 2nd	one week	Dec 31st 2014 in local currency terms	in \$
United States (S&P 500)	1,948.9	+0.4	-5.3	-5.3
United States (NAScomp)	4,750.0	+1.1	+0.3	+0.3
China (SSEB, \$ terms)	280.7	+0.6	-1.1	-3.4
Japan (Topix)	1,466.0	-0.9	+4.2	+3.9
Europe (FTSEurofirst 300)	1,395.7	+1.1	+2.0	-5.3
World, dev'd (MSCI)	1,600.7	-1.0	-6.4	-6.4
Emerging markets (MSCI)	801.1	+1.8	-16.2	-16.2
World, all (MSCI)	386.2	-0.7	-7.4	-7.4
World bonds (Citigroup)	876.5	-0.8	-2.9	-2.9
EMBI+ (JPMorgan)	696.0	+1.5	+0.6	+0.6
Hedge funds (HFRX)	1,206.2 <sup>b</sup>	+1.2	-1.0	-1.0
Volatility, US (VIX)	30.0	+30.3	+19.2 (levels)	
CDSs, Eur (iTRAXX) <sup>t</sup>	73.9	-0.3	+17.7	+9.3
CDSs, N Am (CDX) <sup>t</sup>	83.6	-1.0	+27.9	+27.9
Carbon trading (EU ETS) €	8.0	-2.9	+9.7	+1.8

Sources: Markit; Thomson Reuters. \*Total return index.

<sup>b</sup>Credit-default-swap spreads, basis points. <sup>t</sup>Sept 1st.

Indicators for more countries and additional series, go to: [Economist.com/indicators](http://Economist.com/indicators)

*The Economist* commodity-price index

	2005=100			% change on	
	Aug 25th	Sep 1st*	one month	one year	
Dollar Index					
All Items	130.5	129.5	-4.8	-21.3	
Food	151.7	149.3	-5.5	-17.9	
Industrials					
All	108.3	109.0	-3.9	-25.7	
Nfa <sup>a</sup>	110.8	107.1	-6.9	-20.6	
Metals	107.3	109.8	-2.6	-27.7	
Sterling Index					
All items	151.2	153.7	-5.7	-15.3	
Euro Index					
All items	142.1	143.1	-7.4	-8.3	
Gold					
\$ per oz	1,135.0	1,140.0	+4.3	-9.9	
West Texas Intermediate					
\$ per barrel	38.8	45.1	-1.5	-51.5	

Sources: Bloomberg; CME Group; Cottlook; Darmenn & Curl; FT; ICCO; ICO; ISO; Live Rice Index; LME; NZ Wool Services; Thompson Lloyd & Ewart; Thomson Reuters; Urner Barry; WSJ. \*Provisional

<sup>a</sup>Non-food agriculturals.

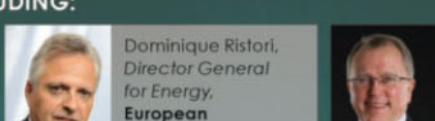
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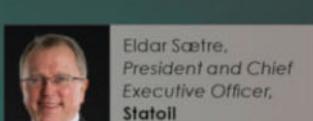
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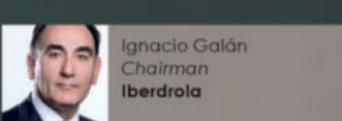
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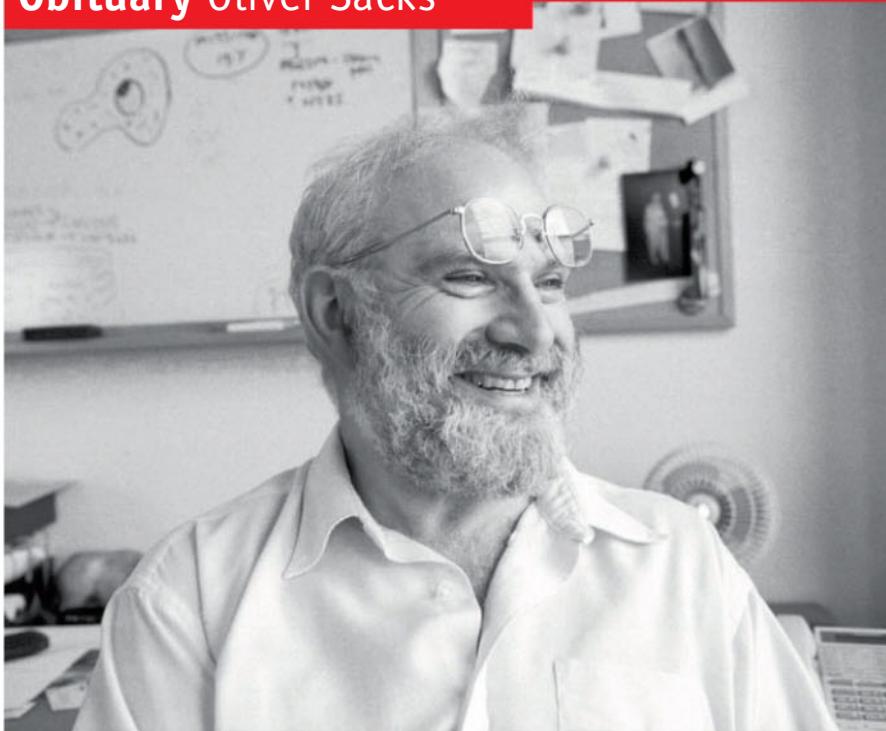


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## Travels through a mindscape

**Oliver Sacks, neurologist, died on August 30th, aged 82**

WHEN Oliver Sacks was asked his profession, he often replied "Explorer". He did not mean this in the geographical sense. As a boy he had devoured Prescott's books on the conquests of Mexico and Peru; as a young man he had travelled by foot, train and motorbike the length and breadth of North America. But what became an obsession with him was to climb inside the brains of his patients. He chose specifically those with right-hemisphere disorders; and, having reached those "furthest Arctics and Tropics", slipping on ice or hacking through the unimaginable, near-impenetrable jungles of the self, he would then describe in extensive and sympathetic detail the world as it appeared from there. So compelling was this urge that even when teaching, as a professor of neurology at Columbia and NYU, and even when in great demand on the lecture circuit, he retained his ordinary medical practice in order to keep exploring.

Over the years he accumulated stacks of clinical records, abundant with every detail of the quirks and tribulations of his patients. He often wrote late into the night, monkish in his solitude. Hundreds of articles and essays, 13 books and (indirectly) three films, a play and an opera resulted. Like characters in Dickens—for he thought of them as strugglers through life, rather

than as "cases"—several of his patients became famous. He wrote of Dr P, a brilliant singer who patted water hydrants, supposing them the heads of children, and who mistook his wife for a hat; of Jimmie G, who in 1975 still lived in 1945, believing Truman to be president and himself to be a fresh-faced teenage submariner; of Tony C, who became obsessed with piano music after being struck by lightning; of Christina, who no longer felt that any part of her body belonged, or would respond, to her.

Most famously, in 1969 he chronicled the waking, with L-Dopa, of a number of patients from the near-catatonic states in which they had been for decades. This became his book "Awakenings". The patients, he noted, felt explosive joy at first on returning to the world; but then developed tics and oddities close to Tourette's syndrome, which few doctors had then described. This led him to investigate Tourette's, and with so keen an interest that he once followed a woman down a street in Manhattan just to observe how she imitated, from one minute to the next, the gait and gesture of everyone she passed.

His obsession with teasing out medical tales might have come, he thought, from the way his parents—both doctors practising in north London—liked to tell such stories over dinner. It might have come from

observing the psychosis of his brother Michael or his own homosexuality, which despite the prejudice of the time (and his mother's despair) was no "condition", simply who he was. Possibly, too, his compulsion sprang from the fact that he was no good at medical research; that data-driven "testability" in the lab repelled him, whereas talking to patients, shy as he was, opened a door into private inscapes that were magical, challenging and almost unfathomable. "Empiricism", he wrote, "takes no account of the soul."

### Green for philosophy

The urge to turn these stories into literature, in the style of 19th-century clinicians and a Soviet neurologist, A.R. Luria, whose work he much admired, was also irresistible. The act of writing itself gave him happiness so intense that he lost track of time, in a way he had not done since childhood candlelit Sabbaths, and gave him a high that was better than amphetamines. He wrote everywhere, ever pausing to scribble with one of the row of Biros he kept in his top pocket: colour-coded for different thoughts, green being for philosophy.

A great deal of this writing, perhaps most of it, described his own experiences. He amassed almost 1,000 journals, and much of his neurological questing was informed, or provoked, by something that had also happened to him. His book on migraine partly sprang from his work with patients at a clinic in New York, but also from the bizarre disappearance of colour and depth during headaches as a child; his work on phantom limbs, from the "abstraction" his own leg became after a gruesome knee injury in Norway; his book "Hallucinations" from the insect-people, flapping buildings and imaginary helicopters he encountered after near-suicidal doses of Artane, LSD and morphine in his 30s; and "Musicophilia", asserting the essential musicality of the human psyche, from the fact that Mendelssohn's Violin Concerto had once helped him walk again. "The Mind's Eye" in 2010 included the distorting, disconcerting effects of losing half his vision to the ocular melanoma that became the cancer that killed him.

Up to that point, he considered himself both lucky and healthy; most of his accidents were self-inflicted and his love affairs painless, with the bonus of true love, at last, in his 70s. Nor, up to his final year, did he cease from exploration. Some medical peers thought his work over-dramatic, even exploitative; his books had at first been ignored in America. He regretted this not just for selfish reasons, but because his wider agenda was to bring back from the strangest frontiers of individual struggling and experience some further indications, some extraordinary hints, of the immense mystery of what it means to be human. ■

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# intelligent life



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