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 intelligence, which presses forward,
 and an unworthy, timid ignorance
 obstructing our progress."

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America's Supreme Court is preparing to overturn the constitutional right to an **abortion**, according to the leaked draft of a majority opinion in a case that is before the court. Written by Samuel Alito, it argues that *Roe v Wade*, the ruling in 1973 that secured women's right to an abortion, "was egregiously wrong from the start" and must be overruled. The court stressed that it was still deliberating and that the draft did not represent the final opinion of the justices. Still, the leak propelled abortion to the front of campaigning for the mid-term elections.

Meanwhile **Oklahoma** became the latest state in effect to outlaw abortion, after the governor signed a bill banning the procedure after six weeks. More than a dozen American states have prepared laws that will immediately prohibit abortion if *Roe* is overturned.

Hillbilly energy

J.D. Vance won the Republican primary in Ohio to be the party's Senate candidate. Mr Vance, who wrote a bestselling memoir about the Appalachian values of his family, was boosted in the race by Donald Trump's endorsement; his victory is seen as confirmation that Mr Trump is still the Republican kingmaker.

Russia's army made little progress in its offensive to seize **Ukraine's** eastern Donbas region. Russian forces captured several villages, while Ukrainian forces pushed the Russians back from the outskirts of the city of Kharkiv. Despite a minor evacuation from the Russian-occupied city of Mariupol, many civil-

ians remain trapped there. Investigators uncovered further evidence of atrocities by Russian troops. Vladimir Putin is believed to be desperate for some form of success before his country celebrates the anniversary on May 9th of its victory over Nazi Germany.

Ursula von der Leyen, the president of the European Commission, said the EU would ban the import of **Russian oil** within six to nine months. But Hungary, Russia's closest friend in the bloc, said it would veto the plan unless countries that import Russian oil via pipelines, as it does, are exempted. The EU is blocking aid to Hungary for violating the rule of law.

Olaf Scholz, **Germany's** chancellor, said he would back Finland's and Sweden's membership of **NATO**, if they decide to join. Earlier Mr Scholz attended a trade-union rally where protesters shouted "warmonger" at him for sending arms to Ukraine. He responded that Ukrainians would think it "cynical" to be "told to defend themselves against Putin's aggression without weapons".

Spain said that Pedro Sánchez, the prime minister, the current defence minister and a former foreign minister, had all been victims of Pegasus smartphone spyware. More than 60 people associated with the Catalan separatist movement were previously known to have been targets. Spanish intelligence is suspected of bugging the separatists, and Morocco of bugging the government.

Luiz Inácio Lula da Silva, a left-wing former president of **Brazil** and the front-runner for the presidential election in October, claimed that Volodymyr Zelensky could have done more to prevent the war in Ukraine. Lula also criticised Joe Biden for not stopping the war. His main opponent in the election, the incumbent president, Jair Bolsonaro, has refused to condemn Mr Putin's bloody invasion.

Iran's oil minister made a trip to **Venezuela**, where he met Nicolás Maduro, the autocratic president. The pair discussed ways to "overcome" the sanctions on their oil industries.

Andrew Fahie, the premier of the **British Virgin Islands**, was arrested in Miami. He is accused of money-laundering and conspiring to import cocaine (he denies both allegations). In the British Virgin Islands protesters took to the streets after a report recommended returning the territory to direct rule from Britain.



The authorities in Beijing continued mass-testing for covid-19. **China's** capital hopes to avoid a full-scale lockdown. More than 60 underground stations were closed and a mass-isolation centre reopened. In Shanghai dozens of cases were detected outside quarantine facilities, raising fears that the city, which has been locked down for weeks, will delay reopening. **Hong Kong**, though, eased its restrictions, which have battered the economy (GDP shrank by 4% in the first quarter) and triggered an exodus of people.

India continued to suffer from a debilitating heatwave, with temperatures consistently exceeding 40°C (104°F) in many places, causing households to crank up their air-conditioners. Coal shortages have exacerbated the problem, leading to power cuts.

North Korea fired yet another missile, the 14th weapons test this year, more than in the past two years combined. It came just a week before Yoon Suk-yeol was due to be inaugurated as South Korea's president.

Analysts believe North Korea is preparing to conduct a nuclear test.

Russia's foreign ministry accused **Israel** of backing neo-Nazis in Ukraine, worsening a row sparked by an anti-Semitic trope from Russia's foreign minister, Sergei Lavrov, that Adolf Hitler had Jewish origins. This brought a rebuke from Israel's prime minister, Naftali Bennett.

Turkey's president, Recep Tayyip Erdogan, met **Saudi Arabia's** crown prince and de facto ruler, Muhammad bin Salman, in Jeddah in a sign of warmer relations. These had been chilly since the assassination of Jamal Khashoggi, a prominent Saudi critic. He had been dismembered in the kingdom's consulate in Istanbul in 2018.

Militants from al-Shabab, a jihadist group, attacked a base in **Somalia** used by Burundian soldiers who are part of an African Union force, killing between ten and 30. The AU and Somali government have been fighting al-Shabab for 15 years with little progress.

Human Rights Watch accused Wagner Group, a Russian mercenary outfit, of torturing and murdering civilians in the **Central African Republic**. Meanwhile, Germany has stopped training **Mali's** army after HRW reported in March that Wagner and government forces massacred 300 people.

Running late

London's transport operator announced that the Elizabeth Line (known as Crossrail) will open at last on May 24th. Dogged by delays since work started in 2009, it will run through the centre of the city, connecting suburbs in the east and west. Initially three separate railways, all will be connected later this year. Chances of getting a seat are good: passenger numbers across the existing Tube network are still far below their pre-covid levels.

America's Federal Reserve raised its benchmark **interest rate** by half a percentage point, lifting it to a target range of 0.75% to 1%. It was the biggest increase since 2000. The Fed also unveiled a plan to start reducing its nearly \$9trn balance-sheet from June, and accelerate the pace of sales in September, intensifying its battle against inflation. More half-point rate rises are expected this year.

The Reserve Bank of Australia increased its benchmark rate for the first time in 11 years, to 0.35%, amid high inflation. **India's** central bank also unexpectedly raised its main rate, to 4.4%, in an effort to tame prices, especially for food.

The great tech slide

With many tech share prices shedding their gains from the pandemic, the **Nasdaq stock-market** fell by 13.3% in April, its worst monthly performance since the financial crisis in 2008. **Amazon's** stock struggled to recover from the hammering it took after the company reported a slowdown in quarterly revenue from online sales. It recorded a net loss of \$3.8bn, in part because it wrote down the value of its investment in Rivian, which makes electric vehicles. Amazon's cloud-computing division, which provides the backbone of its profits, did well.

The momentum that **labour activists** were hoping for from the recent decision by workers at an Amazon warehouse to join a union stalled, after staff at a smaller facility voted against unionisation. Separately, Amazon joined a growing list of companies that are reimbursing costs for employees in America who will have to travel to get an abortion.

Lyft lost 30% of its stockmarket value, after the ride-hailing company forecast a weak outlook. **Uber's** share price also fell, though not as sharply; its business rebounded in the first quarter because of "strong mobility demand", but

it nevertheless made a \$5.9bn loss because of its sinking investments in tech firms.



Underlining a reversal in fortunes compared with the tech sector over the course of the pandemic, the **oil industry** reported bumper quarterly profits, helped by surging oil prices. Despite a \$24bn write-down from leaving Russia, BP's headline profit came in at \$6.2bn, the best since 2008. It expanded its share buy-back programme. Shell's adjusted profit of \$9.1bn was its best ever. ExxonMobil tripled its stock buy-backs and Chevron recorded its most profitable three months since 2012.

Intercontinental Exchange (ICE), the owner of the New York Stock Exchange, agreed to buy **Black Knight**, a provider of mortgage data and software, for \$13.1bn. Like other stock-market operators, ICE has been

expanding into fintech and other areas outside equities. Its acquisition of Black Knight comes amid a boom in American house prices.

Biogen decided to wind down the commercial operations supporting Aduhelm, its treatment for **Alzheimer's disease**, after Medicare, America's health-insurance programme for the elderly, refused to pay for it. The drug was mired in controversy from the start. The Food and Drug Administration approved it, although a panel of experts advised against this. Doctors argued about its effectiveness and health insurers said it was too costly. Biogen will continue to provide Aduhelm free for patients on a programme who have started to take it. Its chief executive is stepping down.

Elon Musk hinted that businesses and governments may have to pay a small fee to stay on **Twitter** once he takes it over, but that it would remain free to "casual users". Mr Musk also said he was not planning to dispose of any more Tesla stock, after selling \$8.5bn-worth of his stake to help fund his buy-out. He may return Twitter to public markets in a few years after the deal is done, according to reports.

Executives from **HSBC** and Ping An are reportedly to meet soon to discuss the latter's proposal to break up the bank. Ping An, a Chinese insurance giant, is HSBC's biggest shareholder and wants it to split its business in Asia, where it is most profitable, from its Western assets. HSBC is understood to be cool to the idea.

It's all going downhill

Just Eat Takeaway's chairman stepped down. Investors are peeved that, despite its sloping share price, the food-delivery company went ahead with its Snow Fest staff jamboree at a ski resort in April. Last year's acquisition of Grubhub has gone off-piste and it might be sold. JET is also investigating a complaint of misconduct at a company event made against its chief operating officer.

Qantas confirmed orders for 12 Airbus A350-1000s that will fly non-stop from Australia to New York and London starting in late 2025. With very-long haul 20-hour flights the planes will have just 238 seats to make space for first-class suites and a "well-being zone". The airline's boss, Alan Joyce, said the aircraft would overcome "the tyranny of distance" that has always bedevilled Australia.



How to save the Supreme Court

To avoid breaking a crucial institution, the nine justices need to restrain themselves

HIPPOCRATES CONDEMNED abortion; Aristotle thought it less cruel than exposing unwanted infants to the elements. The West has been arguing about this hard moral problem for over 2,000 years. Most Western democracies have found a compromise between the liberal position, held by this newspaper, that the state should not control women's bodies; and the most conservative position, that any abortion is murder. In Australia, Britain, Canada, France, Germany and Japan, legislatures have allowed abortion early in pregnancy and made it illegal later. Most Americans agree with that, but their country stands apart.

A leaked draft of a majority opinion from America's Supreme Court obtained by Politico, a news organisation, suggests that the court will overturn *Roe v Wade*, the 50-year-old decision that makes abortion legal until the fetus becomes viable. If so, state law would take precedence. Most abortions look set to become illegal in half of states; some bans would include cases of rape or incest. Better-off women can take time off work and travel to legal clinics, so the burden would fall mainly on poorer women. Banning abortion would increase the number of pregnancy-related deaths, by over 20%, according to one study.

Perhaps the judges will change their mind or temper their arguments before the final opinion is issued. Even so, with a 6-3 conservative majority, not the 5-4 split that has held for the past half-century, the court is poised to reopen some of the most contentious questions in American public life (see Briefing). In this, it risks damaging itself and accelerating the division of the country into two mutually hostile blocs.

The outsize power wielded by the court in 2022 derives from a political system that struggles to strike compromises. Lining up a majority in the House, 60 votes in the Senate (to override a filibuster) and a presidential signature is too hard. It is easier for politicians to fundraise off controversy rather than solve problems. Time and again on the thorniest questions—carbon-dioxide emissions, gay marriage, guns, abortion—Congress has failed to reflect public opinion.

By their dereliction, legislators dump big decisions on the justices. As a result Supreme Court confirmations have become trials of strength where the Senate majority holds sway. Donald Trump, who ran on a promise to pick judges explicitly to overturn *Roe*, further dissolved the idea of judicial independence. All this politicking heaps intolerable pressure on the court.

Conservative Americans, who may not have liked Mr Trump but admire his judges, may retort: so what? Liberals, they argue, broke the court in the 1950s and 1960s, pursuing a programme they could not get past Congress. *Roe* was shoddily argued and a correction is long overdue. Even if most Americans favour a compromise between a libertarian view and the belief that life begins at conception, judges are supposed to rule on the law, they say, not bend to public opinion.

That is surely right. However, the solution to one activist court 70 years ago is not another activist court today. When the legislature cannot pass laws on the big questions of the age, the courts bear a special responsibility, lest justice itself is poi-

sioned. The court must indeed feel that it can go against public opinion. But in whatever it does it should weigh tradition and precedent and exercise restraint. If the justices take it upon themselves to cut through legislative knots, using their power maximally, they will transform themselves into the lifelong members of an all-powerful unelected third chamber.

Three bad outcomes may follow. The justices might find their judgments ignored. An America where the rule of law was weakened would be less free and more dysfunctional. If the court loses its ability to be the decider of last resort, the role asked of it in the presidential election in 2000—and again in 2020—it could lose its ability to settle disputes peacefully.

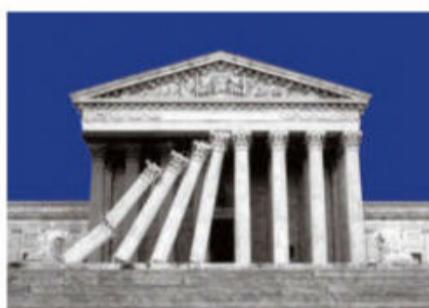
Second, if in the name of conservatism the justices start tearing up precedents that have stood for half a century, there will be growing political pressure to remake the court. Packing it is a terrible idea, and currently a fringe position in the Democratic Party. But if the court swings hard to the right, every Democratic presidential candidate in 2024 will be asked what they would do to tame a body in which a third of the justices were nominated and confirmed by a president and senators who represented a minority of Americans. Such proposals could be at issue even while the court had to rule on the outcome of the vote.

Third, America's divisions into red and blue camps would deepen. The United States is a federal system where states enjoy discretion to write many of their own laws. But unlike the European Union it is also a nation. If state laws became so divergent that nobody in California could own a gun and gay people in Texas could not marry, that would lead to a trampling of the rights of minorities in those states. The only solution would be to move. But an America where al-

most everyone in one state was Republican and almost everyone in a neighbouring state was Democratic could hardly be expected to come together in any national endeavour. States bound in such an arrangement would hardly be united at all.

The ideal way to avoid this would be for the legislature to rediscover the art of compromise, so that the court could act as the arbiter it was meant to be. Political questions are best solved by politicians, not judges. That possibility looks awfully distant today, but Ireland managed to find a compromise on abortion by creating a citizens' assembly which issued recommendations to the government. If only America could rediscover the spirit of institutional innovation and participatory democracy, some of the questions that now seem untouchable could be opened.

Until then the court should save itself by acting with restraint. It should also seek to bolster its own legitimacy. Congress is debating an ethics code, prompted in part by the discovery that Clarence Thomas's wife, a Republican activist, was angling to overturn the election result. Rather than wait, the justices should impose a code on themselves. And, while they are at it, they should announce term limits. Some new members of the court could still be around in 2050. That is asking a lot of them, but unless justices act wisely now, the court will be a different place by then—and America a different country. ■



Medicine

The quantified self

Wearable technology is transforming health care. Do not delay the revolution

IT IS A stealthy killer. When the heart's chambers beat out of sync, blood pools and clots may form. Atrial fibrillation causes a quarter of more than 100,000 strokes in Britain each year. Most of those would never happen if the heart arrhythmia were treated, but first it has to be found. Tests are costly and inaccurate, but Apple Watches, and soon Fitbits, can detect it, are far cheaper and can save those whose lives are in danger.

This is just one example of the revolution about to transform medicine. Smartwatches and -rings, fitness trackers and a rapidly growing array of electronically enhanced straps, patches and other "wearables" can record over 7,500 physiological and behavioural variables. Some of them are more useful than others, obviously, but, as our Technology Quarterly in this issue explains, machine learning can filter a torrent of data to reveal a continuous, quantified picture of you and your health.

These are early days for the quantified self, and for investors in digital health it is still a wild ride. Witness the recent collapse in the share price of Teladoc, which provides online consultations, a worrying sign for other would-be disrupters. But for patients the innovation in wearable devices has just begun. Individual firms may come and go, but wearables and artificial intelligence look set to reshape health care in three big ways: early diagnosis, personalised treatment and the management of chronic disease. Each promises to lower costs and save lives.

Start with early diagnosis. Wearables can detect subtle changes that otherwise go unnoticed, leading to less severe disease and cheaper treatment. Sensors will reveal if an older person's balance is starting to weaken. People's gait and arm-swing change in early-stage Parkinson's. Strength exercise can help prevent falls and broken limbs. Psychiatric diagnosis may be enhanced by tracking patterns of smartphone use—without monitoring what people see or type. A smart ring can help a woman conceive, by predicting her menstrual cycle. It can also detect pregnancy less than a week after conception (many women continue to drink or smoke for weeks before they realise they are pregnant).

Then there is the promise of seeing people as individuals, not clones of the theoretical, average human. Most drugs work in just 30-50% of patients. In one person, regularly eating bananas moderates blood sugar; in another, it raises blood sugar to levels that, over time, can cause harm. Algorithms can turn reams of data from wearables into bespoke prescriptions and diets for losing weight, controlling diabetes and so on. These regimes are more effective, less limiting and hence easier to follow than the one-size-fits-all kind. When doctors can see into a patient's body in real time all the time, they can provide better care. In a German trial this sort of monitoring of heart-failure patients reduced mortality and the days spent in hospital by a third.

And wearables can transform chronic diseases, such as diabetes. Some 80% of disease can be prevented by changes in how people lead their lives. Apps use small devices and clever tactics of the sort employed by a personal trainer or a shrewd spouse to get people to move more, eat better and sleep more soundly. In-

ducing even small increases in exercise is good: adding 1,000 steps (0.7km) a day reduces mortality by 6-36% depending on how sedentary you are. Continuous monitoring also shifts the balance of care from what doctors can do in the brief occasional office consultation to what patients can do for themselves day in, day out. America spends \$10,000-20,000 a year per patient with diabetes and about \$280bn a year nationally, half the entire public-school budget. A diabetes-control app has been shown to reduce the cost per patient by \$1,400-5,000.

The scale of all these benefits promises to be vast. Just how vast will become clearer as wearables create data, leading to innovation. The reason for optimism is that the technology is ripe. Some zoom devices were sold in 2020 and twice as many are expected to sell in 2026. One in four Americans has a wearable device. Smartphones serve as a platform for innovators. Within a year or two the device on your wrist may be measuring non-invasively your blood sugar, alcohol and hydration, as well as various markers of inflammation, kidney and liver function—all of which currently require blood to be drawn. As wearables acquire more features, users are less likely to lose interest in them and shove them into the back of a drawer.

As with any technology, wearables bring worries. Health data are valuable; they could be abused by device-makers, insurers or governments interested in social control. The technology may not reach the poor and those who lead chaotic lives—the people who need it most. But the greatest worry is that the bureaucracy of health care gets in the way.

The first responsibility for powering forward lies with the market. And developers are indeed starting to pay for rigorous studies that demonstrate the safety, efficacy and value of their technology. A cottage industry that ranks devices and apps on, say, clinical efficacy and privacy is helping doctors, insurers and governments sort good from bad.

But health-care professionals also have a vital role. Health care is a conservative industry—and rightly so, given the stakes. Yet it risks slowing the uptake of digital medicine not for legitimate concerns about safety, but because of the inertia of regulators, standards bodies, insurers and medical schools.

An app a day

Rules are needed to make data ownership and use more transparent, so that people understand and control what happens with their information. Standards can help guide developers to produce usable devices. Patients' data need to be tied into medical-record systems, which are often clunky. Practitioners need treatment protocols on how to use the new tech. Doctors must be trained and reimbursed for offering digital treatments and reviewing data. Governments and insurers must work out how to build the technology into subsidised health-care systems so busy fighting fires that they struggle to invest in prevention.

It is a long and daunting list. But the pay-off, in money and well-being, is likely to be huge. Time to roll up sleeves and prepare health care for the era of the quantified self. ■



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Inflation, bonds and stocks

The rate fate that awaits

Tighter monetary policy will squeeze global financial markets

AS CENTRAL BANKS do battle with the worst inflation for a generation, they are putting the easy-money policies of the past decade into reverse. This week the Federal Reserve raised interest rates by half a percentage point and announced that it would soon shrink its portfolio of bond holdings. The Bank of Australia, which not long ago was predicting it would keep rates near zero until 2024, surprised investors by increasing them on May 3rd by a quarter-point. As we published our weekly edition the Bank of England was expected to raise rates to their highest level since 2009.

Though share prices jumped after the Fed's rate rise—in apparent relief that it is not tightening faster—financial markets have been adjusting painfully to the reality of tighter money. Global stockmarkets fell by 8% in April and are down by 11% in 2022, as investors price in higher rates and lower growth. On May 2nd America's ten-year Treasury yield, which moves inversely to prices, briefly hit 3% (see chart), nearly double its level at the start of the year.

One consequence of tightening financial conditions is a repricing of currencies. The dollar is up by 7% against a basket of currencies over the past year. America needs higher interest rates than any other big rich country, because of its overheating economy and labour market. Higher rates in America increase investors' appetite for dollars, adding to dollar-demand caused by a fall in their desire to take risk elsewhere as war rages in Ukraine and China battles the coronavirus. Most striking has been the greenback's appreciation against the Japanese yen, the only currency of a big rich country in which interest rates look unlikely to rise soon. In real terms the yen is at its cheapest since the 1970s.

Another result is the growth in risk premiums as investors worry about pitfalls in the new economic landscape. In America measures of the "inflation risk premium", which goes up when prices become difficult to forecast, are at their highest since

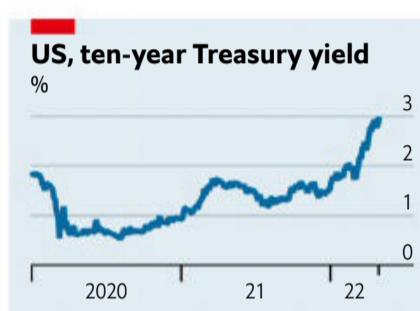
1994. Liquidity in the Treasury market appears to be thinning (see Finance & economics section). The spread on mortgage-backed securities over ten-year Treasuries has doubled since the start of the year, reflecting worries that the Fed could actively sell its mortgage bonds. There has been a modest increase in corporate-credit spreads as investors weigh the possibility that higher rates will make it harder for companies to service their debts. And in Europe the difference between what the German and Italian governments must pay to borrow for ten years has risen because of the danger that tighter monetary policy makes it harder for Italy to cope with its towering debts.

A third effect is the poor performance of even diversified investment portfolios. In America investing 60% in stocks and

40% in bonds produced an annual average return of 11% from 2008 to 2021, but has lost 10% this year. Whereas 2021 marked the apex of the "everything rally" in which most asset prices rose, 2022 could mark the start of an "everything slump", with the end of low rates made possible by low inflation—the macroeconomic foundation of high investment returns.

As investors suffer, monetary policymakers may be tempted to change course. If they stopped raising rates and let inflation run hot, bondholders would lose money but more inflation-proof assets, such as stocks and houses, would benefit. The dollar would fall, helping the many countries which denominate some of their exports or debts in dollars.

Yet it is the duty of central banks, including the Fed, to respond to the economy at home and to stop inflation persisting at an intolerable level. Tighter financial conditions are the natural consequence of raising rates, and the adjustment has some way to go. Investors are still betting that America's interest rates will peak at a little over 3%. That is unlikely to be high enough to rein in underlying inflation, which has risen above 5% on the Fed's preferred measure. More pain lies ahead. ■



China and the world

Cover your bases

How America and its allies should respond to China's search for foreign outposts

THE UNITED STATES maintains hundreds of military bases in at least 45 countries. Britain runs plenty of outposts overseas. French forces are stationed from Ivory Coast to New Caledonia. Even tiny Singapore has training camps abroad. But five years after it opened—to the alarm of Western officials—China's naval base in Djibouti, on the Horn of Africa, remains its only military bastion beyond its borders.

China wants to change that. Over the past two decades it has amassed more ships than America's navy has in total. Lately it has increased efforts to find foreign berths for them. It is thought to have approached at least five potential host coun-

tries. A deal with the Solomon Islands, signed in April, has raised fears that China may establish a military foothold there (see China section). And it has deepened concerns that, one day, China will challenge American naval dominance in the Pacific.

China calls America "imperialist" for keeping foreign bases, while insisting that its own military expansion is peaceful, nothing to worry about and only natural for a rising power. It is surrounded by unfriendly island chains and narrow straits. Most of its trade in goods moves by sea. It is only prudent for China to seek friendly ports abroad, its officials say. It needs a navy equal to the task of defending its overseas investments, ►

► shipping routes and citizens who live or work abroad.

The neighbours are not convinced. China has built landing strips and missile batteries to assert its claims to disputed reefs in the South China Sea. It reserves the right to seize the democratic island of Taiwan by force. Its open ambition to control more territory than it currently does suggests a darker side to this maritime diplomacy. Its goal in Asia is a continent made up of individual countries that genuflect to the regional giant. It wants America out of its backyard, and an end to American-led alliances (see Chaguan).

The Solomons deal is a warning to America and its allies. China denies a naval base is in the works, but a leaked draft of the secret agreement envisages the deployment of Chinese troops and visits by Chinese ships. That could give China a military presence not just near important shipping routes, but between America and its Pacific allies, Australia and New Zealand.

How to respond? For a start, democracies should learn from China, which has spent years diligently wooing Pacific Island governments. America's engagement, by contrast, waned after the cold war's end, giving it the reputation of a fickle and high-handed partner. It closed its embassy on the Solomons in 1993. Australia's national broadcaster stopped short-wave radio transmissions to the Pacific five years ago, despite their value to locals as a source of information. China Radio International now broadcasts on some of those same frequencies. China persuaded the Solomons and Kiribati to stop recognising Taiwan in 2019,

reportedly in exchange for generous aid and aeroplanes.

America and its allies, who still enjoy more goodwill in the region than China, should offer Pacific Islanders a better, more transparent deal. Aid is not the problem—Australia is still the largest donor to the Solomons. Instead Western countries need to offer enhanced terms of trade, more open labour markets and technology and expertise, especially in areas that matter to Pacific states, such as climate change, education, environmental protection, health care, illegal fishing and internet connectivity.

America has promised to reopen its embassy and hold a strategic dialogue with the Solomons. Better still would be to create a new position, American ambassador to the Pacific, with a more direct line to the White House. That would help America, Australia and New Zealand co-ordinate their policies across the region, not just with each other, but with Japan, France and other like-minded democracies that have interests there.

America and its allies will not be able to stop China everywhere—nor should they try. A limited Chinese military presence abroad does not have to be a threat. In Djibouti Chinese soldiers have thus far co-existed with American, French, Italian and Japanese forces, all of which have their own bases in the country. Rather than play “global whack-a-mole”, as an American expert puts it, Western countries should treat this challenge like chess. That means anticipating Chinese moves, making blocking manoeuvres when necessary, and thinking in a strategic way. Just don't treat countries like the Solomons as pawns. ■

Press freedom

The gag tightens

Governments are finding insidious ways to muzzle the media

HERE'S A THOUGHT experiment. If Russia had a free press, how many Russians would support Vladimir Putin's invasion of Ukraine? Here's another: how might the early days of covid-19 have unfolded if the virus had first emerged in a country with a free press, rather than China? Could the government of such a country have hushed it up for those crucial early weeks?

As news junkies celebrated World Press Freedom Day on May 3rd, it was worth remembering why it matters. A free press can scrutinise the mighty, expose corruption and deter abuses. For a tyrant, as Napoleon Bonaparte once lamented, “Four hostile newspapers are more to be feared than 1,000 bayonets.” The free flow of information is the lifeblood of democracy. Without it, voters cannot make informed choices. Governments struggle to notice or correct their mistakes. And free media make it easier for good ideas and useful information to spread, thereby accelerating progress.

Yet around the world, press freedom is in decline (see International section). Around 85% of people live in countries where it has been constricted in the past five years. It is now as hamstrung as it was in 1984, during the cold war. The nature of censorship has evolved since then, however. Hundreds of reporters are still jailed, and dozens are killed each year. But most modern autocrats at least pay lip service to the idea of a free press, and choose more subtle weapons with which to attack it.

State advertising budgets are lavished on fawning outlets.

Critical ones get tax audits and fines for defamation. Such harassment can tip struggling media firms into the red. Some may then be bought by ruling-party cronies, who may not mind if their television stations lose money, so long as they please the people who dole out public-works contracts. Mr Putin pioneered this approach; it has been widely imitated.

Technology is being used to make life hell for uppity hacks. New tools make it easier to spy on them. Investigations last year found Pegasus eavesdropping software had been slipped into the mobile phones of almost 200 journalists, to read their messages, track them and identify their sources. Social media can be used to harass reporters. A survey found almost three-quarters of female journalists have endured online abuse. This is scariest when it is organised, and has the tacit backing of the ruling party. In India, for example, critics of the prime minister, Narendra Modi, face torrents of death and rape threats from Hindu nationalist trolls, who sometimes publish their addresses and incite vigilantes to visit them.

Even in liberal democracies, laws against libel and invasion of privacy are often abused. Oligarchs from elsewhere sue muckraking reporters in London, hoping to impose on them ruinous legal costs and endless hassle (see next leader). In Poland one popular newspaper, *Gazeta Wyborcza*, has been hit with more than 60 cases in recent years, many brought by leaders of the ruling party. A Maltese journalist who exposed state corruption was ►



▶ dealing with over 40 cases when she was assassinated in 2017.

How can defenders of press freedom fight back? An easy place to start would be for liberal governments to scrap archaic laws that criminalise defamation, which are still surprisingly common. They should also curb bogus lawsuits, as the European Commission is currently contemplating. Next, independent media need to find new sources of funding. Charities can chip in, as can crowdfunding and rich proprietors who care about free speech. Public broadcasters can play a useful role, but only if they have enough safeguards to be truly independent.

In more repressive places the task is harder, but technology can help. Where reporting on the ground is too risky, satellite imagery and big data sets allow journalists to pull together stories from afar. Free countries should offer them asylum, and a safe place to keep working. Where censorship is tight, citizens can use virtual private networks to access blocked content and

online tools to capture web pages before they are censored.

Journalists in free countries can help those in autocracies. Cross-border collaborations have exposed scandals such as Pegasus and the Panama papers. The *Washington Post's* cloud-based publishing system allowed *Apple Daily*, a beleaguered pro-democracy tabloid in Hong Kong, to keep publishing for longer than it otherwise could have.

The struggle will be uphill. The pandemic has given governments a plausible excuse to curb press freedom: nearly 100 have done so in the name of public safety. Donald Trump has shown how a demagogue can undermine trust in the media, and others are copying him. In a survey last year, almost 60% of respondents in 28 countries said journalists deliberately mislead the public. Some do, of course, and World Press Freedom Day is a moment for journalists who enjoy protection to ask themselves if they are making the best use of their freedom. ■

Britain's dirty-money problem

Dismantling Londongrad

If the government really wants to take on the oligarchs, it should fund its corruption-fighters properly

OF THE BARRAGE of sanctions the West has inflicted on Russia over its invasion of Ukraine, the most symbolically powerful, if not the most economically consequential, have been those targeting the cronies of Vladimir Putin. Britain's government trumpets the fact that it has announced measures against more Putin-linked plutocrats than any other country. It is less keen to talk about why that might be. London has long been a destination for dirty money. Corrupt capital flows to Britain from all over the world, but no one doubts that Russian loot is a major contributor to a money-laundering problem that the National Crime Agency puts conservatively at £100bn (\$125bn) a year.

Dodgy money has been lured to London by some of the same things as the clean variety, including a long-standing openness to foreign investment and strong property rights. Another attraction, however, is the financial secrecy offered by both Britain and its network of offshore satellites, from Jersey to the Cayman Islands. That has helped make Britain murkier than classic havens such as Panama and Liechtenstein, according to a respected global financial-secrecy index. Political obsequiousness has also played a part. Successive governments looked to woo oligarchs and their billions—for instance, by hawking “investor visas” that gave them residency.

The politicians overplayed the benefits and underestimated the costs of unfurling the welcome mat. In the macroeconomic scheme of things the gains were small and concentrated, mostly filling the pockets of a select group of bankers and lawyers. The costs were more pervasive. London's growing reputation as a repository for tainted money has undermined its financial centre and tarnished its legal system (see Britain section).

The government has pledged to clean things up. But if it is serious, it will have to go beyond the half-baked measures of the past. In 2016 Britain became the first G20 country to set up a public register of company owners. But it did not finish the job. The register is thinly policed: of the half-dozen convictions so far for knowingly submitting false data, the most high-profile was of

an activist who posed as an ex-minister to expose its flaws. Similarly, government attempts to rein in Britain's offshore territories have been half-hearted—witness the scandal engulfing the British Virgin Islands, whose leader has been arrested on allegations of drug-smuggling and money-laundering.

Ministers do seem more determined this time. They have scrapped the visas-for-cash scheme; proposed reforms to a libel law that lets oligarchs scare off critics; and sped up an economic-crime bill that, among other things, will force more transparency on foreign owners of British property. What Britain really needs, however, is not more laws but better enforcement.

One priority is the oversight of lawyers, who play a central role in putting together crooked offshore structures and fending off scrutiny of those who engage in financial chicanery. Ethical

standards have slipped as more lawyers have been tempted by plutocrats' fat cheques. This has put cracks in the industry's “good chap” system of regulation, which relies heavily on self-policing. It is time for the statutory regulator, the Solicitors Regulation Authority, to show some teeth, and punish those falling short. The largest fine it has announced to date was £232,500, little more than a top-tier firm might charge a deep-pocketed Russian client for a week's work.

A second priority is to make government investigators and prosecutors more effective. Corruption cases are hard; money trails are complex and cross borders. In Britain the task of building such cases is spread across over 100 agencies and police forces. Their combined budget for fighting cross-border corruption is just £40m-50m, around the same as the annual wage bill of the three best-paid players at Chelsea, a football club that Roman Abramovich, an oligarch under sanctions, is looking to sell.

As a result, corruption-fighting agencies suffer from a chronic lack of forensic investigators, and prosecutors lack the budgets to bring more than the occasional case. That needs to change. Cleaning up Britain's dirty-money problem is not rocket science, but it will cost money. ■





MANAGER OF STATISTICAL ANALYSIS

INTERNATIONAL COPPER STUDY GROUP (ICSG)

The International Copper Study Group, an intergovernmental organization based in Lisbon, Portugal is seeking a Manager of Statistical Analysis to work for the Group.

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The Manager of Statistical Analysis should be experienced in the assembly, screening and interpretation of data, be familiar with databases, possess excellent IT skills and be proficient in preparing detailed statistical and market reports to deadlines.

The starting salary will depend on the applicant's qualifications and experience. Benefits include a staff Provident Fund, six weeks' annual leave and a relocation allowance, where applicable.

Applications with Curriculum Vitae should be forwarded by email to mail@icsg.org no later than 30 May 2022.

The successful applicant will be expected to commence in the position by September/October 2022.



國立臺灣大學
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National Taiwan University Presidential Search

National Taiwan University (NTU) is a full-fledged comprehensive university with outstanding achievements. Our Presidential Search Committee now invites nominations and applications for the position of President.

Presidential candidates should meet the following requirements: Academician at Academia Sinica, or professor, or professional with prior teaching and academic research experience equivalent to that required of a professor, and at least three years of experience, accumulative, as a director in educational institutions, government agencies, or in other state-owned or private business entities; or have held or currently hold the position of president at a university prior to the enforcement of the amended Act Governing the Appointment of Educators, dated November 15, 2011; or meets the qualifications for appointment as president of a university prior to the amendment. The ideal President should be a leader of integrity with excellent academic achievement and administrative skills in education. The new leader should also be able to administer matters impartially and beyond the interests of any political groups.

For those who would like to nominate a candidate, please fill in all required forms and deliver them to the address below via registered mail, express mail, or in person by 5:00 p.m. on Monday, June 27, 2022:

NTU Presidential Search Committee
No.1, Sec. 4, Roosevelt Road
Taipei
Taiwan 10617

Please note that the nomination/application must reach the Committee by the above deadline. The application dossier will not be returned.

Direct any inquiries to:
Pei-Yu Sun and Yi-Chen Hu, Office of the Secretariat
Tel: +886(0)2-3366-2032, 3366-1483
Fax: +886(0)2-2362-9997
Email: ntupsc@ntu.edu.tw

The nomination forms can be downloaded from the NTU Website: <http://www.ntu.edu.tw>

National Taiwan University Presidential Search Committee



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We welcome qualified women and diverse talent worldwide to join us. Persons with disabilities are equally encouraged to apply.

Neglecting children

I was pleased to see *The Economist* draw attention to the ways in which the youngest children have suffered during the pandemic ("No small problem", April 16th). This government simply doesn't prioritise a good childhood as a public-policy outcome. The *British Medical Journal* recently reported that the terms of reference for the covid public inquiry "do not include the words child, childhood, babies, toddlers, school, child care, college, or for that matter, play, interaction, or socialisation." In the summer of 2020 James Kirkup of the Social Market Foundation noted that the government's pandemic planning prioritised the reopening of pubs and barbers over schools and nurseries. Children's charities continually encounter a Treasury orthodoxy that sees Britain as a country of borrowers, consumers, workers and employers but not, it seems, little people who need to learn and play.

Save the Children has been giving emergency grants to families with young children throughout covid. Although books, educational toys and play packs are useful they cannot offset the cost-of-living crisis that is now tipping thousands more families into a calamity. Parents who have already been cutting back on food, heating and outings for their children are out of options. Nursery staff are reporting lost learning and behavioural problems of children. The worst is still to come.

KIRSTY MCNEILL
Executive director of policy, advocacy and campaigns
Save the Children
London

China's ideological insecurity

Chaguan wrote about China's broadside against liberal human rights (April 16th). This offensive aims to protect China's ideological security, a key part of its national-security concept. China has been ruled by the Communist Party since 1949 on the basis that only it

can lead the country to a great renaissance. The party has constantly warned and has taken action against what it sees as the pernicious influence of liberal ideologies. The Communist Party's repression is its ideological immune system fighting off foreign ideologies both within China and abroad.

In the early days of Xi Jinping, the *People's Daily* wrote about the New Black Five Categories, which were human-rights lawyers, underground religions, dissidents, internet influencers and people of so-called disadvantaged groups (Tibetans, Uyghurs?). These are analogous to the original Black Five party enemies of Mao's time, which were landlords, rich peasants, counter-revolutionaries, bad elements and rightists. Here Mr Xi echoes, as he often does, a Maoist formulation as he defends China's ideological security.

DAVID COWHIG
United States Foreign Service Officer, retired
Alexandria, Virginia

Quadratic voting for firms

"The power of the proxy" (April 23rd) highlighted the inability of minority shareholders to exercise their proportional stakes. The core of the problem was identified in an article you ran last year ("The public squared", December 18th 2021). As Lionel Penrose showed, the power of a holder of several votes grows as the square of their vote weight, rather than linearly, so small holders will inherently be disadvantaged. Penrose's solution is that voting weights should grow as the square root of the stake.

This intermediate point between "one person one vote" and "one share one vote" was successfully approximated in various corporate-voting structures in the 19th century, before the canonisation of one share one vote. It is currently used approximately by the European Union for voting power as a function of population, and is used precisely by many Web 3 distributed

autonomous organisations for governance as a function of crypto-tokens. It also has the virtues of discouraging concentration in asset ownership without heavy-handed anti-trust policy and hostile takeovers without discriminatory poison pills.

E. GLEN WEYL
Founder
RadicalxChange Foundation
Kirkland, Washington

Politics and art

I enjoyed the By invitation by Semyon Bychkov (April 9th) and generally agree with his views on creative freedom. However, his comment that "Art cannot and should not be used for political ends or to justify any ideology" misses the mark. Many of the works that critics label as masterpieces have indeed been used to justify political ideologies. Take a look at Picasso's "Guernica". Politics, art and ideology are intertwined. If Mr Bychkov had added "by the state" to his original sentence, I would have no problem agreeing with him.

NICHOLAS TEENY
Seoul

A strict immigration policy

The Economist has it backwards when it comes to Australia's and Britain's frightful refugee policies ("Somebody else's problem", April 23rd). The Australian government tore up its commitment to human rights through offshore "processing" of asylum-seekers and its explicit policy banning Australian resettlement for any refugees arriving by boat. It is wickedly good marketing that this could be reported as being "interned", when in fact hundreds of potentially legitimate refugees were left stranded in Nauru and Papua New Guinea. Australia has since struck deals with countries to resettle detained refugees, in effect shirking its responsibilities under the refugee convention. It is a mistake to think Australia's refugee policy is a milder precursor to Britain's.

LUCY SHAW
London

Love/hate

I must take issue with your correspondent's description of Marmite as "sludge" ("Marmageddon", April 16th). Marmite is, on the contrary, an unctuous indulgence, a comestible black gold, an ambrosia, even, given its derivation from the fermentation of amber nectar, not to mention its alleged numerous health benefits.

To paraphrase Omar Khayyam, a loaf of bread and marmite, a jug of wine, and thou.
ROBERT GRAHAM-BRYCE
Chicago

Funny car plates

I am glad to hear that Britain's vehicle-licensing agency tries to avoid obscenities and political sensitivities when issuing number plates ("Baby you can drive M1 car", April 16th). In America I have been fortunate to obtain the personalised plate of "MAN UTD" in a few states. Unfortunately it was already taken in Florida (could it be because Florida is the home state of the football team's owners, the Glazers?). So I had to settle for "MAN UTDZ" in recognition of Zlatan Ibrahimovic, who used to play for them.

In Iowa I was asked if "MAN UTD" was obscene. To which I replied, only in certain parts of Liverpool.

NORMAN S.J. FOSTER
Fort Lauderdale, Florida

Some years ago I inquired about a plate I thought would be quite fun. I was told that it was not a special plate and had already been randomly allocated. Indeed, the new owner probably did not think much of X32 TOH. But drivers seeing him approach in their rear-view mirrors might think otherwise.

SHAUN COOKE
Ide Hill, Kent



A countermajoritarian difficulty

NEW YORK

The nine justices face a crisis of legitimacy

BIG NEWS from America's Supreme Court usually arrives in late June, when the most contentious rulings of the year are released. But on May 2nd a legal bombshell was delivered two months early, and in unprecedented fashion. Politico, a news website, published a leaked draft of an opinion overruling *Roe v Wade*, the precedent that has enshrined a constitutional right to abortion for nearly 50 years. The draft, which the chief justice, John Roberts, later confirmed was genuine, appeared to have the support of five of the nine justices, enough to make it the law of the land. If that majority holds when the ruling is officially released, states would be free to ban abortion altogether. Thirteen have already done so, pending just such a ruling.

It is not clear who leaked the draft or why. Justices can change their votes up until the moment a ruling is made public, so *Roe* is not necessarily doomed. What is certain is that a reversal of *Roe* would invite howling from the left and exultation from the right. Although many jurists consider *Roe's* reasoning flawed, voiding it would

still be a shocking step, in that it would run counter to public opinion and lead to the prohibition in many states of a procedure that almost a quarter of American women seek at some point in their lives—all for no more pressing reason than because the composition of the court has changed.

And abortion is by no means the only controversial topic the justices have taken up. They are also about to release decisions on gun rights, the federal government's regulatory powers and the separation of church and state. Next year affirmative action will be under review. If they shift American law to the right in all these areas, growing numbers of Democrats are bound to denounce them as unelected, unrepresentative and illegitimate cat's paws of the right. The court risks being seen as just another manifestation of America's extreme partisanship, and treated accordingly. Should its authority be undermined in this way, it is not much of a stretch to imagine a Democratic governor, say, refusing to enforce an order of the court—or a Democratic candidate refusing to accept its judg-

ment in an election dispute.

Nine berobed judges striking down laws approved by elected politicians poses a “countermajoritarian difficulty”, wrote Alexander Bickel, a legal theorist, in 1971, after the court under Chief Justice Earl Warren had expanded judicial power in the 1950s and 1960s. But Robert Dahl, a political scientist, believed any gulf between popular opinion and the positions of the Supreme Court was bound to be bridged relatively quickly. “The policy views dominant on the court,” Dahl wrote in 1957, “are never far long out of line with the policy views dominant among the lawmaking majorities of the United States” as presidents “can expect to appoint about two new justices during one term of office”. This might not be enough to rebalance a listing court in four years, but presidents are “almost certain to succeed in two terms”.

Terms of entrenchment

Recent decades suggest this confidence was misplaced. For 25 years the pace of appointments was half of what Mr Dahl thought normal. Bill Clinton, George W. Bush and Barack Obama all averaged only one per term. When Antonin Scalia, a conservative, died in 2016, it briefly looked as though Mr Obama would be able to move the court to the left. But within hours of Scalia's death, Mitch McConnell, the leader of the Republicans in the Senate, placed a blockade on the seat and refused to allow a vote on Merrick Garland, Mr Obama's pick. ►

► Donald Trump went on to fill the seat when he became president almost a year later, and then to appoint two more justices, making him the first president since Ronald Reagan to name three in one term.

Mr Trump's third pick upended a 50-year balancing act. Since the 1970s a series of swing justices had kept the Supreme Court from tilting too far from the political centre. Although all of them had been appointed by Republican presidents, each one acted as a pivot, with four liberal justices to the left and four conservatives to the right. In 2020, however, with the death of Justice Ruth Bader Ginsburg and her swift replacement by Amy Coney Barrett, the court's equilibrium vanished.

There are now six solidly conservative justices, all appointed by Republican presidents, and only three liberals, all seated by Democrats. Chief Justice Roberts, the last median jurist of the five-decade balancing act, can no longer curb the conservative majority. The threatened reversal of *Roe*, in other words, may portend a string of highly charged, polarising rulings.

There is no quick way for Democrats to remedy this, since the constitution allows justices to serve "during good behaviour", meaning as long as they like, provided they are not impeached. Nearly half die in office. The oldest of the justices appointed by Mr Trump is just 57; all three could easily remain in robes for another 30 years.

But that tight grip may come at the cost of the Supreme Court's reputation. The Roberts court has moved the law steadily to the right on race, voting rights, campaign finance, religious liberty, labour unions and the right to bear arms. When he dissented from a ruling in 2007 that halted efforts to ensure public schools were racially mixed, Justice Stephen Breyer lamented the ground shifting beneath his feet: "It's not often in the law that so few have so quickly changed so much."

When Justice Breyer delivered those words, the Supreme Court enjoyed the approval of 60% of Americans. Fifteen years on, that figure has fallen to about 40%. The explosive cases currently before the court are likely to drag it down further. The justices are weighing a challenge to laws in New York that make it difficult to carry guns outside the home. A case regarding the regulation of power plants under the Clean Air Act gives them an opportunity to hamstring federal agencies. And two cases could begin to demolish the wall between church and state: a public-school football coach's plea to lead student athletes in prayer and a challenge from parents in Maine who say their state's tuition-assistance programme must include money for religious schooling.

The most contentious of all is *Dobbs v Jackson Women's Health Organisation*, the case that could see *Roe v Wade* overturned.

The government of the state of Mississippi had at first asked the justices to uphold a ban on abortions more than 15 weeks into a pregnancy, even though prior rulings had stated that abortion should be legal at least until the fetus is able to survive outside the womb (about 24 weeks). But once Justice Barrett joined the court, the state was emboldened to sharpen its request. The constitution does not protect a right to abortion at all, Mississippi's lawyers told the justices: *Roe* was "egregiously wrong" and should be overruled.

That is not what most Americans think. By roughly 2-to-1, they oppose letting states ban abortion outright, according to pollsters. Last year fully 80% told Gallup, a polling firm, that abortion should be legal in some or all circumstances; only 19% wanted it to be completely banned. These views have changed little since the 1970s.

A gavelling storm

Overturning *Roe* would also involve departing from a well-trodden precedent—something the court does relatively seldom. In its hearings on *Dobbs*, Justice Sonia Sotomayor predicted that scrapping *Roe* would bring it into disrepute. "Will this institution", she asked, "survive the stench that this creates in the public perception that the constitution and its reading are just political acts?"

In April Justice Elena Kagan posed similar questions in a case concerning the requirement that police inform those they arrest of their rights. She noted that years ago Chief Justice William Rehnquist, while no fan of the ruling that gave rise to the requirement, nonetheless saw it as deeply ingrained in the justice system and "central to people's understanding of the law". For him, she continued, if the court "overturned it or undermined it or denigrated it", the result would be "a kind of unsettling effect not only on people's understanding

of the criminal justice system" but of the "court itself" and its "legitimacy".

Chief Justice Roberts is an institutionalist who tends to honour *stare decisis*, the idea that the court should normally "let stand the decision" made in previous rulings. In 2020 he joined the court's liberal wing in striking down onerous regulations on abortion clinics. Although he disagreed with the precedent the case was based on, he wrote, without "special circumstances", *stare decisis* requires the justices to abide by their precedents. Justice Clarence Thomas, by contrast, has argued that, when a previous ruling is "demonstrably erroneous", the court "should correct the error". The leaked opinion pooh-poohs factors that might typically weigh in a precedent's favour, including its age, how practical a standard it sets and the extent to which Americans have come to rely on it.

Reversing *Roe* would also amplify charges of partisanship, which the justices dislike, whatever their devotion to precedent. Last year, at a centre named for Mr McConnell, Justice Barrett insisted that she and her fellow justices were not "a bunch of partisan hacks". In April, at the Reagan Library, she argued that people would not see justices as politicians in robes if they would only "read the opinions".

Yet the court is taking more decisions without laying out its reasoning, another habit that has elicited complaints from the left. Two days after Justice Barrett's appearance, for instance, it revived a Trump-administration rule that had limited states' power to protect rivers from pollution under the Clean Water Act, in a 5-4 decision released without any written opinion. What is more, *Louisiana v American Rivers* had arrived at the court on its emergency or "shadow" docket—a shortcut supposedly reserved for urgent matters.

The shadow docket has become a back door through which growing numbers of important decisions are slipped with limited airing and little or no explanation. Its expansion reflects in part the Trump administration's filing of 41 emergency applications in four years, compared with a total of just eight during the previous four presidential terms. But the justices have also been more indulgent of petitions of dubious urgency, if inconsistently so. Since their current annual session began in October, the justices have taken up 13 emergency cases on subjects as fraught as electoral redistricting and vaccine mandates.

Since Justice Barrett joined the bench, Chief Justice Roberts has publicly joined the court's three liberals in dissent seven times in shadow-docket orders. But *American Rivers* was notable: it marked the first time he signed one of the liberal justices' dissenting opinions and joined in criticism of the court's tendency to step into legal disputes prematurely. In her dissent,



► Justice Kagan noted that the applicants had not shown "exceptional need for immediate relief". To grant their wish anyway "renders the court's emergency docket not for emergencies at all".

In September a shadow-docket request to block a law in Texas that banned abortions after six weeks of pregnancy met a different fate. Over dissenting votes from the three liberal justices and the chief, the conservative majority allowed the ban to take effect, all but erasing access to abortion for Texas's 7m women despite the precedent set by *Roe*. Justice Kagan argued the move was "unreasoned, inconsistent and impossible to defend". Steve Vladeck of the University of Texas argues that by accepting some emergency applications and refusing others with little rhyme or reason, the justices "open themselves up to charges that they are engaged in political, rather than judicial, behaviour".

The court's decision to let the Texan law stand also raised eyebrows because it was designed expressly to thwart *Roe*, and thus the court's own authority. The law barred Texan officials from enforcing the ban on abortions, thus shielding them from legal challenges. But it empowered private individuals to sue anyone who helps a woman get an abortion. Those found guilty of doing so are to be fined \$10,000, which would be passed as a bounty to the plaintiff. The court saw nothing wrong with this mechanism, even though it could be used to undermine all manner of its rulings.

Deal with it

This is not the first time the Supreme Court has been accused of ideological bias. The biggest crisis came during the 1930s, when policy after policy of Franklin Roosevelt's New Deal hit a judicial roadblock. In 1937 the exasperated president pledged to "take action to save the constitution from the court and the court from itself". He announced a plan to add six seats to the court to create a new, more pliable majority. But he did not go through with it, after one of the justices changed his mind and upheld a contested law on minimum wages.

The "switch in time that saved nine" ended the feud with the president and Congress and heralded greater openness to Roosevelt's economic reforms, which he cemented with seven appointments to the court between 1937 and 1943. That, in turn, paved the way for the most liberal period in the court's history, in the 1950s and 1960s, which prompted Republican complaints of "judicial activism" and calls for the impeachment of the chief justice.

Forty years later came another crisis, when the court voted along partisan lines to end vote-counting in Florida and install George W. Bush as president. But Al Gore accepted the result with paeans to the rule of law and peaceful transitions of power.

The court's standing in opinion polls fell sharply, but recovered within about a year.

The court's reputation does not seem so resilient these days. Three recent studies by two political scientists, Logan Strother and Shana Gadarian, suggest that decisions people do not like "substantially, significantly and durably affect [their] assessment of the court's nature and its legitimacy". When liberals were asked about conservative rulings in prominent cases, and vice versa, they tended to view disagreeable decisions as "political". The more political the court seemed to them, in turn, the less legitimate they considered it.

Yet for all the misgivings about the court on the left, few Democratic politicians have any appetite to do anything about it. President Joe Biden appointed a commission last year to study reforms to the court. But its report is gathering dust. Congress seems uninterested in such ideas as limiting the court's jurisdiction or trimming justices' life terms, much less expanding the number of seats on the court.

One measure with better prospects is an ethics bill. Unlike their colleagues in lower courts, Supreme Court justices are not subject to any formal code of conduct. It had simply been assumed that the justices' professionalism was unquestionable. Yet many Democrats have found reason to question Justice Thomas for failing to step back from cases regarding the efforts by Mr Trump to overturn the results of the election of 2020, which culminated in a rally-turned-riot that overran the Capitol on January 6th 2021. Justice Thomas's wife, Ginni, a conservative activist, had not only attended the rally but had also implored Mark Meadows, Mr Trump's chief of staff, to keep looking for ways to undo Mr Trump's defeat. In February Justice Thomas was the only member of the court to support Mr Trump's bid to prevent a committee investigating the events of January 6th

from obtaining presidential records.

The Supreme Court lacks an army; it relies on others to give life to its decisions. So far, whenever the court's legitimacy has been questioned, its authority has held. Yet the justices would surely like their judgments to inspire more than acquiescence. And it does not seem implausible that grudging acceptance might at some point devolve into defiance.

What, for instance, if a liberal state such as California or Massachusetts followed Texas's example and enacted a law intended to get around the Supreme Court's permissive view of gun rights? If the conservative justices were inconsistent and voided such a law, an outraged Democratic governor might ignore them, spurring a constitutional crisis. Laurence Tribe of Harvard Law School, for one, believes the prospect of government officials "thumbing their noses at the court's formal judgments" is not "an altogether far-fetched scenario".

An even more worrisome possibility is another contested presidential election. A near-majority of the court has shown interest in the idea that state legislators are the ultimate arbiters of election results in their states. In 2020 Mr Trump urged officials in states that had voted for Mr Biden but had legislatures controlled by Republicans to find fault with the count in some way. Although none did so, and the courts knocked back the many flimsy lawsuits filed on Mr Trump's behalf, four justices have given the impression that they would not necessarily overrule a legislature that took it on itself to decide an election.

Justice Robert Jackson saw the court's powers as bound up in the public's perception of its legitimacy. "We are not final because we are infallible," he said; "we are infallible only because we are final." If politicians and voters begin to reject the Supreme Court's authority as the final arbiter of the law, chaos beckons. ■



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**Abortion**

The draft seen round the world

WASHINGTON, DC

How the end of *Roe v Wade* will affect American politics

IN THE 50 years since the Supreme Court handed down its decision on *Roe v Wade*, the right to an abortion has been deemed a constitutional guarantee in America. As he drafted a new decision that would overturn this precedent, Justice Samuel Alito recognised that the verdict would be treated cataclysmically. “We do not pretend to know how our political system or society will respond to today’s decision overruling *Roe*,” he wrote. “Even if we could foresee what will happen, we would have no authority to let that knowledge influence our decision.” Little could he have known that he—and the country—would get an unplanned preview of the public reaction.

On May 2nd Justice Alito’s draft opinion was published by Politico, an American news outlet, more than a month before its expected release. It was a shocking breach of the court’s norms of discretion and deliberation. John Roberts, the chief justice, confirmed the draft’s authenticity and swiftly ordered an investigation.

Such opinions are often revised as justices trade drafts and dissents. That caveat

has not stopped glee from Republicans, who are close to vindication for a decades-long strategy aimed at seizing control of federal courts and overturning *Roe*, and recriminations from Democrats. Chuck Schumer and Nancy Pelosi, the Democrats’ leaders in Congress, denounced the reported Supreme Court votes as an “abomination” and accused the Republican-appointed justices of having “lied to the US Senate, ripped up the constitution, and defiled both precedent and the Supreme Court’s reputation”. President Joe Biden pointed to the political repercussions. “If the court does overturn *Roe*, it will fall on our na-

tion’s elected officials at all levels of government to protect a woman’s right to choose. And it will fall on voters to elect pro-choice officials this November.”

If *Roe* were to be definitively cast aside next month, as had been widely predicted, women would be confronted with a maze of abortion rules depending on their home state. Republican-dominated legislatures in 13 states have pre-emptively passed complete bans on abortion, intended to come into effect after the Supreme Court strikes down *Roe*. Other states, including Georgia and Ohio, have prepared somewhat less draconian restrictions, limiting abortions to pregnancies shorter than six weeks (federal courts have until now blocked these from going into effect). Women in Democrat-run states, meanwhile, would experience little change.

Democrats plainly hope that the shock of such a decision would limit their expected mid-term losses. Sean Maloney, who leads the Democratic Congressional Campaign Committee, has called abortion “the central choice in the 2022 election”.

It is true that overturning *Roe* seems unpopular. Polling from Gallup shows that only 32% of Americans favoured striking down the precedent, compared with 58% who would have kept it. In other ways, though, public opinion is ambivalent. Majorities also support restrictions on the procedure, such as waiting periods and requiring ultrasounds to be shown to a woman considering an abortion. For decades, ➤

→ Also in this section

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24 Ohio’s Senate primaries

26 California’s new demography

27 New sheriff in New Orleans

28 Lexington: Evan McMullin v extremism

► divisions on abortion have remained fairly stable (see Graphic detail).

That suggests the immediate political impact may be limited. Extreme polarisation means that those Americans most exercised by the issue, whether pro-life or pro-choice, are already sorted into their supportive political party. Might suburban women respond by abandoning the Republican Party? Perhaps, but such an exodus has already been under way since Donald Trump's presidency. Against this, Republicans would be able to count on the motivation of an evangelical base elated with judicial victory and on surprising gains among Hispanic and African-American voters, who are more socially conservative than the college-educated whites defecting to the Democrats.

Another strain of wishful thinking among Democrats concerns the coherence of their opponents. The hope that judicial power would overturn *Roe* has for decades bonded seemingly disparate allies in the conservative legal movement: the largely evangelical religious right, the tuxedoed Rockefeller Republicans and the Trumpist nationalists. Having carried out its mission, the fellowship of the right might dissolve. For now, this seems unlikely. White evangelicals are not latent Democrats hindered only by their disdain for abortion. Polling by the Public Religion Research Institute finds that only 11% trust Mr Biden; more than twice as many, 23%, believe in the QAnon conspiracy theory.

Instead, perceived Democratic fecklessness may demotivate the party's own supporters. In theory, a Democrat-controlled Congress could pass a law codifying a national right to abortion, pre-empting the states. Mr Schumer has called for a vote on exactly such a bill. But it will fail. To pass it would require unified support for overturning the filibuster and legislating a nationwide right to abortion. Joe Manchin, the pivotal Democratic swing vote, disagrees with both notions.

The likely result of all this is that the politics of abortion will grow even more febrile. In Missouri, a state with only one functioning abortion clinic, a legislator named Mary Elizabeth Coleman has introduced a new style of abortion bill. It would ban the distribution of abortion pills (which are used more often than surgical abortions) and allow private lawsuits against anyone who knowingly helps a woman go out of state to obtain the procedure. "Missouri women are being targeted by those who are wanting to profit off of abortion. You see billboards across the state. Women are being harmed out of state," she says.

Some thought, incorrectly, that the Supreme Court had settled the issue when it decided *Roe* in 1973. It's equally unlikely that the issue will be settled now. ■



Weapons supplies

The depleting arsenal of democracy

WASHINGTON, DC

The war in Ukraine raises worries about America's ability to arm its friends

AS LONDON WAS being bombed during the Blitz, Franklin Roosevelt delivered a "fireside chat" over the radio on December 29th 1940 that still resonates today. America, the president said, had to become "the great arsenal of democracy", both to help those fighting the Nazis and to protect itself. When Japan attacked Pearl Harbour a year later, America's factories went into full wartime production. The car industry in Detroit took up much of the burden: Oldsmobile made cannon shells, Cadillac produced tanks and howitzers, Chrysler made Browning machine-guns. Ford built a huge factory to roll out B-24 bombers at a rate of one an hour. One of its workers might have inspired the song and poster of "Rosie the Riveter", now an iconic image.

With war raging in Ukraine, President Joe Biden is casting himself as a latter-day Roosevelt. America will not fight directly but is determined to help Ukraine "win". On April 28th he asked Congress for an extra \$33bn to respond to the crisis, on top of \$13.6bn approved earlier this year. The new request includes about \$20bn in military assistance to Ukraine and European allies. "The cost of this fight is not cheap, but caving to aggression is going to be more costly if we allow it to happen," he declared.

Can America's arms industry respond? It must help supply not only Ukraine but also European allies that are rushing to re-arm and America itself, which must replenish its stocks and worry about the risk of great-power conflict. "One of the great success stories of this war is that we have been able to supply the Ukrainians with

large numbers of munitions," says Thomas Mahnken of the Centre for Strategic and Budgetary Assessments, a think-tank in Washington. "My question is: who is going to supply the United States? Nobody."

America has been by far Ukraine's biggest armourer. Since 2018 it has sold or donated 7,000-odd Javelin anti-tank missiles. America has sent 14,000 other anti-armour systems, 1,400 Stinger anti-aircraft missiles, 700 Switchblade loitering munitions, 90 howitzers with 183,000 155mm shells, 16 Mi-17 helicopters, 200 armoured personnel carriers and more. And it has marshalled allies to provide military equipment, often of ex-Soviet vintage.

Most of these weapons have come from stockpiles. Factories may not be able to raise production quickly. Take the Javelin. America does not release details of its stock of weapons. But according to budget documents, its army has bought around 34,500 Javelins since they went into service in 1996. Mark Cancian of the Centre for Strategic and International Studies, another think-tank, reckons that it has used 12,500-17,500 for training and testing. That would leave 17,000-22,000 in stock at the end of 2021. So the 7,000 Javelins given to Ukraine may account for a third or more of the army's stock (see chart on next page). His calculation excludes about 2,400 Javelins bought by the marines, and perhaps 5,000 expended in Iraq and Afghanistan.

On May 3rd Mr Biden visited the factory in Troy, Alabama, where the Javelins are assembled. It produces 2,100 of them a year. It would thus take three or four years to re-

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► plenish the army—more if orders from other countries take priority. The factory could in theory turn out 6,480 Javelins a year. But this assumes that its makers, a joint venture by Lockheed Martin and Raytheon Technologies, receive firm orders, can find the extra workers and, crucially, components. On earnings calls with investors last month the bosses of both firms spoke of supply-chain constraints.

The production of Stinger anti-aircraft missiles is tighter still. They entered service in 1981, and America bought its last batch in 2003. The production line closed last year, but reopened for a foreign customer (thought to be Taiwan). Its maker, Raytheon, says it has only a limited stock of parts. "Some of the components are no longer commercially available," Raytheon's boss, Gregory Hayes, told investors. "And so we're going to have to go out and redesign some of the electronics in the missile seeker head, and that's going to take us a little bit of time."

The recent move to send Ukraine NATO-standard artillery may relieve pressure on munitions stocks (countries have lots of 155mm shells). But other pinch-points will appear. Having long dominated the air-space of war zones, Western countries have underinvested in longer-range ground-to-air weapons of the kind Ukraine craves.

This is not the first time they find themselves short of weapons. In the air war in Libya in 2011—a limited campaign—Britain and France quickly ran short of precision-guided munitions (PGMs). America itself, at some points during the campaign against the jihadists of Islamic State in Iraq and Syria in 2014-18, was consuming more PGMs than could be produced.

Precision weapons, packed with chips and sensors, are hard and expensive to make. Planners tend to focus on "platforms"—tanks, ships, planes—and save money on the bombs and missiles, notes Bradley Martin of the RAND Corporation, a think-tank supported by the American air force. "A risk is being assumed based on a belief that, if a war were to occur, we would

be able to ramp up production," says Mr Martin. "That's a bad assumption."

A related problem is a tendency to underestimate how intensely armies use munitions in a war. A third is that, after decades of peacetime procurement, industry has given priority to efficiency, not resilience. Maintaining spare capacity is costly.

It does not help that the defence industry, like others, has been hit by the covid pandemic, tight labour markets and global shortages of computer chips. A recent report by the National Defence Industrial Association argues that America's defence-industrial base is deteriorating. The biggest problems were a shortage of skilled workers and spare parts. About 30% of firms it questioned said they were the sole supplier of a product to the Pentagon.

A battle against bottlenecks

Kathleen Hicks, the deputy defence secretary, says the Pentagon is trying to clear bottlenecks at weekly meetings with the bosses of defence firms. It is helping them locate alternative suppliers for hard-to-find parts or, in the case of the Stinger, the tools with which to make them. In the longer term the government is trying to boost domestic semiconductor production.

Ms Hicks warns against fixating on particular weapons. "We talk in name-brands. People walk around the street talking about Javelin, but the reality is that we're providing our anti-tank systems," she notes. What Ukraine needs is not a specific weapon, but a capability, such as stopping armoured vehicles. That might be provided by other weapons or allies (Britain and Sweden, say, which have sent their jointly produced Next-generation Light Anti-tank Weapon). And America, she says, is able to draw down stocks of Javelins and Stingers because it has other means with which to destroy tanks and planes.

Ideas for improving defence production abound. Bigger stockpiles, diversifying suppliers, modular weapons designs that allow components to be swapped, common standards among allies and joint acquisition. But much of this is hard, given that procurement is slow and national industries tend to be protected. Ms Hicks says the Pentagon must give industry "a strong, enduring market signal", an assurance that if they hire workers and expand factories "the work is going to be there".

For America, the war in Ukraine is still a limited commitment. But if its industry is under strain now, could it cope with a big war—say against China over Taiwan? "In world war two, one reason industry could rapidly make the shift was because we had a massive amount of unused industrial capacity after the Depression," says Mr Martin. "Right now the arsenal of democracy is not capable of responding to the demand of long-term high-intensity conflict." ■

Ohio primaries

Hillbilly eligible

CINCINNATI, OHIO

J.D. Vance sells Republican voters on endless culture war

MASON, A SUBURB north of Cincinnati, does not feel like a place where the apocalypse is coming soon. It is a district of detached houses and perfect landscaping. After voting at a bucolic-looking wedding venue, however, David Myer, a retired health-care worker, says he sees a much darker future. Thanks to Joe Biden ("not the president"), illegal immigrants are being invited en masse into Ohio. They are living on welfare "and all of the free stuff we give them", and voting for Democrats. Some are even coming to Mason and begging at traffic lights. "We're on the precipice of social collapse," he says.

Mr Myer did not vote for J.D. Vance, the author and venture capitalist who won the Republican primary for the Senate on May 3rd. But his talking points could have come straight out of one of Mr Vance's speeches. With his vision of America being looted by woke corporations, illegal immigrants and a crooked liberal media, Mr Vance persuaded 32% of Republican voters to back him, enough to win in the crowded field.

Mr Vance was helped by the endorsement of Donald Trump. The former president gave his blessing on April 15th, tipping him into the lead. But at his victory speech in Cincinnati, Mr Vance only briefly mentioned Mr Trump, along with other Republicans who had helped his campaign, such as Marjorie Taylor Greene, a conspiracy-theorist congresswoman from Georgia.

Instead, he said that he intends to stand for "the people who are caught between the corrupt political class of the left and the



Messenger of the apocalypse

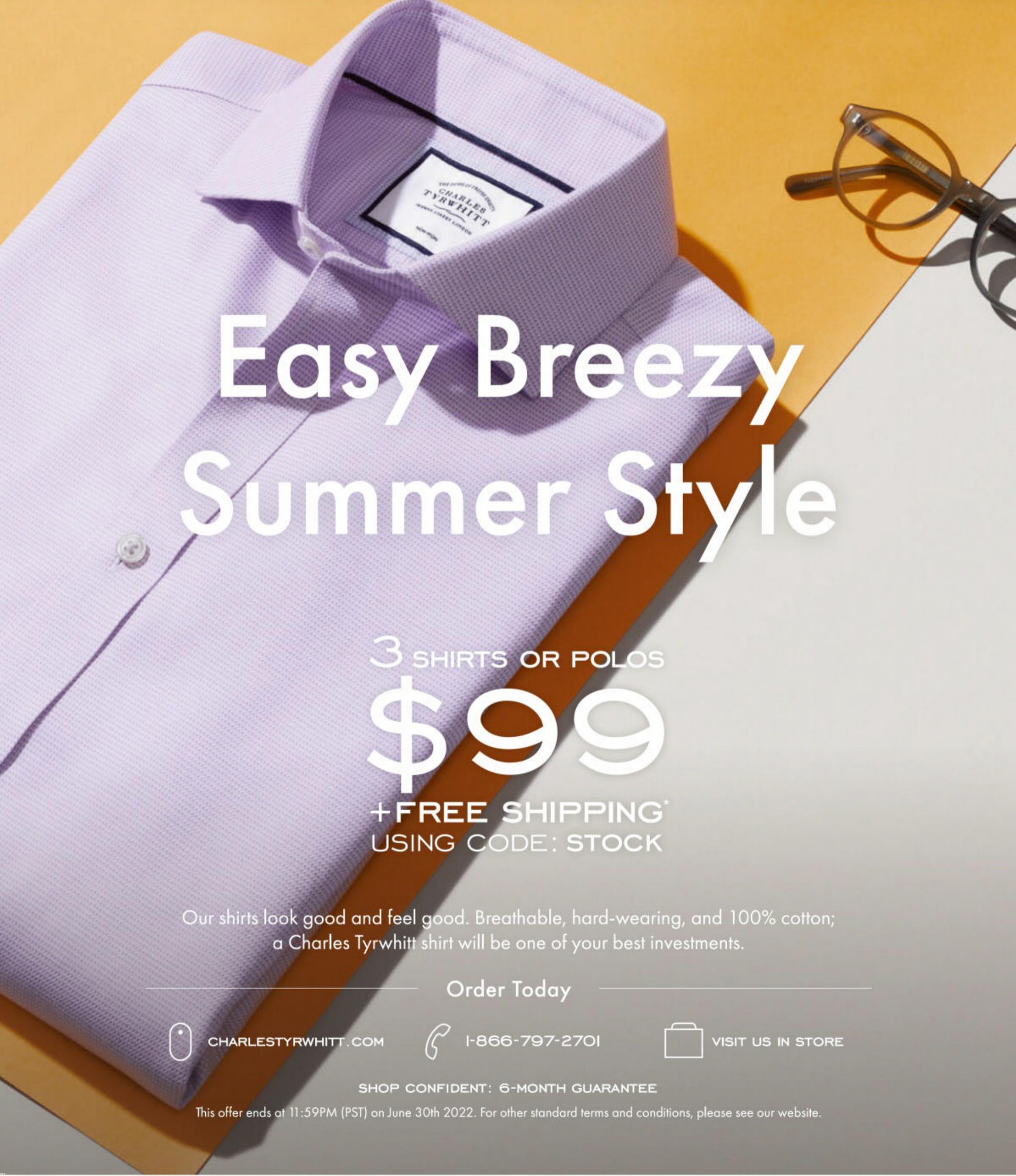
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► right". "Establishment" Republicans, he said, have connived to send American jobs to China while doing nothing to stop Americans getting addicted to opiates. Democrats "actively encourage" Mexican cartels to import fentanyl, even as they tell children there are "42 genders". Mr Vance said both groups ought to be sent to jail.

Why this sort of rhetoric is so persuasive among Ohio's Republican voters is unclear. It is true that opioid addiction is a catastrophe in the state. But illegal immigration is not. Less than 5% of Ohio's population are foreign-born, one of the lowest rates in the country. And yet it seems to have rallied the majority of those voters who turned out (all but one of the seven candidates espoused a similar creed). Every voter your correspondent interviewed outside various polling places mentioned illegal immigrants as their primary concern, shortly followed by inflation.

What did not stop Mr Vance's victory was his previous incarnation, as a darling

of liberal publications and a thoughtful critic of Mr Trump after his book "Hillbilly Elegy" came out in 2016. His opponents plastered the airwaves with unfortunate quotes, including a suggestion that Mr Trump might become "America's Hitler". No matter. "He made a mistake and he admits it," said Rob Fyte, another pensioner in Mason, after voting for Mr Vance. Having become famous for a memoir about how working-class people from the Appalachians often look for outsiders to blame for their problems, Mr Vance has seamlessly switched to arguing that outsiders *are* to blame for their problems.

Will voters in the general election in November be as forgiving? The winner of the Democratic primary, Tim Ryan, a congressman from Youngstown, is also running on China-bashing populism, and may have a chance. But in 2020 Ohio went for Mr Trump by eight points. Most probably, the proud Hillbilly will go on to take his apocalyptic message to Washington. ■

said, "the future happens here first". In fact California's demography is worse than average. The state's total fertility rate (TFR, an estimate of the number of children women will bear over their lifetimes) fell from 2.2 in 2006 to 1.5 in 2020, more than in America as a whole, where the fall was from 2.1 to 1.6. The TFR is one of the most important indicators of future population trends. Fertility has been depressed, in part, suggests the state demographer, Walter Schwarm, because of the larger share of foreign immigrants now coming from South Korea, Japan and China. East Asians have brought their low fertility with them.

As a result, argues Joe Mathews, a writer and commentator, the state's demography is now at odds with Californians' sense of their home state as "a place where we can play in the sun" (to quote the Beach Boys). Youthfulness, attractiveness to migrants and diversity: all three are eroding.

California is still young, but less so. The state's median age, 37.3, is a year and a half below the national average but is catching up, having risen by two years in 2010-20. The over-65s were 11% of the population in 2010 but will almost double to 19% by 2030. The state's 88-year-old very senior senator, Dianne Feinstein, is representative of her constituents in this respect.

California is no longer the migrant magnet it was. Between 2000 and 2020, it lost roughly 3m people to other parts of the country. In recent years the decline has been exacerbated by the pandemic and border controls, both of which have restricted foreign migrants. In 2000 Texas was 60% the size of California in terms of population; now it is three-quarters, thanks in part to an influx of Californians.

Drought, wildfires and relatively poor schools all played roles in the exodus, but dominating everything is the cost of housing. In 2019 median house prices in California were 184% higher than those in Texas. Dowell Myers, a demographer at the University of Southern California, argues that exorbitant housing costs also explain California's falling fertility, since couples who want children go to states where they can afford a family home—and even its relative youth, since large numbers of older Californians are cashing out and buying big retirement homes elsewhere.

As a result, California has lost a component of its diversity: the sense that it is a place where people from all over America come to make good. Ethnically, it has not changed much: 27% of Californians are foreign-born, the highest share in America and twice the national rate. It is one of only two states (with New Mexico) where there are more Latinos (39%) than whites (37%). In absolute terms, it has more Asian-Americans and Pacific Islanders than anywhere, even Hawaii. And it will become less white in future because, though whites are two-►

California

America, only less so

LOS ANGELES

The new demography of the Golden State is at odds with the old California Dream

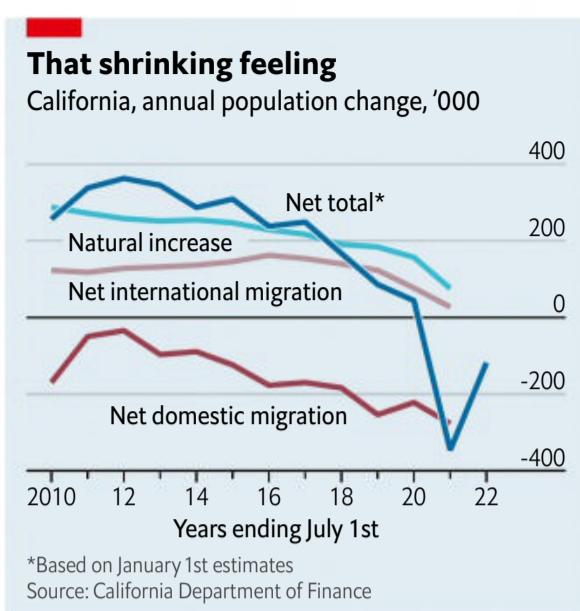
WALLACE STEGNER, a novelist, once called California "America...only more so". To judge by population estimates released on May 2nd, the state is still America, but slightly less so. The population fell to 39.2m in the year to January 2022, 400,000 lower than in 2020 (see chart on next page). In 1990, the number of Californians had been rising by a robust 2.5% a year. The biggest contribution to the decline came from migration. In 2021, the net

change (people moving out of state minus those moving in) was twice as large as the number of covid deaths and four times the population's natural change (the excess of deaths over births). Big cities have been hit hardest; the population of Los Angeles County has fallen for the past four years.

Even if these declines were no worse than average—and national demographic trends are slowing, too—they might seem worse in a state where, as its governor once



As much of a mix, but less of a magnet



► **fifths of Californian adults, among children they account for only a quarter.**

Despite this, the state is less of a melting pot in another way: it used to be a place where everyone came from somewhere else. Before 2000, says Mr Myers, only 40% of 25- to 34-year-olds were born in the state. Now the share is 60%. The Beach Boys' Wilson brothers were born in California, but their parents were from Kansas and Minnesota. Eddie Van Halen grew up in Pasadena to become one of the world's greatest guitarists. His parents were born in the Netherlands and Indonesia.

On surfer to stay?

One sign of the state's ebbing diversity is the decline of those who speak mostly or only Spanish. In the 2010s, four-fifths of self-identified Hispanics spoke the language fluently; by 2020, the share was two-thirds. Another sign is that half the state's foreign-born immigrants are citizens, the highest share for 40 years. "We're not that different any more," laments Mr Mathews.

William Frey, at the Brookings Institution, a think-tank, points out that many of the state's demographic problems are concentrated in four big cities. The rest of the state rivals Texas and Arizona in its continued attractiveness to incomers. And it will be helped as house prices throughout the West start to catch up with California.

Migration into the state has remained steady for a decade (it is the number leaving that has changed). California continues to attract the same share of foreign immigrants as ever, roughly a quarter, even though the total fell. And in the 2010s, according to the Public Policy Institute of California, a research group, more college graduates moved to the state than left, at a time when people with only high-school education were flooding out. Incomers tended to be wealthier, too.

Perhaps California is still where the future happens first. It is a future of ageing, declining populations, ethnic diversity and educational advance: no bad thing, but not the sunshine of California dreamin'. ■

New Orleans

A new, progressive sheriff in town

NEW ORLEANS

Susan Hutson must reform a notorious jail amid rising crime

THE ARRIVAL of a new sheriff is not always a joyous occasion—at least in the films of John Ford or Clint Eastwood. Usually, it means something has gone terribly wrong. But in New Orleans it is another chance for a parade.

On May 2nd a crowd lined Canal Street as marching bands, sheriff's deputies on motorcycles and costumed revellers reminiscent of Mardi Gras headed towards the Mississippi. They were escorting the city's new sheriff, Susan Hutson, to her inauguration. After defeating a 17-year incumbent, Marlin Gusman, in last year's election, Ms Hutson is the first female sheriff in New Orleans's 304-year history, and the first African-American female sheriff in the state of Louisiana.

Her reward is to oversee the Orleans Justice Centre, a jail with a history of violence and mismanagement. Ms Hutson promises a more humane approach to the incarcerated. Though she is not the first such progressive sheriff, Ms Hutson's new jurisdiction is among the largest. Her experience will be closely watched.

Faced with overcrowding in the 1970s, Louisiana shifted many inmates from state prisons to city jails. The New Orleans jail population swelled, peaking at more than 6,000 in 2005. Hurricane Katrina that year brought nightmarish reports of inmates waist-deep in flood water. Violence, organised crime and poor sanitation plagued the jail for years. Following a class-action lawsuit brought by ten prisoners, Mr Gusman agreed to a consent decree with the Depart-

ment of Justice in 2012, under which the sheriff's office promised to improve conditions. The presiding federal district-court judge, Lance Africk, described the jail as "an indelible stain on the community".

A decade later, the consent decree has still not been lifted. The jail, though it now has just under 1,000 inmates, remains dangerous. Force is often used to break up fights. An average of three inmates a year have died in custody since 2014, nearly all from drug overdoses, suicide or preventable medical emergencies. Short staffing and high turnover lead to lapses in security. A surge in crime may put the jail under even greater pressure. More than 90 murders have been recorded in New Orleans this year, the worst four-month stretch to start a year since 2005.

Unlike most sheriffs, Ms Hutson has never served in law enforcement. From 2010 she worked as the independent monitor for the New Orleans Police Department, itself under a consent decree since 2012. "I don't look at everything through a blue lens, but I've worked around law enforcement long enough to know the standards," she says. Inspired by the protests after the murder of George Floyd in 2020, she decided to challenge Mr Gusman.

Her campaign stressed improving medical services for prisoners, including mental health. She pledged to give them full visitation rights, minimise the use of force by deputies and provide housing that accords with an inmate's self-identified gender. She also vowed to bring the office into compliance with the consent decree. But she opposes a \$50m expansion of the jail that would add 89 beds for mental-health services, the construction of which was ordered by Judge Africk and supported by Mr Gusman. Ms Hutson argues that the money would be better spent on upgrading the city's dilapidated structures and she will seek to appeal against the move.

So after the festivities, she will have her hands full. "Jails are like big freighter ships moving down the Mississippi, they need continuous attention to shift course," says Andrea Armstrong, a law professor at Loyola University New Orleans. If the city's crime surge continues, residents may become more receptive to Ms Hutson's critics, who believe a gentler approach to inmates will only embolden criminals. In the films, it is not long before a new sheriff faces a showdown. ■



First lady

Lexington | Evan McMullin v extremism

A former Never Trump Republican is testing a new defence against the populist right



AMID THE horrors of the 2016 presidential election, Evan McMullin offered a moment of relief. The former CIA officer and Republican congressional staffer had watched in horror as his party traded its principles for Donald Trump. When it became clear that no Republican leader would resist him, Mr McMullin launched an independent run of his own. He entered the race just three months before the election, with little name-recognition or money, yet won half a million votes in the 11 states where his name was on the ballot (and over 200,000 write-in votes where it wasn't), including a fifth of the total in his native Utah. The state's senior Republican senator, Mike Lee, voted for him.

Now Mr McMullin has Mr Lee in his sights. His protest vote long forgotten, the senator has become an arch Trump toady and conspirator. A Mormon, like most Utah Republicans, Mr Lee has compared the former president to a mythical Mormon hero, Captain Moroni. Text messages leaked last month suggested that the senator was up to his neck in Mr Trump's effort to steal the 2020 election. Few Republican politicians have fallen further into the Trumpist mire. So Mr McMullin is standing against him at the mid-term elections in November. "Utah is a state founded by my ancestors in the mid-1800s and many others who fled persecution," he told Lexington. "We know the value of our system of self-government better than many. We cannot be represented by someone who is trying to destroy it."

He is again running as an independent, but with a couple of differences. In 2016 he sought to rally his fellow conservatives against Mr Trump for the sake of conservatism and the country. He was for gun rights and against federal efforts to cut greenhouse-gas emissions. Yet, having apparently concluded that conservatism is beyond saving, he is now trying to woo moderates of all parties and none. "A majority of Utahns want to replace Mike Lee but they are divided between political factions," he says. "Our strategy is to unite them into a single voting bloc."

So far, it is working. Though Utah's conservatives are less resistant to Mr Trump than they were, a minority still back Mr McMullin. They might include the state's other senator, Mitt Romney, who has suggested he will not endorse either his Republican Senate colleague or Mr McMullin, because both are "friends". Even

better for Mr McMullin, Utah's Democrats voted on April 23rd not to field a candidate against him.

A two-horse race could be tight. Mr Lee's approval ratings are poor and the senator could be further bruised by next month's Republican primary, at which his secretive role in Mr Trump's post-electoral machinations will receive fresh scrutiny. This is a remarkable development in a state that has not had a competitive Senate race since 1976.

Mr Lee's campaign is naturally trying to define Mr McMullin as a shifty opportunist. In response, the challenger presents his change of tack as a recognition that politics is now less a struggle between right and left than between extremism and moderation. He makes a compelling point. Mr Trump is unrestrained, has no ideology and his party is in thrall to him. By contrast, the Democrats are a broad ideological coalition, including conservatives such as Joe Manchin and democratic socialists, which accepts compromise and restraint, however grumbly, as its only means to stick together. The rise of Joe Biden, an ageing moderate whom few Democrats love but most can live with, is emblematic of the party's pragmatism.

So is the decision of Utah's Democrats to tacitly embrace Mr McMullin (at the urging of the state's most recent Democratic congressman, Ben McAdams). All the more so, it might seem, because Mr McMullin has not significantly revised his conservative views. Three of his five priorities—cutting government waste, keeping America safe, and protecting air and water—are standard Republican talking points. And the other two, strengthening democracy and reducing health-care costs, are hardly left-wing. It is a reminder that Democrats and moderate Republicans, a dwindling but extant species, could govern together perfectly well if their fanatical colleagues would only allow it. Indeed, in Utah, which has a strong tradition of bipartisanship despite its conservatism, they quite often do.

The arrangement looks particularly significant given how hard the Democrats are finding it to win a governing majority on their own. In the Senate, the fact that most states lean to the right, though most Americans vote on the left, gives the Republicans a huge advantage. Senate Democrats have therefore spent much of the past two years debating possible structural reforms to correct such anomalies, for example by scrapping the filibuster in order to grant statehood to staunchly Democratic Washington, DC. Yet to make any reform they need unanimity, given their paper-thin Senate majority, and their most conservative member, Mr Manchin, is not on board. Lending Democratic votes to a pragmatic independent such as Mr McMullin in places where Democratic candidates cannot win looks like a useful second-best option. It could give the Democrats a serious governing partner, as Mr McMullin promises to be, or at least fewer hard-right opponents like Mr Lee.

Reform by stealth

It is also hard to see what the Democrats could lose from the arrangement. Their 35% share of the vote in Utah—and 40% in Louisiana and in Missouri and so on—is currently wasted. Many Democratic voters therefore do not bother to turn out in such places, making it difficult for the party to win the down-ballot contests that it otherwise might. Providing its supporters with a novel winning option, albeit in the form of an independent candidate, should help the party correct this. "I do believe that this is a model for defending our democratic republic from the anti-democracy far-right," says Mr McMullin. He may just be right. ■



Miami

Hub for a hemisphere

MIAMI

If Latin America has a commercial capital, it is in Florida

FOR JOAN DIDION, an American essayist, Miami in the 1980s was “not exactly an American city...but a tropical capital: long on rumour, short on memory, overbuilt on the chimera of runaway money”. Nearly 40 years later, the place that Didion described is still more of a tropical capital of Latin America than a typical city in the United States. But the money which is flowing into it is no chimera.

Miami has become a commercial hub for the hemisphere. Miami-Dade County, which comprises the city of Miami and around three dozen municipalities, is where 1,200 multinational corporations have set up the headquarters of their Latin American operations. The county's GDP was around \$172bn in 2019, making it the 14th-largest county economy in the United States, and roughly as big as the combined GDP of Ecuador and Uruguay. Miami's airport handles 43% of all flights from the United States to South America. It is the “meeting place for the hemisphere”, says Alejandro Portes of Princeton University. “It is easier to commute from capitals in Latin America to Miami than between capitals in Latin America,” he says.

With more than half of its residents born outside the United States, Miami has the largest proportion of immigrants of any metropolitan area in the country. Around 70% of the 2.7m residents in the county are Hispanic, about double the share in 1980. Its population is increasingly diverse (see chart on next page).

Recent geopolitical shocks, such as the war in Ukraine and frostier relations between the United States and China, have made Miami more important, argues Mauricio Claver-Carone, president of the Inter-American Development Bank (IDB), who comes from the city. He sees a trend for “regionalisation” over “globalisation”. This plays to Miami’s strengths as a Latin American hub. “There’s no greater city that encapsulates the heterogeneity of Latin America and the Caribbean,” he says.

Turmoil in Latin America has often boosted Miami’s fortunes. When Commu-

nists seized control of Cuba in 1959, Cubans with money or get-up-and-go fled the island and flocked to Miami. Next came Nicaraguans escaping from a socialist revolution in the 1970s and the civil war that followed it. From the mid-1990s Colombians came in droves, fleeing drug-related violence. All these groups have prospered, and contributed to Miami’s prosperity.

The city benefits in both good times and bad, says Jorge Perez, the boss of a property firm. People from unstable places buy homes in Miami as a “secure investment”, he says. Following the election of leftist leaders in Peru and Chile last year, the number of people moving from those countries has increased, thinks Paulo Bacchi of Artefacto, a furniture shop. And when Latin American economies are doing well, people buy second homes.

The bass and the sunset low

Belen Jesuit Preparatory School was founded in Havana but shut down in 1961 by its most famous old boy, Fidel Castro. Undeterred, it moved to Miami. Its staff, many of them Catholic priests, now teach children whose families come from across the region. “Latin America’s losses are our gains,” says Father Guillermo Garcia-Tunon, the president of the school. And recently, Americans moving to Florida for sunshine and low taxes have also been applying in large numbers.

The political upheaval that drives people to Miami shows few signs of abating. Many desperate Haitians and Cubans—escaping from gang violence, poverty or so-►

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— Bello is away

cialism—have attempted to make their way by boat to South Florida. Since October 2021, the US Coast Guard has intercepted 3,519 Haitians, more than in the previous four years combined.

In this salsa-merengue melting pot

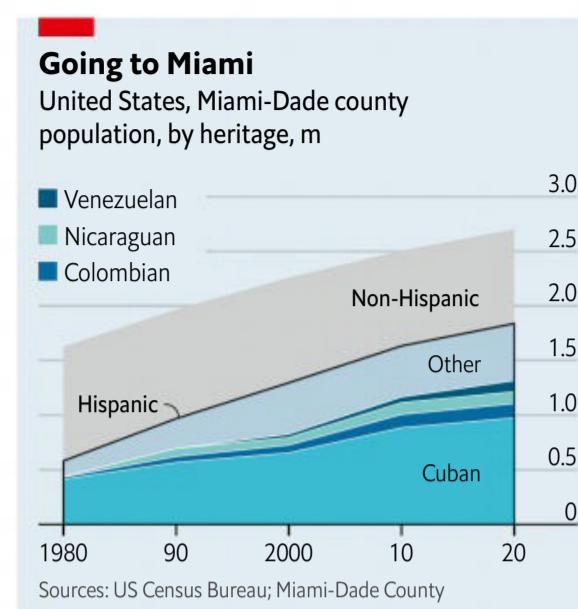
And if more leftists are elected in Latin America, more conservative types may vote with their feet. Some Colombians are nervous about the prospect of a victory for Gustavo Petro, a former guerrilla, in the presidential election this month. Capital flight from Colombia is already evident, says Paul Angelo at the Council on Foreign Relations, a think-tank. People fear Mr Petro will turn the country into “another Venezuela”, he says. In March Colombia was the biggest source of international searches on MiamiRealtors.com, a property website, accounting for around 11% of international traffic. Members of Colombia’s armed forces have asked Mr Angelo about the United States’s asylum process, fearing that they may become targets for left-wing guerrilla groups if Mr Petro is elected.

Miami also appeals to younger tech types. Its startup scene is thriving. Entrepreneurs can find safety and plentiful capital there, so Miami has become a “no-brainer in a post-covid world”, says Shu Nyatta, who co-leads a Latin American fund at SoftBank, a large technology-investment firm. Today there are around 2,500 fintech companies in Latin America. That is more than double the number that existed in the region in 2018, according to IDB. Many Latin American founders are choosing either to base themselves in Miami or to work there for part of the year.

Members of Latin diasporas in Miami are increasingly active in regional affairs. Analysts tend to agree that Latin America is not a foreign-policy priority for President Joe Biden. Eight Latin American countries, including Brazil and Chile, still do not have ambassadors from the United States. Chile has not had one for three years. But American politicians pay attention to their voters, and that includes a lot of people with links to both hemispheres.

After Hurricane Maria hit Puerto Rico in 2017, sending an estimated 50,000 Puerto Ricans to Florida, Republicans worried that these migrants would vote for Democrats. Perhaps for this reason, Donald Trump tightened sanctions on Venezuela’s dictatorial regime and backed the opposition, knowing that this would please the Venezuelans in South Florida who had fled from their country.

Venezuelans in the United States were indeed “galvanised” by Mr Trump’s move, says Erik Bethel, a former director of the World Bank who grew up in Miami. They voted for Mr Trump in droves. Colombian voters are also growing in importance, says Annette Taddeo, a Florida state senator



who is running for governor.

“Miami is a city that’s informed by exile much more than immigration,” says Alberto Ibarguen, a former publisher of the *Miami Herald*. Whereas most new immigrants try to assimilate, Miami’s exiles have often hoped to return to their home country. That may be changing. As Miami tilts further to the right, Latin America is poised to veer further to the left. ■

Mexico

Wrecking ball

MEXICO CITY

Andrés Manuel López Obrador takes on the electoral system

IN 2006 FELIPE CALDERÓN won Mexico’s presidency by 0.6 of a percentage point. His vanquished rival, Andrés Manuel López Obrador, angrily rejected the result, claiming that the independent electoral body had rigged the vote count. There was precious little evidence for this explosive allegation. Nonetheless, Mr López Obrador staged his own “inauguration” ceremony and encouraged nationwide protests.

Fifteen years later and Mr López Obrador, now president, still distrusts the electoral body, now known as Instituto Nacional Electoral (INE). In his daily press conferences he often rails against its staff, calling them part of a corrupt elite. On April 28th he unveiled a package of constitutional amendments which he says will end electoral fraud and give Mexico “an authentic, a true democracy”.

Under his proposals, which have now been sent to the lower house of Congress to debate, the INE would be scrapped and replaced with a new centralised body. This body would have a smaller budget and fewer independent experts working for it. Its most senior people would be elected by popular vote, instead of by lawmakers.

Similarly, the electoral court would be subsumed into the Supreme Court. Its members would also be elected by ordinary folk. Public financing for parties would be cut and electoral propaganda laws, which regulate how parties can campaign and include a period before elections in which campaigning is illegal, would be loosened. (Mr López Obrador breached these laws 29 times in 2021 by making comments deemed to be campaign messages.)

Mr López Obrador says he wants to save money. But the budget for the INE is 13.9bn pesos (\$700m) this year, which is equivalent to just 0.2% of the overall budget. And elections cannot safely be run on a shoestring in a country that in the 1970s and 1980s was racked by electoral fraud. The INE, which has run elections since 1990, uses specialist paper and ink to produce ballot papers that cannot be replicated. It also oversees the cards used to prove voters’ credentials for around 93m people.

The proposed changes would politicise the INE and curb its independence. They would also make it harder for small parties to compete in elections. If the president were truly worried about electoral fairness, he should try harder to stop candidates from being assassinated in local and state contests, says Edna Jaime of México Evalúa, a think-tank.

The constitutional amendments are unlikely to pass; that would require a two-thirds majority in both houses and the support of a majority in the state legislatures. But the president can still do damage. The INE’s budget has already fallen in recent years. His verbal swipes are likely to continue. Such conspiracy theories may rally his supporters in the run-up to the presidential election in 2024, but they threaten to undermine confidence in Mexican democracy. Still, not everyone believes him. Surveys show that Mexicans trust the INE more than any other institution, except for the armed forces. ■



One step at a time



Politics in the Philippines

The name of the father

MANILA

Another Ferdinand Marcos is set to become president of the Philippines. He is expected to be less awful than his dad was

IT WAS JUST after lunchtime when a group of ageing men and women, dressed in red, and flashing V-for-victory signs, drifted past a Uniqlo store in one of the many malls that pass for public spaces in Manila, the capital of the Philippines. The call had gone out on Facebook for supporters of Ferdinand “Bongbong” Marcos to come out for their presidential candidate. “I hope he will vindicate the family name,” says Carmen, 74, as she rides the escalator down towards the Zara outlet. “They are so hated.”

On the floor below, another group, this one mostly in pink, had come to prove her point. Supporters of Leni Robredo, Mr Marcos’s closest rival for the presidency, were there to show their disdain for Bongbong. “We want a clean and honest government,” says Gina Ramos, 52. She has had enough of corruption, she adds.

She is in for disappointment. Barring an earth-shattering surprise or an unprecedented polling error, Mr Marcos, the son of the Philippines’ former dictator of the same name (minus the bongs), will win by a landslide in an election on May 9th. His

vice-president, who is elected on a separate ticket, will be Sara Duterte, the daughter of Rodrigo Duterte, the outgoing president. In a system dominated by dynasties, both members of the all-star team have for months polled at above 50% in their respective races. Ms Robredo’s numbers have remained stuck in the low 20s.

That is a remarkable comeback for the Marcos family, who were run out of the country on February 25th 1986 as massive street protests and the loss of support from the police and army forced Ferdinand senior to reconsider his position. The Marcoses fled to Hawaii—along with at least 24 bars of gold and 22 boxes of cash—where the deposed dictator died three years later.

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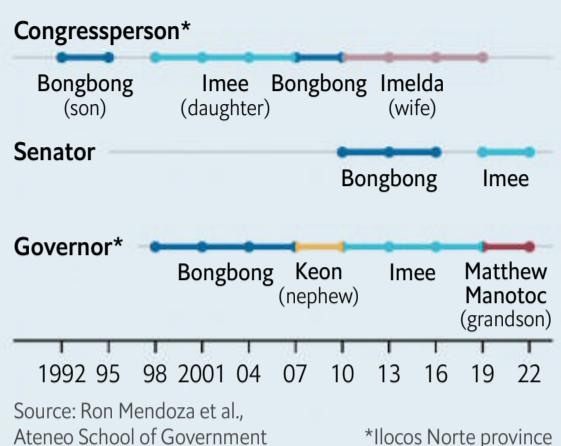
The family returned to the Philippines, ostensibly to face corruption charges, in 1991. Marcos’s wife, Imelda, ran for president the following year, and lost. But Bongbong won a seat in the House of Representatives. Various members of the family have played musical chairs in provincial and national positions ever since (see chart on next page). In 2016, Bongbong ran for vice-president and lost narrowly to Ms Robredo. Now he is about to move his family back into Malacañang, as the presidential palace is known.

Yet it is unclear what Mr Marcos intends to do with power. He has made few promises on the campaign trail, published no policy agenda and appeared in no debates. The slogan of his and Ms Duterte’s campaign is an airy-fairy “Unity”. (The pair call themselves “Uniteam”.) Despite 30 years in public life—as congressman, senator and provincial governor—he has little to show for it. Descriptions of him by supporters, critics and foreign observers are variations on a theme: “easy-going”, “laid-back”, “not very energetic”, “lazy”.

That is because the presidency, for Mr Marcos and his family, is not a means to transforming society, fixing deep-rooted problems or even plundering the treasury. It is instead an end in itself, the culmination of a decades-long effort to rehabilitate the family name, long associated with the late dictator’s brutality and corruption, and the lavish lifestyle enjoyed by Imelda, whose shoe collection now fills a museum ►

Running in the family

Philippines, Ferdinand Marcos's family members in office, by election year



Source: Ron Mendoza et al., Ateneo School of Government

*Ilocos Norte province

in Manila. Thousands of people were killed and tens of thousands jailed or tortured during the period of martial law imposed by Marcos senior. Some \$5bn-10bn of public money is alleged to have been looted. "This campaign did not start six years ago", when Mr Marcos lost his bid for the vice-presidency, says Julio Teehankee of De La Salle University in Manila, but in 1986.

Over time, and more recently helped along by skilful propaganda, the idea took hold that the Marcos dictatorship was a "golden era", when the Philippines enjoyed stability, high growth and massive investment in infrastructure. On social media and on YouTube, sophisticated campaigns push this revisionist version of history.

The lack of an agenda beyond winning is bad for the Philippines. Its population of some 110m is the second-biggest in South-East Asia. Around a quarter of its people cannot afford enough food and other essentials. Its economy, before the pandemic among the best-performing in the region, was battered by an unduly long and harsh lockdown. It is an American treaty ally with a niggling territorial dispute with China, lying within cellphone-signal distance of Taiwan. It will be on the front line in any conflict between those powers.

Mr Marcos has little to say on any of these subjects. What he has said has alarmed economists. For example, he promises to cap the price of rice at about half the current rate. That may be campaign bluster, however. Analysts expect him to forget unaffordable campaign vows and follow Mr Duterte's example in appointing technocrats to run the economy.

On foreign policy, Mr Marcos's family has a long association with China. One of only two Chinese consulates outside the capital is in Ilocos Norte, a province notable only for being the family's stronghold. He is said to be China's preferred candidate. Yet Bongbong is a cosmopolitan sort with a fondness for England, where he studied, and for American culture. There are suggestions that he might appoint Jose Manuel Romualdez, the Philippine ambas-

Diseased marsupials

A koalossal problem

SYDNEY

Australian scientists are jabbing koalas against chlamydia

survivors are left infertile.

Australia's iconic "bear" has plenty of other problems, too. Koala numbers in Queensland and New South Wales have fallen by at least half this century. The decline is so steep the federal government recently listed them as endangered. Their habitats have been ripped up for development and burnt down in bushfires. They are regularly hit by cars and attacked by dogs. Yet chlamydia is one of their biggest killers, and growing.

It is not just that randy koalas are spreading disease the old-fashioned way. Females feed their joeys a kind of faeces called "pap" to pass on nutrients from eucalyptus leaves. That transmits the infection, too. Koalas do not respond well to antibiotics, which disrupt the bacteria they need to break down food.

Help may be coming in the form of vaccines. Competing teams at two Queensland universities have spent years developing jabs for koala chlamydia. Both are now testing them in wild populations. A single-shot vaccine, created by the University of the Sunshine Coast, is being administered to some 1,000 animals in Queensland and New South Wales. Early results suggested that it is about 70% effective at preventing the disease, says Samuel Phillips, one of the researchers. Hundreds more koalas are being given a double-shot vaccine by the Queensland University of Technology and Currumbin Wildlife Hospital.

Mass vaccination is still a long way off. Inoculating every wild koala would in any case be impossible. The creatures would first have to be found (they are not exactly conspicuous) before being coaxed out of trees. Yet chlamydia does not spread as virulently as, for example, covid-19. Vaccinating just 10% of a breeding population annually might be enough to stem infections.



Hard to bear

sador to America (and his second cousin), as foreign secretary. But his lack of any strong beliefs of his own, combined with a susceptibility to external influence, is a potential liability. He listens to the last person he spoke to, says an interlocutor.

The greater risks are at home. Mr Marcos's campaign may have been milquetoast but his candidacy, and probable victory, have been deeply divisive. Ms Robredo has fired up a passionate base. Her rallies draw huge crowds. Lots of Filipinos remain wedded to the ideals of the 1986 revolution that

kicked out his father. It is possible they will not accept the result. Attempts to disqualify Mr Marcos are making their way through the elections commission, and will probably get sent to the Supreme Court. Whatever it decides, there will be uproar.

Mr Marcos's administration is likely to be marked by protests and instability. That will be bad for governance, and for the economy. It will also be a headache for America—and an opportunity for China—as they compete in the Pacific. The Marcos name is rising again. But for how long? ■



Electricity in India

Heat and no light

DELHI

The dysfunctional power sector is struggling to handle surging demand

ELECTRICITY HAS been getting increasingly scarce in India. In a recent survey two-thirds of households said they had been facing regular power cuts. Residents of some rural areas in the northern states report receiving only a few hours of electricity a day. The shortage has even reached posh parts of Delhi, the capital, whose pampered residents are usually insulated from many of the discomforts suffered by their compatriots.

The most immediate reason for the crisis is scorching heat. The past couple of months have been even hotter than usual in South Asia. In north-west and central India average temperatures in March and April were the highest since records began 122 years ago (see map). As a result, air-conditioners in homes and offices have been whirring away at levels not usually seen until mid-May. That has come on top of already rising demand after the easing of covid-19 restrictions and an uptick in economic activity.

India no longer lacks capacity. Over the past two decades it has built more coal plants, which generate about 70% of the country's power, and speeded up the expansion of renewables. It has also connected all but a tiny percentage of households to the grid (though not to 24-hour supply).

But in recent weeks coal plants have not been receiving enough coal to operate at capacity. At the start of this month more than 100 of India's 173 thermal plants had critically low stocks. At the end of April, officials in Delhi said the capital could run out of coal in a matter of days, threatening electricity supply to hospitals and the metro system. Power plants have been scram-

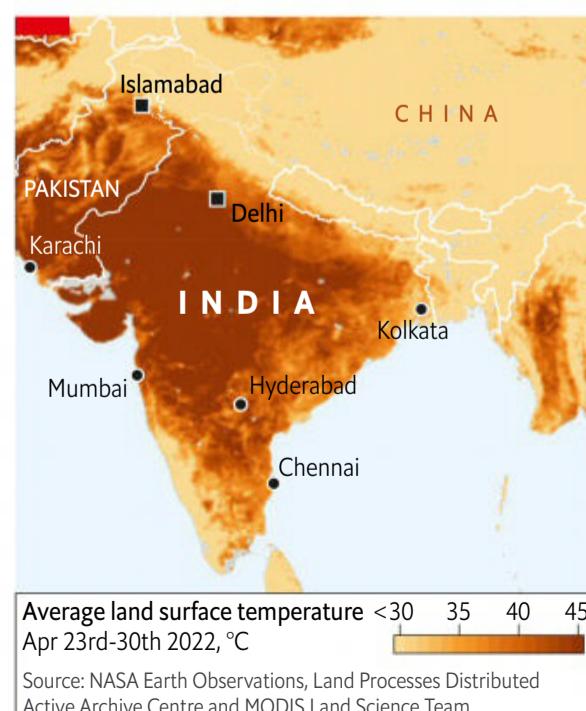
bling for fuel from Coal India, a state-owned company, and paying steep prices for coal at auctions.

One reason for the shortage is that coal is cumbersome to move around. Demand for train travel recovered quickly after covid measures eased in March, causing busy tracks. The government has cancelled hundreds of passenger trains over the coming weeks to make way for cargo ones.

But there is a deeper, more long-running reason: electricity producers have no incentive to keep large stocks of coal because they cannot be sure that they will be paid regularly. Billing and payment for electricity is patchy, leaving many distribution companies in the red and unable to pay the power plants, which in turn have a hard time paying the miners. "They have known for two months that coal stocks were declining, but instead of building them up then, we now have a bunch of broke entities scrambling to buy coal and electricity at a premium," says Karthik Ganesan of the Council on Energy, Environment and Water, a think-tank in Delhi.

In the short term, power plants and distributors have little choice but to muddle through. Longer-term, several fixes are possible. One is to ensure existing coal stocks are used by the most efficient plants, which are disadvantaged by long-standing distribution contracts that favour older, more fuel-hungry plants. Doing that could reduce coal consumption by around 6% a year, reckons Mr Ganesan, freeing up stocks for emergencies. And as the government continues to expand renewables the pressure should ease.

Another solution is to convince more users of electricity actually to pay for it. Farmers in many states are entitled to free power. Around 10% of households connected to the grid do not receive regular bills. Theft is rampant. A study in 2019 by PwC, an accountancy firm, estimated that distribution companies lose about a fifth



of their revenue to theft, meter-tampering and leaks from faulty power lines.

Fixing the dysfunctional electricity distribution system will become more urgent as India gets richer. Climate change will make extreme temperatures more common. More Indians will install air-conditioning: currently only one in ten households has it. The International Energy Agency, a forecaster, estimates that to meet electricity demand over the next 20 years, India will have to increase its installed capacity of 400 gigawatts more than three-fold, adding another 950GW, or roughly the size of the EU's power market. Muddling through will no longer be an option. ■

South Korean politics

Dangerous waters

SEOUL

The incoming president is already unpopular

FOR ONCE, the braised shark fin is not the most controversial thing about Yeong Bin Gwan. The grand banquet hall in Seoul, famed for the dubious delicacy, is where Yoon Suk-yeol, South Korea's incoming president, will have his inauguration on May 10th. The opposition Minjoo party complained that the event's 3.3bn-won (\$2.6m) budget makes it the most expensive inauguration ever. Mr Yoon's people explained that the venue adds only a meagre 500,000 won to the bill. Still, a Minjoo spokesman said it was tantamount to declaring South Korea a country where "the president comes first".

Petty point-scoring is not new to South Korean politics. High office attracts forensic scrutiny. It will soon become routine for Mr Yoon. Shark fin or not, he will have a lot on his plate after inauguration day. He must tackle many problems, including astronomical housing costs and the frustrations of young people who are well-educated but underemployed. Mr Yoon has also promised structural reforms in several areas, including welfare, corporate regulation and criminal justice. Even the executive branch is to be transformed: it will become an institution, his office has said, that "has autonomy, communicates and takes responsibility".

And that is just at home. Mr Yoon must also deal with a dangerous world. He hopes to draw closer to America, but also wants to avoid antagonising China, his country's largest trading partner. He has promised a harder line on North Korea, which has been increasingly bellicose in recent months, launching yet another missile on May 4th, just days before the inauguration. ►

Such Herculean ambitions would be challenging for the most experienced and popular of leaders. Mr Yoon is neither. In 2016 his role in the impeachment of Park Geun-hye, a disgraced former president, on corruption charges earned him a promotion to chief prosecutor under Moon Jae-in, her successor. In that job Mr Yoon zealously pursued figures in Mr Moon's government, bolstering his own anti-corruption credentials. But he entered politics only when he announced his candidacy for president in June last year.

Mr Yoon has promised a "fair adminis-

tration that does not allow privileges or foul play". The public is sceptical about this claim, given the various allegations that tainted him and his family during the unedifying campaign, not to mention those flung at his opponent. Despite his frequent claims to embody the will of the people, he won the election on March 9th with a margin of only 0.7%, the narrowest in the history of modern Korean democracy. He enters office with the highest disapproval rating of any new president.

As if his historic unpopularity and long to-do list did not pose enough of a chal-

lenge, Mr Yoon also faces a third impediment: his party does not have a majority in the National Assembly. Barring a mass defection, the Minjoo party, which holds 168 of 300 seats, will control the legislature at least until elections in 2024. It can block Mr Yoon's bills and try to force through its own. But the presidential veto is a trump card—the opposition lacks the numbers to overturn it. The most likely result will be paralysis. Mr Yoon has said he hopes his administration will be able to "overcome the division of ideologies". But he will be encircled by sharks. ■

Banyan Food fight

Unhelpful short-term fixes are not the answer to spiking food prices

M AHN TUN LYNN says he has thought of little but food since Myanmar's armed forces mounted their brutal coup in February last year. First, from Yangon, the commercial capital, he used his skills from years running an import-export business to get staples to the resistance groups springing up around the country. When, late last year, hunger began to gnaw even at him, he fled the country. He now shelters in Thailand, by the banks of a river that marks the two countries' border. Everyone in his makeshift camp knows how conflict disrupts the cycle of sowing seed and harvesting crops. When bullets fly, ricebowls grow emptier.

And now, says Mr Mahn Tun Lynn, another war, on the other side of the Eurasian land mass, has made things even worse. Since Vladimir Putin invaded Ukraine, the prices of food staples available to Burmese refugees have risen sharply. The World Food Programme and other charities that provide aid find their dollars do not go so far. And the refugees are among the lucky ones. Before the coup, some 1m Burmese were in need of humanitarian aid. Today, according to the UN, the number is over 14m, among them 5m children.

Even before Mr Putin's needless war supply-chain disruptions caused by the pandemic, along with climate-change-related vagaries in the weather, had forced many Asian and Pacific countries to think harder about food. Now the risk is that governments will respond in ways that will make supplies even scarcer and prices even higher in the long run.

The direct effects of the war are bad enough. Ukraine and Russia are both agricultural powerhouses. Before the war they generated 12% of the world's farm exports, measured by calories. That included nearly a third of all wheat ex-

ports and three-quarters of exports of sunflower oil. Fighting has kept many Ukrainian farmers from their fields. Combined with sanctions, it has disrupted trade flows, too. Both countries have restricted food exports to conserve stocks. Russia's fertiliser exports have been hit. All this adds up to a huge shock to global food markets.

Central Asians are feeling the pain. Russia's ban in March on exports of grain to fellow members of the Eurasian Economic Union, a club of some former Soviet states, has hit Kazakhstan hard. Though a big wheat producer itself, it normally imports Russian grain for domestic consumption while exporting its own (dearer) wheat to neighbours. The Russian ban led Kazakhstan's flour-millers to warn that, running out of supplies, they were going bust. Last month the government urged the millers to switch to domestic grain, banning most exports for three months.

Central Asian neighbours, which get 90% of their grain imports from Kazakhstan, are appalled. Uzbekistan, the region's most populous country, was plan-

ning to import 100,000 tonnes of Kazakhstani wheat between April and July. Turkmenistan has long suffered from chronic food shortages, which only last October Kazakhstan's president, Kassym-Zhomart Tokayev, promised to help end. Now he risks exacerbating them.

The war is pushing up the prices of all kinds of foodstuffs, not just grain. In Indonesia, households have been grumbling about the cost of cooking oil. Late last month the government suddenly halted exports of crude and refined palm oil, of which Indonesia is the world's biggest producer. The stuff is used not just for frying but also in cakes, cosmetics and much more (see Business section). India, the world's biggest importer, is scrambling to find replacements.

In Sri Lanka, food inflation—and staples such as lentils disappearing from shop shelves—are a major factor in popular calls for the president, Gotabaya Rajapaksa, to go. As for nearby Bangladesh, with a population of 164m, its food-security predicament is among the most severe, says the Washington-based International Food Policy Research Institute (IFPRI): paying more for food and fertiliser imports will deplete foreign-currency reserves, while leaving less room for social-safety-net support.

Both Kazakhstan and Indonesia claim their moves are temporary. But as IFPRI argues, even short-term measures can be contagious, generating higher prices and further volatility. Hoarding and panic-buying are similarly counterproductive. And seeking food self-sufficiency, which some Asian governments are promoting, is a costly fool's errand for most food-importing countries. Open markets, and help for the neediest: these are the best ways to tackle the hunger that Mr Putin is inflicting on the world.



**Foreign policy**

Base instincts

China wants to increase its military presence abroad. How concerned should America and its allies be?

IN AUGUST 1942 an American-led task force landed on Guadalcanal, the largest of the Solomon Islands, for an offensive that would turn the tide in the Pacific war. The campaign dislodged Japanese troops, thwarted their plans to sever American supply lines to Australia and New Zealand, and gave the Allies a vital platform for later battles that helped vanquish Japan.

Small wonder, then, that American and allied nerves were rattled when it emerged in late March that China, their new Pacific rival, was signing a security deal with the Solomons that could give it a military foothold there. Over the past month, hurried visits from American and Australian officials prompted denials from China and the Solomons that a Chinese base was in the offing. Still, on April 27th an Australian minister predicted that China was “very likely” to send troops to the Solomons.

The exact contents of the deal have yet to be made public. America and its regional allies have promised fresh diplomatic engagement and threatened unspecified consequences if the agreement leads to any substantial Chinese military presence. So

far, though, the saga represents a win for China—with important qualifications.

China still has just one military base abroad, a naval facility opened in 2017 in Djibouti. But it is accelerating and broadening its quest for more. American and allied officials believe it has approached at least five countries since 2018 and considered a dozen others as potential hosts (see map on next page). Whether the Solomons deal translates into a Chinese base remains unclear. And if it does, the strategic value of such an isolated outpost is debatable.

Nonetheless, some who track China’s efforts predict more such deals in the coming years and say that America and its allies should focus on limiting their utility rather than trying to outbid China on each. The alternative is “a game of global whack-

a-mole”, says Isaac Kardon of the US Naval War College. “I think part of it is just adjusting to the reality that the PLA (People’s Liberation Army) is going to be more global, and thinking about ways to make their assets vulnerable.”

The skirmishing over the Solomons began in March when a draft of the deal was leaked online. It said the Solomons could ask China to send police and soldiers to help maintain social order, provide humanitarian relief and conduct “other tasks” agreed on by the two sides. China could, “according to its own needs” and with local approval, send its ships to stop over, according to the draft. It also said that neither side could make the contents public without the other agreeing.

Soon after the leak, Australia, which has a similar, though transparent, agreement with the Solomons, rushed two intelligence chiefs to the country and made a public appeal for the government there not to sign the Chinese deal. Manasseh Sogavare, the prime minister of the Solomons, signed it anyway, saying he needed to diversify his country’s security partnerships.

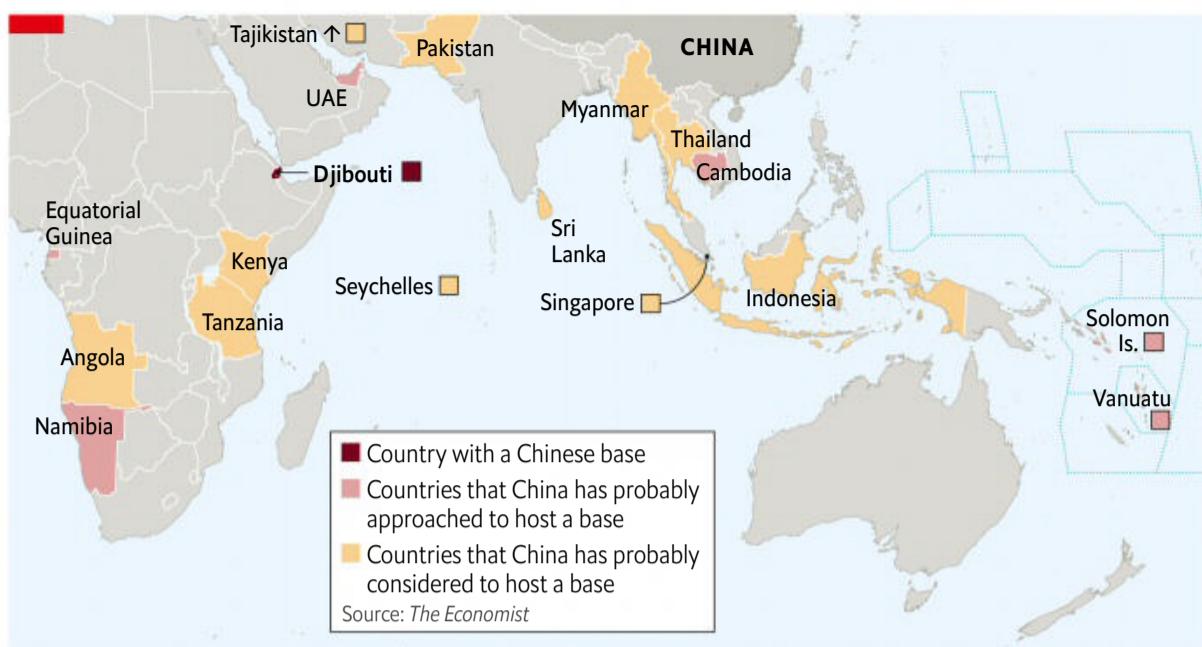
America then dispatched Kurt Campbell, who oversees Indo-Pacific affairs in the White House, and other senior officials on an island-hopping tour of the region culminating in the Solomons. Mr Campbell made several commitments, including a promise to expedite the reopening of the American embassy in the Solomons, which closed in 1993, and to start a strategic dialogue with the government there. ➤

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► Mr Campbell issued a warning, too. If any steps were made to establish a Chinese military installation or permanent presence in the Solomons, America would "respond accordingly", the White House said after his meetings, without explaining what that might entail. Scott Morrison, Australia's prime minister, added a similarly vague threat, saying a Chinese base in the Solomons would cross "a red line".

Ports in a storm

As China seeks to protect its worldwide interests and challenge American military dominance in Asia, it can already rely to some extent on a global network of over 90 ports that are partly or wholly owned or operated by Chinese firms. Those are fine for refuelling, replenishing supplies and repairing ships in peacetime. But it also needs facilities in which to station uniformed personnel and store weapons and equipment. In the past three years alone, it has signed a secret deal to use a Cambodian navy base, tried to negotiate its own naval outpost in Equatorial Guinea and secretly begun building a military facility inside a Chinese-run port in the United Arab Emirates (UAE), say American officials.

China also appears to have adjusted its tactics, abandoning attempts to convince America and its allies that such deals don't threaten their interests, and targeting countries of more strategic importance to America. Before opening its base in Djibouti, China insisted that it would only be a "logistics hub" to support Chinese forces involved in UN peacekeeping, anti-piracy and humanitarian operations. It made no such effort to sell the Solomons deal.

One likely explanation is Chinese pique at the recently unveiled AUKUS pact, under which America and Britain will help Australia to acquire nuclear submarines. It is part of a broader joint effort to counter China's military ambitions. In April one of China's deputy foreign ministers, Xie Feng, contrasted the Solomons agreement with the "covert operations of certain countries,

which have put together military blocs, stimulated an arms race and exacerbated the risk of nuclear proliferation".

Another difference about the Solomons deal is the reference to Chinese forces quelling local unrest. Chinese proponents of overseas bases often argue that they are needed to help protect Chinese citizens abroad, citing evacuations from Libya in 2011 and Yemen in 2015. Still, they rarely, if ever, suggest intervening in the host's domestic affairs, which would violate what China says is a pillar of its foreign policy.

That change no doubt reflects Chinese authorities' concern about the roughly 3,000 Chinese citizens in the Solomons, who were targeted in rioting in November. But it also paves the way for Chinese security forces—which have already trained local police in the Solomons—to intervene in support of Mr Sogavare if violence erupts again after an election due next year. Such a direct Chinese intervention in a democracy would be unprecedented and deeply troubling. The world has plenty of unpopular leaders who would welcome Chinese help to stay in power.

For all China's efforts to expand abroad, the results so far have been mixed. That is partly the result of history. America, Britain and a handful of other military powers have a global network of bases that have existed for decades and are mostly legacies of empire, the second world war and the cold war. China has started from scratch, and establishing even a small new base abroad is costly and time-consuming.

China's challenge in some ways resembles that of the Soviet Union, which from the mid-1960s began a push to find overseas bases to give its navy global reach. Over the next couple of decades it negotiated access to facilities in some 15 countries, including Mauritius, Syria and Vietnam. But those agreements took many forms, with some allowing full-blown bases and others only ship repairs. Some fell through.

As with the Soviets, China's progress is largely dependent on local strongmen and

vulnerable to sudden shifts in the political landscape. The Solomons deal was driven by Mr Sogavare's concerns about his own political future—and by his antipathy towards Australia. Any Chinese military presence would be fiercely opposed by many islanders. In a poll last year 91% said they would prefer their country to be diplomatically aligned more with liberal democracies than with China.

Further constraining China is a recent push by America and its allies to draw more public attention to Chinese base-hunting and to co-ordinate their diplomatic responses. Although unlikely to reverse any agreements, those efforts may have slowed China down by forcing local leaders to deny plans for a Chinese base, and by mobilising domestic or regional opposition. Observers say Chinese forces have not yet been spotted using the Cambodian naval base and that the UAE has halted construction of the alleged Chinese military facility in its port.

China's deal with the Solomons marks a step towards extending its global military presence. For the moment, though, a second overseas base of its own remains elusive, let alone a global network. ■

Emigration

Ready to run

China's young elite are considering moving abroad

LATE LAST month China's central propaganda department announced a new campaign: "The Strong Nation's Rejuvenation Has Me". The goal of this odd-sounding effort is to rally red spirit before the Communist Party's 20th congress later this year, when Xi Jinping hopes to secure a third term as party chief. But a different kind of rejuvenation is trending online, that of "run philosophy", a coded way of talking about emigration. Instead of using a character that suggests running away from China, which would antagonise state censors, netizens have been using one that sounds like the English word "run", but means something different: *run* (moist).

Most of Shanghai's 25m residents have been locked in their homes for more than a month in order to stem an outbreak of covid-19 in the city. Case numbers are dropping there, but rising in Beijing, the capital, which is doing mass testing and imposing targeted lockdowns. Business leaders worry about the economic impact of China's covid controls. Many foreigners are leaving—and, according to online search trends, China's young and educated

► elite are thinking about doing the same.

On WeChat, a popular messaging app, searches for “immigration” increased more than fourfold between early and mid-April. Users of Weibo, China’s version of Twitter, published more than 78,000 posts with the *run* character in March and April (see chart). Spikes in their frequency coincided with traumatic events in Shanghai, such as when an asthma patient was refused medical treatment and died, or when videos of infected children separated from their parents spread online.

“It’s like an alarm bell has gone off,” says Miranda Wang, a young Chinese video-producer who moved to Shanghai after studying in Britain. The Chinese metropolis used to feel like a global city, similar to London, she says. But after more than 50 days of lockdown, Ms Wang has begun researching ways to leave. “Now we realise, Shanghai is still China’s Shanghai,” she says. “No matter how much money, education or international access you have, you cannot escape the authorities.”

Chinese internet users have crowdsourced a repository of *run*-philosophy readings on GitHub, a platform for open-source coding and rare refuge from censorship in China. There they discuss why to run, where to run and how to run, archiving stories of successful emigration to various countries. To run is not to seek pleasure or profit, one essay states, but to escape a country that is speeding in the wrong direction. “Surely a sheep that has been hurt by beating can try to flee?” it asks. “Therein lies the truth of run.”

But to run is easier said than done. Flights out of China are few and expensive. America has tightened visa restrictions on Chinese students over exaggerated fears of spying. In the name of pandemic prevention, China is also making it harder for citizens to move around. Since 2020 the National Immigration Administration has stopped issuing travel documents for “non-essential reasons”. The agency handed out 335,000 passports in the first half of 2021, only 2% of the number issued over

the same period in 2019. The authorities in one city, Leiyang, have been confiscating citizens’ passports to prevent travel. “We’ll return them after the pandemic is over,” says a public-security official.

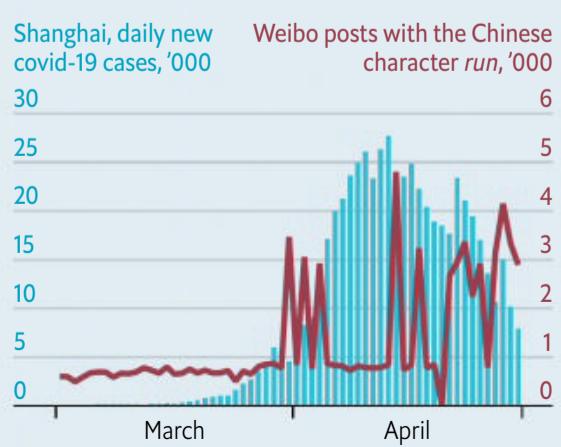
Would-be emigrants know that they are in the minority. A young finance worker in Beijing says her peers “see no future” in China. But most Chinese, especially older generations, are “numb”, she says. Ms Wang fears that leaving would mean losing touch with her parents. “Calm your heart,” her mother scolds her on WeChat. “Fill it

with home, parents and motherland, find a steady job and you’ll be fine.”

A white-collar worker in Shanghai used to take his freedom for granted. It was “something to chat about over a pint”, he says. Now, stuck at home and lacking food, he fears being taken to an isolation centre if he tests positive for covid. Yet in China, he laments, memories are short. People will forget about the chaos in Shanghai; the government will maintain its strict covid controls. Such despair is why some Chinese are looking to run. ■

Searching for a way out

China, 2022



Morality courts Name and shame

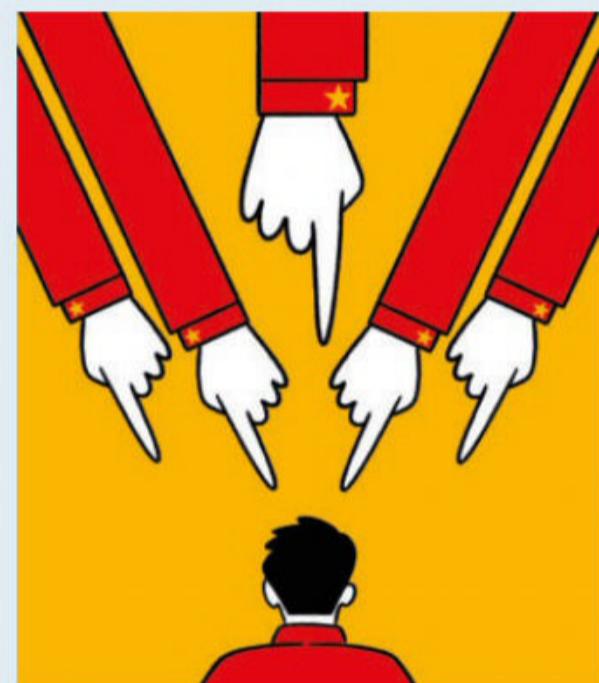
To keep villagers in line, officials are turning to informal tribunals

IN THE VILLAGE of Anbang in Yunnan, a south-western province, people of social stature are heaving a sigh of relief. In the past, what a delicate matter it was to point out bad behaviour among residents. There was etiquette to consider, and the risk of causing offence. Recently, however, Anbang has set up a “moral review council” to praise the worthy and criticise the errant. The local government says the mood has changed. Now the village elite can use these meetings to exercise their “right to speak”.

In some parts of China, such councils have been a feature of rural life since the 1980s. Their members—mainly drawn from the ranks of village powerholders—have met regularly to praise those who are well-behaved and denounce others’ misdeeds, face to face. By 2018 more than half of China’s provinces had them, according to Shaoying Zhang of Shanghai University of Political Science and Law. In a paper last July, he said the councillors were “like the village priest or the Protestant pastor in rural European contexts centuries ago”.

In the past couple of years, the central government (ever keen to tighten social controls) has been stressing their importance. Like other places, Anbang has been using its council to enforce covid controls—summoning selected villagers to point out their failings, such as resisting vaccination. The humiliation does not stop in the meeting room. Offenders may be subjected to public shaming by having their names displayed on a morality notice board for all to see.

As Mr Zhang points out, councillors are usually male. Their values reflect patriarchal traditions. Those chosen for praise are often women deemed to have shown exemplary behaviour in their roles as mothers-in-law or daughters-in-law (a relationship that is often tense in



Chinese villages, where married women usually live with their husband’s family). Respect for the elderly is also prized. Bad behaviour can cover a wide range of sins: littering, gambling, urinating in public or “superstition”, such as burning paper money for the dead.

It can also include behaviour that the Communist Party regards as threatening to stability. Officials in the countryside are hypervigilant about people who travel to cities to complain to governments there about injustices they have suffered in their villages. Such petitioning is legal as long as the person involved does not bypass their nearest city authority. But, to protect their own backs, village officials are quick to dismiss any petitioning as “unreasonable”, and thus a matter for the morality police.

Baoshan, the municipality to which Anbang belongs, claims the councils are a success. By the end of last year it had 128 of them. “The seeds of morality and civilisation have spread to everyone’s hearts,” the city’s government boasts.

Chaguan | China's vision for global security

Xi Jinping lays out a worldview with Chinese-Russian roots



WITH EACH day that fresh blood is shed in Ukraine, it becomes more painfully clear that China and the West have clashing notions of how to preserve world peace. Since President Vladimir Putin first invaded his neighbour, hopeful voices in some Western capitals have called China an ideal mediator between Russia and Ukraine. Such optimists cite the supposed pragmatism of the modern Chinese Communist Party. They note the ties of trade and investment that bind the Chinese economy to Russia, Ukraine and wider Europe, and conclude that brokering peace is in China's self-interest. Alas, their elegant arguments cannot overcome a stark and ugly point of difference. Most Western governments and citizens want Mr Putin to lose in Ukraine, and to pay an instructively high price for his aggression. China's rulers want the opposite.

In part, Chinese sympathy for Russia—ill concealed behind protestations of neutrality—is explained by domestic politics. In February President Xi Jinping and Mr Putin declared a partnership with “no limits” between their countries. Mr Xi calls Russia’s boss his closest friend, seeing a kindred spirit in a fellow autocrat obsessed with traditional values and national revival. This is a sensitive year, during which Mr Xi is expected to secure a third term as party chief: an awkward time for him to be linked to a loser.

Nor does it suit China’s ruling party to concede that Russia is committing war crimes. Chinese officials insist that America caused Ukraine’s invasion by enlarging NATO up to Russia’s borders. The Chinese public is assured that the West is now prolonging the conflict to enrich American arms dealers, while Russian troops are praised for their restraint. Despite these efforts to turn reality on its head, the Chinese foreign-policy establishment does not deeply respect Russia, a country seen as admirably tough but in sad decline. As Chinese scholars tell it, America and the West may be trying to contain Russia now, but their main target is surely China, a far more important country. As a result, China has selfish reasons to root for Mr Putin to avoid paying a high price for aggression. Such an outcome may be the result of a Ukrainian surrender, the crumbling of Western unity or the flopping of international sanctions. China is strikingly indifferent to Ukraine’s suffering, but really wants to see the containment of Russia fail.

More disruptively for the world at large, China is growing more

willing to adopt Russian arguments about how to organise a global security order. On April 21st Mr Xi presented a new “Global Security Initiative” to the Boao Forum for Asia, a Chinese gathering of bigwigs. Mr Xi’s initiative is dense, brow-furrowing stuff. He calls for a security order that is “common, comprehensive, co-operative and sustainable” and declares humanity “an indivisible security community”. This slab of party-speak is sprinkled with bromides about respecting sovereignty and territorial integrity that sound rich coming from a friend of Mr Putin’s.

Mr Xi’s speech is a code. Governments from Europe to Japan and Australia should take it seriously, for it is China’s latest bid to delegitimise the American-led defence alliances and treaties that have guaranteed their security for decades. Much of Mr Xi’s new initiative builds on “Asia for the Asians” arguments that China has promoted in its home region for years. In a commentary on his boss’s Global Security Initiative, China’s foreign minister, Wang Yi, traced the lineage of common, comprehensive, co-operative and sustainable security back to a “New Asian Security Concept” offered by Mr Xi in 2014 to the Conference on Interaction and Confidence-Building Measures in Asia (CICA), a multinational forum.

Eight years ago Mr Xi called for Asian countries to shun defence alliances that include some countries but exclude others (the meaning of calls for common and co-operative security) and to handle disputes by dialogue (ie, prodding them to bargain one-on-one with China, their giant neighbour). Mr Xi’s CICA speech included the declaration: “It is for the people of Asia to run the affairs of Asia, solve the problems of Asia and uphold the security of Asia”—an unusually bald hint for America to leave the region.

In contrast, Mr Xi’s talk of indivisible security is a more recent addition to China’s lexicon, and echoes Russian talking points about Europe. Europeans have debated indivisible security, the idea that countries should not ignore other nations’ legitimate security interests, ever since cold-war efforts to set ground rules for Soviet co-existence with the West. Russia’s definition of indivisible security is self-serving: a demand for a say over any European defence arrangements that offset Russia’s offensive capabilities. A Western diplomat summarises the argument as: “You can never be secure, as long as we do not feel secure.”

Building a world with impunity for great powers

Since the Ukraine crisis began Chinese diplomats have called for a “balanced, effective and sustainable European security architecture”. The same phrase then turned up in Mr Xi’s Global Security Initiative, shorn of European references. China has been studying Europe, says Wang Yilai of Renmin University, and thinks that security deals there must involve Russia, as one of five permanent members of the UN Security Council, or the UN will lose its meaning. Indeed, for global agreements outside Europe to endure, China thinks that all five of those powers should be consulted, alongside such bodies as the African Union, Professor Wang suggests.

There is an obvious objection to a world order that grants veto rights to America, Britain, China, France and Russia, the five permanent Security Council members. Because the five agree about little, an international community that needs UN permission to act will often struggle to intervene. That would not break China’s heart, or Russia’s: both loathe Western powers acting as global policemen. China suspects that many developing countries agree, and will applaud its Global Security Initiative. America and its allies call their united actions over Ukraine proof that the West is not finished just yet. China sees a chance to prove them wrong. ■

**Education**

Boy trouble

Why lads in Arab countries do worse in school than girls

MUHAMMAD ADMITS he was not an eager student. The young Emirati says he slept through school, if he turned up at all. When he was 17, desperate teachers arranged for him to spend one day a week in classes put on just for disaffected males. These aimed to raise ambition and to grab him with more practical kinds of school-work. Now 20 and completing military service, Muhammad says this last-ditch intervention saved him from flunking. A career as an army officer looks possible. Even training to be a doctor. Perhaps.

Muhammad is a graduate of Hands-on-Learning, a modest project aiming to drive down drop-out rates in Ras al Khaimah, one of the scruffier of the seven statelets that make up the United Arab Emirates (UAE). It is but one local effort to solve a sweeping regional problem. Across the Arab world, girls are less likely than boys to be at school. But in the classroom girls vastly outperform their male peers—to a

degree unmatched anywhere else in the world. Boys' shockingly bad school marks are a big drag on Arab economies, as is the continuing oppression of females. Shoddy boys' schools are turning out insecure young men who are more likely to feel that their livelihoods depend on keeping better-educated women out of work.

The region's boys and girls both perform badly in international tests. This makes Arab boys' failings all the starker. The World Bank says two-thirds of ten-year-old boys in the Middle East and north Africa cannot read a simple story, compared with more than half of girls (see

chart on next page). Eight Arab school systems have the world's widest gender gaps in science, according to international tests of 12-year-olds in 40-odd countries in 2019: in all of them boys score worse. Arab girls almost always outperform boys in high-profile tests of 15-year-olds carried out every three years by the OECD, a club mostly of rich countries. In Jordan, Qatar and the UAE the gap in 2015 was equivalent to girls having had an extra year of schooling in science and two extra years in reading.

Segregated schooling is part of the problem. Single-sex schools are common in Arab countries, especially in the Gulf, where boys' failures relative to girls' are worst. Boys' schools tend to be crummier than girls', in part because hiring male teachers is difficult. Whereas a job in girls' schools can easily attract ten applicants, an opening in a boys' school might get three or four, says an official in Saudi Arabia. An academic study of six men who were training to be teachers in the UAE found that four did not particularly want a job in a school and only three liked working with children. Men in Gulf countries can generally earn more money and status working in the army or the police. Thus many schools rely on immigrant teachers from poorer Arab neighbours, who struggle to win local pupils' respect.

Bullying also drags down school marks ►

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40 Rewriting Egypt's history

41 Fuel shortages in Africa

42 Africa's many market failures

► and increases drop-out rates. Polling analysis by UNESCO found that more than 40% of the teenagers in the Middle East and north Africa are bullied at least once a month, compared with 32% in North America and 25% in Europe. The region's boys were more likely to be bullied than girls, whereas globally boys and girls are bullied at about the same rate. Moreover, the bullying was much more likely to involve violence. Around 60% of boys also report getting into fights at school.

Many boys see little point in working hard, says Natasha Ridge of the Al Qasimi Foundation, an Emirati think-tank. Hide-bound economies do not reward strivers. In the richest countries young men can expect a share of oil money, however badly they flunk. In other places, boys with poor scores can still hope for jobs in bloated civil services: a quarter of jobs in Egypt are in the public sector; in Saudi Arabia in 2014 the share was over twice as high. For girls the benefits of swotting are much clearer. Education is one of the few ways to gain independence from husbands and fathers.

Parents contribute to this disparity, too. Muhammad in Ras al Khaimah says he often stayed out gallivanting with friends on school nights, while his sisters, kept indoors by their parents, spent more time studying. Arab parents are less likely than those elsewhere to say they "often" read to their children, and less likely to read with sons than with daughters—even though research suggests that boys' literacy tends to suffer more than girls' when parents don't nudge them towards books.

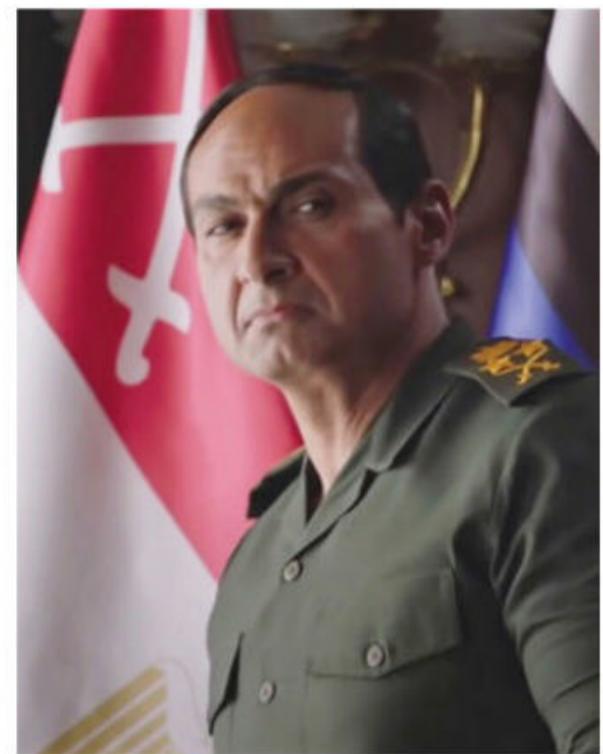
In theory preschools can help iron out these differences. But less than a third of children in the Middle East and north Africa go to one, which is about half the global rate. Prejudice complicates matters. "Boys are smarter than girls, but they can't settle down," says Andjy, an Egyptian teacher and mother in Alexandria.

Women are still largely locked out of workforces, despite having better school grades. Across the Middle East and north Africa only around a fifth of women have jobs. Poorly educated men are in no hurry to change that. Research outside the region

confirms that less-educated males are more likely to hold sexist views, and that men who do not complete a secondary education are more likely than others to abuse a wife or partner.

Reforms under way in some countries could drive up standards and benefit left-behind boys. More Arab countries are choosing to take part in the big international tests that have helped make the region's woeful schooling so plain. In 2019 Saudi Arabia's government let women teach boys in the first three grades of state primary schools, though in single-sex classes. Today 45% of those boys have female teachers. In 2018 the UAE began creating mixed-sex classes in state primary schools. It is also well on its way to making pre-primary education universal.

Yet very few countries have conjured up policies or projects, such as Hands-on-Learning, that expressly aim to help boys close the gap. More must be done for girls, too, to ensure that they go to school: since 2012 progress towards equal enrolment has stalled. But tackling the boy problem is unfashionable, says Ms Ridge. Reform-minded leaders in the Arab world prefer to talk up their efforts, however meagre, to improve the lot of women. They fear that spending more on lads will make governments look like dinosaurs—even when the data show that boys are in sore need. ■



More telegenic than the president

protests and subsequent coup in the summer of 2013 that overthrew Muhammad Morsi, the Muslim Brotherhood apparatuschik who had become the first and only man to win a fair election in Egypt.

Mr Galal (pictured) plays his role with uncanny precision, capturing the general's penchant for half-smiles and clasped hands. Close your eyes and his whispery, singsong voice is almost indistinguishable from the real Mr Sisi, who has been president since 2014. There is never a doubt about whom viewers should root for. Mr Sisi is portrayed as humble and pious; en route to announcing a coup, he stops for a heartfelt chat with his mother. Mr Morsi and his henchmen come off as shifty sorts, their appearances set to ominous music.

The producers describe the show grandiosely, not just as entertainment but as a "history book" for future generations. This would be laudable—if they were serious about it. Even for those who lived through them, that summer's events were a blur. What seemed as if it could be a one-day protest against Mr Morsi, a chance for the opposition to blow off steam, progressed with bewildering speed to a bloody coup.

The show purports to take viewers inside the inner sanctum of Egypt's security state. The credits thank the army and the interior ministry before the crew. It incorporates real-life recordings of Brotherhood officials that must have been taken in secret and had never been aired before.

The clips paint the Brotherhood as obstinate and inept, a truth many of Mr Morsi's one-time supporters concede. But the show sheds little new light on how the deep state conspired to junk democracy. This is history written by the victors.

Gamal Abdel Nasser and Anwar Sadat, the second and third post-revolution presidents, both had their careers immortalised in film. But their appearances came ►

Egyptian television

Victors' version

DUBAI

A lavish drama tries to rally Egyptians with memories of a dark moment

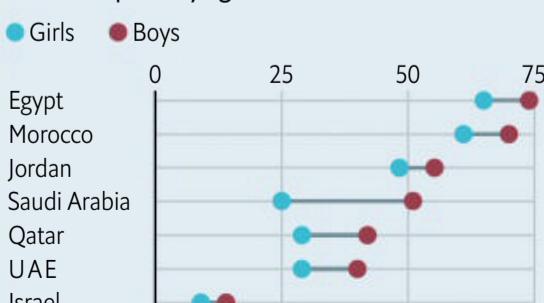
WHEN TELEVISION viewers tuned in last month to "Al-Ikhtiyar" ("The Choice"), they knew exactly how it would end. In the penultimate episode Yasser Galal, who plays Abdel-Fattah al-Sisi, then the defence minister, enters a room full of religious and political leaders. "We must make a fateful decision," he says. "The country needs one." The date was July 3rd, 2013. Within hours the assembled grandes would appear on television alongside Mr Sisi, as he declared Egypt's brief experiment with democracy to be over.

Television viewers in the Arab world are spoilt for choice during the month of Ramadan, which ended on May 1st. Studios roll out dozens of big-budget serials, with a new episode each night. "Al-Ikhtiyar", now in its third season, was one of this year's most heavily promoted shows.

The latest one dramatises what the producers call "the most dangerous 96 hours in modern Egyptian history": the mass

Unlettered

Share of children below basic reading proficiency* at end-of-primary age, 2016 or latest available, %



▶ long after their deaths. (Their successor, Hosni Mubarak, a man perhaps best remembered for being overthrown, may not merit a biopic.) Mr Sisi's turn on the small screen comes at the height of his powers: he forced through constitutional amendments in 2019 that all but guarantee he will rule until 2030. This was a lavish propaganda effort, meant to rally Egyptians just when many have grown disenchanted.

Six years after it struck a \$12bn deal with the IMF, Egypt has gone back for another loan, worried about how soaring food and energy prices will hurt its budget. Poverty has risen since Mr Sisi took office. Endemic problems—shoddy education and health care, urban chaos, rampant inequality and corruption—are unfixed. The president's boosters say he saved Egypt from a "dark tunnel" of Islamist rule. But the country has not quite emerged into sunlit uplands.

ON, the network that aired the series, has not released viewing figures. Egyptians of various political hues seem to have started watching the show in large numbers, out of patriotic fervour or a desire to chuckle at propaganda, but few appear to have watched more than a couple of episodes. Journalists were urged to write puffy articles to big up the ratings. Perhaps some Egyptians wanted to relive the events of that summer. Nine years later, most have more pressing concerns. ■

Africa's fuel market

Pumped dry

PARIS

Why fuel shortages are spreading across Africa

IN BURUNDI, DRIVERS are so desperate for fuel that they sleep on forecourts of petrol stations. Senegal has so little jet fuel that Air France's flight from the capital, Dakar, to Paris has been stopping in the Canary Islands to fill up. Johannesburg has the same problem, which has caused United Airlines to cancel some flights from New York. From Kenya, which recently suffered its worst petrol shortage in a decade, to Lagos, where queues outside petrol stations backed onto motorways, and Cameroon, where thousands of lorries have been stranded without diesel, Africa has been short of the lifeblood of modern economies. "Everywhere, everyone is scrambling for diesel," laments Anibor Kragha of the African Refiners and Distributors Association, an industry group.

The economic costs of shortages are huge. They bring commerce to a grinding halt, shut the millions of businesses that have to generate their own electricity and

force holidaymakers to cancel trips for lack of flights. This is a blow to tourism, a large contributor to GDP in many African countries. The social impact is large, too. Hospitals cannot get drugs and ambulances are immobilised. All this makes politicians jumpy. Anger at shortages can quickly erupt in the streets.

Demand for fuel surged across the world last year as economies recovered from covid-19. Yet for the first time in 30 years global refining capacity fell, causing fuel prices to rise. Russia's invasion of Ukraine pushed them higher still. In most places fuel has remained available, if expensive. But not in Africa, which is going through its worst supply crisis in 40 years, according to Pierre Barbe, who runs the Africa business at Vitol, the world's biggest independent oil trader.

The shortages are not simply the result of higher prices that have made fuel unaffordable to poorer buyers in many parts of Africa. They have also been caused by several other market changes that particularly affect the continent, says Kristine Petrosyan of the International Energy Agency (IEA), an intergovernmental think-tank.

Fuel traders generally use financial markets to lessen the risk of price fluctuations. But they have to spend much more (and tie up more working capital) hedging when prices are high and volatile. Importers to Africa are often smaller than those in richer regions, and have tighter balance sheets. To conserve capital many simply import less fuel.

The problem is being aggravated by a turn in the futures market: the price for deliveries of oil at a future date has fallen far below that for immediate delivery. In more usual times traders would park dozens of full oil tankers (known as "floaters") off the west African coast, where they would wait for higher prices. Now traders want to unload them as quickly as possible and send them to Asia through the Suez canal, avoiding Africa altogether.

Many sub-Saharan countries are particularly vulnerable because they generally buy in small amounts from floaters or tankers sailing by. Whereas many rich countries hold a 90-day supply in reserve, few sub-Saharan countries have any such backup. It is clear that there is little storage capacity in the region, although data on this are scant.

A second vulnerability is that sub-Saharan countries refine little oil domestically. Many of their refineries are badly run and operate far below capacity or are too small to compete. Refinery output in sub-Saharan Africa has fallen by half over the past decade, even as oil demand in the region has risen by 19%, according to the IEA. Sub-Saharan Africa now imports about three-quarters of its refined products on average, a greater share than any other region. That

leaves it deeply exposed to external shocks. West Africa is especially vulnerable. Senegal, for example, is short on fuel in part because the country's sole refinery has been shut for maintenance.

Having little refining capacity and barely anything in reserve is risky at the best of times. In many African countries poor logistics, bad management and distorting subsidies regularly cause supply shocks. Many African ports can only receive ships with a shallow draft, forcing big tankers to offload into little ones. They are also heavily congested, exacerbating delays. Nigeria's recent shortages emerged after the authorities blocked the sale of 350,000 tonnes of petrol: it contained too much methanol. Exactly who messed up is hotly contested but, with tiny reserves, motorists were soon running dry. In Kenya the government subsidises petrol but does so clumsily, worsening fuel shortages. It was recently late paying the equivalent of \$112m in subsidies to retailers who were already struggling with a shortage of working capital because of high prices.

Things may soon get even worse. Big oil traders are reducing purchases of Russian oil to comply with European sanctions that take effect on May 15th. This will further cut the flow to Africa of fuel refined in Europe from Russian oil.

In the long run much hope—and cash—is invested in a big refinery being built in Nigeria by the Dangote Group. Though the project is years behind schedule, it is expected to be completed later this year. Yet the project is an exception to the trend of declining capacity. Africa also needs deeper strategic reserves of fuel to weather both global shocks and local troubles. "Maybe this will be a wake-up call, the way the 1970s were to Europe," says the IEA's Ms Petrosyan, "because it is clear that this situation can repeat in the future." ■



Dual fuel

African economics

The paradox of untapped riches

KAMPALA

Why resources sometimes go unused, even where they are badly needed

GHANA HAS a curious problem: it produces too much electricity. Under the terms of opaque contracts with generating companies, the government has been paying over \$500m a year for power that is never used. That is odd, because the country is hardly awash with energy. The average Ghanaian uses as much electricity in a year as an American does in a fortnight. Although access has expanded rapidly, more than a quarter of rural households are not connected to the grid.

The biggest obstacle to economic development is often inadequate resources. But not always. In Ghana, generating power has proved much easier than distributing it. So, too, in several east African countries, including Uganda, where installed capacity is nearly double peak demand—and your correspondent sits writing this in a blackout. Electricity is not the only industry where resources are sometimes plentiful, and needs are obvious, but demand does not join up with supply. Call it the paradox of untapped riches: surplus and shortage, existing side by side.

Seeking hide

This riddle is most apparent in parts of the economy where the market ought to link up supply and demand. Yet in many cases lorries sit idle on roadsides, even as traders cannot find vehicles to carry their goods. Or factories run short of supplies even though the resources they need seem plentiful. Ethiopia has more livestock than anywhere else in Africa and the tanneries to turn hides into leather. Yet some of its shoe and glove makers import leather from as far afield as China. “Most of the raw hides and skins are supplied from household backyard slaughter,” explains Tesfaye Birhanu of the Leather Industry Development Institute in Addis Ababa, the capital. These can be ruined by bacteria within six hours of slaughter if not treated properly.

Even Aliko Dangote, Africa’s richest man, cannot escape the paradox. In 2016 his conglomerate opened a tomato-processing plant in northern Nigeria to turn the country’s vast crop of fresh fruit—half of which rots each year because of poor handling and storage—into the tinned paste that is currently imported. But a shortage of tomatoes forced the factory to shut down within months because of a crop failure caused by a voracious moth. Several years later the factory was still op-

erating at a fraction of its capacity because of problems in getting enough tomatoes of the right quality.

A different variation of this paradox also arises in state-managed markets, like electricity, where governments have struggled to forecast supply and demand, and to build the infrastructure linking the two. It also appears within government institutions themselves. Because of poor management, health ministries in Africa fail to use about a fifth of the budget they are allocated, despite hospitals running short of medicines. The underspend is similar in agriculture ministries, sometimes for the simple reason that money for farm inputs such as subsidised fertiliser is released after crops have been planted.

Another mismatch is in infrastructure. Governments and investors often have money to spend. And demand for roads, ports and the like continues to grow. But bankable projects—the link between the two—are in short supply. “There is funding, a large pipeline, and a need for spending, but not enough money is being spent,” argue analysts at McKinsey, a consultancy. They reckon 80% of African infrastructure projects fail at the feasibility and business-plan stage; fewer than 10% reach the point of funding. Even high-profile schemes can stutter. By 2020, at the end of the first eight-year phase of the Programme for Infrastructure Development in Africa, an initiative led by the African Development

Bank, construction had started on fewer than half the planned projects.

In a survey by the European Investment Bank, more than 60% of African banks say that a lack of “bankable” projects significantly constrains their lending to small businesses; a similar proportion of entrepreneurs tell World Bank researchers that they cannot get a loan when they need one.

What do these diverse examples have in common? One obvious theme is broken connections—quite literally, in the case of power grids. A quarter of the electricity that is sold in Ghana is lost due to derelict distribution infrastructure and theft, estimates Theo Acheampong, an energy economist at Aberdeen University. Bad roads and grasping middlemen stand between farmers and buyers.

Sometimes the missing link is information, such as the credit histories that would help banks assess the riskiness of would-be borrowers. A second lesson is that quality trumps quantity. Yes, Ethiopia has a lot of cows, but they need to be kept healthy and slaughtered skilfully if their hides are to be turned into brogues.

A few rotten tomatoes

None of these obstacles is insurmountable. Farmerline, a Ghanaian firm, uses technology to connect farmers, their suppliers, lorry drivers, warehouses and buyers. “We know how much food people are growing ahead of time, we know the location,” says Alloysius Attah, its co-founder. “It gives us an edge on how we plan our supply chain.” Tomato Jos, a startup in central Nigeria, is trying to crack the tomato-paste conundrum. It spent years talking to and then training farmers before its first tin rolled off the production line. “It’s not as simple as just setting up a factory and mopping up supply,” says Mira Mehta, its American founder. “Roads are horrible, market information is bad, tomatoes are perishable. You have to actually control your supply chain.”

Unclogging bottlenecks is often unglamorous, costly work that businesses are loth to do on their own because it will benefit free-riding competitors. “There has to be an intentional effort from government to support the market,” says Ed Brown of the African Centre for Economic Transformation, a think-tank in Accra, Ghana’s capital. In farming that may mean enforcing standards, or providing support and credit to help build up a whole supply chain. Mr Brown notes the success of Ethiopia and Kenya in developing cool storage at airports, which allows farmers to export flowers and fresh vegetables to Europe.

Economists have long known that resources alone do not make a country rich. African economies already have many of the pieces of the growth jigsaw. What matters is how they slot together. ■



When life hands you tomatoes



Eastern Europe's economies

Bearing the brunt

The states hit hardest by war in Ukraine favour the toughest response

WHEN RUSSIA invaded Ukraine, many eastern European countries responded with hawkish resolve, fearing they could be next. Their governments pushed for the EU to cripple Russia's economy and dug deep into their own pockets (some deeper than western counterparts) to send Ukraine weapons and aid. Countries in the EU's east have taken in most of the 5.6m refugees who have fled the war. But doing the right thing does not come cheap, and the economic fallout of being frontline states is starting to show.

Trade was the first victim. Russia has been a big export market for some economies in the region. Trade with Russia accounted for 6% of GDP in Latvia and Lithuania in 2021 and 1.5% in Poland and Slovakia. In 2021 Russia received roughly a tenth of non-EU exports from Poland and the Baltic states. Most such links are probably severed for good, but they see that as a price worth paying. "It is Poland's key political interest that the West does not return to doing business with Russia," said Piotr Arak, head of the Polish Economic Insti-

tute, a government think-tank in Warsaw.

Direct trade is only part of the story. Eastern EU states have become integrated into western supply chains. Their economies, especially those of the Czech Republic, Hungary and Slovakia, are heavily oriented towards exports to Germany. So a hit to German industry, such as a cut-off of Russian gas, would badly hurt its suppliers in the east.

Energy imports are especially thorny. Slovakia and Hungary, which got 96% and 58% of their oil from Russia last year, say any EU oil embargo should be phased in gradually. Other countries are better prepared. The Baltic states ended Russian gas imports in April and now rely on liquefied natural gas (LNG) imported via ships. Poland has embargoed Russian coal and, like most countries, rejected Russia's demand to pay for gas in roubles. In response Gazprom, which supplies 40% of the country's gas, halted deliveries to Poland (and Bulgaria) last week. But Poland, too, has an alternative gas-import plan through its own LNG terminal and new pipelines to the gas

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grids of Norway and Lithuania.

Shunning Russian energy means higher prices. That will be especially painful in Europe's poorer east. Inflation was already higher in eastern Europe before the war; in April it reached double digits in many countries. In some, consumer energy bills are fixed by regulation, delaying the pain. In Slovakia, for instance, prices will only be updated in January. But "the prospect of a 100% increase in household gas prices has not sunk in yet," says Michal Horvath, the central bank's chief economist.

In Poland inflation hit 12.3% in April, a headache for the ruling party, which faces elections next year. Government largesse is partly at fault for cost-of-living increases, and Mr Arak thinks voters will blame it: "In communist times the government would introduce higher prices, often sparking mass protests. For the majority of Poles it remains clear that the state is responsible for maintaining price levels." To soften the blow, the government has cut value-added tax on food, gas, fuel and fertiliser. It dubs an upcoming economic package an "anti-Putin shield".

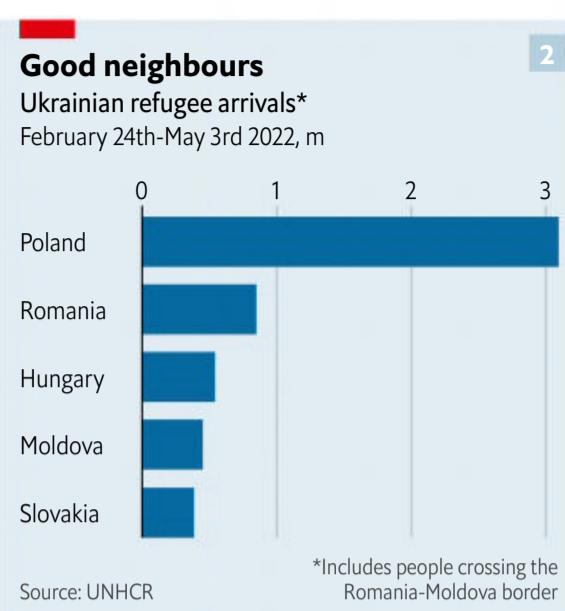
Central banks will have to act, too, notably by raising interest rates. But that will have unpleasant consequences. In Poland, where about 90% of loans to households and businesses have variable rates, mortgage-holders are heavily exposed. Banks have already tightened credit standards considerably. Along with inflation, rocketing house prices and sagging business con-

►fidence, that could spell a “perfect storm”, says Adam Czerniak, head of research at Polityka Insight, a think-tank in Warsaw. Higher interest rates and weakening economies mean that rising government debt will become more expensive to service, especially in countries such as Hungary where debt is already high.

Spending on refugees will further spur inflation. Take housing. In Warsaw rents have jumped by more than 30% since the end of February. Strains on public services are similar. Refugees have swelled Poland’s population by almost 8% since the war in Ukraine started in late February. That puts pressure on health care and education, which were already in poor shape. This will be partially offset, however, by the newcomers joining the local labour forces. In Slovakia and Hungary, the dedication of NGOs and private citizens has compensated for a lack of public services for refugees.

The war’s economic costs to eastern Europe look formidable. But that seems not to have softened countries’ resolve. The economic hit is seen as manageable. Poland’s economy, which remains strong, had not seen a recession in almost three decades until the covid-19 pandemic, notes Wojciech Kopczuk of Columbia University. The Baltic countries suffered much worse during the financial crisis, adds Morten Hansen of the Stockholm School of Economics in Riga. Citizens absorbed that suffering because it was needed to join the euro, part of the countries’ strategic drive to integrate into the West. As in the current crisis, they were willing to undergo economic pain to safeguard their independence.

The war and its aftermath will have some economic benefits for eastern Europe. Bulgaria aims to become a regional energy hub. Poland in particular stands to gain from Ukraine’s post-war reconstruction and its increasing integration into the EU. “No Western country has as close intergovernmental ties with Ukraine as Poland,” says Oktawian Zajac of the Warsaw



office of the Boston Consulting Group. The ties that Ukrainian migrants and refugees are forming will also bring economic benefits down the line, argues Mr Kopczuk.

The responses of central and eastern European states to the Ukraine crisis “will define the region for decades to come,” says Sona Muzikarova of Globsec, a think-tank in Bratislava. Undeterred by the economic pain of the war, they are showing by example that Russian aggression must be firmly resisted. ■

Austria and Russia

Blowing bridges

VIENNA

Austria is at last rethinking its cosy ties with Russia

“D

ESPIE BEING a neutral country, Austria positioned itself very clearly,” says Karl Nehammer, Austria’s chancellor. Sitting in his offices at Vienna’s baroque Ballhausplatz, he says that Austria’s immediate backing of EU sanctions against Russia surprised many. Austria gave €60m (\$64m) to NGOs to help Ukraine and donated helmets, protective vests and fuel. The small country has taken in 66,000 Ukrainian refugees. Mr Nehammer sees his visit to Vladimir Putin on April 11th to appeal for a ceasefire as part of that support.

Others thought the visit showed ambivalence. Indeed, Mr Nehammer’s backing of Ukraine was not assured. Austria, which became neutral during the cold war at Soviet insistence, has been notably friendly to the Kremlin in recent decades. Eastern Europeans refer to it as Russia’s Trojan horse in western Europe. After Mr Putin annexed Crimea in 2014, Austria was the first Western country to welcome him for a visit. The far-right Austrian Freedom Party (FPÖ) frequently criticised the EU’s sanctions against Russia and praised the coun-

try as a bastion of cultural conservatism.

The Austro-Russian love affair peaked during the first government of Sebastian Kurz, a coalition between his ÖVP and the FPÖ from 2017 to 2019. Karin Kneissl, then Mr Kurz’s foreign minister, had Mr Putin to her wedding; images of her curtsying to him after they danced went viral. In 2018 Mr Putin and Mr Kurz met four times.

Mr Kurz’s government fell in 2019, after a secretly filmed video showed Heinz-Christian Strache, then vice chancellor and leader of the FPÖ, seeming to accept an offer of financing from a woman pretending to be the niece of a Russian oligarch. (The meeting took place at a louche drinking party in Ibiza; the woman offered to invest €250m in Austria and buy newspapers to support the FPÖ.) Mr Kurz returned to power in 2020 with a coalition government that included the Greens and a foreign minister, Alexander Schallenberg, who is a committed Atlanticist. The flirtation with Mr Putin started to cool. “Austria vastly overestimated the geopolitical role it could play as a bridge-builder between Russia and the West,” says Gerhard Mangott of Innsbruck University.

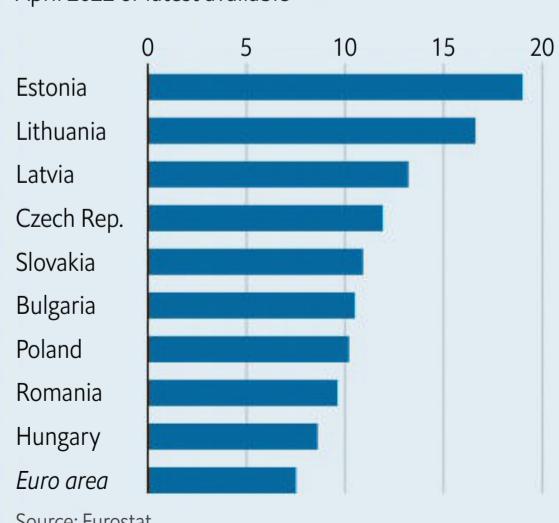
Still, economic relations are substantial. Austria gets 80% of its natural gas from Russia. One-quarter of all gas deliveries from Russia to the EU flow through a hub in Baumgarten, in lower Austria. Russia is the country’s number-two foreign investor after Germany, with investments of €21.4bn in 2020. Raiffeisenbank International, Austria’s second-biggest bank, made 35% of its profits in 2021 in Russia, where it employs 9,300 workers.

Cultural ties are close, too. Russians play key roles in Austrian cultural institutions. Ekaterina Degot runs Steirischer Herbst, a contemporary-art festival in Styria; Anna Netrebko, an opera singer, received Austrian citizenship in 2006. She is still scheduled to sing at Vienna’s state opera, whereas other houses, such as New York’s Metropolitan, cancelled her performances. Austrian interest in Russian high and popular culture is tremendous. “We are fascinated by a culture that seems so familiar and still remains so foreign,” says Simon Mraz, a diplomat who for 12 years ran Austria’s cultural centre in Moscow.

Mr Nehammer’s visit to Moscow left him deeply pessimistic. Mr Putin, he says, has completely adopted the logic of war. The conflict will permanently alter relations with Russia. Austria has embargoed Russian oil and is working to diversify its gas supplies. Raiffeisenbank is considering the possibility of pulling out of Russia. Strabag, Austria’s biggest construction company, forced Oleg Deripaska, a Russian oligarch who owns 28% of its shares, to leave its board. But opera and ballet fans hope the artistic relationship will survive—or be revived, after the war. ■

Rising in the East

Consumer prices, % increase on a year earlier
April 2022 or latest available



Spain

Bugging out

MADRID

Spyware hits both the prime minister and Catalan separatists

FOR WEEKS Spanish headlines have trumpeted a scandal known as CatalanGate. In April the *New Yorker* and the Citizen Lab, an NGO at the University of Toronto, revealed that the phones of at least 67 people, nearly all associated with the Catalan separatist movement, had been infected with spyware, mainly a program called Pegasus. They included Catalonia's four most recent regional presidents.

Then on May 2nd government officials announced that the phones of Pedro Sánchez, the prime minister, and Margarita Robles, the defence minister, had also been infected with Pegasus in 2021. Mr Sánchez is the first national leader confirmed to have been a victim of the spyware. In both cases the infected devices were government-issued, and periodically screened for security threats—unsuccessfully. A day later it turned out that Arancha González Laya, a former foreign minister, had been bugged too.

No one knows who was responsible. Pegasus is made by NSO, an Israeli company, which sells it only to government entities. It grants virtually complete access to the infected phone, including the camera and microphone as well as messages and files. Infection can come via a link or, in some cases, with “zero-click” attacks that require nothing of the phone’s user.

Initially, CatalanGate made the Spanish government look bad. Pere Aragonès, Catalonia’s president, was infected twice, and the attackers seemed to know what his political concerns were. In late 2019 and early 2020 his ERC, a separatist party, was dealing with Mr Sánchez over a vote to back a minority government. The second infection came via a contaminated link to an article about Mr Sánchez’s negotiating position. The ERC abstained in the vote, allowing the government to take its seats.

Mr Aragonès has since taken part in a dialogue with the government to move on from the crisis in 2017 over an unconstitutional independence referendum. He and other Catalan nationalists feel betrayed, and are demanding answers. Those snooped on included not only politicians but activists, journalists and even spouses. Many suspect the CNI, Spain’s foreign and domestic intelligence service.

A spokesman for NSO said the company had seen no details of the Spanish allegations, but that monitoring politicians, activists or journalists would be “a severe

misuse” of its software. The company’s website says its tools are used to help governments fight “terrorism and crime”. But Amnesty International claimed last year that over 180 journalists and many politicians had been targeted, though it was unsure which attacks had been successful.

NSO is known to sell to Western-allied autocracies. Morocco and Spain were in a diplomatic row at the time of the ministers’ buggings, but there is no evidence that Morocco was the perpetrator. Until last week, Ms Robles was defending the CNI. In a fiery statement in Congress, she asked: “What is a state, a government, supposed to do, when someone violates the constitution, declares independence?”—as the Catalan separatists had. That was before her own phone was found bugged. A spokeswoman for the Catalan government said wryly that “now there is an urgency that there wasn’t before.” ■

Moldova

The next target?

CHISINAU

Trying to stay out of Russia’s crosshairs

MAIÀ SANDU, Moldova’s soft-spoken, pro-European president, seems out of place in her country’s vast presidential palace. It was built in the 1980s to show off the Soviet Union’s authority in the second-smallest of its republics. When the union collapsed and Moldova became independent, Russia backed a rebellion in its Transnistria region. Russian troops remain in the breakaway statelet. Now Russia’s war in Ukraine is threatening Moldova, one of Europe’s poorest countries.

This, Ms Sandu tells *The Economist*, is



Appealing to Europe, hopefully

Moldova’s most dangerous moment since independence. On April 22nd Rustam Minnekaev, a Russian general, said control over southern Ukraine would open up a route to Transnistria, where he claimed Russian-speakers were being oppressed. “These were worrying words,” says Ms Sandu, “after we’ve seen what is happening in Ukraine.” Three days later an explosion damaged the state-security ministry in Tiraspol, the separatists’ self-proclaimed capital. The following day two more explosions wrecked antennae used by Russian radio. Russia has a history of “false-flag” operations as a pretext for assaults.

If Moldova joined NATO, that might deter Russia, but applying to join would be provocative. “The moment we ask, the bombs could start to fall,” says an official. “We are trying to do our best to keep the country out of the war,” says Ms Sandu. Moldova’s tiny army has no combat planes or helicopters; its only tanks are on display as memorials.

An invasion does not seem imminent. The 1,500 Russian soldiers in the breakaway statelet are poorly equipped. Russia’s main forces in Ukraine would need to drive almost 200km west to reach Moldova.

A more immediate threat is Russian-engineered social and economic chaos. Ms Sandu is a former World Bank adviser and corruption-fighter whose election in 2020 was a rebuke to the Kremlin’s kleptocratic model of governance. The man she defeated, the pro-Russian Igor Dodon, now leads the opposition. Russia supplies almost all of the country’s gas. Prices have risen by 380% in less than ten months, says the president. Roughly 80% of Moldova’s electricity comes from generators in Transnistria. The power company, which is Russian-owned, has refused to grant long-term contracts. Moldova’s lights would have gone out on May 1st had the government not secured a one-month deal.

The government subsidises energy, but risks going bust as a result. Ms Sandu has asked the EU for €300m (\$315m) to tide it over until the end of the year. That has yet to come through. New power lines to Romania are a couple of years from completion. “Russian political forces in Moldova have already been talking about massive protests and have been calling for the government to step down,” says Ms Sandu.

Besides money, she is asking for solidarity. A week after Russia invaded Ukraine, Moldova applied to join the EU. The government promptly answered the list of 366 questions the EU sent, Ms Sandu says, only to be hit with another 2,000 queries. Membership would take many years. But being recognised as a candidate would send a signal that the country belongs in the West, she says: “The EU is the place which can provide safety and help save us as a democratic country.” ■

Ukraine's war

How things are done in Odessa

ODESSA

A cosmopolitan city fights for normality in the face of war

THE SUN is shining, the fountains are playing and Odessans are enjoying simple pleasures—most of all that of seeing their city come back to life. Primorsky (“Seaside”) Boulevard is still cordoned off, and the statue of the Duc de Richelieu, the city’s early-19th-century governor, is covered in sandbags. But the tank traps have been moved to the outskirts, where the lines of defence now lie.

The actual fighting has moved to Mykolaiv, some 130km away. Russian shelling left that city’s residents without water, so Odessans are sending them bottled water and food. In Odessa the main threat now comes from the occasional Russian missile. Even when air-raid sirens wail, people carry on with their lives.

In the morning they flock to Privoz, Odessa’s biggest market and the source of much folklore. The fish rows are emptier than usual, as mines have barred fishing in the Black Sea, and tomatoes are twice as expensive as before the war, but nobody is complaining. In the evening, in the city gardens, a local crooner sings romantic songs in Ukrainian to people on benches and in cafés. As 10pm approaches, the streets empty and men with guns come out to enforce the curfew.

Odessa, a cosmopolitan port city of traders, adventurers, writers, gangsters and romantics, of multiple ethnicities, languages and cultures, is known for storytelling. And the story it tells today is of life winning over war. Odessans are proud that the most popular meme of this war was



coined off their coast, on Snake Island, where Ukrainian border guards told a Russian warship “Go fuck yourself.” They are even prouder that on April 14th their army sank the *Moskva*, Russia’s Black Sea flagship. Four days later they queued to buy new postage stamps marking the meme.

Since then there have been no Russian ships on the horizon. At Arcadia beach, people are jogging and cafés are reopening. But the beaches are still mined, and only the bravest venture into the water. More important, Odessa’s economic heart, the port which carries Ukraine’s grain to the world, is blockaded.

Russia still yearns to conquer Odessa, once a jewel of the Russian empire. But ac-

cording to Gennadiy Trukhanov, the city’s mayor, they want it “intact and beautiful”, so they are unlikely to bomb its historic centre. Their plan is to cut it off from the rest of Ukraine by advancing from Mykolaiv to Transnistria, a pro-Russian separatist region of Moldova (see previous story).

Russia once hoped Odessa would greet its soldiers with flowers, counting perhaps on Mr Trukhanov’s many ties to Russia. A former Soviet officer, he was one of the first to warn that Russia might invade, and prepared by revamping bomb shelters. Russian is the *lingua franca* in this city of 130 nationalities, but that does not make it pro-Russian, Mr Trukhanov says. He is disgusted by the Russian army’s behaviour: “These are not military warriors, they are murderers, driven only by fear of what will happen to them if they don’t follow orders—and by money.”

Mr Trukhanov’s anger is all the greater because he considers the war a personal betrayal. So do most Odessans, for whom Russia’s language, history and culture are a part of their city. “Russian soldiers and officers must see that this is not a military operation, but a cynical, murderous, occupational war of punishment, with all the signs of fascism and Nazism.”

Where Russia hoped Odessa might be a weak link in Ukraine’s defence, it has proved a bastion, an emblem of a nation that draws its strength from diversity, free enterprise and freedom. While soldiers dig trenches and fortify defences, the city is stockpiling enough food, water and medicine for two months. Mr Trukhanov is asking the army to de-mine some of the beaches so that people can swim in the summer.

It is not just his Soviet military background that equips him for the job. In the 1990s Italian police named Mr Trukhanov as a major player in the Odessan mafia, responsible for training gang members in “hand-to-hand combat and sniper shooting with high-precision weapons”. In 2021 he was charged with organised crime in Ukraine, but avoided arrest with a \$1.1m bail payment. He makes little distinction between his own businesses and those of the city. (Mr Trukhanov denies all such allegations.) But what seemed an obvious conflict of interest before the war became one of the city’s strengths in defending it against the invasion. Old vendettas have been set aside, at least for the moment.

Nika Vikhniansky, a furniture businessman who opposed Mr Trukhanov in elections, is now working side by side with him managing volunteers and co-ordinating humanitarian aid. “The city council told us we were far more efficient than they are,” he explains. Mr Vikhniansky’s grandfather was a tank driver who fought the Nazis during the second world war. “Then they were killing us as Jews,” he says. “Now they are killing us as Ukrainians.” ■



Can't keep a good city down

Charlemagne | Macron 2.0

France's re-elected president wants to govern differently. That means curbing his own instincts



CASING HANDS and squeezing shoulders, Emmanuel Macron lingered for hours amid a crowd of well-wishers in a little market town at the foot of the Pyrenees, just days after he was re-elected. At the end of a divisive campaign, the French president's trip was designed as a show of healing and listening. The technocratic slayer of populism could still connect with the people, the visit implied, and the second-term president would now listen to them more, too. It was time, Mr Macron declared, for reconciliation, and a "new method" of consultative government: "We can't resolve everything from *là-haut* (on high)."

From the leader who clambered up to grand heights to begin his presidency in 2017, this marks something of a turnaround. The centrist, it seems, has taken the full measure of what is at stake during what is probably his final term. (The constitution allows only two consecutive ones.) For Mr Macron's challenge is typical of those facing liberal democrats across Europe as they seek to hold the centre against the forces of populism. And France, the euro zone's second-biggest economy, is a test case that matters. By 2027, if Mr Macron holds on to his majority at parliamentary elections next month, the then 49-year-old may well leave behind him a decade of stable, competent government at the heart of Europe. In France, a country outsiders like to think is always on the brink of collapse, this would be quite a result.

Yet France also emerges from this election fractured and fragile. Mr Macron is politically triumphant. But as he recognised, he owes his victory in part to those who wanted to keep out his opponent, the populist-nationalist Marine Le Pen. Her campaign tapped into, and stirred up, the humiliation and anger that many French voters feel. If Mr Macron cannot find a way to address political disenchantment, and entrench the democratic centre, in five years' time the young political retiree may hand over a France readier than ever to put a radical populist in power.

Nobody charges Mr Macron with lacking competence, seriousness, intellect or imagination. He has some work to do to improve the sharing of wealth, although the record is not bad. To live up to his government's post-partisan billing, he needs to rebalance it towards the greens and the left. But the main complaint is about Mr Macron's solitary exercise of power, and the impression he can

give of disdaining the less able or lucky. How might a Macron presidency 2.0 listen more and dictate less?

One challenge will be to soften the style that accompanies the philosophy. Mr Macron's political thinking is centred on the concept of "emancipation": creating fairer opportunities for individuals to improve their lives, while maintaining a strong safety-net for those who stumble. He has invested in better early education and nutrition in poor areas, and vastly expanded apprenticeship schemes. Such projects are laudable and overdue. But they take time to show results, and will leave some behind. The impression of disrespect for those who still struggle undermines the genuine investment in making sure they do not.

Another option to alleviate the feeling of voicelessness would be to give people more of a say in between elections. Mr Macron has talked about setting up a citizens' assembly to discuss assisted dying, like the one Ireland used to discuss whether and how to legalise abortion. (He set up a similar one on climate change after the *gilets jaunes* protests, with mixed results.) He could encourage more local experimentation in the running of schools, say, in defiance of the country's Jacobin reflexes. He might also seek to make parliament more representative. Ms Le Pen won 41.5% of the vote, her best total ever; yet in the National Assembly her party holds just seven seats. Mr Macron tried in 2019 to introduce a dose of proportional representation, but was blocked by the Republican-controlled Senate. A cross-party commission might help to reach a consensus this time round.

Mr Macron will also have to work with the country's testy unions. He wants to raise the pension age from 62 years to 64 or 65, and get teachers to do more for better pay. But he cannot simply impose such reforms. Michel Rocard, a Socialist ex-prime minister and one-time mentor to the young Mr Macron, argued that the decline in France of both the Catholic church and the Communist Party, which once lent structure and purpose to society, rendered institutions such as unions more important, not less. They may have fewer members these days, but they still have clout. Talks will be tough. Even moderate leaders reject Mr Macron's pension plan. He will need unusual finesse if he is to consult more while still fulfilling the pledges for which he was elected.

Au revoir *là-haut*

Perhaps the greatest challenge, though, will be to Mr Macron himself. By constitutional right, he has made full use of the powers of the presidency under France's Fifth Republic. By temperament, he keeps an eye on everything. This is a president who devours dossiers, pores over public policy and studies subjects independently to fill in the gaps carelessly left by others. Even his admirers say Mr Macron is not always an easy boss. Perhaps this is why it has taken him so long to name a new prime minister, a post that Rocard once called "hell". The re-elected president will have to wrestle with that instinct if he is to fulfil his promise to govern differently.

The test of Macron 2.0 is in part the same one that faces every European leader: how to make the economy fairer, greener and more competitive at a time of war, inflation and soaring energy prices. For Mr Macron it is also whether he can strike the right balance between ensuring policy coherence and efficiency on the one hand, and avoiding dictating and lecturing on the other. Nobody, however talented, can do everything alone or get everything right. And if delegation does not come easily to Mr Macron, there is a reason. As he reminds anybody who cares to ask, had he listened to others he would not be where he is today. ■



Britain and the oligarchs

Dirty capital

Why is London so attractive to tainted foreign money?

FOR YEARS London has been awash in Russian money, much of it begrimed. Rich Russians flocked to the capital for a variety of reasons. Some were looking for a stable home for legitimate wealth. Some sought tax benefits. Others were seeking to launder dirty money, or to recycle wealth earned in circumstances which, though not brazenly criminal, looked corrupt to Western eyes.

With a huge financial centre and a preference for light-touch regulation, Britain was an ideal place to rinse stained money. The country is relaxed about foreign ownership of trophy assets, from newspapers to football clubs. London has oodles of luxury property, an ideal repository for large bundles of cash in need of washing. Lawyers, bankers and other professionals offer reassuringly discreet, and expensive, service. Add in the draw of top-notch schools and universities, and no wonder the National Crime Agency (NCA) thinks the country has a money-laundering problem amounting to £100bn (\$125bn) a year.

Successive British governments did little to discourage the Russian influx. The

war in Ukraine brought about an abrupt change. Britain has slapped sanctions on more than 1,600 individuals and businesses, including over 100 oligarchs and family members who got rich under President Vladimir Putin's kleptocracy, or made sweet with him to keep fortunes intact.

A long-delayed economic-crime bill that makes it easier to prosecute international corruption cases was rushed through Parliament in March, less than three weeks after Russian forces entered Ukraine. The government has scrapped the investor-visa scheme, introduced by Sir John Major's government in 1994, that allowed any foreigner with a few million pounds to spare who passed (fairly rudimentary) checks to buy residency.

The welcome mat is now being taken away from Russian oligarchs. But getting rid of the capital's "Londongrad" nickname is a narrower and easier task than abating the overall flow of dirty money into Britain. The country has sought to attract footloose global capital for decades, and not just from post-Soviet countries: Chinese citizens have accounted for a third of the

→ Also in this section

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investor visas handed out since 2008. And noble attributes of Britain's common-law system, which include independent courts and strong property rights, are attractive to illicit actors, too. "Criminal money seeks out many of the same protections as clean money. If you stole your wealth, you'll be just as determined as anyone else not to have it stolen from you in turn," says Jason Sharman of Cambridge University.

Reducing the amount of dirty money flowing into the country will therefore be hard. It requires further action in four areas in particular: the law itself; the conduct of those who practise it; the court system; and, above all, enforcement of the rules.

Lawmat London

Start with the law. As well as liking destinations that respect the rule of law, kleptocrats also flock to places where financial secrecy is most strongly enshrined. Britain is a curate's egg. It was the first G20 country to introduce a public register of company owners, in 2016. But those who file false (or no) information are unlikely to get caught; if they are, penalties are not draconian.

It remains easy and cheap to set up opaque shell companies and partnerships. In his new book "Butler to the World", Oliver Bullough describes how "Scottish limited partnerships" have proved especially popular with those washing dirty money from the former Soviet Union. And Britain remains umbilically tied to offshore territories, such as the British Virgin Islands, whose business model is built on financial

▶ secrecy (and whose premier was recently arrested in an American drug sting, further sullying the territory's not-so-good name).

Another attraction for the scrutiny-shy is Britain's libel law. Britain remains popular with "libel tourists", foreigners with tenuous links to the country who bring cases there because they believe they have a better chance of winning. The Defamation Act of 2013 was intended to resolve this imbalance, but clever lawyers have "chiselled away" at what Parliament intended the law to do, says Caroline Kean of Wiggin, a law firm. For instance, the act aimed to codify a public-interest defence that had evolved through case law, by increasing protection for writers who "reasonably believed" that what they published was true. Lawyers for oligarchs have had a field day with those two words. "When motive is in play, clever solicitors can tie opponents in knots," says Ms Kean.

The tactics used by such lawyers have become well-honed. They centre on firing off intimidatingly long letters to journalists or NGOs who are investigating their clients, with the aim of bullying them into backing down, typically not by force of legal argument (which is often flimsy) but by the prospect of ruinous costs as litigation, or just the threat of it, stretches on.

The government has proposed reforms to curb "lawfare". These include strengthening the public-interest defence, capping costs claimants can recover and giving judges the right to throw spurious cases out earlier. Anti-corruption campaigners and an American congressman have called for visa bans and other sanctions against lawyers who work for dodgy plutocrats. Some of the firms accused of such conduct, including Carter-Ruck and Harbottle & Lewis, have issued statements denying that they have acted inappropriately.

The lawyers have another weapon, however. Employing innovative legal arguments, they have increasingly been using Britain's privacy and data-protection laws to bring defamation-like cases. These argue that alleged privacy breaches damage their client's public image. A legal claim by two oligarchs against HarperCollins over "Putin's People", a book by Catherine Belton, was based on arguments about data protection. Some defence lawyers say that privacy is becoming the new libel.

If the law is one area of concern, what lawyers are willing to do for clients is a second. "There is a more general problem of erosion of ethical standards" among British lawyers, says Robert Barrington of the Centre for the Study of Corruption at the University of Sussex. "The legal system has always been tilted in favour of those with more resources. But it has been pushed further out of kilter through the allure of cash from oligarchs and kleptocrats who should fail any reasonable due-diligence

test." Some of the richest Russian clients will pay more than double the £500-per-hour going rate for top solicitors. "This has played havoc with the moral compasses of many law firms," adds Mr Barrington.

These navigational problems have been exacerbated by a broader trend. Under the old partnership model, the client may have come first but lawyers also took seriously their role as "officers of the court", dedicated to serving the wider justice system. Over the past quarter-century the legal industry focused more on short-term financial performance. The big firms grew more "corporate", less stable (as poaching increased) and less culturally cohesive. "This has driven a shift further towards the primacy of the client over duties to the court," says Richard Moorhead of Exeter University.

Conduct unbecoming

Some lawyers justify working for oligarchs with reference to the right to representation enshrined in the UN's "basic principles on the role of lawyers". In reality, different rights compete. Article 14 of the basic principles says that lawyers "shall seek to uphold human rights" and "at all times act freely and diligently in accordance with the law and recognised standards and ethics of the legal profession". Lawyers have a choice about whom they serve, unlike doctors, who are expected to treat even the most heinous criminal if he requires medical attention.

Lawyers' views of how they should act particularly matter in Britain, argues Mr Barrington, because its legal system rests on the self-policing of behaviour. "One of the good things about our system is that it has been long-established with behavioural checks and balances. It was upheld and carried by the lawyers themselves. Now we are seeing what happens when those standards are upended." He sees a parallel with

politics, where concerns have grown that the system has been weakened by Boris Johnson's breaking of uncodified norms.

But anyone expecting the legal regulator to tackle ethical slippage may be disappointed. Faced with growing complaints about lawyers taking Russian money, the Solicitors Regulation Authority (SRA) has promised more "spot checks" on the industry. But the SRA's hybrid status—it is a legally independent arm of the Law Society, an industry association—does not inspire confidence. Though it can impose fines of up to £250m, its largest announced to date, against Mishcon de Reya for money-laundering failures, is £232,500.

The third problematic part of Britain's legal system is its courts. British judges have a strong global reputation, but they can fall short in cases involving wealth accumulated in foreign jurisdictions with less respect for the rule of law. In particular, they sometimes give undue weight to questionable evidence submitted by the authorities of other countries. "Judges show too much credulity," says a British lawyer. "They often take at face value witness statements, financial documents and other evidence provided by dodgy governments, because they are 'official'. This is hugely consequential because many oligarchs are linked to people still in power in those countries who can control, or doctor, information flowing to the courts here."

In April 2020 two relatives of former Kazakhstani president Nursultan Nazarbayev successfully challenged an attempt by the NCA to seize three London homes worth over £80m, which the agency believed had been acquired with dirty money. A report published in March by academics from the University of Exeter who specialise in cross-border corruption concluded that the ruling was flawed because the High Court judge in question had "accepted evidence from the Kazakhstani authorities that was likely tainted by political bias". It also found that she did not question the reasons why Dariga Nazarbayeva, the ex-president's daughter, and her son were using complex offshore structures.

British justice also suffers from a lack of transparency. Although many hearings are public, finding out in advance when and where they will take place is often a challenge. Information about cases, including transcripts, is hard and expensive to obtain. This stands in stark contrast to America, where full sets of transcripts and other documents in federal and state cases are readily and cheaply available (at ten cents a page, with a cap of \$3 per document) via user-friendly public databases.

Another concern about the court system is the cost of justice for litigants. Britain, again in contrast to America, practises "costs-shifting", in which the loser in a case pays some or all of the winner's costs. ▶



► This tilts the system in favour of those with very deep pockets, who will have no trouble picking up an opponent's bill.

It also has the effect of ratcheting up legal fees. "Some lawyers might feel able to charge huge sums because they can argue to the client that if they win the other side will pay it," says Frederick Wilmot-Smith, a barrister and author of "Equal Justice", a book about inequities in legal systems. "It encourages a billing arms race." Top London law firms have been known to charge £70,000 for a single court application.

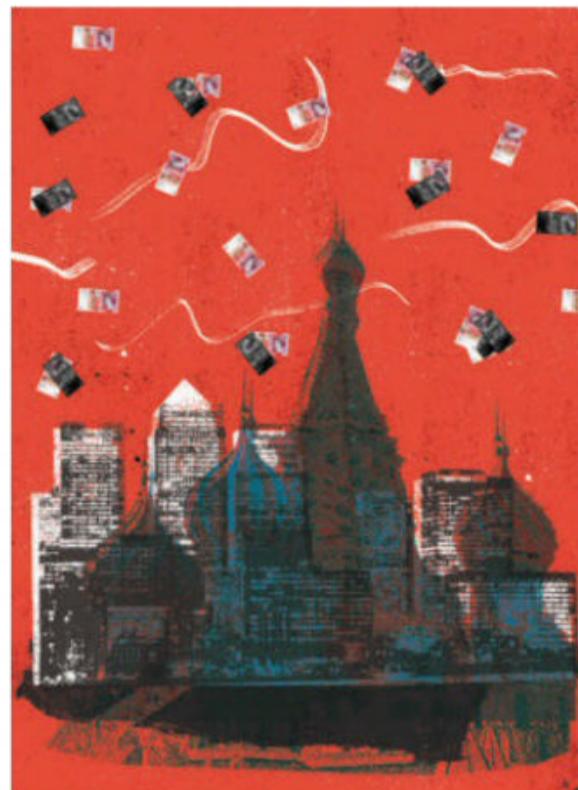
High fees and costs-shifting do not deter plutocrats, who regularly take each other on in English courts and barely bat an eyelid at the expense. But even in moderately complex civil cases, says Mr Wilmot-Smith, "no sensible person worth less than tens of millions" would expose themselves to a court trial. He argues that the English legal system should be structured more like its health-care system, by severing the connection between trial resources and the allocation of lawyers.

Costs-shifting stymies not just private litigants but the authorities, too. The NCA, for instance, often shrinks from pursuing cross-border corruption cases for fear of having to pay out a hefty chunk of its budget should it lose. A former NCA investigator says he "almost gave my superiors a heart attack" when he wanted to freeze over \$1bn in a corruption investigation linked to Nigeria. They balked, he said, fearing it could "sink our entire budget".

The case documents were instead passed to a prosecutor in Italy who was keen to take the case to trial (one of the firms involved was Italian); the country's well-funded, 60,000-strong Guardia di Finanza honed its skills following Mafia money trails. America, with large kleptocracy-focused budgets and habits of prosecutorial aggression (some prosecutors see taking on big cases as a career stepping-stone) is also far ahead of Britain when it comes to chasing down dirty money.

Enforcement is the fourth and most important part of the puzzle for ministers to solve. Britain's overall budget for fighting economic crime is an underwhelming £850m, according to Spotlight on Corruption, an NGO. A mere £43m goes on tackling international corruption, bribery and the like, estimates Mr Barrington. It is no surprise, then, that few big cases are prosecuted. Between 2016 and 2021 the NCA did not secure a single conviction for high-level international corruption.

It did win two high-profile asset freezes using "unexplained wealth orders" (uwos), but this new tool, too, has been disappointing. Britain introduced uwos in 2017 as a way to make it easier to get results in kleptocracy and organised-crime cases, where proving that money in a bank account is corrupt or a mansion was corrupt-



ly obtained can be fiendishly difficult. They require the target to prove that their assets were bought using clean money, or face confiscation. But despite hopes of up to 20 uwos a year, just four have been issued so far. None was against a prominent Russian figure.

When the NCA had its uwo against Ms Nazarbayeva and her son overturned, it was landed with a legal bill for £1.5m, roughly a third of the agency's annual budget for international corruption cases. (To help tackle this problem, the new economic-crime act places a cap on costs in the event of a uwo being overturned.) According to Jonathan Benton, a former head of the NCA's corruption unit, the obstacles that prosecutors face in cases like this also include queasiness among judges about the legal underpinnings of uwos, which "make sense in the context of the difficulties of bringing such cases but sit uneasily with the principle that you are innocent until proven guilty".

The lack of enforcement resources af-

flects the quality of both personnel and the technology that is key to investigations these days. Middle-level financial sleuths at the NCA get roughly the same pay as coppers on the beat, says Mr Benton; when he was there, some had to take a pay cut when transferring from the police. The structure of enforcement is sub-optimal, too. Britain does not have any overarching authority for its anti-corruption efforts. A study in 2016 found 66 separate "specialist enforcement, prevention, investigative and oversight agencies" involved in the policing of corruption-related offences, in addition to 45 regional police forces.

Penalties for banks, lawyers and other "enablers" of dirty money are paltry. Even for banks, fines for money-laundering lapses rarely exceed a few tens of millions of pounds, small change for many. Lawyers who turn a blind eye can expect no more than a rap on the knuckles. Several British estate agents filmed undercover for a documentary seemed unconcerned when the "buyer" said they were using funds stolen from the Russian state budget.

A report published by Chatham House, a think-tank, in 2021, was damningly titled "The UK's kleptocracy problem". It described how Britain has adopted a "risk-based" approach to anti-money-laundering, whereby much of the front-line policing is delegated to banks, lawyers and others in the private sector. But, it concludes, "failures of enforcement and implementation of the law—plus the exploitation of loopholes by professional enablers—have meant that little has been done in practice to prevent kleptocratic wealth and political agendas from entering Britain."

The upshot of all this was encapsulated in the report's subtitle: "How servicing post-Soviet elites weakens the rule of law." The British authorities are turning their backs on Mr Putin and his cronies. But the cracks in the foundations of Britain's legal system that allowed Russian loot to flow into London will be harder to close. ■

Stain removers

A brief tour of selected money-laundering centres

Britain	Popular with plutocrats and kleptocrats from the ex-Soviet Union, Middle East and Asia, despite the rain. Attractions include laws that make even dodgy assets hard to seize and a world-beating "reputation management" industry
British Overseas Territories	Still in the vanguard of offshore finance owing to Britain's reluctance to crack down. Shell companies and opaque investment funds mass-produced in the British Virgin Islands and Cayman Islands, respectively
Dubai	Wannabe Switzerland of the Middle East. Foot-dragger on global anti-money-laundering standards. Favoured haunt of financial fugitives. Sanctions-busting hub
Hong Kong	Alluring mix of secrecy, low taxes and light-touch regulation. Hong Kong companies, trusts and funds feature heavily in creative ownership structures used by rich Chinese to move money under the radar
Switzerland	The Rolls-Royce of tax havens. Forced into a partial clean-up after the Gnomes of Zurich were caught aiding tax evasion on an industrial scale. But 1930s financial-secrecy laws remain in place
United States	New York skyscrapers and Miami condos are awash in corrupt capital, especially from Latin America. Delaware and Nevada do a roaring trade in shell companies; South Dakota in trusts

Bagehot | Bucket-hat Boris

From sleaze to an unpopular prime minister, British politics is stuck in a 1990s time-warp



BUCKET HATS are back. The 1990s fashion staple that used to grace the head of Liam Gallagher, a singer, is enjoying a renaissance. Dior sells one for £560 (\$700); Sports Direct flogs an Adidas one for £13. Across Britain teenagers sport headwear that was last in vogue before they were born.

If the 1990s are in fashion, then British politics is *à la mode*. Westminster has fallen into a time-warp and found itself back in that decade. That would be no bad thing if it were the second half of the 1990s, a time of Euro 96, Cool Britannia and sustained economic growth. Unfortunately, British politics has returned to a grimmer period, and specifically to 1994. As then, various scandals grab the headlines. As then, an unpopular leader leads an exhausted Tory government which has little sense of what to do with power and lacks the nous to push through those ideas it does have.

Sleaze, the preferred Westminster term for financial and sexual misdeeds, has returned. Neil Parish, an MP with an interest in rural affairs, has resigned after admitting to twice looking at pornography in the House of Commons. In the first instance, he said he was trying to find tractor-related material. In the second, he was doing it for fun. At the start of April Imran Ahmed Khan, the MP for Wakefield, stepped down after being found guilty of molesting a 15-year-old boy. In November Owen Paterson, then the MP for North Shropshire, resigned after lobbying on behalf of paid clients in Parliament. It is a run that rivals the early 1990s, when MPs were accused of accepting cash for posing parliamentary questions and one minister was eventually jailed for perjury.

An unpopular prime minister again sits in Downing Street. Boris Johnson's net approval rating bottomed out in January at -46, the lowest such level since Sir John Major, the prime minister in 1994. Conservative MPs would probably remove the prime minister if they had the chance, but the lack of alternatives provides a reason (or, rather, an excuse) not to move against him. Liz Truss, the foreign secretary, is painted as fundamentally unserious. Rishi Sunak, the chancellor, is seen as a political ingénue. Critics say Jeremy Hunt, a moderate Conservative MP, is a deluxe version of John Redwood, the slightly odd Welsh secretary who unsuccessfully challenged Sir John for leadership of the Tories in 1995.

Mr Johnson sits atop a weak government. He has a mighty ma-

jority of over 70 but a puny legislative agenda. Bold plans to reform Britain's growth-throttling planning laws have been scrapped, as Conservative MPs ran scared of NIMBY voters flocking to the Liberal Democrats. The government did, however, find time to support a ban on glue traps. There is no point in having a majority if a government does not use it. Yet there are few ideas floating around. Conservative MPs privately wonder whether a stint in opposition would be restorative. In the early 1990s the Conservative government lurched between confidence votes in a bid to stay alive. The pulse of the current government is barely discernible.

Yet there are things to do. Public services are exhausted. Satisfaction with the NHS is at its lowest levels since 1997, as it grinds to a halt amid a backlog of cases built up through the pandemic. Waiting lists, the emblematic symbol of the 1990s, are at their highest levels since records began. Public services fell apart in the first part of the 1990s, but at least the economy still clipped along. This time the private sector is in a similar state to the public one, with growth slowing. Like its counterpart in 1994, the government has been in power too long to dodge blame. In an interview this week, Mr Johnson was challenged about a 77-year-old woman forced to ride a bus all day simply to keep warm; his first response was to boast that he was responsible for giving her a free bus pass.

Two things mean that the return to the mid-1990s need not end as painfully for the Conservatives. The first is the calibre of the opposition. Labour has learned to love the 1990s: the 25th anniversary of its landslide victory in 1997 has just produced a bout of political onanism. But Labour seems determined to love the wrong things about it. New Labour was radical, embedding Thatcherism in Britain's economy and redistributing the gains (in theory, at least). It was an ideological project, disguised as a pragmatic one. Labour's current management offers little such vision. Tony Blair was a zealot; Sir Keir Starmer preaches platitudes. Labour appears allergic to policy ideas, never mind ideology. It is the Labour Party's stultifying leadership that keeps Conservatives calm and Mr Johnson in Downing Street.

The second is the size of the government's majority. Executive inactivity is a choice. The government could still overhaul Britain, if it wished. Indeed, this was the fundamental motivation behind its support for leaving the EU. But whereas Conservative ideas about freedom used to come in two flavours—freedom from constraints and freedom to get ahead—Brexit has created a third: the freedom to do nothing at all.

Don't look back in anger

Mr Johnson, once a consummate political gambler, has become paranoid about upsetting backbenchers, even with a large majority. Levelling Up looks destined to remain a slogan rather than a policy. Instead, the government will probably produce increasingly specific legislation against animal cruelty and ideas designed to annoy liberal voters rather than change the country.

Mr Johnson still has a chance to emulate his idol, Michael Heseltine, a former Conservative cabinet minister who straddled the 1980s and 1990s, and who oversaw the regeneration of Liverpool and London's East End. Mr Heseltine shaped modern Britain, even if he never ran it. Mr Johnson has the chance to succeed where Lord Heseltine failed, by leaving behind a rebalanced and reformed country. If he flunks it, he will be remembered as the second coming of Sir John, presiding over an era of sleaze, inertia and decline. A return to the 1990s could be ugly. Bucket hats do not suit everyone, least of all politicians. ■

**Press freedom**

Where the truth lies

BUDAPEST, HONG KONG, MUMBAI, ST PETERSBURG

Press freedom is retreating worldwide as states develop new means of control

OHLGA RUDENKO has a litany of worries as editor of the *Kyiv Independent*, an online newspaper in Ukraine. Since the Russian army invaded in February, more than 20 journalists have been killed. Throwing aside international conventions, the Russians are targeting reporters. Insurance for local correspondents is prohibitively expensive, and the paper is struggling to get hold of helmets, satellite phones and bulletproof vests. "We are being invaded by people who hate journalists," she says.

It's a triumph that Ms Rudenko and her team are working at all. Last year they were worrying about a threat less dramatic than Russian bombs, but still insidious: a reorganisation of the paper which they believed would undermine their editorial independence. The *Kyiv Independent* was born after the staff of the *Kyiv Post*, Ukraine's largest English-language newspaper, suspected that the wealthy owner was seeking to influence coverage under pressure from the authorities, an accusation he denied. When they protested, he fired the whole staff in early November. Around 30 journalists, led by Ms Rudenko,

decided to launch an independently funded news outlet. The *Kyiv Independent* has far exceeded their expectations. Since Russian missiles began hailing down on Ukraine, readers across the globe have been counting on it. As the war began and interest peaked, some 630,000 visitors a day were reading the *Kyiv Independent*. It has raised almost \$2m in crowdfunding.

Globally, press freedom is in retreat. Around 85% of people live in countries where it has declined over the past five years, according to analysis by UNESCO of data on freedom of expression from the Varieties of Democracy (v-DEM) Institute. v-DEM gives each country a score from 0 (least free) to 1 (most free). The global average weighted by population peaked at 0.65 in the early 2000s, and then again in 2011, before falling to 0.49 in 2021. This is the worst score since 1984, when the cold war was raging and the two sides were propping up dictators on every continent.

The sharpest decline has come in the past decade, and has included several of the most populous countries. China declined from very bad (0.26) in 2011 to atro-

cious (0.08) in 2021. India fell from 0.85 to 0.55; Turkey from 0.54 to 0.15; Egypt from 0.58 to 0.14; Indonesia from 0.83 to 0.68 and Brazil from 0.94 to 0.57. Russia plunged from 0.51 to 0.31 even before the war prompted President Vladimir Putin to crack down more harshly. Ethiopia opened up after 2018, but a civil war means its score for 2022 will be woeful.

Several states still deploy old-fashioned brute force against journalists. In 2021, 488 were behind bars, according to Reporters Without Borders, a non-profit group. Many more were subject to intimidation. "Government agents raided my house and threatened to kill me," says Lucy Kassa, an Ethiopian journalist reporting on atrocities in Tigray. Ms Kassa fled Ethiopia, and, like Ms Rudenko and others, she had no choice but to try new ways of doing journalism. She is continuing to report on Tigray from exile. "I have a strong belief that the truth will find ways to reveal itself, will fight for itself," Ms Kassa says. "And I consider myself as an instrument of that."

Even as press freedom has declined over the past decade, the number of journalists killed on the job has also fallen, from 76 in 2011 to 46 in 2021. That may be because authoritarian leaders are finding they can control the news in less grisly ways. To direct the flow of information, many use state funding and laws purportedly meant to guard state security or even to protect the truth. They often pretend to allow a free press, and tolerate some independent voices to reinforce this claim. But ➤

they use all the power of the state, including new powers granted by advancing technology, to ensure that these voices are barely audible, while pro-regime media are lavishly favoured and funded.

For such leaders, the covid-19 pandemic has been handy. New rules in countries such as Bolivia, Russia and the Philippines punish the spread of “false information” about the virus with jail time. Brazil has restricted access to government data. And reporters working from home, often on unprotected personal devices, are more vulnerable to cyber-attack. A study covering 144 countries suggests that pandemic policies have been used to justify curbs on press freedom in 96 of them.

Financial pressure on independent media can be effective not least because the news industry has been in decline since the 1980s. Advertising has followed readers online, where the duopoly of Google and Meta laps up half of all revenues. PwC, a consultancy, predicts that global newspaper advertising, in print and online, will fall by about 20% between 2019 and 2024.

Against that backdrop, governments can cripple critical outlets by withholding advertising and leaning on private firms to do likewise. Meanwhile, they subsidise more servile competitors. In Mexico President Andrés Manuel López Obrador has squeezed local media by slashing the government advertising budget. The money the state does spend is concentrated with friendly outlets: more than half of its advertising goes to ten media groups, according to one analysis of the 2020 budget. In India advertisers are often frightened to back outlets critical of the ruling party.

Another common trick is for regimes to nudge friendly plutocrats, who often depend on official patronage for their fortunes, to buy up independent media and neuter them. This has happened in Russia, Turkey and Hungary, among other countries. Since Viktor Orbán, Hungary’s prime minister, took office in 2010, his cronies have snapped up private media groups and turned them into ruling-party mouthpieces. Some have donated their media holdings to a pro-government organisation run by former lawmakers for Mr Orbán’s Fidesz party. Called the Central European Press and Media Foundation (KESMA), this conglomerate now controls over 500 outlets. Mr Orbán won a fourth term in office last month, thanks in no small part to his grip on the public’s understanding of reality. The opposition got almost no airtime, except to be denounced as stooges of a Jewish billionaire supposedly conspiring against the Hungarian way of life.

Hungary’s journalists have not given up. Telex, a news site, has a similar origin story to the *Kyiv Independent*. It was founded in Budapest two years ago when more than 80 staff jumped ship from a media

group run by an Orbán ally. “We knew that we cannot rely on advertising revenue, because of the political influence of the advertisement market,” says Veronika Munk, co-founder of Telex. “So we decided, ‘OK, let’s turn to our readers.’”

Telex appealed for donations via YouTube, and to build trust with its audience it began sharing detailed information on revenues and spending online. In the run-up to the recent election, Telex reporting stood in stark contrast to that by government-led groups. Mr Orbán’s team didn’t share details about his campaign events with independent media. It painted the prime minister as a man of the people, posting videos of him pushing his way through crowds of fans, glad-handing. Telex reporters asked readers who learned of coming campaign events to tip them off, then lingered outside. They captured images of Mr Orbán driving through empty streets, closely guarded by security, to speak at tiny invitation-only gatherings.

The story vanishes

Hungary shows how press freedom can be curtailed in a country that is still, more or less, a democracy—critical voices such as Telex reach far fewer people than state-backed propaganda outlets. In truly authoritarian regimes such as China the muzzle is far tighter. Technology has allowed the Communist Party to snoop and censor on a scale and with a precision that would have been extremely hard to achieve without more brute force even a few years ago. It is not just criticism of officials that is off limits. Topics like racism and feminism can be as well. Members of the public can be terrified to speak to reporters. And when reporters and their sources put themselves at risk to produce investigative journalism, sharing those stories can be near impossible. In the midst of a covid lockdown in Shanghai in April, Caixin, a

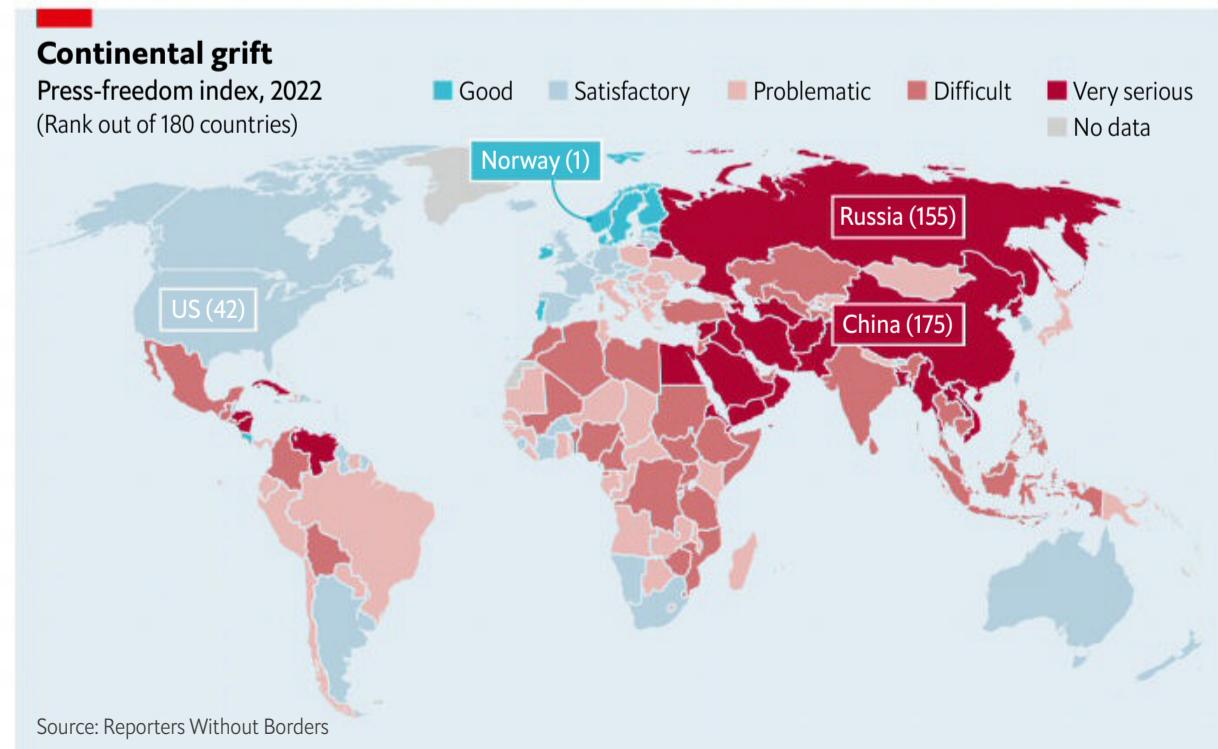
Chinese media group, posted an article exposing hidden deaths at the city’s largest elderly-care hospital. It lasted online for just an hour, then vanished.

This climate of fear is now enveloping Hong Kong, which until recently allowed relatively free speech. A “national security” law introduced in June 2020 threatens severe penalties, including life sentences, for vaguely defined crimes, such as subversion, that journalists might consider just doing their job. “To simply continue at the moment feels like a revolutionary act,” says Tom Grundy, editor of the *Hong Kong Free Press*, the last independent English-language news outlet there. The effect, he says, can be insidious. “You get intrusive thoughts when it comes to, you know, self-censorship,” he says. “You can’t help it. Just cringing when you press publish.”

The Hong Kong authorities’ campaign to shut down *Apple Daily*, a pro-democracy tabloid, and silence its billionaire owner, Jimmy Lai, has provided a template for repressive regimes everywhere. The attack was financial, legal and technological.

Mark Simon, an aide to Mr Lai, says the harassment began more than 20 years ago. The authorities pressed local businessmen to stop advertising with *Apple Daily*. Other independent news outlets were gradually bought out by pro-Beijing tycoons. Executives’ emails were repeatedly hacked. But the real crackdown came with the national security law. Mr Lai was charged with “foreign collusion” and arrested. Police flooded the *Apple Daily* newsroom, seizing laptops and hard drives. The death knell came in June, when the group’s bank accounts were frozen. “It wasn’t death by a thousand cuts,” Mr Simon says. “It was ten whacks.”

The reporters at *Apple Daily* found creative ways to resist, though only for a while. When the Hong Kong police swooped into the newsroom and demanded staff tell them where the servers were,



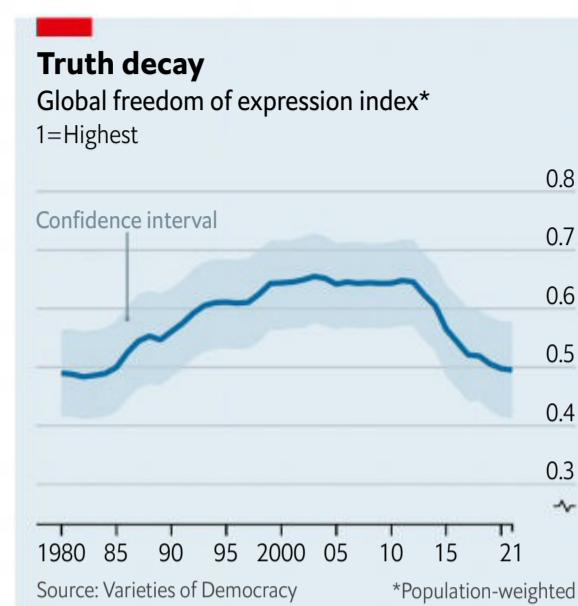
► they were infuriated by the response: "in the cloud". The IT team weren't joking. *Apple Daily* had switched to a secure cloud-based publishing system managed by the *Washington Post*. Meanwhile, female staff took advantage of the fact that the cops were all men, rushing to the restroom and sending the day's stories to editors in Taiwan via Facebook. But then the bank accounts were frozen, and *Apple Daily* folded. When the final issue was printed, Hong Kongers queued at the newsstands and bought a million copies, more than ten times the usual sales.

Another threat to press freedom is common even in places where journalists are generally respected, such as western Europe. Rich and powerful folk with things to hide have found that overstrict libel laws and vaguely drafted privacy rules can be used to deter nosy journalists. "Strategic lawsuits against public participation", or SLAPPS, are claims that aim to exhaust publications' time and resources. Those unable to meet legal costs are forced to take down content and often stop reporting on the individuals suing them.

Daphne Caruana Galizia, a Maltese investigative journalist known as a "one-woman WikiLeaks" for her coverage of corruption and money-laundering, spent almost every day of the last year of her life in court. Even the car-bombing that assassinated her in 2017 did not stop the harassment. Her son, Matthew Caruana Galizia, who with the rest of the family inherited the cases, recalls a hearing just a few days after Ms Galizia died, when the courtroom was filled by top officials; some of them had brought cases against his mother for her reporting. "This was only designed for one thing: to intimidate my family into shutting up," Mr Galizia says.

In a push to stop such misuse of the legal system, the European Commission sketched out new rules in April that would allow reporters to appeal to the courts to have bogus cases thrown out. In European countries, which lag behind places like Canada, Australia and some American states in the development of anti-SLAPP legislation, a group of non-profit groups identified around 570 such potential cases filed between 2010 and 2021. The list is not exhaustive but it does point to a trend: those bringing the cases are often politicians or public servants, and they often target independent journalists.

Like the law, free speech itself, augmented by technology, has been turned against journalists. Social media provide a platform for hate campaigns that can wear down the most hard-nosed correspondent. Women have it particularly bad. A survey last year found almost three-quarters of female journalists have experienced some form of online abuse, including surveillance and threats of sexual violence.



Rana Ayyub, an Indian commentator who loudly admonishes Prime Minister Narendra Modi for stoking anti-Muslim violence, has endured a campaign of intimidation by his supporters. Hindu nationalist trolls have superimposed her face onto pornographic videos, called for her murder, and shared her home address online. Fear of attack has confined Ms Ayyub to her home for long spells. Unable to eat from the anxiety, she has spent days on end in bed and been fed through an intravenous drip. "It's a living, breathing nightmare for me and my family," she says.

Where Putin is winning

As journalism has moved online, governments have found new ways to censor it. China's "great firewall" lets the Communist Party block nearly any content it dislikes. Other regimes sometimes use cruder methods. A report in mid-2021 by Freedom House, a watchdog, found that 20 out of 70 countries had shut down the internet in the previous year to keep their citizens in the dark, typically during periods of unrest. States are increasingly using digital means to snoop on reporters, too. An investigation last year revealed that almost 200 journalists had been targeted by Pegasus spyware, which is sold by an Israeli company to governments across the globe.

Journalists are fighting technology with technology. They conduct interviews on encrypted messaging apps, like Signal or Telegram. To protect whistleblowers with access to important information, they rely on new sharing tools that erase files as soon as a transfer is complete. Ms Kassa, the journalist forced to flee Ethiopia, continues to report on Tigray via the internet. From her new base, which she asked to keep confidential, Ms Kassa conducts interviews with victims and witnesses of atrocities over the phone. She asks a net-

work of locals she has developed, people who are not on the Ethiopian government's radar, to get hold of photographs, videos and health records as evidence. In regions where there is a communications blackout, these so-called fixers go to NGO offices, which are sometimes the only buildings with Wi-Fi connections, to share documents with Ms Kassa via messaging apps. She compares each story against satellite imagery, and she has hired experts to help her spot doctored images. An article that would have taken her one week to report on the ground now takes a month. But, Ms Kassa insists, "there are always ways."

Reporters can be annoying. When they bang on about freedom of the press, they might sound self-serving. But as Timothy Garton Ash, a professor at Oxford University and author of "Free Speech", puts it, "you need these pesky, difficult people." Research shows that where there is freedom of the press there is less corruption. When autocrats distort the news, they force their publics to live in a fantasy world.

Consider Russia. Even as Mr Putin is failing in his war on Ukraine, he is succeeding in mythmaking at home. His propaganda machine is spewing lies, including that war crimes committed by his forces are hoaxes staged by actors, and he has criminalised objective reporting. Victoria Arefyeva, a photojournalist for Sota.Vision, an independent news outlet, faces constant harassment while trying to report on protests: "You begin to realise you can no longer film as before." Those determined to challenge the state narrative must take extreme steps, like Marina Ovsyannikova, a television producer who interrupted a live broadcast on state-owned Channel One holding a sign: "Don't believe the propaganda. They are lying to you here."

Elena Kostyuchenko, an investigative reporter, has been beaten by thugs and has seen four colleagues murdered in her 17 years at *Novaya Gazeta*, a Russian newspaper. She says the new censorship laws are succeeding. Publications like hers have been forced to stop printing and to take down online articles. Even tech-savvy Russians are struggling to reach blocked content now that many Russian bank cards have been disabled, making it tricky to pay for VPN services. "I love my country," Ms Kostyuchenko says, when asked why she would risk jail by reporting there. "It may sound strange, but it's still true."

Perhaps Ms Kassa is right when she says that the truth can fight for itself. But the omens are not good. As government control grows more sophisticated, even the bravest and most innovative journalists are finding it harder to do their jobs. If the steady erosion of press freedom is not reversed, governments will get away with more abuses and everyone will find it harder to understand the world as it is. ■



Technology in China

Alibaba and the 40 officials

SHANGHAI

Can Chinese big tech learn to love Big Brother?

JACK MA, CHINA'S most famous entrepreneur, has not been one to mince his words about the role of government and business. At a meeting with corporate leaders in Bali in 2018 he told the audience that it is not the government that makes business and innovation happen. That is the work of entrepreneurs, he insisted: "They have the ideas and dreams."

A crackdown that began in late 2020 on China's consumer-internet champions has made such inspiring sentiments harder to sustain. For the first time the leading firms' sales growth is slowing. Alibaba's revenues rose by just 10% in the final three months of 2021, the slowest quarterly expansion since going public in 2014. Tencent, an internet-services and video-game Goliath, notched up 8% revenue growth in the same period, its slowest rate as a public company (see chart 1 on next page). JD.com, another e-commerce group, announced solid revenues but Richard Liu, its founder and chairman, resigned in April, one of many high-profile entrepreneurs to do so in the past few years. Local media reported that Meituan, a delivery giant, plans to axe up

to 20% of its employees in its core business units despite its sales rising by 30%. Shares in those four companies, along with Pinduoduo, one more e-commerce group, have shed about \$1.5trn in value since February last year (see chart 2).

The techlash is moving into a new phase. The sorry state of the Chinese economy has forced regulators to delay further planned corporate punishment in the hope that the industry can help recharge growth. In the most positive signal for tech in over a year, the central government said on April 29th that it planned to normalise regulation and to "promote the healthy development of the platform economy". The

share prices of several firms, including Alibaba, soared at the news. But some new rules have been merely put off rather than withdrawn, according to the *Wall Street Journal*. And much damage has already been done. The entrepreneurs behind China's biggest tech successes have come to a grim reckoning: that because of government meddling they will be unable to innovate, and may even become boring.

When Mr Ma celebrated Chinese enterprise in Bali, Alibaba and Tencent were two of China's biggest private investors, pushing into an array of businesses. Acquisitions were giving them an early toehold in hot new areas. Online education and health, media and entertainment, banking and lending services: all were fair game. By 2020 Ant, Alibaba's financial affiliate, had swallowed up 15%, or 1.7trn yuan (\$257bn), of the market for total outstanding consumer loans in China. As Jeff Bezos, founder of Amazon, was buying the *Washington Post*, and Jack Dorsey of Twitter, a social-media group, was launching Block, a payments platform, Mr Ma was scooping up his own media assets and building a finance conglomerate.

American tech bosses are still reshaping and expanding their empires. Mark Zuckerberg, founder of Facebook, is seeking to turn his social-media group into a "metaverse company", bringing virtual reality to the mainstream. Elon Musk, boss of Tesla, an electric-car maker, is buying Twitter. Chinese empire-builders, by contrast, are tempering their ambitions.

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Beijing's regulatory crackdown has greatly discouraged risk-taking. Tencent's foray into online education in 2019 is now a dead end, as is that whole industry, after sweeping new rules were enacted last year on the services that can be offered to school-age pupils. Investors want nothing to do with Chinese fintech after Ant's initial public offering was crushed by Communist Party leaders in late 2020. Forget about massive data-crunching businesses, too, where the government's new framework for control and ownership of personal and financial data will limit private innovation. Online video-games, Tencent's chief revenue-generator, have also come under attack. The government has signalled it will no longer tolerate private investment in news-gathering, putting Mr Ma's media empire at risk. It may even be planning to take small stakes in tech firms in order to guide their development.

The companies' strategies reflect limited options for rapid growth. Take Alibaba and its three core areas of operation: international, such as Lazada, an e-commerce business based in Singapore; within China, dominated by e-commerce; and a tech division that counts cloud computing as its biggest engine of growth.

Alibaba's solution to a long-expected slowdown in Chinese e-commerce as the market becomes saturated has been to move into smaller, poorer cities across the country with the expansion of Taobao Deals, a platform that allows groups of people to buy products at lower cost. The company has recently started playing down this strategy to analysts and investors, who are underwhelmed by its low margins.

Its global business has grown rapidly, mainly thanks to the fast expansion of Lazada. But its retail operations abroad have contributed only about 5% of overall annual revenues since 2017, and are unlikely ever to make up a meaningful part of the Alibaba empire. Its prospects of breaking into developed markets in America and Europe are close to non-existent. Some of that pessimism is based on America's in-

creasing distrust of Chinese companies. In 2018 Ant's attempt to buy an American payments firm was shot down by regulators in Washington on national-security grounds. This has prompted Alibaba to focus more on developing markets with much less spending power.

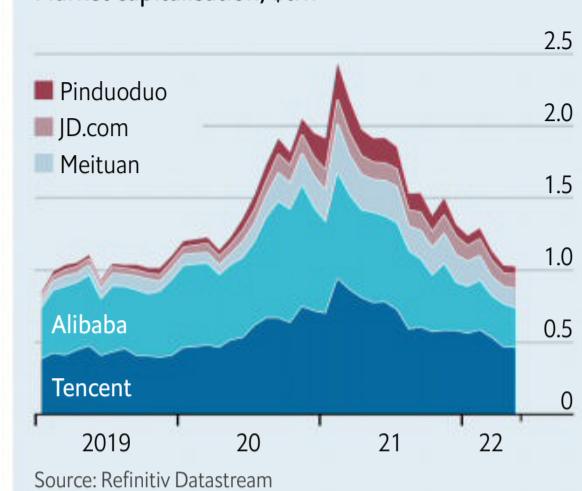
Chinese regulators, too, have clamped down on the tech titans' foreign investments. They have also stepped up prevention of monopolistic behaviour at home, stifling domestic investments. Alibaba was one of China's biggest corporate acquirers in 2018, when it pulled off about \$18bn in mergers and acquisitions. In 2021 that slumped to \$5.7bn, over four-fifths of which was spent within China, according to Refinitiv, a data company. The more acquisitive Tencent's dealmaking was valued at \$20bn last year, down from \$32bn in 2018; the company also sold about \$16bn in shares in JD.com in December, sparking fears that regulators were pushing it to unwind its sprawling empire.

As customary sources of revenue come under further pressure, China's internet giants have gamely talked up a new stage of innovation—one in which their ambitions are defined by the state. The government wants Chinese big tech to make or design semiconductors and artificial-intelligence (AI) software, and run cloud-computing businesses. It has been designating specific areas for companies to pursue, giving a green light for private entrepreneurs to go after the next big thing, as long as it lines up with policy goals. Baidu, best known as China's online-search champion, is the government's first choice for leading AI and autonomous-driving businesses. On April 28th the firm was awarded China's first permit for driverless ride-hailing on public roads.

Many tech firms have taken the hint. Alibaba relies heavily on the success of its cloud-computing division, which leads the market and brought in 8% of total revenue in the last quarter of 2021. In February Daniel Zhang, Alibaba's chief executive, told analysts that cloud computing could

The great fall of China

Market capitalisation, \$trn



be a trillion-yuan business by 2025 and be transformed into his firm's main activity. Tencent and Baidu have large and growing cloud operations, too. Most business-to-business services will one day be dominated by the incumbent tech groups, says Elinor Leung of CLSA, an investment bank.

Such top-down delegation of entrepreneurial activity cannot be completely written off, says David Hsu of the Wharton School in Pennsylvania. State-backed research and development is commonplace in even the most market-driven economies. The momentum building in China may eventually enhance the underlying technologies on which a new wave of enterprise will take root.

Bottling up the genie

Finding state-endorsed technologies to invest in is politically expedient for the largest internet platforms, says Robin Zhu of Bernstein, a broker. Robin Li, Baidu's founder, has embraced his firm's party-picked mission with such zeal that he even wrote a book on autonomous driving last year. Yet even self-driving cars and other state-backed projects will probably fall short of the growth rates to which the companies became accustomed in the heady 2010s.

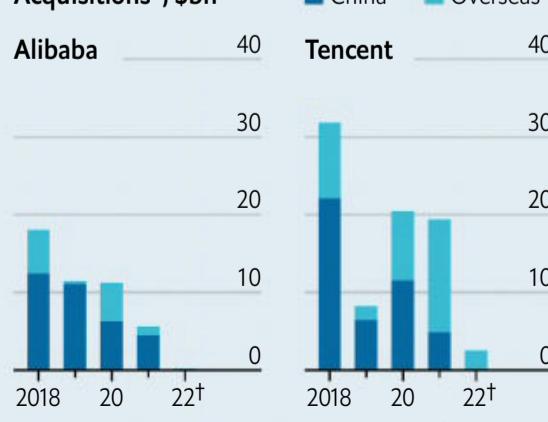
Alibaba is again a case in point. Aliyun, its party-approved cloud business, has suffered big setbacks recently. It lost ByteDance, the owner of TikTok, Western teenagers' favourite time sink, as a customer. A steady stream of state-controlled companies are leaving it for cloud platforms owned by other state groups. China's big telecoms firms, which have competing businesses, are expected to eat up market share in the lower-value-added part of cloud services. There are limits to how much Aliyun can earn in foreign markets, where a distrust of Chinese technology has led to the banishment of tech compatriots such as Huawei, a telecoms-equipment maker. Aliyun's revenues grew by 20% year on year in the last quarter of 2021. Not bad, you might think. But much slower than analysts had anticipated. ■

Deal-breakers

Revenues, % increase on a year earlier



Acquisitions*, \$bn



War and food

Palm roiled

SINGAPORE

Consumer-goods giants risk going hungry

WHEN VLADIMIR PUTIN's tanks rolled into Ukraine in late February, crude-oil markets reacted instantly to the uncertainty and, in short order, to the sanctions imposed on Russia, the world's second-biggest exporter of the black stuff. The war's impact on another set of crucial oils—the edible vegetable fats such as sunflower oil, of which Ukraine and Russia are the world's two biggest exporters—has taken longer to digest. It is now causing heartburn for the consumer-goods giants that use them by the tonne to make everything from snacks to lipstick.

Exports from war-torn Ukraine have all but stopped. Russia has placed an export quota on its sunflower oil. Worries about scarce supplies have led countries including Egypt and Turkey to ban exports of edible oils. And from April 28th Indonesia has banned exports of palm oil, another widely traded variety.

The archipelagic country sold \$18bn-worth of the stuff abroad in 2020, accounting for half of all palm-oil exports. So the move sent prices, which had dipped after the initial war-induced spike, soaring again (see chart). A tonne of palm oil for delivery in May is trading at over \$1,700, 70% higher than the average spot price in 2021. This is piling more inflationary pressure on global producers of consumer goods—and sabotaging their environmental bona fides.

Unilever, a soap-to-soup group, spent \$2.7bn on palm oil last year, around 15% of its total spending on commodities. Procter & Gamble, a similarly sprawling giant, and big packaged-goods firms like Mondelez and Nestlé are in a similar pickle. Everyone

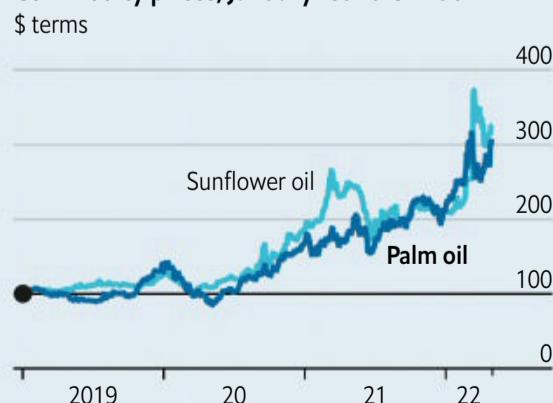
**Fat of the land**

is paying more for soyabean and other alternative oils, too, so substituting one kind for another would bring little financial relief. Investors typically view the big consumer firms as being resilient to economic shocks. But as input prices rise some may be beginning to doubt the companies' ability to pass on the extra costs to shoppers, who are becoming fed up with rising bills.

The ban, which does not have a specified end date, will also complicate the companies' efforts to present themselves as environmentally responsible. Palm-oil production has historically often come at the expense of rainforests, which were razed in places like Indonesia to make room for plantations. Today Nestlé says that 90% of the palm oil it purchased in 2021 was certified as deforestation-free, thanks to close monitoring of supply chains, from the plantation to the port. Such capacity has taken years to develop in Indonesia and will be hard to replicate elsewhere at short notice. If the Swiss giant and its rivals have to resort to buying oils from more opaque places, that could leave a greasy stain on their carefully manicured green reputations. ■

Sizzling markets

Commodity prices, January 1st 2019=100



Sources: S&P Capital IQ; Refinitiv Datastream; OEC

Palm-oil exporters, 2020



Business in Africa

Ottomanpower

ISTANBUL

Turkish builders are taking on the Chinese south of the Sahara

SELMİ BORA has had quite a run. In March his company, Summa, won a contract to rebuild and run Guinea Bissau's new international airport. Months earlier it had completed a 50,000-seat national stadium in Senegal, after less than 18 months of work—a sprint-like pace for such projects. The company's résumé also includes convention centres in the Democratic Republic of Congo and Equatorial Guinea, a sports arena in Rwanda, and airports in Niger, Senegal and Sierra Leone. "Ten years ago we had no projects in Africa outside of Libya," recalls Mr Bora, taking in the view from his office in Istanbul. "Today 99% of our work is in Africa."

Turkey's construction industry is an international heavyweight. Of the world's 250 biggest contractors, 40 are Turkish, behind only China and America. Many have long had a big footprint in north Africa. Of late they have begun making inroads in the continent's south. Last year alone the value of projects undertaken by Turkish builders in sub-Saharan Africa was \$5bn, or 17% of all Turkish building projects abroad, up from a paltry 0.3% before 2008. The region has overtaken Europe (10%) and the Middle East (13%), and is second only to countries of the former Soviet Union. In parts of Africa Turks are even giving Chinese builders, which continue to dominate construction in Africa, a run for their money.

Many of the Turkish construction firms got their African start in Libya in the 2000s, where they locked up billions of dollars in contracts. The toppling of the country's dictator, Muammar Qaddafi, in 2011 and the ensuing civil war forced them to flee. They found new opportunities south of the Sahara, where their reputation regularly preceded them: many African leaders who had visited Libya and admired Turkish projects there were eager to work with the companies responsible for them.

Some assistance for Turkish projects comes from Turkey's export-credit bank and public lenders from Japan. Both countries are, for their own strategic reasons, keen to check Chinese interests in Africa. Still, the Turks concede that they can rarely compete with Chinese rivals on price. "We cannot match the Chinese, because they come in with their own financing and we have to go to the markets," says Basar Arioglu, chairman of Yapı Merkezi, another big construction firm.

The Turkish firms are therefore stress-



Playing footsie with Africa

ing other selling points instead. They tend to work faster than Chinese rivals and to offer superior quality. Having completed a big railway project in Ethiopia a few years ago, Yapi Merkezi more recently beat Chinese rivals to build the first section of a Tanzanian railway connecting Dar es Salaam and Lake Victoria. In December it signed a \$1.9bn deal to build the third section.

The Turks are also happy to comply with African governments' demands to hire local subcontractors and workers, which the Chinese have been more reluctant to do. This is in large part making a virtue out of necessity: whereas Chinese firms can afford to bring their own skilled workers, including engineers, to Africa, Turkish ones often cannot. Since Turkey lacks China's resources to be in all places at once, Mr Arioglu observes, "the only way we can survive in the long run is to become local in all the countries we work in." When Summa began working in Senegal in the 2010s, its workforce was 70% Turkish, remembers Mr Bora. That figure is now down to 30%.

Some Africans still grouse about the Turkish presence in their countries. Like the Chinese, "they come and go," grumbles one official, creating only fleeting jobs. Another complains that the Turks (and other newcomers) invest in construction, mining and ports rather than higher up the value chain, which would do more for Africa's broader economic development. And they could launch more joint ventures with African companies.

Such gripes are, however, outweighed by one last consideration increasingly prized by African governments. "We came at a lucky time," recalls Mr Arioglu, "when both Ethiopia and Tanzania were looking for alternatives to Chinese companies." As more sub-Saharan countries follow suit, being non-Chinese is a Turkish trait that China's builders cannot match. ■

Logistics

Digital decongestants

A flotilla of startups promises to streamline the world's supply chains

FORTO SEEMS an unlikely tech darling. It does not make gadgets, build the metaverse, forge cryptocurrencies or launch rockets. The six-year-old startup from Berlin, whose main business is arranging the transport of cargo from one place to another, has nevertheless managed to raise nearly \$600m from venture capitalists. Its backers reckon the firm can shake up the archaic freight-forwarding industry. It has tripled its business in each of the past four years, boasts Michael Wax, its boss, and is now one of the top ten forwarders in the busy trade lane between China and Germany. In March it announced \$250m in new funding at a valuation of \$2.1bn.

Forto is not the only freight tech startup attracting investors' attention. With the world's supply chains gummed up by bottlenecks, lockdowns and other disruptions, venture-capital (vc) firms are pouring billions into companies offering ways to make freight transport more efficient. In 2021 supply-chain-technology firms raised more than \$62bn, according to PitchBook, a data provider, more than twice the figure in pre-pandemic 2019 (see chart). Of that, nearly \$9bn went to freight-tech startups. PitchBook counts more than a dozen private freight-tech "unicorns", valued at more than \$1bn. Viki Keckarovska of Transport Intelligence, a firm of consultants, expects more funding rounds this year.

Part of the appeal lies in the industry's size and potential for disruption. The freight-forwarding business alone is worth \$475bn in annual revenues, reckons Armstrong & Associates, a supply-chain research and consulting firm. The broader "third-party logistics" market, which includes transport management and warehousing, generates sales of \$1.4trn. At the same time, freight remains technologically backward, especially the cross-border sort. "This industry is completely offline," marvels Zvi Schreiber, boss of Freightos, a digital-freight marketplace. "You would expect that shipping a container would be just as digital as booking a flight," he says, "but it is not at all." Just getting a quote can be a headache. "For 90% of the freight-forwarders today it still takes one or two days to come back with a price," says Mr Wax.

This is starting to change thanks in part to whizzy new software platforms designed to streamline the process of shipping freight overseas. Flexport, a digital freight-forwarder based in San Francisco,

automates many of the supply-chain processes that were traditionally done manually, including getting quotes, filling out documents and co-ordinating with shippers and carriers along the supply chain. The nine-year-old startup, which earned \$3.2bn in revenues in 2021, was recently valued at more than \$8bn. Project44, a supply-chain visibility platform from Chicago, lets retailers and brands monitor milestones in their cargo's journey, such as when it is loaded onto a ship, leaves the port or arrives at its final destination—all in real time. They can also make adjustments or reroute shipments if needed.

One common feature of such platforms is the ability to glean insights from data. Big shippers and logistics providers typically manage their shipments in software known as a transport-management system (tms), which tracks shipments as they make their way along logistics networks, from the factory to the port and finally to the customer. Such systems, which have been around since the late 1980s, are useful databases of information, says Evan Armstrong, president of Armstrong & Associates. But they are not clever. "The first step was getting everything onto a tms. Now the next step is taking those tms and making them intelligent."

Although recent supply-chain snarls-ups have played a part in boosting demand for logistics software, they are not the ➤

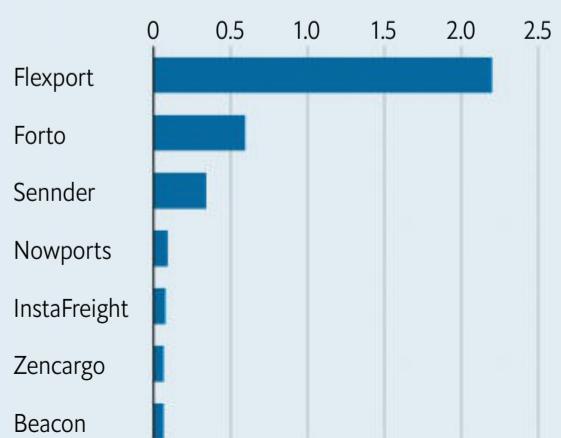
Freighted with feeling

Worldwide venture-capital investments
\$bn



Digital freight-forwarders

Venture-capital investments, 2014-22*, \$bn



Sources: PitchBook; Transport Intelligence

*To April 26th

► main force behind the boom. That, industry-watchers agree, would be Amazon. The e-emporium “is the absolute number-one catalyst for supply-chain transformation, no question”, says Julian Counihan of Schematic Ventures, a vc firm. Whereas the supply chain has historically been seen as a cost centre, Amazon has turned it into a money-maker. With the rise of next-day and same-day delivery, consumers’ expectations have changed dramatically. As shipping times plummet, logistics requires “way, way more supply-chain technology”, says Mr Counihan.

Some scepticism is in order. Many of the startups look little different from the incumbents they are seeking to disrupt. Kuehne + Nagel, a big Swiss freight-forwarder, has invested heavily in digitisation even if it doesn’t “sing and dance that they are a ‘digital’ freight forwarder”, as Mr Schreiber of Freightos freely admits. C.H. Robinson, a big American logistics firm, is “really a digital freight broker”, says Mr Armstrong. And although some of the big incumbents rely on antiquated technology, he adds, they have much more scale than any of the newcomers. That lets them

secure lower prices from ocean liners, air freighters and other carriers.

Still, as Ms Keckarovska points out, the upstarts have a shot. The freight-forwarding market remains highly fragmented, so they need not take on a huge incumbent. DHL and Kuehne + Nagel, the two biggest brokers, have a combined global market share of just 6%. And despite their digital aspirations, the incumbents’ tech nous leaves plenty of room for improvement. Of the 20 biggest established freight-forwarders, 15 apparently use the same off-the-shelf TMS to manage their shipments. ■

Bartleby Suntan lotion, laptop charger

It sounds wonderful. But working from anywhere is only for a lucky few

FOR MOST white-collar workers, it used to be very simple. Home was the place you left in order to go to work. The office was almost certainly the place you were heading to. Co-working spaces were for entrepreneurial people in t-shirts who wanted to hang out with other entrepreneurial people in t-shirts. You could stay at a hotel on a work trip but it was not a place to get actual work done, which is why a hotel’s “business centre” defined all of business as using a printer.

The pandemic has thrown these neat categories up into the air. Most obviously, home is now also a place of work. According to a recent Gallup survey, three-quarters of American workers whose jobs can be performed remotely expect to spend time doing just that in the future. And offices are increasingly where you go to put the company into company—through collaborative work as well as through social activities.

But the boldest version of remote working extends well beyond these two locations. “Working from anywhere” envisages a completely untethered existence, in which people can do their jobs in Alaska or Zanzibar. Plenty of destinations are keen to blur the lines between business and leisure (“bleisure”, the world’s ugliest chunk of word-vomit). Hotels are revamping some of their rooms as offices and rolling out work-from-hotel offers. Entire countries are reinventing themselves as places to mix play and work (“plork”?): the Bahamas, Costa Rica and Malta are among those that offer visas for digital nomads.

The work-from-anywhere world edged a little closer on April 28th, when Brian Chesky, Airbnb’s boss, outlined new policies for employees of the property-renting platform. As well as being able to move wherever they want in their

country of employment without any cost-of-living adjustment, Airbnb staff can also spend up to 90 days each year living and working abroad. Mr Chesky has been living out of Airbnb properties himself for the past few months, and thinks this is the future.

The idea of a globe-trotting existence sounds wonderful. Nevertheless, plenty of barriers remain. Some are practical. The legal, payroll and tax ramifications of working from different locations in the course of a year are an administrative headache (Mr Chesky admits as much, and says that he will open-source Airbnb’s solution to this problem).

Mundane issues like IT support become more complicated when you are abroad. Working from anywhere is only feasible if your equipment functions reliably. If the Wi-Fi at your Airbnb reminds you of what life was like with modems, your options may be limited. If you spill suntan lotion on your laptop, the people on the hotel’s reception desk are more likely to offer you sympathy than a replacement computer.



Another set of obstacles is more personal. The carefree promise of working from anywhere is far easier to realise if you don’t have actual cares. Children of a certain age need to go to school; partners may not be able to work remotely and have careers of their own to manage.

The option to work from anywhere will be most attractive to people who have well-paid jobs and fewer obligations: childless tech workers, say. For many other people, the “anywhere” in working from anywhere will still boil down to a simple choice between their home and their office. That might be a recipe for resentment within teams. Imagine dialling into a Zoom call covered in baby drool, and hearing Greg from product wax lyrical about how amazing Chamonix is at this time of year.

Resentment may even run the other way. Hybrid work has already smudged the boundary between professional and personal lives. Making everywhere a place of work smears them further. Countries that used to be places to get away from it all will become places to bring it all with you. Turning down meetings when you are on a proper vacation is wholly reasonable; it is not an option when you are plonking on a job-liday. Antigua and Barbuda’s tourism slogan, “The beach is just the beginning”, sounds a lot more idyllic if the punchline in your head isn’t, “There’s also the weekly sales review”.

Adding to the menu of working options for sought-after employees makes sense. Mr Chesky’s new policies will probably help him attract better people to Airbnb. They are certainly aligned with the service he is selling. But for the foreseeable future, working from anywhere will be a perk for a lucky few rather than a blueprint for things to come.



Schumpeter | Facebook's retirement plan

What happens when the world's biggest social network becomes its most dodderly?



“WHITE HOT”, a new documentary, traces the rise and fall of Abercrombie & Fitch, an American fashion label that soared in the early 2000s before crashing just as dramatically. The film explores the firm’s obsession with employing a certain type of staff—handsome, chiselled, white—which led to damaging claims of racism and sexual harassment. But just as harmful to Abercrombie was that it became dated. Its low-rise jeans, cropped t-shirts and migraine-inducing cologne, “Fierce”, became inseparably linked with Americans who came of age around the turn of the century. The price of being so closely associated with one generation was that the next wanted nothing to do with it.

Facebook, which took off around the same time, may be experiencing a similar problem. Its millennial identity is embodied in its 37-year-old founder, Mark Zuckerberg, who still wears his college uniform of skinny jeans and hoodie (though these days his hoodies are bespoke). The social network, which began as a way for oversexed Harvard undergraduates to rate each other’s looks, is now seen by youngsters “as a place for people in their 40s and 50s”, in the words of one leaked internal memo. Investors consider Facebook unfashionable, too: its parent company, Meta, has lost 35% of its market value this year, including a plunge of \$232bn in February, the biggest one-day drop in stockmarket history.

Some of Facebook’s problems are overstated. With 2bn daily users, nearly one in three humans, growth was bound to sputter. Its loss of 1m users in the last quarter of 2021—the firm’s first-ever fall—was attributed to a rise in the price of mobile data in India. A decline in European users in the latest quarter followed Meta’s ejection from Russia. Privacy rules introduced by Apple are a more serious problem, expected to cost Meta about \$10bn this year by making it harder to target ads for iPhone users. But the company is devising workarounds. In February it said that since September it had clawed back half of the 15% reduction in its ability to determine ads’ effectiveness. Similarly, it may be better able than most to absorb the cost of new tech rules being written in Europe. Firms like Meta “have a cockroach-like ability to find ways to maintain business as usual”, says Mark Shmulik of Bernstein, a broker.

Yet if these hurdles can be overcome at a price, the ageing of Facebook’s audience seems inexorable. In rich countries, which

matter most to advertisers, young users appear to be drifting away. Frances Haugen, a former Facebook executive, made headlines last year for blowing the whistle on failures of content moderation. But her more telling revelation was that engagement among young Americans had plummeted. In Facebook’s five most important countries, account registrations for under-18s had fallen by a quarter within a year, she said. Independent estimates corroborate her claims. In Britain 18- to 24-year-olds are spending half as much time on Facebook and Instagram, its sister app, as they were four years ago, estimates Enders Analysis, a research firm. Mr Zuckerberg admitted last year that, amid competition from TikTok and others, Facebook had neglected young people: “Our services have gotten dialled to be the best for most people who use them, rather than specifically for young adults.”

In the past, saving the flagship app was Mr Zuckerberg’s priority. After the acquisition of Instagram in 2012, Facebook reportedly limited its adoptive sibling’s ability to hire staff, out of fear that it would cannibalise Facebook’s users—“like the big sister that wants to dress you up for the party but does not want you to be prettier than she is”, in the words of a former Instagram executive quoted in “No Filter”, a book by Sarah Frier. Today Mr Zuckerberg seems willing to sacrifice his first-born to protect the wider business. Efforts to attract young people have focused on other apps, such as Messenger Kids and Instagram Kids (which was shelved last year). Reels, Meta’s TikTok clone, was rolled out first on Instagram. Last year Mr Zuckerberg even dropped the Facebook name from his company, the better to insulate the business from its least fashionable brand. Where once Mr Zuckerberg’s obsession was repairing the ageing Facebook mothership, now he is scrambling lifeboats in all directions: four new virtual-reality headsets are expected in the next two years, as well as a smart watch.

The Face that launched a thousand shops

That is the right thing to do. But it raises the question of what will become of the world’s biggest social network as it begins to decay. Once-mighty sites like MySpace endure, like abandoned digital ruins. Far in the future, will Facebook, too, become a ghost town?

Not necessarily. Young users are unlikely ever to return to Facebook for social networking, which they increasingly do on apps like Snapchat or BeReal, a photo-messaging service that is spreading on college campuses. But networking is only one function of social media. People also use it to be entertained, and increasingly to buy things. Facebook is losing its appeal as a place to socialise, but it may reinvent itself as a platform for other activities.

In entertainment, TikTok is well ahead. Meta’s first attempt to copy it, with Lasso, in 2018, failed. But having proved a hit on Instagram, where it accounts for 20% of time spent, Reels is building an audience on Facebook, too. Facebook’s newsfeed is being revamped along TikTokian lines, to recommend content suggested by artificial intelligence, whether or not it was posted by a friend. Facebook has long run an eBay-esque Marketplace, and in the pandemic launched Shops, to bring more e-commerce onto its own platform. Its latest earnings call promised investment in a service to let users send messages to companies through ads.

Abercrombie has dropped its elitist style in favour of “championing inclusivity and creating a sense of belonging”. Half-naked hunks are out, replaced by plus-size models in comfy athleisure wear, and last year revenue was back to 80% of its peak. Facebook will likewise never be cool again. But there is plenty of less glamorous money to be made. ■

**Quantitative tightening**

Braced for impact

NEW YORK

The Fed's balance-sheet is about to shrink fast. Is the giant market for Treasury bonds ready?

CONSIDER THE life of a Treasury bill or bond. Typically once or twice a week, a batch of fresh Treasuries are born. Their first home is usually, briefly, an investment bank's dealing desk. Those dealers might hold on to a few for themselves, but generally they distribute the bulk to more permanent owners, like the bond portfolios of a mutual fund, a foreign government or a company or the Federal Reserve. A certain slice will swap hands repeatedly—some \$700bn or so are traded each business day—but many will stay put for their lifetimes. Their deaths are predetermined: they come of age, or “mature”, as little as one month or as long as 30 years after their birth, at which point they are settled and cease to exist.

The Fed is the single largest holder of Treasuries—its balance-sheet is where many of those securities have found their permanent home. Thanks to bond-buying schemes put in place to ease monetary conditions during the pandemic, the Fed now holds some \$5.8trn-worth of Treasuries, a quarter of the \$23.2trn-worth the government has issued (see chart on the next

page—it also holds \$2.7trn-worth of mortgage-backed securities). On May 4th, however, Jerome Powell, the chairman of the Fed, said it would start shrinking this giant portfolio, a process known as “quantitative tightening” (QT), in June. The reversal could spark a repeat of the temporary, yet troubling breakdowns that the world's most important financial market has suffered in recent years—on a bigger scale.

According to the policy statement released on May 4th, the Fed will reduce its

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balance-sheet not by actively making sales, but by letting bonds that have reached the end of their lives mature without buying a new bill or bond to replace them. By September, if all has gone to plan, the Fed's portfolio will be shrinking by \$95bn a month, split between \$60bn of Treasuries and \$35bn of mortgage-backed bonds. At that pace the Fed's balance-sheet will shrivel by more than \$1trn over the next year. That is “quite the clip”, says Darrell Duffie of Stanford University.

There are two reasons why investors and policymakers are watching QT closely. The first is its potentially vast impact on monetary policy. Estimates of the effect of bond-buying on the cost of money vary—but any downward pressure on interest rates exerted as the Fed bought up Treasuries is likely to be reversed as its holdings start to ebb. Two-year Treasury yields have already climbed from 0.8% in January 2022 to 2.7% as investors have come to expect quicker balance-sheet shrinking and faster rate increases. On May 4th Mr Powell announced a 50-basis-point rate rise, the first increase of that size since 2000, and signalled more would be “on the table at the next couple of meetings”.

It is also possible that QT will cause the Treasury market to malfunction—the second reason for concern. Its smooth running matters well beyond America: Treasury rates are a crucial benchmark for pricing virtually all other financial assets globally. And recent history is not encouraging. A series of episodes—including the “flash

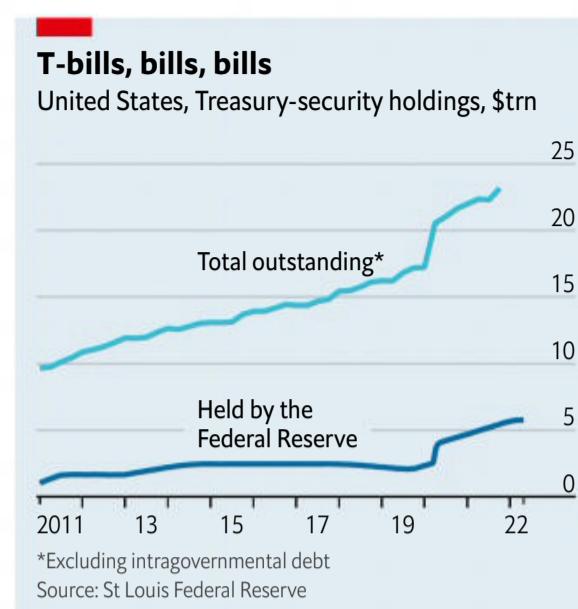
► rally" of 2014; stress in the repo market (a key money market where Treasuries can be swapped for cash) in September 2019; and the covid-19 shock of March 2020, in which the Treasury market in effect ceased to function for periods of time—have created serious doubts about how robust the Treasury market is.

Each of the episodes had slightly different causes. Regardless of the robustness of the Treasury market, there was little that would have stopped the extreme nature of the covid-19 shock from rocking it. The repo crisis was in part the result of some perverse incentives caused by post-crisis regulation that deterred banks from holding Treasuries. But both were exacerbated by a deeper issue, says Randal Quarles, a former vice-chair for supervision at the Fed, which is that the Treasury market "has grown out of its waist size".

A combination of financial-crisis stimulus, fiscal deficits under President Trump and pandemic-era splurge have caused the Treasury market to grow nearly five-fold since 2007. At the same time fresh regulation imposed on investment banks, which are the main conduits in Treasury markets, such as the introduction of the supplemental-leverage ratio, which measures the total size of bank assets relative to the amount of capital they hold, has restricted their ability to facilitate Treasury-market activity. The rule is not very friendly to low-risk activities, such as holding Treasuries. A report released last year by the Group of Thirty, an economics advisory body, warned that "the aggregate amount of capital allocated to market-making by bank-affiliated dealers has not kept pace" with its lightning growth.

To combat issues that have cropped up in the past the Fed has taken measures to increase liquidity, such as opening up a "standing facility" for selected intermediaries to swap Treasuries for cash. But few think that this is a panacea for dysfunction. Mr Duffie favours replacing the current market structure, which relies on broker-dealers, with a central-clearing system. This would make it easier for market participants to interact directly—for one mutual fund, say, to sell to another without relying on a bank to intermediate the transaction. But the fix would be no match for "the scale of the problem", says Mr Quarles. A more urgent task, he argues, is to loosen the regulatory shackles hampering investment banks from supporting the market. That is unlikely to happen soon: there is little appetite in Washington for weakening bank regulation.

In the absence of an obvious fix, the unknowable fallout from the Fed's pull-out is adding to the uncertainty created by rising rates, stagflation and geopolitical ructions. Liquidity in the Treasury market is already thinning: the "yield error" captured by the



Bloomberg Treasury liquidity index, which measures the difference between the yield a Treasury is traded at and a measure of fair value, is 12% higher than it was in January. It has more than doubled since August 2021. The growing possibility of renewed dysfunction could deter investors from dealing further, making it yet likelier that the market seizes up. The once-placid life of Treasury bills and bonds could get more chaotic for a while. ■

Chinese stocks

Flee market

SHANGHAI

China's erratic policies are terrifying investors

ON MAY 3RD investors in Chinese stocks woke up to the news that Jack Ma, the co-founder of e-commerce giant Alibaba, had been arrested on national-security charges. Or so many of them thought. State media were reporting that a tech worker with the surname Ma had been detained in the city of Hangzhou. The description seemed to fit that of the billionaire tech magnate, whose companies are based in Hangzhou and have been subject to a regulatory onslaught over the past year. The speculation, it rapidly turned out, was wrong (Ma is a common family name in China). But not before Alibaba shares dipped 9%, temporarily wiping out more than \$25bn in the firm's market value.

The incident shows how fragile market sentiment has become in China. Beijing's unpredictable, often-shocking policy swerves in recent years have made it all the more conceivable that the country's most prominent entrepreneur could suddenly be accused of attempting to "split the country and subvert the state". President Xi Jinping's increasingly ideological campaign to rid China of the Omicron variant

of covid-19 is threatening to throttle economic growth this year. His unwavering support for Russia, even as Vladimir Putin commits war crimes in Ukraine, has further fuelled the perception that the country's leaders, once known for their pragmatism, are faltering.

The shift has been punctuated by gloomy comments from prominent experts who until very recently remained upbeat on China. Stephen Roach, the former Asia chairman of Morgan Stanley, a bank, has long defended Chinese policy. But in a recent article in *Project Syndicate*, an online publication, he said "the China cushion", the economic might that helped power the world through the global financial crisis in 2008, had "deflated". Shan Weijian, the chief executive of PAG, a Hong Kong-based private-equity firm, recently told investors the Chinese economy "at this moment is in the worst shape in the past 30 years", the *Financial Times* reported.

Some use harsher language—and are getting punished for it. Joerg Wuttke, the head of the European chamber of commerce in China, last week suggested in an interview with a Swiss website that China's zero-covid strategy has put many decision-makers in "self-destruction mode". Hong Hao, an outspoken analyst at Bank of Communications, a state lender, recently had a Chinese social media account frozen after he published a negative outlook on the economy. He has now left the bank.

Much of the darkening sentiment has been focused on Mr Xi's covid strategy. Closing down Shanghai, China's business and financial hub, seemed unimaginable only a few months ago. But the city of 25m has undergone a strict lockdown since April 1st. Flare-ups of covid in Beijing and other cities have prompted targeted lockdowns. A regime of testing for the virus is quickly becoming part of everyday life.

The costs of controlling the spread of Omicron are becoming apparent. Factory activity has suffered dearly and strains on shipping and logistics are rippling through global supply chains. The central govern-



ment has mandated that it must hit its GDP growth target of 5.5% but many analysts have downgraded their outlook for economic activity in the country this year. Some economists believe real growth in China in 2022 will only reach 2% (even if official statistics say otherwise).

Markets have reflected the gloomy sentiment. The Shanghai Composite Index is down by about 7% in a month. It dipped below 3,000 points in late April, a threshold it had not gone under since July 2020. Investors have dumped yuan-denominated securities at a record pace (see chart).

The state is fighting back against plummeting confidence. At a meeting on April 29th the Politburo, a top decision-making

body, pledged to increase investment in infrastructure this year in order to boost growth. Leaders also said they would normalise regulation and support the development of internet-consumer companies, such as Alibaba and Tencent. The statement marks the first strong sign of central support for such groups since the start of a regulatory crackdown that began in 2020.

Politburo memos are usually released after Chinese markets close. This one dropped while stocks were still trading, leading to a surge in share prices for some tech groups. This was probably done intentionally in the hope of a positive market response amid a sea of doom, gloom and mounting panic. ■

Russia's economy

'Tis but a flesh wound

Russia's economy is back on its feet

IN EARLY APRIL we pointed to preliminary evidence that the Russian economy was defying predictions of collapse, even as Western countries introduced unprecedented sanctions. Recent data further support this view. Helped along by capital controls and high interest rates, the rouble is now as valuable as it was before Russia's invasion of Ukraine in late February (see top chart). Russia appears to be keeping up with payments of its foreign-currency bonds.

The real economy is surprisingly resilient too. True, Russian consumer prices have risen by more than 10% since the beginning of the year, as the rouble's initial depreciation made imports more expensive and many Western companies pulled out, reducing supply. The number of firms late on their wage payments seems to be growing.

But "real-time" measures of Russian economic activity are largely holding up. Total electricity consumption has fallen only a smidge. After a lull in March, Russians seem to be spending fairly freely on cafés, bars and restaurants, according to a spending tracker run by Sberbank, Russia's largest bank. On April 29th the central bank lowered its key interest rate from 17% to 14%, a sign that a financial panic which began in February has eased slightly. The Russian economy is undoubtedly shrinking (see bottom chart), but some economists' predictions of a GDP decline of up to 15% this year are starting to look pessimistic.

Even before the invasion Russia was a fairly closed economy, limiting sanctions' bite. But the biggest reason for the economy's resilience relates to fossil fuels. Since the invasion Russia has

exported at least \$65bn-worth of fossil fuels via shipments and pipelines, suggests the Centre for Research on Energy and Clean Air, a think-tank in Finland. In the first quarter of 2022 the government's revenues from hydrocarbons rose by over 80% year on year. On May 4th the European Commission proposed a ban on imports of all Russian oil that would come into full force by the end of the year. Until then, expect the Russian economy to continue to trundle along.

Fuel in the tank

Roubles per \$, 2022, inverted scale



Current economic-activity indicator*

% change, annualised



*High-frequency measure of economic activity
Sources: Refinitiv Datastream; Goldman Sachs

India's largest IPO

Selling off the piggy bank

MUMBAI

India begins the privatisation of its huge life-insurance company

IN 1956, AS part of its experiment with embracing socialism, India created the Life Insurance Company of India (LIC) by nationalising and lumping together 245 firms. The experiment took a while to conclude. In 2000 India allowed private firms to sell life insurance again. Two decades later it is selling a 3.5% sliver of LIC on the public market, a first step in what is intended to be a full privatisation. Orders will be taken from investors between May 4th and May 9th. Trading is due to commence on May 17th.

The scale of LIC is such that the sale of even this trivial stake will bring in \$2.7bn, making it the fifth-largest public offering of the year globally and the largest in India's history. One of the reasons stated by the company for such a small percentage being sold is that selling more might crowd out investment in other private and public firms in the country's capital-constrained market. Out of similar concerns, market regulators are already considering waiving a provision that currently requires the dominant shareholder of a listed firm to reduce its ownership stake below 75% within five years.

Once listed, LIC will have a market valuation of around \$80bn, making it the fifth-most-valuable life insurer in the world. Yet more striking is how thoroughly LIC dominates the Indian market. Its utter supremacy has no equivalent in any other major country: LIC has a staggering 286m policies in force and collects 64% of all of India's written premiums (the share of the largest insurer in Britain is 23%; in China it is 21%). The firm has \$507bn in assets under management, triple the amount of its 23 private competitors combined.

Although such dominance gives the firm and its products unmatched scale—a big advantage in an industry that runs on trust—the 659-page listing prospectus makes it clear that there are cracks in LIC's armour. Premiums have been growing by 9% annually over the past five years, a good performance but one that pales in comparison to its Indian competitors, many of which have been growing at twice that rate.

And government ties may come with costs. Investors have long suspected that LIC is often required to invest at least some of its river of premiums in the interests of the state rather than in the pursuit of profits, quietly seeding problems. Included in the prospectus's 47 pages of risk factors are



Making an entry

► LIC's large investment in IL&FS, a government-supported infrastructure-investment fund that went spectacularly bust in 2018, and its majority stake in another formerly government-controlled entity, IDBI Bank, which it bought as its contribution to a 2019 bail-out. Also featured are equity investments purchased over the years for 8.8bn rupees (\$115m), currently valued at 2bn, and debt investments of 113bn rupees, 54bn of which are classified as non-performing assets.

A public listing, and the transparency that must accompany it, may alter this approach. But concerns about hidden problems and continued interference by the government are worrying investors, which helps to explain why the offering is being priced so low. Until recently there had been expectations that LIC would be valued at three times its "Indian Embedded Value", an approach based on the present value of future profits derived from expected premiums, like most other Indian private insurance firms. Instead LIC shares are likely to be sold at only 1.1 times, suggesting buyers have serious reservations.

Still, in time, the most salient detail about the listing may have nothing to do with price and size and everything to do with the fact that it happened at all. When the newly reelected administration of Narendra Modi first proposed a public sale of a stake in LIC, in early 2020, it was derided as an empty political promise. Highly publicised efforts to flog other state-controlled assets, most notably Air India, had flopped multiple times. In October of that year, however, Air India was finally sold—to Tata Group, from which it had been seized in 1953. LIC's return to the markets after almost as long a gap is not without snags. But it suggests a cycle may have genuinely, if not entirely, come to an end. ■

Apple Pay Tap dance

Trustbusters take aim at Apple's clout in contactless payments

THERE IS NOT yet an app to keep track of the growing number of antitrust complaints against Apple. But perhaps there should be. On May 2nd the European Commission, the EU's executive arm, added another to the pile. Following an investigation begun in 2020, it sent the smartphone-maker a "statement of objections", saying that, in the commission's view, Apple is abusing its power in the market for smartphone payments.

At issue is Apple Pay, a contactless-payment service introduced in 2014. Apple Pay uses a specialised radio called a Near-Field Communication (NFC) chip to allow an iPhone to work like a contactless credit card. Users who have loaded their banking details onto their phones can wave them at contactless-payment terminals to pay for things. Apple collects a fee from the user's bank for each transaction.

The service has quickly become popular: in 2020 Bernstein, a financial firm, estimated Apple Pay accounted for about 5% of global card transactions, and forecast that it might reach 10% by 2025. The problem, in the commission's view, is that iOS, the operating system used by iPhones, allows only Apple's own mobile-wallet software to make use of the NFC chip. That freezes out rivals who might want to build competing payment apps of their own. Android, a rival smartphone operating system maintained by Google, does allow third-party apps access to a phone's NFC chip, meaning that Android users can choose contactless-capable smart wallets from firms such as Google, Samsung, PayPal and others.

The commission's findings are only preliminary. But if a full investigation comes to the same conclusion, Apple would be in breach of European competition laws, and exposed—at least in theory—to fines of up to 10% of its worldwide turnover. The firm will have further chances to argue its corner before the commission issues a final decision, a process that could take many months.

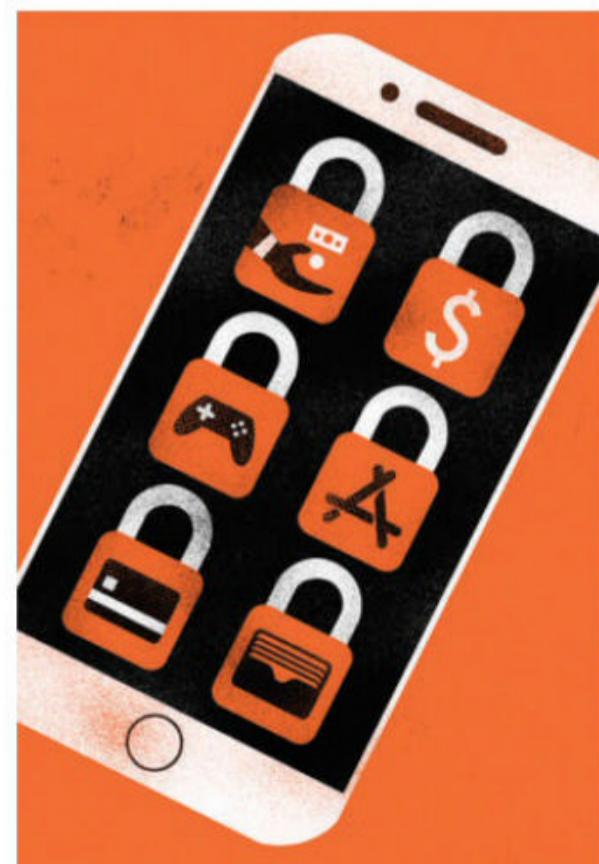
The antitrust probe is the latest in a string of attacks on Apple's business model by app developers, rival firms and governments. Apple runs the iPhone as a "walled garden", in which the firm imposes tight controls on which apps are allowed to run on its devices, and on what those apps are allowed to do. Apple says its restrictions are there for the privacy and security of its

users, an argument it has repeated in response to the commission's allegations.

Others, though, allege less noble motives. In 2020 Epic Games, the maker of "Fortnite", a popular video game, and "Unreal", a software engine on which hundreds of other video games are built, sued Apple, claiming that its refusal to allow rival firms to process payments made from within apps was anticompetitive. (Epic had wanted to offer Fortnite players a rival, cheaper payment system.) After losing the initial case, Epic has appealed—this time with support from Microsoft, America's Department of Justice and 35 individual states.

Similar complaints by Spotify, a music-streaming firm, helped prompt another EU antitrust investigation in 2020; a third is under way in Britain. Following a complaint from Match Group, an operator of dating sites, Dutch trustbusters found Apple's in-app payments policies to be anticompetitive in October. They fined the firm €5m a week every week between January and March 28th (when it reached the €50m maximum fine, a cap the watchdogs have not yet raised).

Investigations and court cases, of course, are not foregone conclusions. But even if Apple wins some battles, it could still lose the war. On March 24th the EU agreed the text of the Digital Markets Act (DMA), a bumper piece of legislation designed to force big tech firms to open their platforms up to competition. One of its themes is to try to forbid companies from giving preferential treatment to their own apps and services. The DMA would require Apple to allow users to install apps from places other than Apple's own App Store, and force it to allow rivals to provide in-app payment tools of their own. The walls are not looking as solid as they were. ■



Japan's currency

Land of the crashing yen

TOKYO

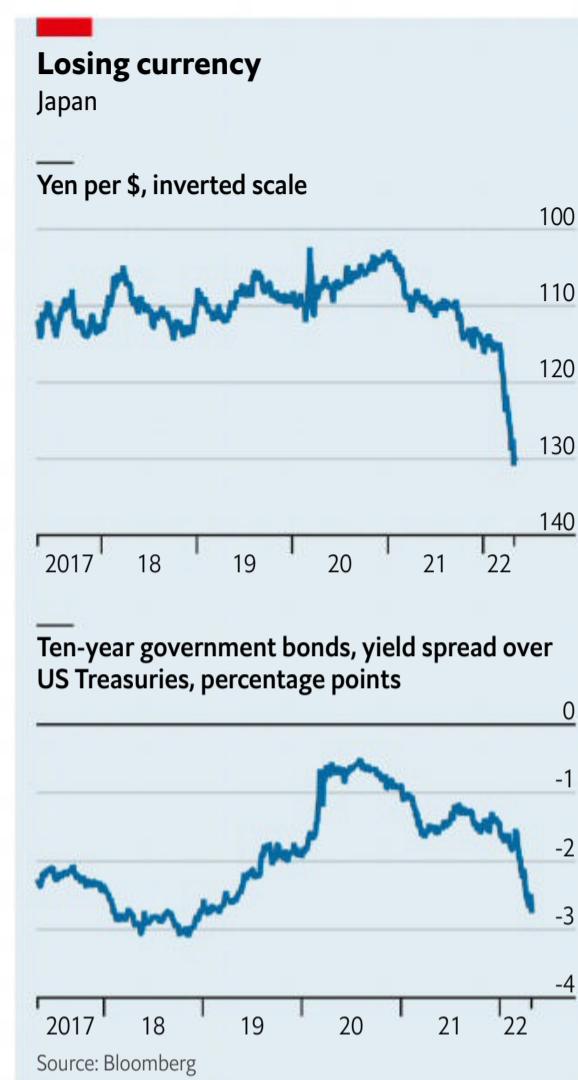
Will an ever feebler currency save or sink Japan's economy?

THE LAST time the Japanese yen dipped below 130 to the American dollar, in 2002, China's economy was smaller than France's, Vladimir Putin was meeting Western officials with a smile, and Eminem, a rapper, was atop the pop-music charts. The yen's slide to that abyss, first reached on April 28th and then every day since, has been precipitous: it stood at just 115 to the dollar at the start of this year. Japanese policymakers have begun to fret, leading markets to speculate about whether they will intervene to halt the fall. That would probably prove futile: deep forces are driving the yen's depreciation.

The most important one is the widening gap in interest rates between Japan and America (see chart). While prices have risen sharply in America, inflation in Japan has remained below the Bank of Japan's (BOJ) 2% target. And though inflation may touch that mark later this year, the BOJ reckons it is being fuelled by one-off increases in costs; idiosyncrasies of Japan's labour market have meant limited wage growth. As a result, even as the Federal Reserve has begun tightening rates, the BOJ has maintained its ultra-loose stance. At a monetary-policy meeting last week, the BOJ reaffirmed that direction, pledging to keep buying ten-year bonds to help control the yield curve. With more money to be made holding American bonds than Japanese ones, investors have snubbed the latter, dampening demand for the yen.

Trade also plays a role in the yen's woes. Japan's current-account balance went into the red in December. Rising import costs (which the Ukraine crisis has made worse) have been the main culprit: fuel and raw materials make up roughly one-third of Japan's import bill. In order to buy pricier foreign goods, importers have been forced to sell more yen. Japan's borders have remained closed to inbound tourism due to the pandemic, further weakening Japan's balance of payments.

Policymakers have traditionally seen a weak yen as a positive for Japan and its powerful export-focused industries. Some still do. They also now hope a bit of cost-push inflation may help to break Japan's entrenched deflationary mindset and to force zombie firms out of the market. Yet the yen has sunk to such lows that concerns are mounting. Consumers are getting squeezed by rising import prices; the government announced another fiscal-



stimulus package in April to ease the pain ahead of upper-house elections expected for July. Business sentiment has also turned, even in the manufacturing sectors, says Baba Naohiko of Goldman Sachs, an investment bank.

One reason is Japanese firms' gradual but sustained efforts to mitigate the risks of currency appreciation by offshoring production. "The flip side," Mr Baba says, "is that they can't reap as many benefits from depreciation." The stuff that is still exported from Japan tends to be high-value-added goods, which tend to be less responsive to changes in exchange rates. The pandemic and supply-chain snags have also hampered the export of some of these products, such as automobiles.

Some reckon the yen could continue falling, perhaps to 150 to the dollar, a level unseen even during the Asian financial crisis of 1997-98 (when it fell to 147 to the greenback). Inside the BOJ, some have argued for shortening the target of the yield-curve control policy from ten-year bonds to five-year ones, a form of soft tightening, but that seems unlikely in the remainder of the term of the current governor, Kuroda Haruhiko, which runs until April 2023. A turning point might come when Japan reopens to foreign tourists, as expected following the elections. Ultimately though, argues Jesper Koll of Monex Group, a financial-services firm, "the yen's fall from grace will stop and reverse exactly when Japanese investors begin buying their mother markets." ■

Lebanon's banking crisis

Zombie defence

BEIRUT

Desperate Lebanese depositors take their banks to court, with little success

THIS WAS not how Rebecca Ego planned to use her law degree. In 2020 she was accepted into a master's programme in America. It would cost \$20,000 after scholarships, a sum she had in the bank. In Lebanon, though, getting money out of the bank is almost impossible: lenders have imposed harsh, arbitrary capital controls amid a financial crisis. Ms Ego was told she could not withdraw her funds.

Like hundreds of Lebanese, she sued her bank for breach of contract. The case has languished for two years. One of her banks subsequently shut her account, cashing out her savings in a cheque no other bank will accept. "There's no legal basis for any of this," she says. "But there's no judge who will say that."

For almost three years, Lebanon's banks have been zombies. The crisis dates to 1997, when the central bank, the Banque du Liban, pegged the pound at 1,500 to the dollar. It sustained the peg by borrowing dollars from commercial banks at double-digit interest rates, a state-run Ponzi scheme that unravelled in 2019.

Lebanon defaulted the following year. Losses in the financial sector are estimated at \$68bn (130% of pre-crisis GDP). Earlier this year the pound sank as low as 34,000 on the parallel market, a 96% depreciation.

On April 7th the IMF reached a deal with Lebanon, which could include a \$3bn loan. Before the fund's board votes on the package, though, it wants the Lebanese government to take steps to restructure the financial sector, such as by passing a law strengthening capital controls. Parliament has dithered on the matter for two years. A vote planned for April 20th was postponed. With parliamentary elections set for May 15th, it is unclear when it might happen.

The vacuum has left banks to impose their own rules. Most depositors can access only small sums in pounds. Withdrawals from dollar accounts use unfavourable rates.

Local courts offer little relief. The Depositors Union, which represents thousands of savers, reckons there have been more than 300 lawsuits against banks to date. Only a handful have been resolved.

Foreign judges have been more expeditious. In December a French court ordered Saradar Bank to pay \$2.8m to a customer in Paris. In February a court in London handed down a similar judgment in favour of a Lebanese-British businessman. Bank Au- ►

► di, one of the lenders ordered to transfer him money, warned that the ruling would lead to “unequal treatment” of depositors.

To show its commitment to fairness, Bank Audi has shut dozens of accounts held by British citizens or residents. So has at least one other lender. Depositors say they were offered a chance to reopen their accounts if they signed a contract that waived their right to sue and stipulated they could not make transfers abroad. Otherwise, their balances would be paid out in a cheque, all but useless in a country with a defunct banking system.

A few have tried more desperate measures. In January the owner of a café in the eastern Bekaa valley doused his bank's lobby in petrol and demanded \$50,000 from his account. He got his money (his sister says he signed a receipt). Some Lebanese cheered his boldness. Others saw a symptom of everything that ails their country, where force trumps the rule of law.

The lawsuits may soon have little effect: the capital-controls law would void them. “It's like an amnesty for bankers,” says Fouad Debs of the Depositors Union.

The government has proposed guaran-

teeing accounts under \$100,000, though depositors may have to wait up to eight years to withdraw their full savings. Larger balances would receive a haircut.

Even if Lebanon's banks escape a legal reckoning, their industry seems wrecked for a generation. Lebanon has become a cash economy. Many businesses no longer accept card payments. The sprawling diaspora, which once poured billions into Lebanese lenders, will probably keep its money abroad. “If we don't see banks pay the price for what happened,” says Ms Ego, “we can never trust them again.” ■

Buttonwood Bond villains

Who wins from carnage in the credit markets?

THE FIRST rule of investment, according to Warren Buffett, is not to lose money. The second rule is not to forget the first. That is true for no one more than bond-fund managers, whose job is to shelter their clients' money from volatility while eking out what returns they can. The bloodbath in bond markets so far this year—America's have had their worst quarter since 2008, and Europe's their biggest-ever peak-to-trough plunge—ought to be the ultimate nightmare for such timorous investors. Instead many are sighing in relief.

After a brutal but brief crash when the world shut down in March 2020, and until the end of last year, rule number one was pretty easy to follow. Central banks were pumping \$11trn of new funds into the markets via quantitative easing and keeping interest rates at rock bottom. Governments offered unprecedented fiscal support for businesses to stop them going bust.

The corollary was that the best thing for bond investors to do was to close their eyes and lend. Quibbling about trivia like the state of the borrower's balance-sheet or capital discipline seemed like a quaint tradition. In general, high-risk, high-yield debt performed best. Yet the market's foremost trait was “low dispersion”: a tendency for returns across sectors, issuers and credit-rating bands to be unusually similar.

There is plenty of money to be made in such a market, which a credit strategist at a Wall Street bank describes as “a rising tide lifting all boats”. But it is awkward for active fund managers, whose craft is to use financial nous to select particular bonds hoping they will beat the broader market. Measured by monthly returns between January and October 2021, for instance, around 95% of

America's corporate bonds performed better than Treasuries, with the lion's share clustered together. That made it hard for prudent bondpickers to stand out.

Yet this state of affairs has started to reverse—and dispersion is back with a vengeance, the strategist says. The successful roll-out of covid-19 vaccinations last year had already “squeezed the excess juice” out of those few sectors, like travel and leisure, whose debt was not already at a high valuation, reducing its potential to appreciate further. Now headwinds, from inflation and snarled-up supply chains to recession risk and the withdrawal of easy money, are blowing against borrowers, clouding the outlook further.

These hindrances are so broad that few companies are able to avoid them. But firms differ widely in their ability to cope. Take inflation. Businesses with rock-solid brands and unassailable market shares, like Coca-Cola or Nestlé, have had little trouble increasing their prices to mitigate rising costs. Other companies—Netflix, for example—have suffered.

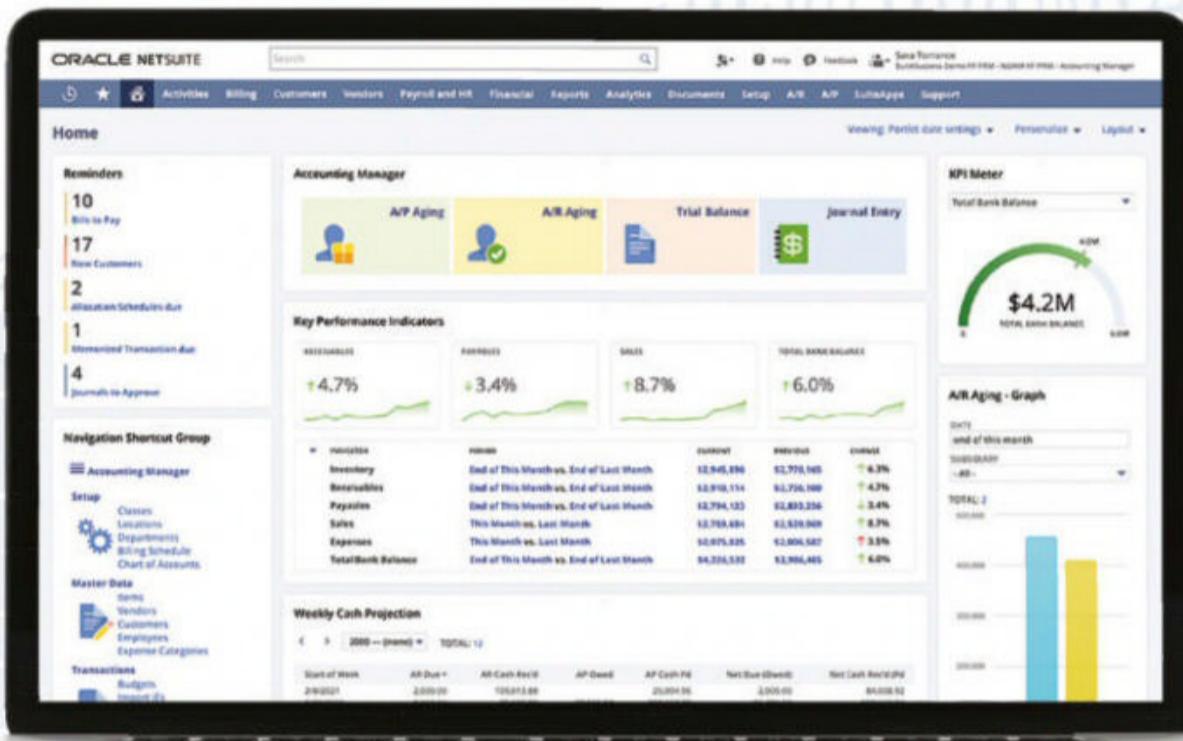
Such variation in pricing power

spreads well beyond consumer-facing sectors: commodity producers in general are much better positioned to face down ballooning energy and metals prices than commodity purchasers. Those commodity producers that are less exposed to Chinese lockdowns—energy firms as opposed to miners, for instance—are better placed still. At the other end lie industries such as carmaking, vulnerable to both supply-chain snags and recession-induced damage to consumer sentiment.

This adds up to a minefield for investors, whatever their asset class. For bondpickers, divergence will be further fuelled by a withdrawal of liquidity from the market. On June 1st the Federal Reserve will begin winding down its \$5.8trn portfolio of Treasuries; by September, it intends to be shrinking it by \$60bn a month. That amounts to the disappearance of an annual buyer of 3% of publicly held Treasuries, whose yields are thus likely to rise. As a result corporate borrowers will have to work harder to convince investors to buy their debt rather than seek the safety of government paper. Such a buyers' market means more scrutiny of debt issuers, and more variance in the yields they have to offer.

Active bond investors—or, at least, those who are any good—will benefit from this renewed emphasis on fundamentals. But they will not be the only ones. Financial markets derive their value to society from their ability to allocate capital to those best placed to make a return on it. A rising tide may lift all boats, but by diluting the incentive to discriminate between borrowers it reduces the efficiency of that allocation. A credit market that makes more of a distinction between winners and losers is one step towards restoring it.





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A calming explanation for why economic progress often disappoints



FROM THE point of view of the 1950s, America's economic progress over the 70 years that followed has been a huge disappointment. Futurists foresaw a world of super-pills, space farms and cities encased in glass. Science and technology would engineer unending riches and everything consumers could ever want. Yet the speed of gains achieved during the Space Age, it turned out, soon ebbed: between 2000 and 2019 America's real income per head grew by 1.2% a year on average, down from 2% between 1980 and 1999 and 2.5% in the 1950s. And instead of flying cars, Peter Thiel, a venture capitalist, once jibed, "we got 140 characters".

A new paper suggests such disappointment is not warranted—because it stems from an equally huge misunderstanding of how economic progress happens. Thomas Philippon, a professor of finance at New York University, argues the post-war experience was unusual. Looking at American data going back to 1890 and British data from 1600 to 1914 he finds that, when technological progress is properly understood, the world has been on broadly the same path for centuries. In the grand scheme of things, in other words, there has been no slowdown at all.

Most economists' starting point for thinking about growth is Robert Solow's 1956 paper, "A contribution to the theory of growth". Mr Solow's model for predicting a country's long-term wealth relies on what he dubs the "production function". It is a mathematical black box: on one side labour and capital go in; out the other come all the consumer goods and services that contribute to people's standard of living. One way of growing is obvious: shove more labour and capital into the box. But that cannot deliver improvements for ever. Adding more labour means the output is divided between more workers. And capital wears out, so more investment is needed over time just to stay put.

Instead long-term growth can only come from improving the black box—the way in which labour and capital are combined. The fancy name economists give to this is total factor productivity (TFP), though they sometimes refer to it with more intuitive labels, such as technology or knowledge. You might think of it as a recipe. On one side lie labour and capital, the ingredients. On the other is the finished dish: economic output. TFP is an attempt to measure how effective the recipe is at combining the ingredients,

which in turn depends on factors including the level of education on offer to the population, the quality of business management and the depth of scientific know-how.

Mr Solow assumed that the annual contribution of TFP to GDP would grow exponentially. This may have been for purely mathematical reasons: he wanted his model economy to grow at a fixed rate, of say 2% a year, which required ever larger gains as GDP got bigger to keep the pace of growth constant. Later economists, including Paul Romer, a Nobel Prize-winner, have tried to work out the chemistry underpinning TFP's presumed exponential growth. Their theories usually contend that some investment goes not into capital, but into research and development. And because knowledge can be freely copied, they observe, this investment has an increasing marginal product, meaning that each prior bit of research makes the next bit of research more effective. Knowledge thus cascades out, creating more knowledge as it does, akin to how a virus spreads in the early stage of an epidemic.

The problem, according to Mr Philippon, is that TFP does not actually grow exponentially. Using the most popular data sources for long-term growth, he compares predictions from two different models to observed trends in TFP. A linear pattern—which he calls "additive growth"—consistently fits better with how progress has actually unfolded. Contrary to existing theories, that suggests previous research does not make the next idea any easier to find. It also explains why, as Mr Philippon puts it, some economists keep predicting some future wave of innovation that just never comes.

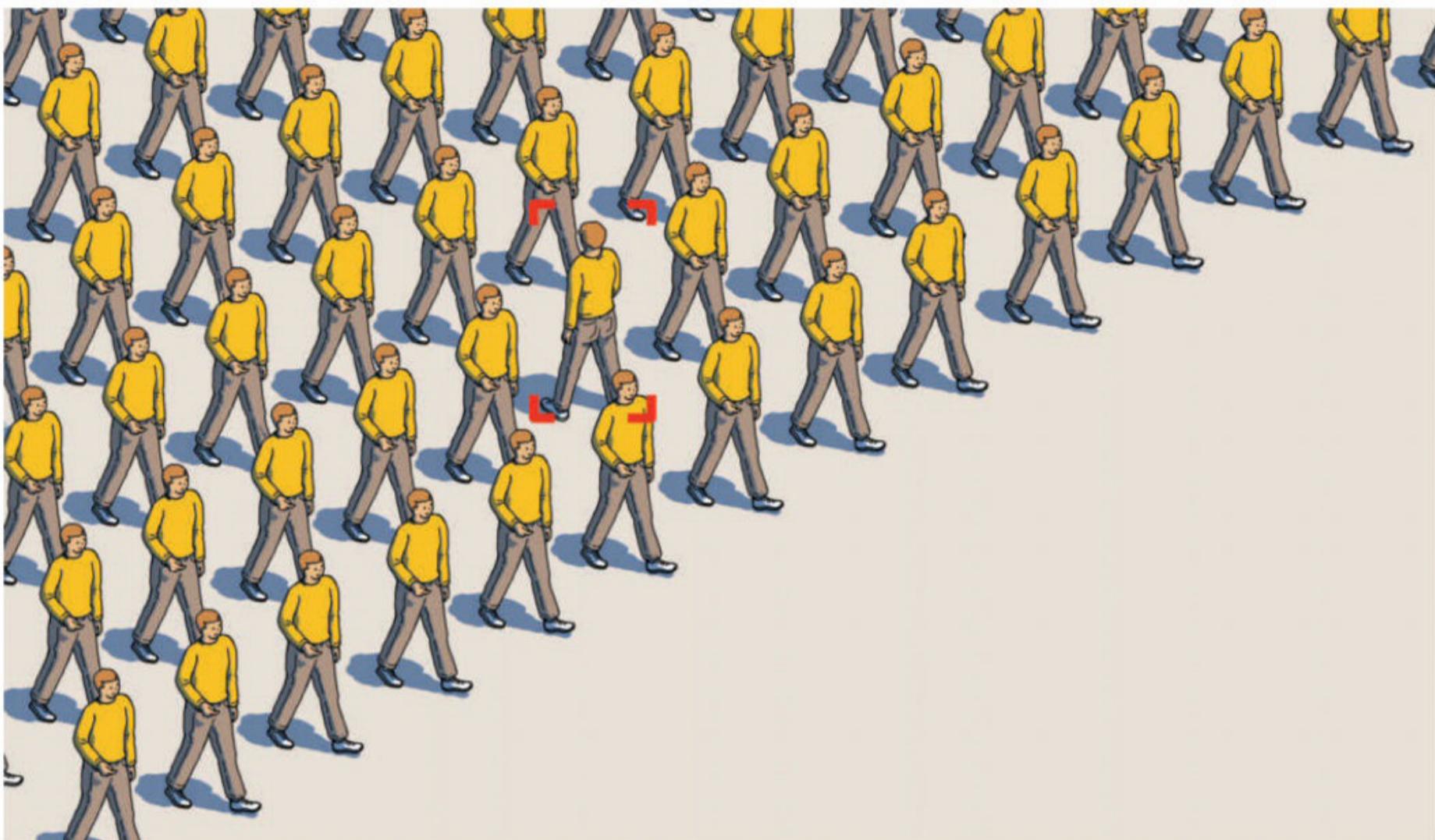
This is not a counsel of despair. While the rate of growth in percentage terms may be slowing, Mr Philippon's model predicts that the size of any increment is roughly constant. Societies do get richer—but just not as fast as generally thought.

Encouragingly, Mr Philippon also finds evidence of moments when the rate of TFP growth does temporarily accelerate and the annual increment gets higher. His paper plots one such moment in Britain between 1650 and 1700, and another around 1830, consistent with when historians date the first and second Industrial Revolutions. He also finds one in America around 1930, which he credits to the adoption of electrification. Such moments only seem to take place about every century or so. But they do help to explain Mr Solow's mistake: it would have been easy for him, as he was living through one of these periods of acceleration, to fall for the illusion of exponential progress.

The ways of growth are inscrutable

Mr Philippon's statistical analysis does not speak to TFP's deeper conceptual problems. One is that capital is hard to value. There is usually a difference between its historical cost, suitably depreciated, and the discounted value of the profits it will eventually produce. Unlike labour, which can be quantified in hours, there is no non-monetary unit with which to value oil rigs and pharmaceutical patents alike. After Mr Solow's 1956 paper came out, a group of economists at the University of Cambridge showed that its method for valuing capital was circular, a point Mr Solow's followers conceded. But the model is still widely used regardless.

Similar problems bedevil TFP itself. Statistical techniques that try to measure the concept of "knowledge" typically bundle all the variation in growth that cannot be explained by changes in the workforce or investment into the black box. Hence TFP's other, less flattering name—the "Solow residual". Rather than a reliable metric of society's level of knowledge, TFP so far seems to remain, in the words of a Solow critic, a "measure of our ignorance". ■



Aerial surveillance

The spies in the sky that see backwards in time

Use of wide-area motion imagery is spreading

THE WAR in Ukraine has brought the tactic of eyes in the sky to general attention, as the Ukrainian army in particular has put surveillance by drone to good effect in identifying and destroying targets in the here and now. But aerial surveillance can also reach backwards in time, by the expedient of indiscriminately recording everything that is going on in a particular neighbourhood, and then looking for useful patterns in the resulting footage. This technique, called wide-area motion imagery (WAMI), has been around since 2006. But improvements in both the recording equipment used and the means by which the images are analysed are making it more and more valuable.

WAMI was first employed by American forces in Iraq to track down those placing roadside bombs. When such a bomb went off, it was possible to run the relevant footage in reverse and trace the events that led up to the explosion. That often allowed the bombers to be identified and dealt with. Clearly, though, the omniscience provided by WAMI can be employed for many other

intelligence-related tasks, and the number of jobs the technology is being used for has thus multiplied.

But there is a problem. Explosions are easy to see. For many tasks other than bomber-hunting, however, an awful lot of staring at screens looking for things that are out-of-the-ordinary is involved. People are bad at this—and there is, besides, a lack of willing eyeballs. A study published last year by researchers at the RAND Corporation, a think-tank, showed that America's air force has responded to the flood of data from WAMI sensors by archiving most of it without inspection. Better means of sifting WAMI footage are needed. And technology is starting to provide them.

Chips called graphic-processing units,

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borrowed from the video-game industry, are helping. So is machine learning, the basis of much modern artificial intelligence. But special tricks are also being deployed—for example, a mathematical technique called higher-order moments anomaly detection that can distinguish moving objects reliably from background clutter by looking at groups of pixels in a video and deciding whether their changes from frame to frame are the result of actual movement or just electronic noise.

Meanwhile, WAMI devices themselves are becoming yet more effective. The latest, announced on April 25th by Transparent Sky, a firm in Albuquerque, New Mexico, promises to take the technology to another dimension. Literally. The video images it shoots are 3D rather than the 2D of a normal WAMI feed.

Shoot first. Ask questions afterwards

WAMI began with an aircraft-borne system called Constant Hawk, which was developed by Lawrence Livermore National Laboratory, in California. Constant Hawk's success in Iraq begat more powerful versions. Gorgon Stare, carried by drone, was designed by the armed forces themselves. A blimp-mounted arrangement called Kestrel, intended to watch over installations such as military bases, emerged from Logos Technologies, a firm that has John Marion, one of Constant Hawk's inventors, as its president. And other countries have joined in, too. Perhaps surprisingly, China ➤

► is not (as best one can tell) among them. For domestic purposes, at least, it prefers closed-circuit television. But Britain, France, Israel and Turkey all host companies that make WAMI kit.

American firms, however, still rule the roost. L3Harris, a company in Florida, sells WAMI sensors for use as automatic sentries. Their software monitors the coming and going of vehicles and pedestrians into and out of so-called watch boxes. These are protected areas surrounded by virtual trip wires, the triggering of which will cause a vehicle or individual of interest to be tracked. Motion-analysing software, meanwhile, looks for particular types of driving behaviour, such as avoiding vehicle checkpoints or travelling in convoy.

This approach can detect immediate threats. It can also, working over a longer period, carry out "pattern of life" analysis by building up a picture of what normal daily traffic looks like in an area. That permits the identification of anomalies which might signal hostile agents whose movements would otherwise be masked by the hurly-burly around them.

Double WAMI

The sensors themselves are getting better, too. For one thing, they are smaller. Constant Hawk weighed 680kg. Transparent Sky's latest weighs in at less than 1kg.

They are also more versatile. Logos, for example, now has "multi-sensor" pods. These combine several types of instrument with WAMI, to increase effectiveness. They are now being tested by America's navy. The latest version includes a so-called hyperspectral sensor, which sees simultaneously across many different wavelengths, including infrared and ultraviolet. It is thus able to distinguish things which the naked eye cannot, such as the difference between camouflage and vegetation.

This approach's real power, however, lies in software which automatically passes data between sensors. Mr Marion cites a recent demonstration in which the hyperspectral sensor identified simulated homemade explosive material. That cued an inspection camera to take close-ups. The system then checked the surrounding area for recent vehicle movements, identified a car which had been nearby, and followed it. All of these data were combined into an intelligence package tailored for human consumption. Only at that point was it passed on to a human being.

Future multi-sensor pods may include other instruments, such as signals-intelligence receivers. These are bits of equipment which can detect radio-frequency communicators like mobile phones and walkie-talkies, enabling particular devices to be identified and located. That would permit the individual carrying the phone, and also those he or she came into contact

with, to be tracked and photographed. Add specialised infrared cameras and LIDAR, an optical equivalent of radar, and such an instrument would also be able to see through dust, haze and darkness.

So far, the costs and complexity of WAMI have kept it as a predominantly military technology. But that is starting to change. Smaller and more affordable versions are now within the reach of police, fire services and other non-military users.

Some such uses are unexceptional. VIDAR (Visual Detection and Ranging), for example, is a system developed by Sentient Vision Systems, an Australian firm, to spot life jackets in search-and-rescue missions. It has a camera that sweeps a wide area and instantly picks out items of interest. Sentient Vision claims it is 300 times faster than a human being at doing so, and can spot a life jacket even in rough seas with six-metre waves. It can also be used to detect illegal fishing.

Such innovation is good if it is used to save lives and catch the bad guys. But at the murky intersection of ordinary crime fighting and sedition it could also offer those inclined to emulate Big Brother a powerful new tool to abuse.

At the moment the employment of WAMI for crime fighting is (as far as is known) still rare. One early example was the use of Simera, a development of Kestrel, to watch an area of 160 square kilometres around the stadia used for the 2016 Olympics, in Rio de Janeiro. That was a temporary expedient, stood down once the games were over. But some police forces in America have tested WAMI out for day-to-day policing.

The most famous examples were in Baltimore, where the local cops experimented with the idea twice—first in 2016 and then in 2020. The second time around they made the mistake of monitoring a political protest as well as looking for crimes such as vehicle theft. That is precisely the sort of slippery-slope approach which civil-libertarians worry about. They were therefore taken to court by the American Civil Liberties Union. Their actions were ruled unconstitutional and both the police department and the firm involved will have to expunge all records and data collected.

This, and an analysis of the Baltimore experiments by RAND, which suggests they brought only marginal benefit to regular crime fighting, means American police forces will probably not push the point. Nor has a test of WAMI to monitor illegal crossings of America's border with Mexico been followed up. But security services elsewhere, with political as well as crime-fighting agenda, might take a different view. WAMI may yet prove to have legitimate policing uses. But if the price of liberty is eternal vigilance, then vigilance against the misuse of this sort of vigilance needs to be eternal. ■



Aerospace

A second opinion

Future aircraft will have a digital twin in the cockpit

DIGITAL TWINS are virtual representations of a component, a device or even an entire production line in a factory. Fed with data from sensors installed on its physical opposite number, the digital version can be used to plan maintenance, spot any emerging problems and simulate the effect of upgrades and design changes. Aircraft engines in particular are followed by their manufacturers in this way. General Electric, Rolls-Royce and Pratt & Whitney, the three principal firms involved, maintain simulations of individual engines at engineering centres on the ground. These suck in real-time data from their counterparts in the air.

At Cranfield University, in Britain, however, a group of engineers hope to go further than this. They propose expanding the idea of digital twinning to produce what they rather grandiosely refer to as a "conscious aircraft". This would involve creating a digital twin of an entire plane by merging its various monitoring systems, and interpreting the result using artificial intelligence (AI).

At present, the monitoring systems on planes tend to work independently of each other. This means, for instance, that if a sensor keeping an eye on a valve in the fuel system indicates a problem, engineers may then replace that valve, only to find that the problem remains because the actual fault is in the electrical system. Ian Jennions, the technical director of Cran-

► field's Integrated Vehicle Health Management Centre, proposes instead a "reasoning system" that takes an overview of the individual monitoring systems.

Because it is not practical to put a sensor onto every potentially breakable part of an aeroplane, lest it end up too heavy to take off, this will use AI trained to find faults which can be detected from broader measurements, such as patterns of vibration and temperature changes. Moreover, such a whole-plane digital twin is likely to reside in the aircraft itself, rather than relying on vast amounts of raw data being transmitted to a maintenance base for processing. That will provide swifter analysis and avoid transmission bottlenecks.

All this will enable an aircraft to reconfigure such things as battery connections and fuel use on the fly, as it were. The reasoning system would also keep an eye on things like the weather the aircraft was operating in, because these, too, can effect the wear and tear of parts. Flying through dust clouds, for instance, can accelerate the abrasion of engine parts.

The aircraft would communicate with its pilots (assuming there were any, for some future aircraft, especially freighters, may well be drones) and also with ground engineers. Such a plane would, in some sense, be "aware" of how its various components were performing and interacting with one another. It is this level of self-awareness which the researchers use as an excuse for describing the system as conscious, a term which they say reflects a direction of travel rather than a goal.

That self-awareness would, though, allow the plane to book itself in for maintenance when needed, rather than on a fixed schedule, and to order any spare parts required in advance. The predictive maintenance such a system would provide should help avoid unscheduled stopovers and repairs. Every day which a passenger jet remains on the ground costs several hundred thousand dollars of lost revenue. Dr Jennings reckons a conscious aircraft could cut maintenance expenses by around 30%.

Such maintenance might also be automated, at least in part. Cranfield, which began as an aeronautics college in 1946, has its own airport, a hangar and a Boeing 737 to experiment on. The researchers are exploring the use of drones equipped with optical and thermal sensors to fly around an aircraft in a hangar, looking for external anomalies. Meanwhile, tiny snakelike service robots could crawl into enclosed areas such as fuel tanks to conduct repairs.

The Cranfield team hope to have a whole-aircraft digital twin operating by 2024 and a prototype with a degree of self-awareness flying on an aircraft by 2035. Whether such a system will include a sense of shame for lousy cabin service remains to be seen. ■

Sheep farming

Turning the worms

Gut bacteria may help fight nematode infestations in sheep

SHEEP FARMERS in Australia and New Zealand have a problem. Their charges are susceptible to intestinal nematode worms which cause them to waste away and can, in severe cases, kill them.

Over the years, the worms have evolved resistance to drugs once used to attack them. But a second approach is to breed countermeasures into the sheep themselves. This can be done by counting the number of worm eggs in animals' droppings and selecting as sires and dams those that have the fewest, on the assumption that these are the sheep with the least worm-friendly guts, and that this property will show up in their offspring as well. That works. But how, has been obscure. A study just published in *Animal Microbiome*, by Erwin Paz of the University of Western Australia and his colleagues, throws light on the matter. It suggests that what is being bred for is a propensity to develop a worm-hostile gut microbiome.

Gut microbial health, once a fringe medical interest, is now mainstream for human beings, as bugs in the alimentary canal are linked with conditions ranging from obesity to arthritis. But what is true of people is true of other animals, too. And, in the case of sheep, Dr Paz and his collaborators seem to have hit the jackpot.

Dr Paz knew from past work that sheep with severe worm infestations tend to have

abnormal bacterial populations in their faeces. This led him to wonder whether the bugs in the guts of resistant sheep were somehow hampering the worms' activities. He and his team therefore looked at a flock of 200 sheep at a farm in Western Australia and selected ten that had particularly high loads of worm eggs in their faeces (1,940 per gram, on average) and ten that had low loads (410 per gram). These unfortunate sacrificial beasts were then slaughtered and their entrails examined—not for auguries of the future but for their microbial populations.

As they had hoped to, the researchers did indeed find systematic differences between the microbiomes of the two groups. These differences were particularly notable in the small intestine, where the worms live, with resistant sheep having richer and more diverse bacterial populations in this part of the gut than vulnerable animals did. In particular, the team noticed that populations of bacteria which ferment carbohydrates such as cellulose and turn them into short-chain fatty acids were especially abundant in the resistant animals.

It is, of course, possible, that the worms are affecting the sheep's microbiomes, rather than the other way around. But Dr Paz thinks this is unlikely, because all of the sheep looked at had at least some worms. Rather, he suspects, genetically resistant sheep are providing an intestinal environment conducive to bacteria which either produce compounds that repel the worms or consume resources which the worms depend upon. If that is correct, it opens up a third approach to worm control, which is to employ probiotics to shape the gut microbiomes of flocks directly, rather than relying on selective breeding to do it at one remove. ■



Safely grazing

Sustainable power

Inertial frames

Green electricity needs more than just solar panels and wind turbines

NO GOOD DEED, an old saying has it, goes unpunished. That is certainly true of the introduction of green energy. The unreliability of solar and wind power compared with that generated by fossil fuels is well known—and with it the concomitant need for storage facilities such as large battery packs to smooth things over.

But green energy brings another, more subtle, problem. Modern electrical grids operate on alternating currents (AC), and these need to be of a fixed and reliable frequency (usually either 50Hz or 60Hz). This frequency's stability is maintained by a phenomenon called grid inertia, which results from the real, physical inertia (as described by Isaac Newton's first law of motion) embodied in the power-generating turbines of fossil-fuel (and also nuclear and hydroelectric) power stations.

Going for a spin

These turbines act as massive, inertia-storing flywheels. As long as their outputs are in synchrony (and one important part of grid management is to keep them that way), the resistance to change which their inertia provides stabilises the whole grid. The fewer the number of these turbines (as opposed to wind turbines, which rotate out of sync with the grid, and solar panels, which do not rotate at all), the less inertia a grid has. And in some particularly green countries this is getting to be a problem, to the extent that non-power-generating flywheels are being added to the system to provide the missing inertia.

One such place is Britain, which generates about 30% of its electrical power from wind and sunlight. On March 17th, for example, National Grid ESO—the firm that, as its name suggests, operates the country's electricity grid—cut the opening ribbon on a plant built near Keith, in northern Scotland, by Statkraft, a Norwegian renewable-energy firm. The inertia in this plant is stored by a pair of steel flywheels (see picture of the road train required to deliver them). Each of these flywheels weighs 194 tonnes and rotates at up to 500 revolutions per minute (rpm).

A second Statkraft plant should open in the autumn, near Liverpool. Instead of large masses rotating relatively slowly, this will rely on smaller ones spinning fast (1,500rpm). Both approaches embody about the same amount of inertia, and in combination the pair will store around 2%

of the inertia currently required to support Britain's grid. That is equivalent to the inertial contribution of a conventional coal-fired station. Moreover, later in the year National Grid ESO plans to add two more systems, built by Siemens, to increase its inertia-storing potential still further.

There is, though, an alternative to building new flywheels, and that is to repurpose old ones—in other words, to redesign existing fossil-fuel stations simply to store inertia, rather than generating electricity. National Grid ESO is testing that idea, too, in a former gas-fired station in north Wales. This has been open for business as an inertia store since 2021.

The firm hopes, as well as all this, to develop ways of stabilising the network without spinning lumps of metal for their own sake. That will involve the use of what are known as grid-forming inverters.

Both solar power, which is a direct current (DC) when it comes out of the generating panel, and wind power, which is AC but still needs to be tweaked before being fed into a grid, are first processed by semiconductor-based devices called inverters. This is also true of the DC drawn from storage devices such as batteries, which are employed to smooth out irregularities in solar and wind power.

Existing inverters are described as "grid following". This means they monitor and fit in with the established frequency of the

grid they are feeding into. That suits grid managers well enough when solar and wind contribute only a small fraction of a grid's total power, but is progressively less suitable as that contribution rises. However, inverters can be designed to be "grid forming" instead—meaning the current they put out mimics the external stabilising effect of mechanical inertia. Using grid-forming inverters rather than grid-following ones should allow much more wind and solar power to be integrated easily into a grid.

Until recently, grid-forming inverters had been tested only at small scale. In January, however, Britain's energy regulator, Ofgem, signed off on a technical standard acceptable to both manufacturers and service providers. That will permit their large-scale deployment, and Julian Leslie, National Grid ESO's chief engineer, says he expects big grid-forming inverters to be providing inertia within two years.

Grid lock

Being an island, Britain has a more or less self-contained electricity grid. This makes it a good place to try such an experiment. Success would encourage other island grids, both real (Australia's and Ireland's, for example) and metaphorical (such as Texas's, which has few links with the rest of North America) to try. Larger grids in North America and Europe will no doubt be watching from the wings.

The quest for grid inertia, then, is an example of the nitty-gritty adjustments needed to accommodate the shift in energy production and use that is now going on. Other technologies, from electric cars to hydrogen-gas supplies, may have higher profiles. But what is happening down in the engine room of the green economy is just as important—if not more so. ■



Inertia, embodied



Preventing diseases

The GERM of a good idea

A founder of Microsoft wants to reboot the world's response to pandemics

FIRST, THE climate. Next, plagues. Bill Gates's career-switch from entrepreneur and philanthropist to crusading author is developing nicely. It is just over a year since he published "How to Avoid a Climate Disaster". Now he sets out to explain "How to Prevent the Next Pandemic".

Both books consider what might be described as human-created natural disasters. Some disasters—hurricanes, earthquakes, tsunamis—are purely natural. The best people can do when dealing with these is to anticipate them through things like warning systems, planning codes and reinforced buildings. Others, such as war, have human causes. They may sometimes have a natural trigger, such as a drought that sets populations on the move. But human beings inflict the damage.

Climate change and epidemics are halfway between these extremes. They are caused by people interacting with nature—in one case by altering the atmosphere's chemical make-up, in the other through actions ranging from inadequate disposal of sewage to international jet travel and sexual activity. As Larry Brilliant, one of the epidemiologists who helped to eradicate

How to Prevent the Next Pandemic.

By Bill Gates. Knopf; 304 pages; \$28. Allen Lane; £25

smallpox, observes, "Outbreaks are inevitable [the nature part of the equation] but pandemics are optional [the human part]." And that provides an opening for the sort of techno-optimistic approach that Mr Gates loves.

One pandemic that might have been optional had it been spotted early enough—AIDS—has been in his cross-hairs for years, as part of the activity of the foundation he runs jointly with his ex-wife Melinda French Gates. AIDS has killed some 36m

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people, most of them since it came to the attention of medical science in 1981. Yet subsequent analysis has shown it had been spreading in Africa for decades. A better early-warning system could have picked it up in the 1950s, rather than the 1980s, allowing it to be tackled much earlier.

Sexually transmitted infections, though, spread slowly. Airborne ones spread fast—particularly in an era of mass international travel. Early detection is vital, and is the first item on Mr Gates's list of things to accomplish. Others include helping people protect themselves; finding new treatments; and developing vaccines. And practice drills: he is big on the idea that, just as military forces drill and earthquake-response teams drill, so should those tasked with combating pandemics.

But who should those people be? That is the nub of the book. Armed forces and civil-defence teams are national responsibilities. But pathogens know no borders, and governments, in any case, are curiously uninterested in contingency planning for new diseases. While covid-19 remains fresh in people's minds, Mr Gates sees an opportunity to correct this.

He suggests creating a global "fire brigade" of 3,000 experts scattered around the world, recruited for skills ranging from epidemiology and genetics, through drug and vaccine development and computer modelling, to diplomacy. This outfit, which would probably work under the auspices of the World Health Organisation, would remain on permanent standby, ready to respond to any detected outbreak. ➤

► Mr Gates tentatively proposes that it be called GERM (Global Epidemic Response and Mobilisation). The PR department might not like the name, but the idea is worth exploring. He estimates GERM itself would cost about \$1bn a year. While waiting for the call, its staff would be employed in beefing up the world's anti-pandemic infrastructure—this is where the diplomacy would come in—by chivvying governments into the necessary spending on detecting, monitoring and suppressing potential outbreaks. And in running drills.

On the technological side, his shopping list includes designing and agreeing on protocols for the rapid mass-testing of drugs that might work against a particular pathogen if an outbreak did happen. (Britain's RECOVERY trial, which was ready to go within six weeks of covid-19 being identified, and eventually included 40,000 participants at 185 sites, comes in for particular praise here.) Mr Gates also wants to improve both vaccine manufacturing and distribution, and to improve vaccines themselves, particularly by eliminating cold chains.

Most existing vaccines are temperature-sensitive, and must be passed quickly from one refrigerator to another en route to the clinics where they will be used. Mr Gates recommends research into the development of heat-tolerant vaccines. For pathogens that spread through the air, he favours a cutting-edge approach to prevention: nasal sprays containing drugs that bind to the cell-surface proteins which viruses use to gain entry, thus denying them the means to get into their target cells.

And he envisages new, broad-spectrum jabs against entire classes of viruses, such as influenza. Techno-optimist that he is, he suggests such universal vaccines could not only pre-empt illnesses of the future, but annihilate those of the present. In other words, no more flu. Ever.

That does sound pretty optimistic, especially given the difficulty of eliminating even single viruses from the planet—something that has been achieved only for smallpox and for a cattle disease called rinderpest, and has notably not happened for polio, which still lingers in a few places despite a decades-long campaign to get rid of it. But, as Arthur C. Clarke put it in his second law of science, "The only way of discovering the limits of the possible is to venture past them into the impossible."

Whether anything like GERM will ever come to pass, as the world's attention shifts from the crisis of covid-19 to the catastrophe in Ukraine, remains to be seen. But if this book stimulates even a little limit-pushing of the sort Mr Gates suggests, it will have served its purpose well. ■

HOME ENTERTAINMENT

"The Good Soldier Svejk"

The idiocy of war

Jaroslav Hasek's satire makes a mockery of bellicose authority

IT IS WITH pride that Josef Svejk declares to his superior officer: "I dutifully report, Colonel Sir, that I am an idiot." He has already been kicked out of the Austro-Hungarian army once for being an imbecile. Since then he has scraped a living in Prague selling stolen dogs. On hearing of the assassination of Franz Ferdinand, Svejk initially confuses the archduke with another Ferdinand who cleans dog mess off the streets. The war that follows sees Svejk called up to serve the empire again.

"The Fateful Adventures of the Good Soldier Svejk During the World War" (known as "The Good Soldier Svejk") follows the self-proclaimed fool's circuitous journey to the front. Jaroslav Hasek published three volumes of his anti-war satire between 1921 and 1923; he was working on a fourth when he died.

Svejk is a picaro who drifts between places and masters. He follows his orders to the letter. Told to attend to every desire of a lieutenant's mistress, Svejk does as she wishes and sleeps with her. Instructed to find a dog for the lieutenant, he steals one from a colonel—who sends the whole battalion to the front as punishment.

Eventually Svejk is thrown off a train

heading to the eastern front in the Austro-Hungarian province of Galicia, so decides to walk. His own side takes him for a Russian deserter and he narrowly escapes execution. He rejoins his unit, and here—before he sees combat—the novel stops.

Svejk is often compared to Yossarian, the American captain in Joseph Heller's "Catch-22" whose aim is to survive the second world war at all costs. Heller played down suggestions that he took inspiration from Hasek, describing his story as "just a funny book". But if that were accurate, Svejk would be just an idiot. In fact he is a master of subversion, a little man who keeps himself out of the regime's war simply by following orders.

Hasek's life was almost as chaotic as his character's. He too was sent to the eastern front; later he joined the Red Army and hobnobbed with Trotsky, eventually severing his communist links. Many writers have tried to finish his saga (Bertold Brecht wrote a play in which Svejk crosses paths with Adolf Hitler). But none has captured the Czech imagination as successfully as Hasek, helped by Josef Lada's Tintin-esque illustrations in early editions (see picture).

"To svejk" has entered the Czech vocabulary, meaning to undermine authority through stupidity. In 1968, when the Soviet Union installed Gustav Husak as Czechoslovakia's leader after the Prague Spring, he urged people to "Stop svejking". (The Soviets, missing the point, lauded Hasek's work.) Svejk's buffoonery has left its mark across Europe. From Athens to Warsaw, dozens of imitations of "U Kalicha" (At The Chalice), Svejk's local, serve steins of Czech lager. Ingrida Simonyte, Lithuania's prime minister, quotes Svejk in her speeches.

Today much of what was once Galicia is in Ukraine. The Russian soldiers now waging a senseless war in that country could do worse than read "The Good Soldier Svejk". With luck, its send-up of swaggering authority might inspire them to try a bit of svejking themselves. ■



To hear our interview with Bill Gates, go to economist.com/billgatespod

Shipping shenanigans

Lost at sea

Dead in the Water. By Matthew Campbell and Kit Chellel. *Portfolio*; 288 pages; \$27. Atlantic Books; £18.99

THE GLOBAL shipping network is one of capitalism's most impressive achievements. Commercial vessels carry over four-fifths of world trade in physical merchandise, much of it lugged around in the more than 16,000 container ships and oil tankers in service. Yet as ever-more ports have been moved away from cities, shipping has become one of the least visible engines of the modern economy.

It can also be among the shadiest, argue Matthew Campbell and Kit Chellel, two journalists from Bloomberg. Based on more than four years of reporting, their tale of the fate of the *Brillante Virtuoso* exposes the dark, barnacle-encrusted goings-on beneath the industry's waterline. They tell a remarkable story about an unremarkable ship, "fought over, picked apart in court, and investigated by police, naval forces, private detectives and experts who make their living boarding ships to look for nearly invisible clues". Books about merchant shipping are rarely so gripping.

The central event is the boarding of the *Brillante*, an ageing oil tanker, by pirates claiming to represent "the authorities", as the ship crosses the Gulf of Aden in July 2011. The interlopers set off an explosion that causes a devastating fire, then flee.

David Mockett, a Yemen-based maritime surveyor working for the Lloyd's of London insurance market, is sent to inspect the badly damaged vessel, but is left with more questions than answers. Why was the crew so quick to let the pirates on board? And why did the marauders start a fire and disappear rather than seize the ship and demand a ransom?

Suspecting an insurance scam, Mockett begins to dig deeper. But within weeks he is killed by a car bomb. Two British ex-detectives hired by the insurers to take up the investigation encounter several obstacles. One is a thicket of corporate layers, common in shipping, which makes it hard to identify the *Brillante*'s owner. Shell companies and flags of convenience allow shipowners to take "all of the profits, little of the accountability", say the authors.

Another problem is the investigators' own employers. Lloyd's, the main market for insuring large commercial risks, has a history of paying out (at least partially) on claims by shipowners suspected of scut-

tling their own vessels, rather than enduring long, expensive inquiries and litigation. Another reason very few "accidents" are fully investigated is that insurers worry this will lead big shipowners to take their business elsewhere. Better to cough up, say, half the ship's value and move on.

So egregious is this case, however, that after much toing and froing, the investigators are allowed to keep digging. They identify Marios "Super Mario" Iliopoulos, a car-racing enthusiast and owner of a Greek ferry service, as the *Brillante*'s ultimate owner. Whistleblowers confirm that the attack was an insurance fraud; one needs rescuing when he discovers that a group of bulky-looking men are searching for his house. A Greek lawyer representing the insurers receives death threats and is beaten up near his office in Piraeus.

In October 2019, more than eight years after the *Brillante* was set ablaze, the High Court in London eventually ruled that the attack had been faked and that the "orchestrator" of the audacious fraud was Mr Iliopoulos (who has always denied it). But it was an odd sort of victory for the underwriters. Mr Iliopoulos was found to have made a false insurance claim for \$77m, but that did not cost him a penny since he was not party to the case—which was between the insurers and one of his lenders, Piraeus Bank. The bank, which had financed the purchase of the *Brillante*, had long since written off the loan. Two months after Justice Nigel Teare handed down his 136-page judgment, one of Mr Iliopoulos's ferries won "Ship of the Year" at the Lloyd's List Greek Shipping Awards. He accepted the prize in person, at a ceremony attended by industry bigwigs and Greek politicians.

The private investigators who helped uncover the scam arguably came off worse than its alleged perpetrator. One was even

forced to defend a criminal complaint after an associate of Mr Iliopoulos alleged the sleuth had illegally tried to access his private information. The insurers withdrew an offer to pay the investigator's legal bill, leaving him heavily out of pocket. Mockett's widow got a rum deal, too. She asked for compensation from the insurers, who, she had been told, had spent \$28m on their own legal fees, but received nothing, according to the authors.

The sobering lesson of the *Brillante* saga, they conclude, is that maritime fraud is profitable—and even if those behind it are unlucky enough to get caught, their chances of ending up in prison, or even out of pocket, are slim. The story illustrates how the shipping industry "has the unique attribute of being utterly integrated with the world economy while existing apart from it, benefiting from its infrastructure while ignoring many of its rules." ■

A campaigning Japanese film-maker

Caught on camera

TOKYO

Hara Kazuo has chronicled Japan's changes and inspired other directors

MINAMATA WAS a sleepy little town on Japan's western island of Kyushu. But in the early 1950s eerie things began happening there. Birds flew in circles and plopped into the sea. Cats "danced", as locals put it, as if in agony. Soon people, too, were losing their senses; some ended up paralysed and bedridden.

The town had fallen victim to one of the worst pollution scandals of Japan's post-war boom. A neurological disorder was named after it: the Minamata disease. Chisso Corporation, a chemical company, had released wastewater containing methylmercury into the bay; the government failed to stop it. A Hollywood film of 2021, starring Johnny Depp as a photojournalist who visited in the 1970s, revived memories of the episode. But "Minamata Mandala", a six-hour documentary also released last year, told the story best. "I realised the situation was far from resolved," says Hara Kazuo, who spent 15 years shooting and five years editing the film. "I knew somebody had to do something about it."

Unfamiliar as his name may be in the West, over five decades the 76-year-old film-maker has left an indelible mark on the documentary form. His best-known film is "The Emperor's Naked Army Marches On" (1987); it features Okuzaki Kenzo, an anti-war anarchist who once pelted the emperor with pachinko balls. Mr Hara's interventionist style—in which he abandons ►



Peril on the waves



Greetings from Minamata

► the pretence of objectivity and enters the scene—fluenced Michael Moore. After watching “Extreme Private Eros: Love Song 1974”, Mr Hara’s provocative portrait of a former girlfriend, Martin Scorsese wrote to him: “No one has ever made a film like that. No one has ever seen a film like that.”

His themes and techniques have tracked the development of Japanese society—but his mission has always been to tell silenced and marginalised stories. His aim with “Minamata Mandala” was to “change the air” around the scandal (lawsuits demanding that the state should recognise the illness and compensate victims are still ongoing). Its daunting 372-minute length is an “approximation of the temporality of the patients”, who endure year after year of pain and neglect, reckons Aaron Gerow, a historian of Japanese cinema at Yale University.

Mr Hara’s urge to challenge oppression stems from his childhood. He was born out of wedlock at the end of the second world war; his impoverished mother toiled in the nocturnal entertainment industry. As a young man he witnessed the student uprisings that swept Japan during the soul-searching of the late 1960s. Distant revolutionaries such as Che Guevara and Fidel Castro inspired him, too. “Most Japanese only know how to obey their superiors, but such movements taught me how to pick a fight with authorities,” he says. The camera was his weapon.

As Mr Gerow notes, the director spotlights emotions, and basic human experiences such as love and sex, to illuminate the effects of power. This interest in the private realm sets him apart from earlier Japanese documentarians, who focused more on contexts and environments. Anger is “sacred” for Mr Hara, says his producer Shimano Chihiro. In a society that

values good manners and orderliness, it is “an emotion of the marginalised class”, Ms Shimano observes. “Minamata Mandala” evokes a broad spectrum of feelings. At times it is a courtroom drama, at others a romantic comedy, as Mr Hara explores the love lives of the victims.

For a while, ideas—or Japanese society—seemed to betray him. From the mid-1990s he struggled to find subjects, which led to long gaps in his filmography. In his earlier works the protagonists were iconoclasts like the pachinko-hurling Okuzaki. But as Mr Hara grew older he found it hard to identify anyone in Japan who was even remotely as daring. “I thought my career was doomed,” he says. While prosperity had made Japanese lives more comfortable, complacency and conformism had set in. “It’s a bit hard to breathe in today’s society,” says Mr Hara’s wife and collaborator Kobayashi Sachiko.

Yet he made a glorious comeback in 2017 with “Sennan Asbestos Disaster”, which chronicled the battle of asbestos victims for compensation. This time his apolitical subjects learned the art of rebellion under his influence. “It’s interesting to cause a ripple effect on reality by intervening in people’s lives,” he says. There were still stories for him to tell, and new ways to tell them. The collaborative style of that film paved the way for Mr Hara to portray subtler forms of activism. Making “Minamata Mandala”, he saw how everyday scenes might resonate with audiences.

He also started to see himself in his subjects. Like them, he is proof that anybody can cause the right kind of trouble and challenge entrenched world-views. “I’m an ordinary man from the bottom rungs of society who obtained the means to probe the meaning of life through documentary,” he says. “I feel as if I came full circle.” ■

New American fiction

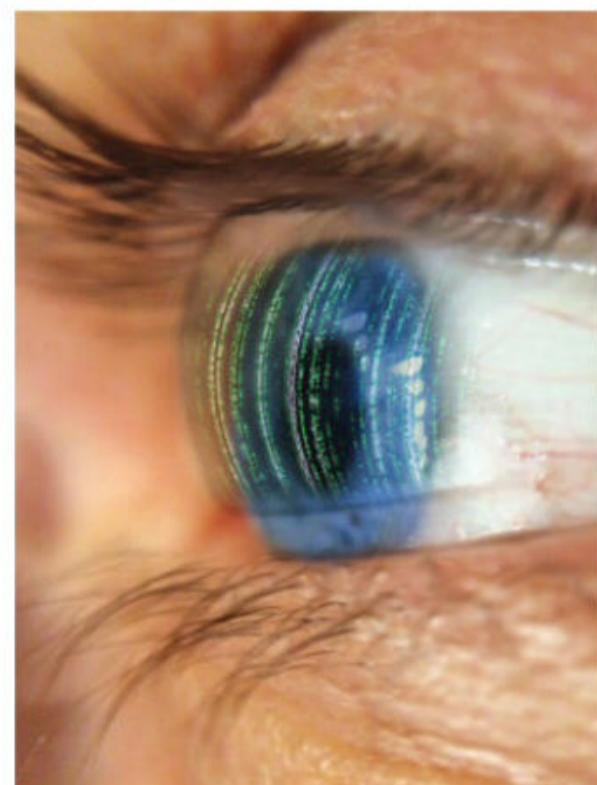
Trick and treat

The Candy House. By Jennifer Egan. Scribner; 323 pages; \$28. Little, Brown; £20

THE TITLE of Jennifer Egan’s new novel refers to the witch’s cottage which, enticing yet full of danger, lures in Hansel and Gretel. “Never trust a candy house!” a character observes early in the book, as competition from the file-sharing platform Napster destroys her father’s music business. Such technology is “a Faustian bargain”, Melora Kline goes on: “like letting a stranger rummage through your house—or your brain!”

Rummaging through the brain—and uploading it to a global collective consciousness—may be the next step in mankind’s surrender to technology, Ms Egan suggests in her clever and disturbing new book. Like “A Visit from the Goon Squad”, for which she won a Pulitzer prize in 2011, this “sibling novel” is an interlocking puzzle of stand-alone tales. “Goon Squad” took on the subject of time; “The Candy House” is about what humans lose in offering up their private lives to algorithms that mine them for profit. Yet for all the seriousness of its theme, it is hugely entertaining. As dazzlingly inventive and formally ambitious as its predecessor, it slips down as pleasurable as—well, candy.

The novel is a kaleidoscope of nearly two dozen characters and perspectives (readers may find they need a list to keep up). Yet Ms Egan spins a subtle web that



The mind's eye

connects them all—a chain that is completed, like many of the best fictions, in the reader's own mind. The landscape that develops is uncomfortably similar to the current digital realm. Bix Bouton, a "tech demigod on a first-name basis with the world", has invented a program called "Own Your Unconscious" that allows users to "externalise" their memories and feelings into software. He bases this innovation partly on the work of an anthropologist investigating trust networks in a remote Brazilian tribe.

In this entirely mediated future there

are "counters" who quantify individuals' online activity, and "eluders" who choose to secede from digital life, leaving behind dummy identities. Before long, Bouton's company offers users the chance to access other peoples' memories in exchange for uploading their own; meanwhile a non-profit outfit has emerged to help the refuseniks escape. Pinballing between tales told in tweets, emails, maths formulas and her own liquid prose, Ms Egan questions the cost of trading away authentic selves for something that appears to be shinier and more exciting.

For all its fluency in the languages of gaming, addiction and tech, "The Candy House" is a social novel, a kind of "Middle-march" for the 21st century with an aptly whirling form. The characters' stories are not wrapped up neatly; there are reversals and redemptions and, above all, an assertion that imagination can still trump technology. In the closing scene, Bouton's son Gregory, a writer of fiction, realises that he is surrounded by "a galaxy of human lives hurtling toward his curiosity". He can feel the collective, he marvels, "without any machinery at all". ■

Johnson If you dangle, don't mangle

Frankly speaking, dangling participles are not the end of the world

READING THIS sentence, it may occur to you that something is slightly awry with it. Or you may not notice anything wrong at all. The first three words are a "dangling modifier". This writing fault has been deprecated for over a century. It has made its way into countless usage guides, perhaps because of its catchy and evocative name, as something to be avoided at all costs.

The most common kind of dangling modifier is a dangling participle, as at the beginning of this column. Participles are those verb forms that end in *-ing* in the present tense, and usually in *-ed* in the past tense: *playing, played*. (Some past participles, like *born* and *spoken*, are irregular.) Participles are so named because they "participate" in two parts of speech. They are verbs in sentences like *She has spoken French for three decades*, but act like adjectives in those like *French is the most spoken language in Belgium*.

Participles can be used to add some contextual or explanatory information to a sentence: *Speaking Spanish, he ordered three beers. Spoken in Paraguay, Guarani is the source of the word "jaguar"*. Since participles are a bit like a verb, readers seek an appropriate subject to go with them, typically in the first noun they find. The problem comes when these don't match up. Writing gurus have often conjured up clumsy examples to highlight the issue: *Trembling with fear, the clock struck twelve. After fighting the flames for hours, the ship was finally abandoned*. The clock was not trembling, nor did the ship fight the flames.

By no means do such abominations have to be invented. Take "Pulling off his boxer briefs, his erection springs free. Holy cow!" The quotation, from E.L. James's "50 Shades of Grey", has a classic dangling participle, the kind of thing that

makes critics mock the style of her erotic novels. (A bit of envy may be mixed in with the condescension: "50 Shades" was the bestselling novel of the 2010s.)

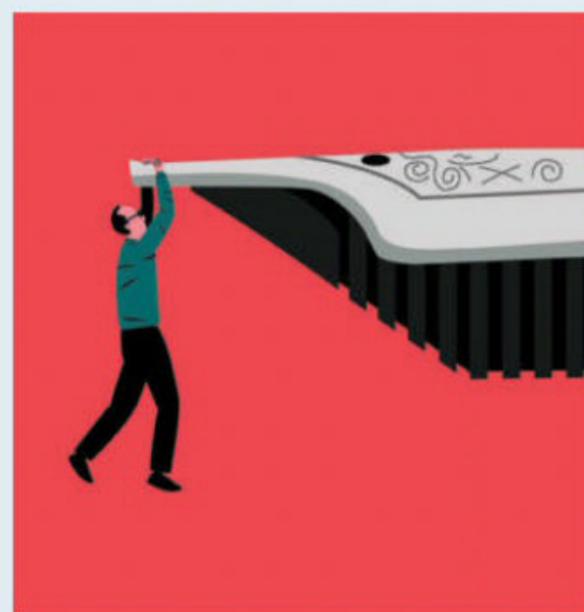
Consider, though, that James Donaldson, who provides this example in his recent doctoral dissertation, also cites 21 dangling modifiers from a rather more critically admired source: Virginia Woolf. "Lunching with Lady Bruton, it came back to her." "Rubbing the glass of the long looking-glass and leering sideways at her swinging figure a sound issued from her lips." "Looking up into the sky there was nothing but blackness there too."

The idea that an introductory phrase must always apply to the subject of the clause that follows is a useful rule, but not a cardinal one. Speakers often introduce a remark with some throat-clearing about their own feelings on the statement to come, as in "Frankly, my dear, I don't give a damn." It is but a short step to saying things like *Frankly, he is lying to you*—which under a strict rejection of "dangling modifiers" would be incoherent, as the speaker, not the liar, is being frank.

Yet these kinds of things crop up all the time, as when Richard Nixon said "Speaking as an old friend, there has been a disturbing tendency in statements emanating from Peking to question the good faith of President Reagan." The dangling participle—"Speaking as an old friend"—has nothing to attach itself to. But *Speaking as...* is also a common introduction, the type that includes *Considering, Assuming, Leaving aside* and so forth. Only occasionally are these accompanied by an explicit *I* or *we*, which are nevertheless so strongly implied that they hardly need spelling out—a reason so many dangling modifiers go unnoticed. Moreover English sentences often have a dummy subject, such as "it" (*Considering inflation, it seems plausible...*) or "there are" (*Given our situation, there are three options...*). That makes dangling modifiers all the more likely to slip past editors.

It is best for writers to avoid, and those editors to fix, any danglers that give rise to absurdity, or even just a momentary jolt of confusion. Even if they bother only a few readers, those readers are disproportionately likely to think that the writer does not know how the parts of a sentence are meant to be combined. They are also disproportionately likely to write letters to the editor.

At the same time, a supposedly unforgivable error that has featured in distinguished writing for centuries ought really to be considered a lesser sort of misdeed, more parking violation than murder in the second degree. A dangling participle is not a sin against grammar so much as a failure to take the reader's expectations into account. That is enough to revise them each time you spot them—which even skilled readers, quite often, will not.





**GOVERNMENT OF INDIA (भारत सरकार)
MINISTRY OF RAILWAYS (रेल मंत्रालय)
RAILWAY BOARD (रेलवे बोर्ड)**

NOTICE INVITING BID

Notice No.:2022/Elect/Dev./440/2

Date 20.04.2022

Project: Manufacturing and Maintenance of 1200 (twelve hundred) 9000 hp Electric Locomotives

The President of India, represented by Ministry of Railways, Director Electrical Engineering (Development), Railway Board (the "Authority"), having its principal office at Rail Bhavan, Raisina Road, New Delhi-110001, India is engaged in the development of Railways and related infrastructure, and as part of this endeavour, the Authority has decided to undertake Manufacture and Maintenance of 1200 (twelve hundred) 9000 hp Electric Locomotives, through single stage two packet bidding system and has to carry out the Bidding process for selection of a Bidder to whom the Project may be awarded. A brief description of the Project may be seen in the Information Memorandum of the Project at the Authority's website (www.indianrailways.gov.in) Brief particulars of the Project are as follows:

"Manufacture and supply of 1200 Electric Locomotive of 9,000 horse power, Co-Co configuration (the "Locomotive") spread over a period of 11 (eleven) year at **Rolling Stock Workshop, Dahod** by the selected bidder and Maintenance at nominated Government Depots over Indian Railways on the basis of a long term manufacture and maintenance contract (the "Project")."

The Bidding Documents can be viewed/downloaded from official portal of the Railway website <https://ireps.gov.in> from 27.04.2022 to 10.06.2022 (upto 17.00 Hrs. IST). Bidder must submit its Financial Bid and Technical Bid at <https://ireps.gov.in> on or before upto 24.08.2022 at 11:00 hours IST. Bids received online shall be opened on 24.08.2022 at 11:00 hours IST.

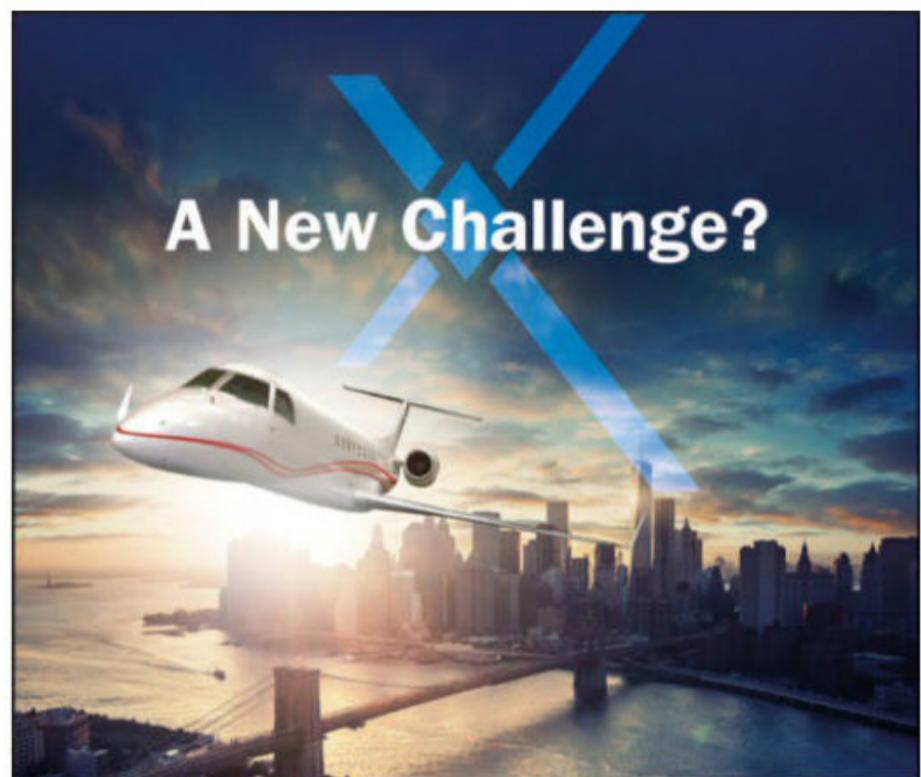
Bid submitted through any other mode shall not be entertained. Power of Attorney and Joint Bidding Agreement etc. shall be submitted physically by the Bidder on or before 24.08.2022 at 11:00 hours IST. Please note that the Authority reserves the right to accept or reject all or any of the Bids without assigning any reason whatsoever.

For further details please contact:

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Economic data

	Gross domestic product			Consumer prices		Unemployment rate		Current-account balance		Budget balance		Interest rates		Currency units	
	% change on year ago latest	quarter*	2022†	% change on year ago latest	2022†	%		% of GDP, 2022†	% of GDP, 2022†			10-yr gov't bonds latest,%	change on year ago, bp	per \$ May 4th	% change on year ago
United States	3.6	Q1	-1.4	3.0	8.5	Mar	7.2	3.6	Mar	-3.9	-6.6	2.9	132	-	-
China	4.8	Q1	5.3	5.0	1.5	Mar	2.2	5.8	Mar‡§	2.3	-6.2	2.6	§§	-35.0	6.59
Japan	0.4	Q4	4.6	2.8	1.2	Mar	1.7	2.6	Mar	1.1	-5.9	nil	-8.0	130	-16.0
Britain	6.6	Q4	5.2	3.9	7.0	Mar	6.4	3.8	Jan††	-3.3	-5.5	1.9	102	0.80	-10.0
Canada	3.3	Q4	6.7	3.8	6.7	Mar	5.1	5.3	Mar	1.3	-3.6	2.9	141	1.28	-3.9
Euro area	5.0	Q1	0.8	3.2	7.5	Apr	5.2	6.8	Mar	2.4	-4.1	1.0	121	0.95	-12.6
Austria	5.5	Q4	-2.0	2.6	7.2	Apr	6.5	4.2	Mar	-1.3	-4.4	1.5	148	0.95	-12.6
Belgium	4.6	Q1	1.2	2.8	8.3	Apr	8.6	5.6	Mar	-0.8	-4.9	1.5	146	0.95	-12.6
France	5.3	Q1	-0.2	3.2	4.8	Apr	4.1	7.4	Mar	-1.3	-5.5	1.5	134	0.95	-12.6
Germany	3.7	Q1	0.8	1.6	7.4	Apr	6.8	2.9	Mar	5.9	-2.9	1.0	121	0.95	-12.6
Greece	7.4	Q4	1.7	3.5	8.8	Mar	5.8	12.9	Mar	-5.2	-5.1	3.4	241	0.95	-12.6
Italy	5.8	Q1	-0.7	3.0	6.2	Apr	6.3	8.3	Mar	2.3	-5.7	3.0	215	0.95	-12.6
Netherlands	6.5	Q4	4.1	2.5	9.7	Mar	9.6	3.3	Mar	5.9	-3.0	1.3	134	0.95	-12.6
Spain	5.5	Q4	1.3	5.4	8.4	Apr	4.5	13.5	Mar	1.4	-5.7	2.0	152	0.95	-12.6
Czech Republic	3.7	Q4	2.8	2.7	12.7	Mar	9.5	2.4	Mar‡	-1.6	-4.8	4.3	254	23.4	-8.0
Denmark	6.8	Q4	12.5	2.7	5.4	Mar	2.0	2.5	Mar	8.6	nil	1.3	126	7.05	-12.3
Norway	5.4	Q4	0.3	3.3	4.5	Mar	3.6	3.1	Feb##	9.2	2.6	1.4	76.0	9.41	-11.5
Poland	8.0	Q4	6.6	4.2	12.3	Apr	9.0	5.4	Mar§	-1.4	-4.4	6.6	493	4.44	-14.6
Russia	5.0	Q4	na	-10.0	16.7	Mar	16.0	4.1	Mar§	6.7	-6.5	10.3	315	65.8	13.8
Sweden	3.5	Q1	-1.6	2.8	6.0	Mar	4.1	8.2	Mar§	3.4	-0.4	1.8	141	9.86	-14.1
Switzerland	3.7	Q4	1.1	2.6	2.4	Mar	2.1	2.2	Mar	6.1	0.5	0.9	105	0.98	-7.1
Turkey	9.1	Q4	6.2	3.0	61.1	Mar	50.5	11.4	Feb§	-3.8	-3.7	20.3	252	14.8	-43.9
Australia	4.2	Q4	14.4	3.2	5.1	Q1	4.3	4.0	Mar	2.0	-3.0	3.5	188	1.40	-7.1
Hong Kong	4.8	Q4	0.8	0.8	1.8	Mar	4.5	5.0	Mar##	-1.6	-6.9	2.9	170	7.85	-1.0
India	5.4	Q4	26.6	7.2	7.0	Mar	6.0	7.8	Apr	-1.4	-6.4	7.4	136	76.4	-3.4
Indonesia	5.0	Q4	na	5.2	2.6	Mar	4.2	6.5	Q3§	0.3	-4.8	7.0	57.0	14,497	-0.5
Malaysia	3.6	Q4	na	4.0	2.2	Mar	2.9	4.1	Feb§	3.2	-6.2	4.4	121	4.35	-5.3
Pakistan	6.0	2021**	na	3.0	13.4	Apr	9.5	6.3	2021	-5.8	-6.6	12.9	+++	308	186
Philippines	7.8	Q4	13.0	6.0	4.9	Apr	4.6	6.4	Q1§	-3.0	-7.7	6.1	198	52.5	-8.5
Singapore	3.4	Q1	1.4	3.6	5.4	Mar	4.5	2.2	Q1	17.5	-0.9	2.6	106	1.38	-2.9
South Korea	3.1	Q1	3.0	2.7	4.8	Apr	3.2	3.0	Mar§	2.2	-3.0	3.5	133	1,266	-11.3
Taiwan	3.1	Q1	6.4	4.5	3.3	Mar	3.8	3.7	Mar	13.1	-1.2	1.1	65.0	29.5	-5.4
Thailand	1.9	Q4	7.5	2.9	5.7	Mar	5.0	1.5	Dec§	0.1	-4.8	3.0	136	34.5	-9.8
Argentina	8.6	Q4	6.3	3.2	55.1	Mar	54.5	7.0	Q4§	1.2	-4.3	na	na	116	-19.2
Brazil	1.6	Q4	2.2	0.8	11.3	Mar	10.2	11.1	Mar§##	-0.5	-7.1	12.3	297	5.01	9.0
Chile	12.0	Q4	7.5	3.2	9.4	Mar	7.9	7.8	Mar§##	-2.7	-4.5	6.7	296	859	-17.9
Colombia	10.7	Q4	18.2	4.2	8.5	Mar	7.9	12.1	Mar§	-4.0	-5.3	10.4	335	4,061	-5.5
Mexico	1.6	Q1	3.6	1.9	7.5	Mar	7.4	3.5	Mar	-0.9	-3.5	9.1	247	20.2	0.1
Peru	3.2	Q4	-12.9	3.1	8.0	Apr	6.5	7.9	Mar§	-3.1	-2.6	7.7	225	3.81	0.5
Egypt	9.8	Q3	na	5.1	10.5	Mar	9.7	7.4	Q4§	-6.3	-7.0	na	na	18.5	-15.2
Israel	11.1	Q4	17.8	4.1	3.5	Mar	3.8	3.8	Mar	3.4	-2.7	2.4	131	3.39	-3.8
Saudi Arabia	3.2	2021	na	6.7	2.0	Mar	2.3	6.9	Q4	14.9	10.1	na	na	3.75	nil
South Africa	1.7	Q4	4.7	2.1	6.1	Mar	5.8	35.3	Q4§	-1.1	-6.1	9.9	75.0	15.9	-8.8

Source: Haver Analytics. *% change on previous quarter, annual rate. †The Economist Intelligence Unit estimate/forecast. §Not seasonally adjusted. ‡New series. **Year ending June. ††Latest 3 months. #3-month moving average. §§5-year yield. +++Dollar-denominated bonds. Source: Haver Analytics

Markets

In local currency	Index May 4th	% change on:			index May 4th	one week	Dec 31st 2021	% change on:			index May 4th	one week	Dec 31st 2021
		one week	Dec 31st 2021	Dec 31st 2021				one week	Dec 31st 2021	Dec 31st 2021			
United States S&P 500	4,300.2	2.8	-9.8		45,249.4	-0.6	1.5						
United States NAScomp	12,964.9	3.8	-17.1		3,349.3	0.9	7.2						
China Shanghai Comp	3,047.1	3.0	-16.3		2,677.6	1.5	-10.1						
China Shenzhen Comp	1,878.9	3.2	-25.7		16,565.8	1.6	-9.1						
Japan Nikkei 225	26,818.5	1.6	-6.9		1,652.3	-0.6	-0.3						
Japan Topix	1,898.4	2.0	-4.7		89,401.4	-0.7	7.1						
Britain FTSE 100	7,493.5	0.9	1.5		108,343.8	-0.9	3.4						
Canada S&P TSX	21,185.0	2.1	-0.2		51,432.6	-1.8	-3.5						
Euro area EURO STOXX 50	3,725.0	-0.3	-13.3		11,047.7	3.1	-7.2						
France CAC 40	6,395.7	-0.8	-10.6		2,022.1	-3.1	-2.5						
Germany DAX													

Church and choice

Religion, not gender, is the best predictor of views on abortion

SHOCKED BY A draft Supreme Court opinion that would allow states to ban abortion, American liberals are hunting for silver linings. Some hope that women enraged by the loss of *Roe v Wade* will vote en masse for Democrats in November.

That would put Republicans in swing states at risk. However, liberal activists focus solely on the gender gap at their peril: women are almost as likely as men to oppose abortion. The most reliable backers of abortion rights are the 30% of Americans with no religious affiliation.

Views on abortion have been fairly stable over time. Big majorities favour legal abortion in cases of rape or health risks. Since 2002 the share of participants in the General Social Survey, a large poll, who say abortion, for any reason, should be legal has climbed from 40% to 54%. Compared with the change in support for gay marriage, however, this increase looks modest.

Although state-level polls on abortion are sparse, public opinion in each state can be estimated using demographic and geographic patterns in national surveys. This method shows that just 12 of the 50 states have majorities that want to ban abortion, or allow it only if the mother's life is at risk. In contrast, 19 states have laws limiting abortion that would take effect the day *Roe* is reversed. They include Arizona, Michigan and Wisconsin, where an estimated 60% of people favour abortion rights.

Voters likely to mourn the loss of *Roe* can be targeted demographically. The gender gap in views on abortion is modest, at six percentage points. Religion and race, in contrast, account for up to 65 points.

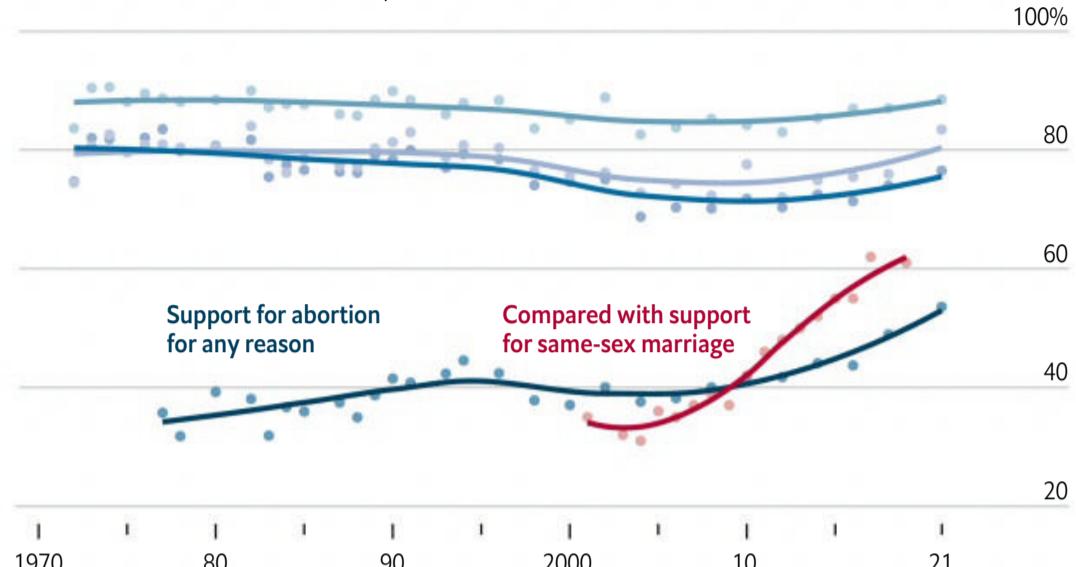
In a sample of 13,659 people surveyed by YouGov, a pollster, just 28% of white or older Hispanic evangelicals wanted abortion to be "always" or "mostly" legal. Despite the Catholic and Orthodox churches' opposition, 53% of whites and 65% of Hispanics in these groups favoured abortion rights. Among agnostics and people who did not list a religion, the shares were 61% for those who did not attend college, and 79% for people who did. Other strong backers were Jews (76%) and atheists (a hefty 92%).

America's political coalitions reflect these cleavages already. However, whites who are non-evangelical Protestants, or who are not religiously affiliated and lack college degrees, favour abortion rights more than they do Democratic candidates. Their loyalty may now be up for grabs. ■

→ After decades of stability, support for abortion rights has begun to rise

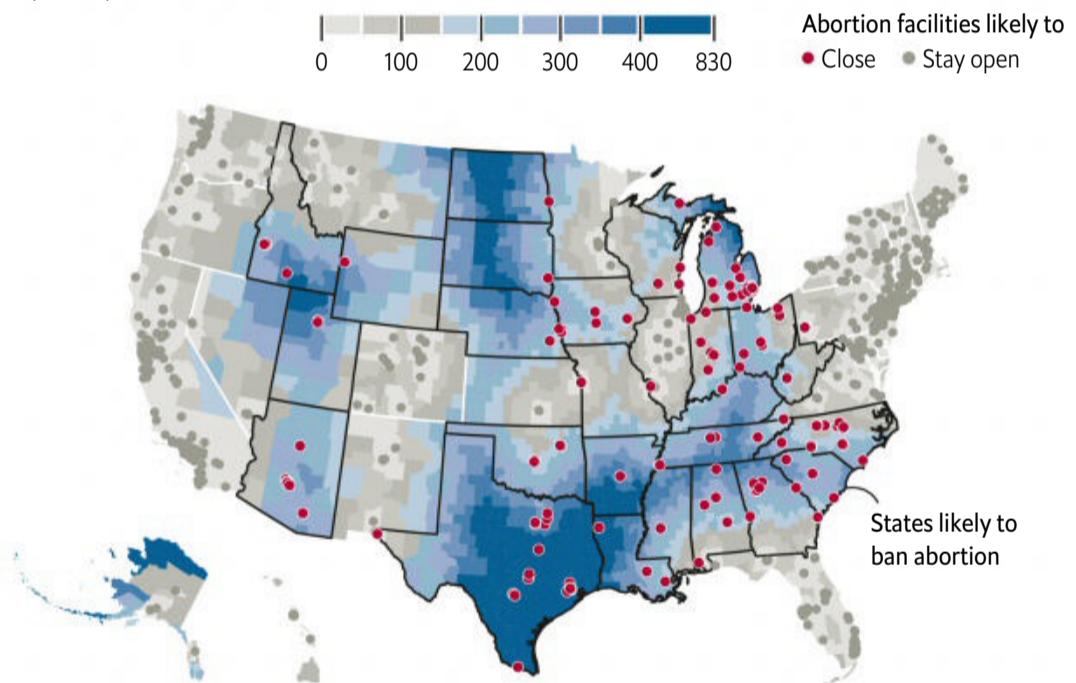
United States, share of respondents that support abortion in cases of:

Mother's health at risk Rape Risk of birth defect



→ Without *Roe v Wade*, much of the South would lack abortion providers

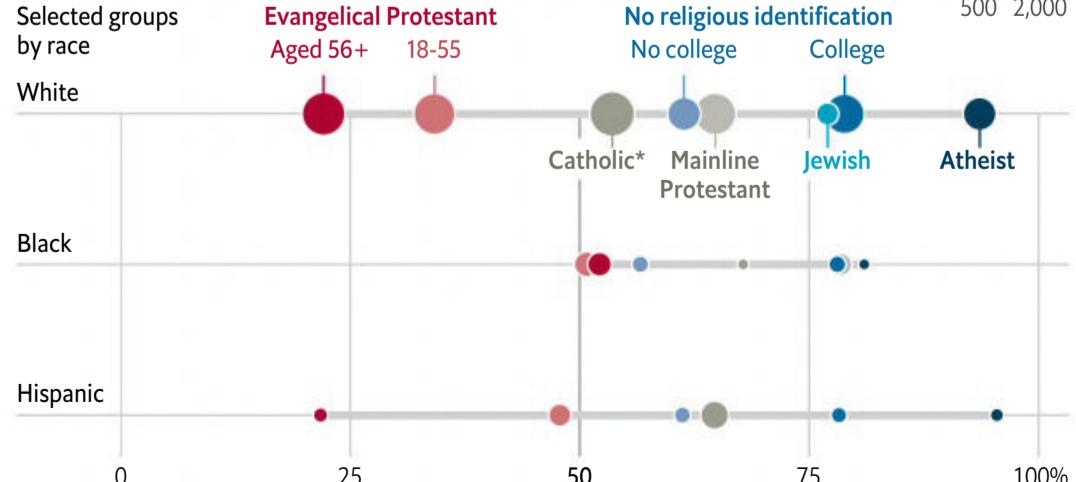
Distance to nearest abortion provider, in scenario where *Roe v Wade* is overturned
By county, miles



→ Religion shapes views on abortion, but its impact varies by race

Share of respondents who think abortion should be "mostly" or "always" legal

Selected groups by race





Travels with a piano

Franz Mohr, Steinway's chief tuner for 24 years, died on March 28th, aged 94

SEVERAL DECADES ago *The Economist*'s New York office was above the old showroom of Steinway & Sons, piano-makers, on West 57th Street. The way to the office was a staircase to the left; to the right the glossy black pianos stood among rich carpets, and customers could be seen and heard shyly, or boldly, trying them out.

The showroom, however, was not Franz Mohr's place. His realm was the basement, where the beautiful concert grands were stabled within bare walls, out of the daylight, in ideal relative humidity of 45-65%. Here, in his black Steinway apron, he was in near-constant attendance, ears cocked to his tuning fork to hear how quickly, after he struck a key, the wave died and the note was "in", while his right arm was thrust into the innards of each creature, moving his tuning hammer along the tuning pins. When electronic strobes came in, he had no time for them. To set pitch, a tuner could rely only on hearing and touch.

Each piano had a different character. To make two sound exactly alike was an impossibility. No doubt the good Lord—to whom he turned constantly, as to his tuning fork, to hear the perfect pitch of his life—could make two the same, but where would be the joy in that? So one piano would have a big, bombastic voice, just right for Rachmaninov, and another would be refined, for chamber music. No piano could give what wasn't there. He could, however, gradually adjust them, by both tuning and full mechanical regulation, to be as close as possible to the sound the owner wanted. Day in and day out, that was what he was doing.

Into this room the great pianists came, looking for an instrument to play in public. He would brim then with pride and excitement, but kept his mouth shut, unless the maestro asked a ques-

tion. He knew his place. In his time at Steinway he was the chief tuner for Arthur Rubinstein, Van Cliburn, Glenn Gould and, more than anyone, Vladimir Horowitz, who in the 1980s was perhaps the greatest in the world. His awe at their art did not alter his feeling that the pianos were his, as much as theirs.

Their tastes were highly distinctive. Horowitz wanted a brilliant response from a petal-light touch, which most other pianists could barely control. He also liked (and here Mr Mohr's German English ran out), a bit of "nasal-ness" in it. Rubinstein preferred a warmer, darker sound, and forbade the keys to be cleaned because it made them slippery. When Mr Mohr, new to his service, polished them, he had to apply a double-pssst of hairspray to restore their resistance. Gould wanted the hammers to make a drumming at certain speeds, so he fixed that for him, though it hurt.

As the stars toured the world he went with them, or firstly with their chosen pianos and a box of tools of his trade. Anxiously he oversaw their disassembly at Steinway and their reassembly in the concert hall, where he would tune for hours on end, sometimes going without his dinner. Often he was the only living creature there, apart from the piano itself. But he loved that! He thanked God he could stay in the background, with a servant heart, unless things went wrong. For they did: a stool set too high in Chicago, propelling Horowitz into fury, and a broken string, a bass A flat, at Carnegie Hall. He went on to fix both, gathering applause and taking bows, but could not leave those lonely stages fast enough.

In his youth, growing up in wartime Germany, he had never considered such a role. He had learned the violin, studied music at Detmold and Cologne, and hoped to be a soloist. But the Lord had planned a different future for him. Tendonitis crippled his left wrist, and he had to give up playing. He answered an ad that led him to an apprenticeship in piano mechanics, then another that took him in 1962 to Steinway in New York. It was not his dream path, but it still had to do with music. In a way it mirrored an event he had never forgotten, the burning in a bombing raid on Cologne of the Academy's great organ, which responded to the winds that followed by groaning, then singing, through the fire.

Working with the maestros was eye-opening in itself. Cliburn, a good Texas boy, was too lazy to practise except "onstage" (he told him), and collected dozens of leather suitcases. Gould, before a recording, would soak his hands in water as hot as he could stand it, then put on gloves, then take them off to play. He made the technicians despair both with his humming as he played, and with the squeaks of the fold-up chair he insisted he must sit on.

It was Horowitz, though, and Horowitz's piano, with whom Mr Mohr's life became most tightly entwined. After a few delicate years, Horowitz would have no tuner but him. The piano in question, one of six the maestro used, had been built for him by Steinway in 1941, and regulated so lovingly by Mr Mohr since 1965 or so that its insides were as good as new. On this Horowitz could display his whole range, from whispering *pianissimi* to thundering *fortissimi*: mostly because it was a Steinway, as Mr Mohr loyally insisted, whose secret lay in the quality of the wood in it, but also because he had given a really high tension to the repetition spring. After Horowitz's death in 1989 he continued to care for it, tuning and regulating it and accompanying it on tour round America, so that other pianists could play it—though this would not, he cautioned, no way! make them play like Horowitz afterwards.

Life with the maestro was not always easy, but he could cope. When the cry went up once in rehearsal, "Franz, there's something wrong with this key!", he told Horowitz that he could fix it in half an hour, a good chance for the maestro to take a coffee break. The break cured the problem. He did not need to touch the key.

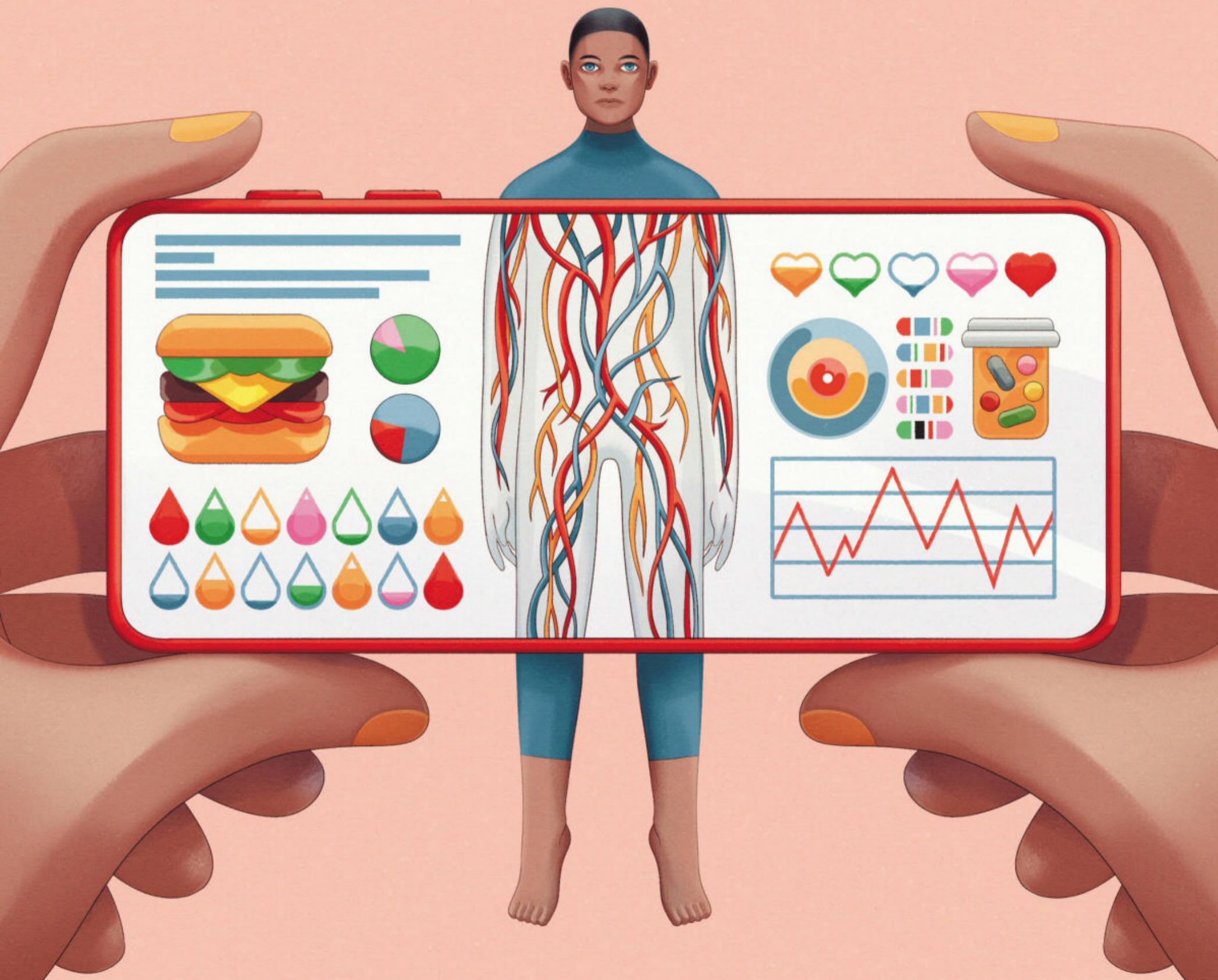
His duties came to include holding Horowitz's hands before a concert. They were very cold. "I admire you with your warm hands," the maestro said once. He also said, "Franz, you are the most important person here." "No, Maestro, you are!" "No, no," came the reply. "If the piano's not right, I'm not going to play!" ■

TQ

The Economist
Technology Quarterly:
The quantified self

→ May 7th 2022

- 3 The new wearables
- 5 Measuring your health
- 7 Apps and data
- 8 Delivering treatment
- 11 Medical research transformed



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A wearable revolution

The quantified self

Wearable fitness trackers and smartwatches are connecting health care to daily life, says Slavea Chankova

BRAYAN JOHNSON has just spent another weekend being examined. “On Saturday the sonographer was measuring...my ankles and knees and hips and shoulders and elbows, assessing what is the age of my tendons and ligaments,” he says. It is part of a mission to have all 70-plus organs of his body measured in exhaustive detail so he can see whether, and to what extent, his healthy lifestyle is rejuvenating them.

Mr Johnson, a tech entrepreneur in California, says he has undergone more than 300 tests of various sorts to that end. At one point he had one to check for damage to his arteries from all the blood drawn for other tests. His diet is also entirely determined by tests which have looked at how his body reacts to some 150 foods. “My conscious mind never decides what to eat,” he says. The main meal every day is the same green veggie mush, with a side of strictly regimented sleep, exercise and meditation.

By some measures, Mr Johnson reckons, eight months of living like this has left his body five years younger. Be that as it may, he is certainly pushing at the boundaries of what, in 2007, *Wired* magazine dubbed the “quantified self” movement: the meticulous collection and analysis of data about bodies and lifestyle that people do to hack their way to better health.

Systematic measurements of people’s physical attributes and records of their behaviour came into their own with the Enlightenment and the development of statistics. For the most part, they were used to understand and control populations, organising them into classes and seeking out the sick, the different and the

“inferior” in order to segregate, encourage or punish them. What is striking about the current quantification of the self is the inward-looking individualism of its standardised scrutiny.

As it becomes more mainstream, the technology in smart wristbands, watches, rings and patches—collectively called “wearables”—is measuring ever more aspects of wearers’ lives more accurately and subtly. An Apple Watch collects millions of data points per day. People are seeing into themselves in ways not possible before and are finding new ways to act on what they learn. The effect on health and lifestyle is likely to be profound.

Natasha Schüll, a cultural anthropologist at New York University who is writing a book, “Keeping Track”, about the quantified-self movement, began lurking in meetings of its devotees around 2011. The attendees back then were “geeky techno enthusiasts”, mostly men, who brought data they had collected about themselves and shared what they had learned from it. Soon, though, Dr Schüll says, other types began to show up: people who just sat at the back taking notes. They were the entrepreneurs who would turn what they learned from these meetings into consumer products: apps and gadgets that put such data to use in various ways.

By 2015, when Apple launched its first Watch, Fitbit’s fitness trackers had already been on sale for six years, and there were more than 500 health-related wearables on the market. Sales of smartwatches and fitness trackers amounted to \$8bn, according to CCS Insight, a market-research firm. By 2021, \$29bn was spent globally—more than half the amount spent on sporting goods. ➤

In America smartwatches are catching on as fast as did early mobile phones (see chart 1). In 2021 about one in four Americans was estimated to own a smartwatch or fitness tracker. The rate is similar in leading European adopters such as Britain and Finland. The number shipped in North America more than doubled from 2015 to 2021. In western Europe and China it more than tripled (see chart 2). In 2019, Apple sold more watches than the entire Swiss watch industry. Some 400m devices a year (of all brands) are expected to be sold globally by 2026, up from 200m in 2020.

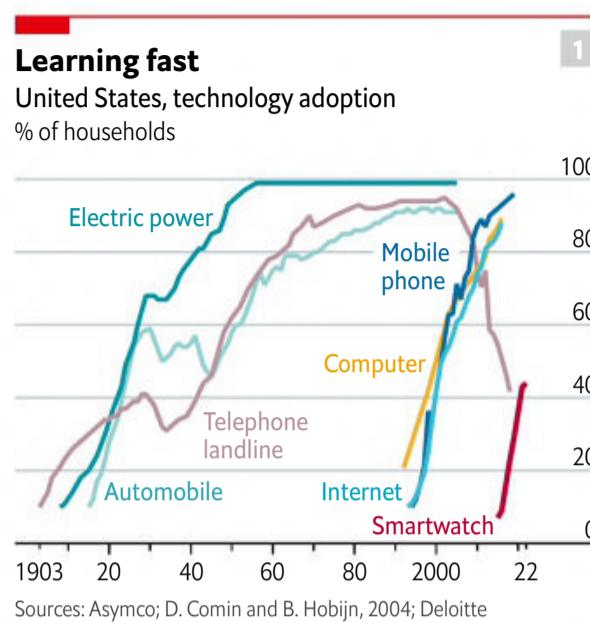
There has long been a gap between the parts of Western societies and economies that look after people when they are sick and the parts that help them stay healthy. Wearable devices—and the technologies that they enable—are starting to bridge that divide in two ways. On the one hand, they are making life more medicalised, with people, for the first time, keeping an eye on things like their nocturnal heart rate. On the other hand, they are ushering in a shift in the balance of responsibility between medical treatment provided by clinicians and what patients do to improve their health.

The covid-19 pandemic accelerated the process. Wearables entered the lives of more people and took on new roles. With gyms closed, exercise shifted outdoors and many people bought them for the first time, to keep track of how much they walked, ran and pedalled. A parallel trend was that lots of consumers began to see these devices as tracking specific areas of their health, not merely their activity level. Before covid, wearables were often “what we might call disposable”, says Ranjit Atwal from Gartner, a research firm. People would buy them for no particular reason, wear them for a short time and put them into a drawer. It was unclear how, or indeed whether, the market for such devices would mature. The pandemic changed that because many people had to be monitored at home for health reasons. Doctors in America and Europe started seeing more elderly patients with smartwatches that relatives have bought for them in order to track their health and send alerts of any problems.

All this is assisted by the fact that people are more used to having technology help monitor and manage their lives. AI-assistants like Siri and Alexa are no longer a novelty used by a brave techie minority. Things that reflect how intimately a device knows you, like personalised playlists, are starting to feel less creepy.

The benefits are noticeable. A round-up by researchers in Denmark of more than 120 studies of personal-activity trackers, which included healthy people and those with various health conditions, concluded that wearing the devices makes people move more. The improvements are modest: about 1,200 more steps (around 800 metres, or half a mile) daily, 49 more minutes of vigorous exercise per week and 10 minutes less sedentary time per day. But physical activity is so important that even small changes can matter a lot. Studies that have followed people for 4-10 years have found that increasing steps by an extra 1,000 per day reduces mortality by between 6% and 36%, with the biggest impact among those who are most sedentary.

Such results have convinced some American health insurers to give away fitness trackers and smartwatches to their customers. UnitedHealthcare, one of the



billion, says that 59% of takers log exercise for at least six months. For comparison, gym-membership retention rates drop off a cliff after two or three months.

Doctors in America and Europe are starting to warm up to the idea that wearables can help them take better care of their patients. Profit-oriented health-care systems, like America's, smell greater efficiency. Instead of asking patients if they are sleeping better, for example, doctors can simply look up a chart from a wearable device. Several hospital groups in America that care for millions of patients are setting up systems that make wearables a seamless part of clinical care. Finland's citizens can link their wearables and other personal health devices (such as smart scales) with their national health records.

Market analysts expect that, in the next five years, the wearables market will split into two categories: medical-grade devices approved by regulators for people with chronic conditions who need tracking with greater care and accuracy, and devices with less sophisticated features for healthy people who want to keep an eye on their metrics and be able to spot problems early. Leading manufacturers are expected to offer increasingly specific devices for groups such as children and the elderly.

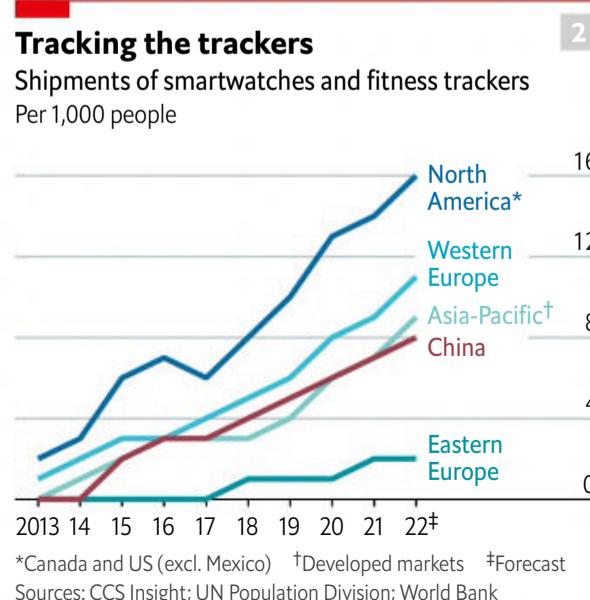
Qualitative, too

This report will examine the technologies that are paving the way for this transformation of health care. The sensors and algorithms that unobtrusively measure things as people go about their daily lives are becoming more sophisticated, turning wearables into diagnostic devices. AI-based apps built on the data streaming from people's wrists are dispensing personalised advice on what to eat for lunch or when to go for a walk. Interactive apps backed up by clinical evidence are being prescribed as treatment for all sorts of ailments, just as medicines are. Some of them work better than conventional therapies aimed at the same problem.

Wearables are also transforming disease surveillance and clinical trials for new drugs, by showing how people experience a disease or a treatment in their daily lives. They make it possible, for the first time, to take the temperature, or measure the pulse, of a population rather than an individual.

There are plenty of problems to be resolved. Chief among them are concerns about privacy and discrimination based on the health data from wearables. Digital-health products built on the data are still variable in quality, though it is getting easier to sort the good from the bad. Regulators are trying to strike a balance between protecting consumers and not suppressing innovation, while also learning how to regulate a digital-health ecosystem.

But few doubt that the benefits from wearables will be huge, even if the digital care that they make possible will remain supplementary to conventional medical treatments. About 80% of the burden of disease in America is caused by lifestyle factors, and many poorer countries are not far behind. Drugs work as intended in only 30-50% of people. For many diseases there are no therapies at all. Digital health care can deal with many of these problems. To appreciate what it can achieve, the best place to start is the technology behind wearable sensors. ■



Tracking your health

One ring to rule them all

Wearable devices measure a growing array of health indicators

ON THE OUTSIDE, the Oura ring looks rather ordinary, indistinguishable from a chunky wedding band. But a faint green light that intermittently leaks out from the gap between finger and ring suggests that it is not just jewellery.

The inside of the ring is packed with electronics. The green light comes from a pair of rectangular metallic specks that are light-emitting diodes, or LEDs. Three dome-shaped bumps the size of water drops contain red and infrared LEDs and a pair of photodetectors. They are surrounded by seven temperature sensors, a wafer-thin battery and a miniature 3D accelerometer that detects any kind of motion.

The LEDs illuminate the blood vessels inside the finger. As the heart pumps blood through the body, the vessels expand and contract and the light reflected changes accordingly. The number of these changes per minute is the heart rate or pulse. It is calculated by an algorithm that takes the data given out by the sensors and makes adjustments for the noise in their signal brought on by motion, ambient light and numerous other external factors.

The green LEDs do their work by day; the infrared ones, by night. Their advantage is that they reach deeper blood vessels, in which the pulse is more easily detected. But their signal is even more sensitive to disturbance, so needs more algorithmic adjustment. The red LED will, eventually, be used to monitor blood-oxygen levels. The software which will turn its data into such measurements, though, will be available only in a later update.

What a wearable device can measure depends on its sensors and its software. Lower level algorithms turn the noisy output of photodetectors and the like into heartbeats. Higher level programs combine, say, heart rate, temperature and movement into measures of the duration, and quality, of sleep.

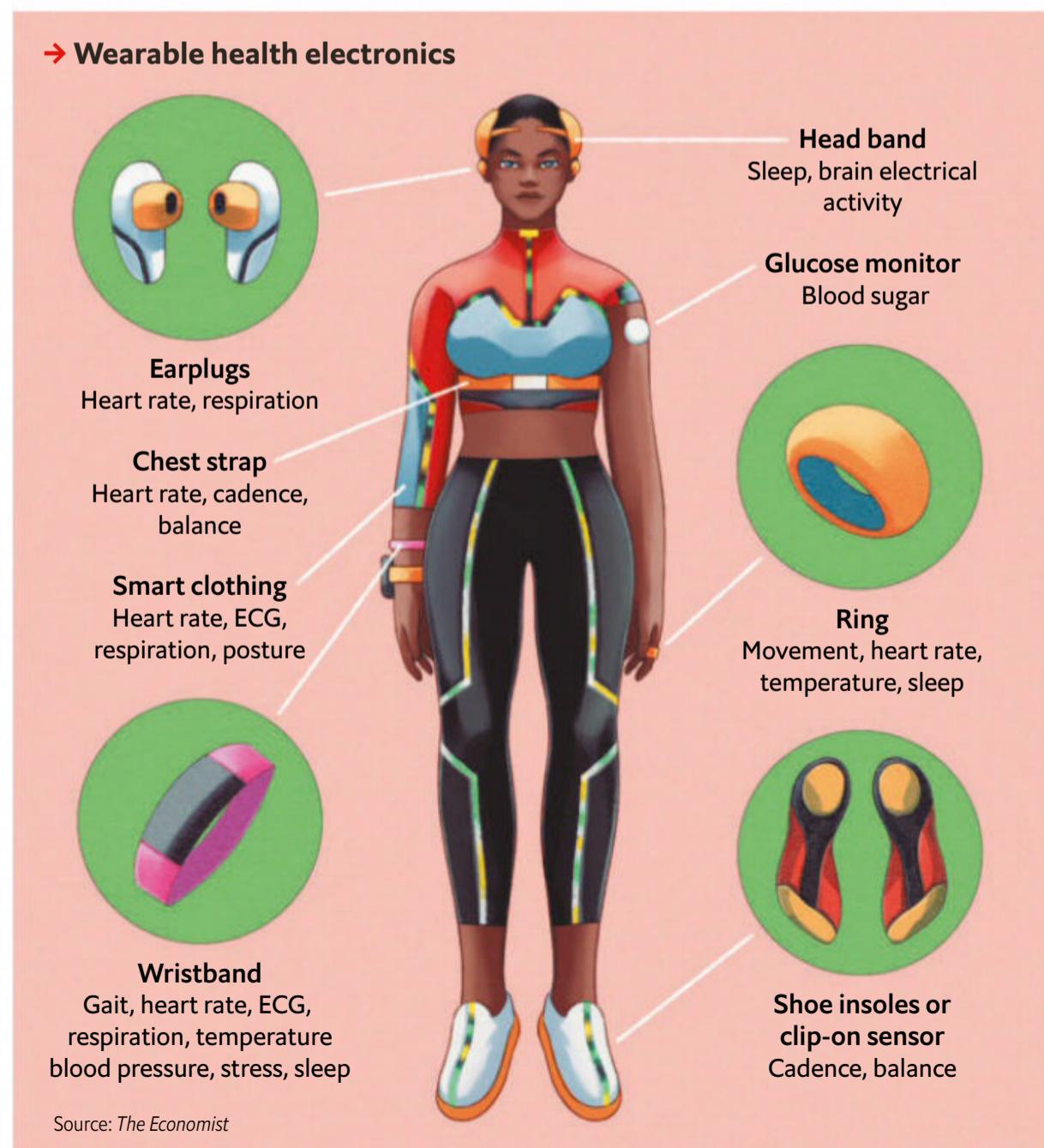
Sensors and algorithms combine to help wearable devices measure step counts, calories burned, oxygen levels and more. Artificial intelligence (AI—as machine learning is popularly known) gives extra oomph to the algorithms. Technology advancements in the past five years have made it possible to pack wearable devices with more sophisticated sensors and more computing power. Oura's third-generation ring, released three years after the second, has 32 times more memory with the same battery life.

All that has enabled wearables to produce more accurate measures and a greater number of them. In a recent review IQVIA, a research firm, found 384 wearable devices marketed to consumers. They include wrist-worn fitness trackers, sports watches, smartwatches, smart jewellery like the

Oura ring and sensor-bearing headsets, patches, straps, clip-ons and even clothes (such as smart socks that measure the vitals of babies). Just over half of the devices analysed by IQVIA monitor activity. The rest are devices that measure a wide array of health variables, including sleep, temperature, breathing, blood pressure, oxygen saturation, blood sugar and electrical activity of the heart.

Many of these variables are starting to appear on popular activity-tracking wristbands, such as Fitbit and Apple Watch. Lots of devices added blood-oxygen measurements to their repertoire in response to the pandemic because low levels are a sign of severe covid. Rockley Photonics, which provides sensor technology to big consumer and medical-device manufacturers, claims its newest sensor can measure hydration, sugar, alcohol, lactate (reflecting muscle inflammation from exercise) and much more in the blood, as well as core body temperature and blood pressure, which have been hard to crack in wearables. Rockley plans to seek approval of its new sensors by the Food and Drug Administration (FDA), America's medical regulator, later this year. For health applications, it helps to turn measurements into the sort of insight required for diagnosis.

In medicine, diagnoses often depend on biomarkers—specific molecules in blood and other fluids linked to a particular health condition. High blood-sugar concentration, for example, is a biomarker for diabetes. Neurological diseases are usually diagnosed with standardised assessments of how people behave, and how well they perform certain tasks. Some of the algorithmic measurements made by wearable devices can be thought of as digital equivalents of established biomarkers and diagnostic tests. Oth-



ers are novel metrics that can predict or diagnose a disease, such as movement or coughing patterns that cannot be measured with conventional diagnostics. Collectively, these are called "digital biomarkers".

Tracking digital biomarkers allows wearables and their associated software to identify changes that are early signs of disease or age-related deterioration that may otherwise go unnoticed. Take atrial fibrillation, an abnormal heartbeat that increases the risk of stroke. About 9% of Americans over 65 and 2% under 65 have the condition, often with no symptoms to alert them to it. In 2018 the FDA approved the Apple Watch as a device that can identify atrial fibrillation. It issues an alert when it spots a string of irregular heartbeats. The user can put a finger against a sensor on the side of the watch, which sets up a circuit sensitive to the heart's electrical activity, allowing the watch to produce an electrocardiogram (ECG). On April 11th Fitbit got FDA approval for its own atrial-fibrillation function.

Movement, an irksome source of noise for individual sensors, is a valuable ingredient in many digital biomarkers. Gait changes, for example, can show whether a person's balance is deteriorating. A recent study found that people who have early-stage Parkinson's disease have subtle differences in gait, arm swing and how they type compared with those who do not. All were measured by their phones and wrist-worn devices. The digital measures also reliably tracked how far the disease had advanced.

Currently, depression is diagnosed using a standard set of questions. Algorithmic measures of the sentiment in daily voice diaries can do the job just as well. Some virtual providers of therapy and psychiatric care are already using interaction patterns between people and their smartphones (without capturing the actual content of what is typed or viewed) to track the mood and cognitive state of patients.

Wearables can also spot healthy changes that people want to know about. Upticks in temperature, for example, are markers for ovulation and pregnancy. Oura is testing a feature predicting weeks in advance the date of a woman's next period. A small study found that measurements from the ring could detect pregnancy on average nine days before at-home pregnancy tests.

Measure for measure

There is almost no part of human biology that has remained untouched by digital measurement. HumanFirst, an organisation in San Francisco that maintains a catalogue of connected devices for remote patient monitoring, has identified 1,200 digital sensors that are tied to 8,000 physiological and behavioural measures.

Quantity does not mean quality. Some devices are much better than others at measuring certain variables; a product may be good at measuring one thing but not another. A recent round-up of studies on the accuracy of various measures produced by 72 wrist-worn trackers found that many devices did a poor job. Some of the leading brands, however, bucked the trend. Fitbit's devices had consistently good accuracy on step counts; the Apple Watch had the highest accuracy for heart rate. None of the devices was good at calorie counts, with estimates off by more than 30% for all brands. But most of the devices in these studies have since been updated and probably use more sophisticated algorithms.

The situation is similar with sleep tracking, an increasingly popular feature. Many devices report measures such as the amount of time in various sleep stages, including deep and rapid-eye-movement (REM) sleep, which are important for brain functioning and recharging the body. Researchers comparing wearable devices against a clinical-grade method that tracks electrical brain activity with a special headset, have been unimpressed. As one study of nine popular wearables published in 2020 put it, "All the

Wearables can recognise important deviations in lifestyle earlier, before a disease develops

commercial devices tested struggled with accuracy." But some, notably Fitbit's and Oura's products, have been reasonably accurate for several years. Oura's chief scientist, Shyamal Patel, says that in studies of more than 1,000 nights of sleep its algorithm agreed with polysomnography, the gold standard for grading sleep, 78% of the time. Polysomnography involves an expert analysing data on brain activity from an entire night of slumber. Two experts doing this agree with each other's assessment 83% of the time.

One area where independent studies find consistently good performance across many devices is heart-rate measurement. Euan Ashley, a cardiologist at Stanford University whose team has done independent studies on the accuracy of wearable devices, says that leading brands, notably Apple and Fitbit, have been good at measuring heart rate for years, "to the point that I would have been willing to trust it in a clinical situation".

When measurements are informing formal diagnostic tests for medical conditions, such as that for atrial fibrillation, they need not just accuracy, but also selectivity. Making an algorithm more sensitive means it will catch more cases, but also means it will call more false positives.

The Apple Heart Study and the Fitbit Heart Study each enrolled more than 400,000 people, who were followed for several months. About 0.5%-1% of participants in each study got an alert about irregular heartbeat. They were asked to wear an ECG patch (the best method for measuring heartbeat) for a week or two. In both studies, a third of people monitored that way went on to have atrial fibrillation. Fitbit's devices identified cases correctly 98% of the time. Apple's did so 84% of the time. Comparing them is tricky because the studies differed on average age of participants and other things. In a study of people mostly older than 55 an updated version of Apple's algorithm caught 89% of atrial-fibrillation cases, and 0.7% of those without the condition got a false alert.

Heather Ross, a cardiologist at the University of Toronto is particularly worried about false negatives from devices that claim to diagnose heart problems but have not had these claims validated. People may ignore warning signs like heart palpitations, she says, if they are wearing something which suggests there is no problem. Dr Ross points to a round-up of studies on 40 wearable devices on the market in 2020, only 15 of which had been vetted by the FDA. Although there were nearly 1,300 studies published about these devices, most were about feasibility or proof of concept matters; only 128 of the studies were from some stage of a cardiovascular clinical trial, the sort of data that doctors want to see in order to trust the results from a device.

Andy Coravos, the chief executive of HumanFirst, has a worry about unregulated devices. Some collect information that is not currently protected as health data, she says—which means it could be used to target advertisements or possibly discriminate when it comes to health insurance or employment. A neurological symptom such as a tremor, for example, could be collected as "wellness" data and reveal a high likelihood for a disorder such as Parkinson's disease, says Ms Coravos. Insurers can get hold of this information via online data brokers and charge that person a higher premium.

The growing array of health variables tracked by wearable devices can lead to big changes in the prevention of chronic ailments like diabetes and heart disease. Continuous measurement makes it possible to establish what patterns are normal for an individual for vital measures like heart rate or respiration. This, in turn, will help users and their doctors to recognise important deviations in lifestyle earlier, before a disease develops. Spotting unhealthy lifestyles, however, is not much use unless it leads to change. And that is something that the devices can now help with, too. ■

Dealing with the data

Killer apps, saving lives

Better measurement does little good unless the apps that interpret the data are well designed

IT IS A TRENDLINE that gives you pause: a spike nearing the top of the blue band that marks your normal blood-sugar range, followed by a sharp dip. The culprit is obvious: the sourdough toast for breakfast half an hour before. A generous piece of banana bread the following morning leaves a completely different trace. The blood-sugar line runs nicely unperturbed right down the middle of the normal zone all the way through to lunchtime.

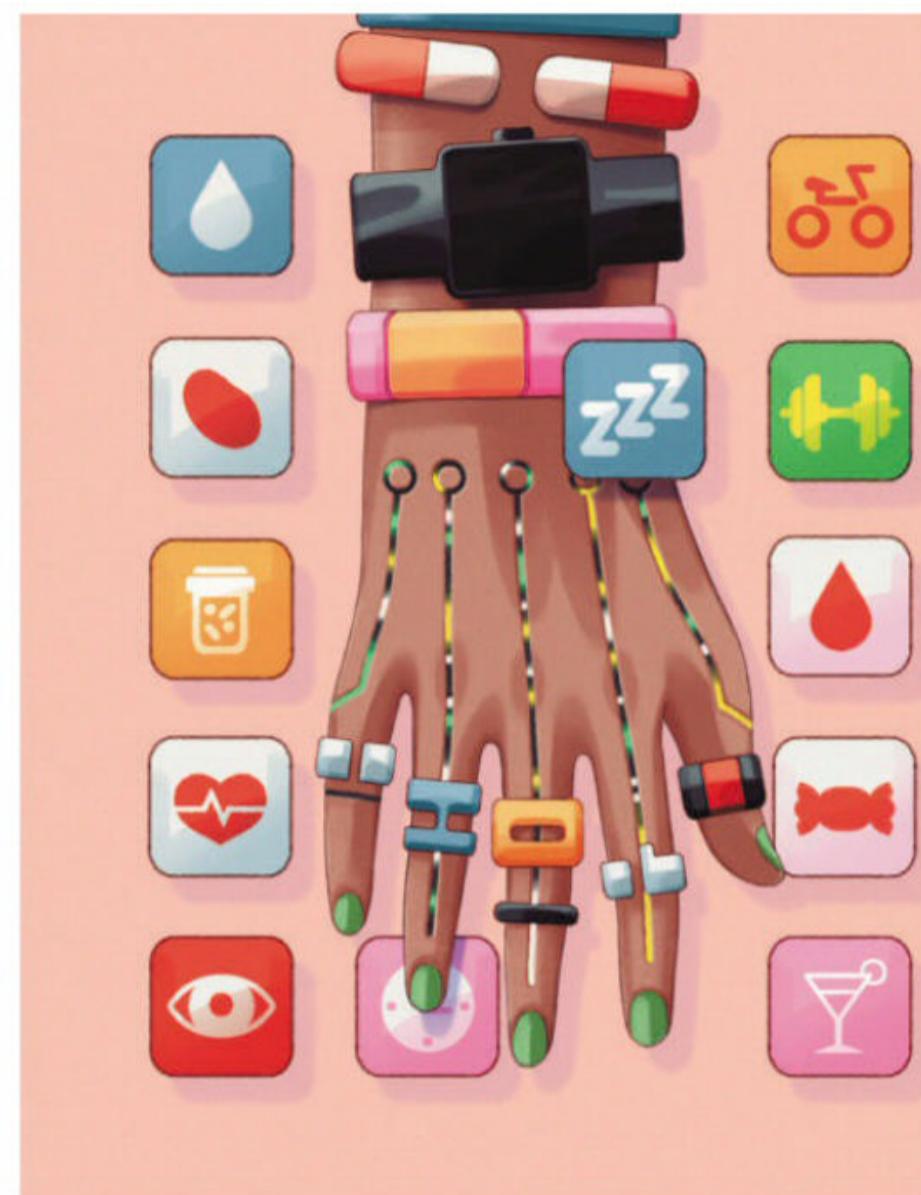
These are the sort of revelations that a continuous glucose monitor, a coin-sized device attached to the skin, beams to your smartphone's screen. The device lasts for two weeks and has a tiny needle that gets just under the skin. Every few minutes it measures the concentration of sugar in the fluid between the cells there—a good proxy for what is going on in the bloodstream.

Almost as soon as the first such continuous glucose monitors started replacing finger-prick blood tests for diabetics in 2014, they began to show up on the arms of non-diabetic geeks in Silicon Valley. They were looking for ways to "hack" their metabolism into delivering, for instance, more energy or brain clarity. Their ad-hoc experiments were soon replicated by formal researchers doing broader studies of metabolism. Those, in turn, have led to the possibility of personalised nutrition.

Such metabolic studies have changed the scientific thinking on what a healthy diet looks like. It has turned out that many seemingly healthy people often have large post-meal spikes in blood sugar, which have been linked to the development of pre-diabetes. Without any intervention pre-diabetes turns into diabetes in 37-70% of cases within four years. The sugar dips that often follow the spikes were recently found to be problematic, too, because they make people feel hungry. People who are "big dippers" consume about 300 more calories a day than those who are not.

In 2015 researchers in Israel showed that an AI-based algorithm they had developed could predict someone's blood-sugar reaction to various foods. The algorithm's inputs included blood tests, sleep, exercise, height and weight, which all affect daily metabolic variations. They also included the composition of the gut microbiome, the trillions of bacteria residing in the gut whose collective job is to process what we eat. Microbiome analysis is done by shotgun genomic sequencing of everything found in a stool sample.

In the past five years startups in America, Europe and Asia have launched AI-based personalised-nutrition apps that build on these discoveries. One of them, Zoe, sends customers a set of specially formulated muffins. By knowing exactly what is in the food being eaten, and measuring the changes in blood sugar and fat that come about in response, the company can create a predictive model of its customers' metabolism. Its algorithm then whips up a bespoke catalogue of foods and meals, with predicted blood-sugar reactions to each. Tushar Vashisht, co-founder of HealthifyMe, an Indian startup that provides digital coaching for weight loss, says the trove of data from customers who can afford various connected devices and blood tests as inputs for their bespoke



plans is useful far beyond those customers. It can help to build apps for people who do not have such devices, which would rely on AI-derived proxies of weight, blood sugar and so on.

For such systems to keep metabolisms in balance, they have to be adhered to. Knowing what is happening inside your body is no help if you do nothing to change the pattern of behaviour involved. Just being told that it is in your interests is not, typically, enough. So apps sold as ways of achieving health gains on the basis of measurements made by wearables typically incorporate a variety of behavioural nudges to keep the user focused.

The AI innovation in such personalised diets makes them easier to maintain in the long term because it gives people options on how to make the foods that the algorithm says are particularly bad

for them a little less bad. The algorithms may suggest small tweaks, such as sprinkling some nuts on that ice cream or going for a long walk after eating it. January AI, another personalised-nutrition startup, says it has derived the nutrition contents of 16m grocery-store items, recipes and menus of local restaurants, which makes it easier for users to plan and track meals.

It is still early days, but results reported by users of such precision-nutrition programmes look encouraging. Users say they are losing weight, have higher energy levels and are sleeping better. Some diabetic users no longer need medication. Studies of several apps are under way to confirm and quantify these benefits.

However, thoughtful suggestions that make compliance easier are the exception. ►

App-trition
Health-care apps released by year*



► As too often with the design of new tech products, behavioural science is an afterthought. When she began researching her book, Natasha Schüll, the cultural anthropologist from NYU, found trying to decode the logic behind many health-tech products very frustrating. Then she realised that there was no logic. It was “a pinch or two of positive psychology thrown in with the infrastructure of a punitive Skinner box, thrown in with some other notion of the brain” ending up as “a hotch-potch of ad-hoc things that was not that studied or scientific”. The typical design strategy, she concluded, “was just throwing things at the wall”.

This may be why many of the apps fail to establish themselves in people’s lives (see chart on previous page). There are more than 400,000 health and wellness apps on the Apple and Google app stores with 250 new ones added daily. Appetite for them is healthy, with around 5m app downloads per day. But 95% of those downloads will be deleted within 24 hours.

The problem is that people do not just need a product that is well designed. They need a product that is well designed for them, says Liz Ashall-Payne from Orcha, a British organisation that evaluates the quality of health apps for clients like the National Health Service. As she points out, buying a pair of trousers online is made easy by filters for size, colour and style, but no such system exists on the app stores. A teenager seeking help for anxiety will need a different type of app to his grandparent wanting the same thing.

A lot of dead wood

Orcha has rated 7,000 health apps on three criteria: privacy, user experience and evidence that they work. Only about a quarter of them meet its quality threshold on all three. Mental-health apps are particularly weak. But quality is improving, says Ms Ashall-Payne. She attributes that to the guidelines for health apps that were set recently by British health authorities, which gave developers clarity on what “good” looks like. As the market matures the bad products will die out, “but it’s going to take time”.

Making people stick to healthy behaviours is probably the biggest challenge in public health. That makes innovations which boost compliance particularly exciting. Technology developed by Sweetch, an Israeli startup, is making the advice dispensed by health apps more practical and personalised. Sweetch’s AI-based algorithm is a hybrid of a personal secretary and a motivational coach. It keeps track of whatever it is the user must do, such as walking a certain number of steps or checking their weight weekly, and finds the best time to suggest they do it.

The vigilant bot may spot, for example, that you have a 20-minute gap between meetings and suggest you pop out for a walk to the coffee shop a few blocks away to do your steps. It changes your activity goals up and down depending on how you are doing, to prevent you from becoming demotivated and ditching the whole thing. The prompts are available in 33 different tones of voice: combinations of words that can be friendly, begging, commanding and so on. Yoni Nevo, Sweetch’s chief executive, says that the algorithm evaluates about 7000 possible combinations of things to say to an individual on any given day. It takes about four to five weeks for the algorithm to learn what makes you tick by trying different combinations of all these things.

Device manufacturers, for their part, are starting to realise that when it comes to giving people health data, less is sometimes more. Many people are happier when they are simply told whether things are fine or not, rather than being flooded with all sorts of data to make sense of before breakfast. Some smart scales now just buzz approvingly when you step on them to confirm that your weight and body-fat composition are in your target range, rather than giving you the metrics. Wearables like the Oura ring are now able to tell you not just what your heart rate, sleep or temperature trends are, but also what that means—and what changes might improve things. And when the data show that things have gone off kilter, novel digital treatments may come to the rescue. ■

Software as treatment

Digital therapeutics

Treatment—not just diagnosis—is being delivered by apps and devices connected to them

“IT LOOKS LIKE your back is a bit tight today. Let’s modify your workout.” The voice is gentle yet commanding, the instructions rolled out in the signature cadence of a physiotherapist. It is also unmistakably robotic. The AI physio issues her commands straight from a smartphone’s speakers. A phone with a camera is all she needs to do her job: select the exercises to suit the patient’s injury, guide him through each session and order corrections when he is not doing something right (bending a knee at the wrong angle, for example). An AI algorithm marks up his body as he moves, which is how it knows when a joint is hurting or the back is stiffer than the day before.

This digital therapist, developed by Kaia Health, a German startup, is, by many measures, as good as a human therapist. One trial, which involved 552 exercises by osteoarthritis patients, found that human therapists agreed with the corrections to exercise suggested by Kaia’s app as often as they agreed with the corrections suggested by other human therapists. In clinical trials patients with back pain using the app improved more than those who got in-person physiotherapy. Making people with injuries bend and twist carries some risks. On that, too, Kaia’s app is no worse than human experts. Less than 0.1% of nearly 140,000 users of the app in studies reported adverse events.

The app is registered as a medical device by America’s Food and Drug Administration (FDA) and also in the European Union. Since 2017 the FDA has approved more than 40 other health apps for pro-



blems as varied as diabetes, back pain, opioid addiction, anxiety, ADHD and asthma. They are reviewed under the rules for medical devices, usually in the moderate-risk category (which covers things such as pregnancy tests and electric wheelchairs).

Some European countries are designing special approval pathways that also stipulate how health apps are paid for through their health systems. In Germany health apps can get provisional approval for a year based on preliminary evidence of benefits, which obliges health insurers to pay for them. Apps that provide solid evidence from clinical trials get permanent approval. Twelve have already done so and another 19 are on the provisional list. France and Belgium are copying the German model.

Such apps, known as “digital therapeutics”, hold great promise for common and rare diseases alike. Some are stand-alone products, for which you need nothing more than a smartphone. Others are paired up with wearables and other devices that feed them data from users’ bodies, like continuous glucose monitors. Some of them are available only on prescription or through referral from a health professional.

Brent Vaughan, a veteran entrepreneur in digital health who is currently the chief executive of Cognito Therapeutics, a Boston-based startup, says there have been three waves in the evolution of digital therapeutics. The first was mostly what he calls “nagware”—apps that help patients with diabetes and other chronic diseases manage mundane tasks, such as taking their medication, moving around more, eating suitable food or measuring their blood sugar. The second wave digitised existing therapeutic interventions that had almost no safety risk, such as cognitive-behavioural therapy for insomnia and various mental-health problems (“Repackaging things that we’ve done before face-to-face, and moving them to face-to-screen,” as Mr Vaughan puts it). It is the

Within a year most heart attack survivors prescribed cholesterol drugs are not even picking up their drugs

latest wave of digital therapeutics that he says are genuine medical breakthroughs. These therapies may change the progression of a disease by altering the underlying biological mechanisms, such as rebuilding neural connections within the brain.

The nagware apps for chronic conditions may sound boring but can have a big impact on health at population level. “If you want to change behaviour, that’s what it’s going to take,” says Steven Driver, a cardiologist and medical director of digital therapeutics at Advocate Aurora Health, a big hospital group in

America. “It’s not going to be me in the office 30 days later, reminding them to eat less and exercise more. It’s going to be someone on Tuesday saying, ‘It’s 5pm, you’re probably home from work and you only have 3,500 steps. If you get up and walk for a half hour you’ll meet your goal.’ That’s what we need and that’s what a digital therapeutic allows us to do.”

Poor adherence to medication regimens is a huge problem, too. “Nobody is more eager to take their medicines than someone who just survived a heart attack,” says Dr Driver. But in just three weeks, adherence to most treatment regimens begins to wane. Within a year most heart-attack survivors prescribed cholesterol drugs are not even picking up their drugs. And because chronic conditions like diabetes and heart disease often come with other health problems mixed in, even conscientious patients struggle to keep track of everything they must do.

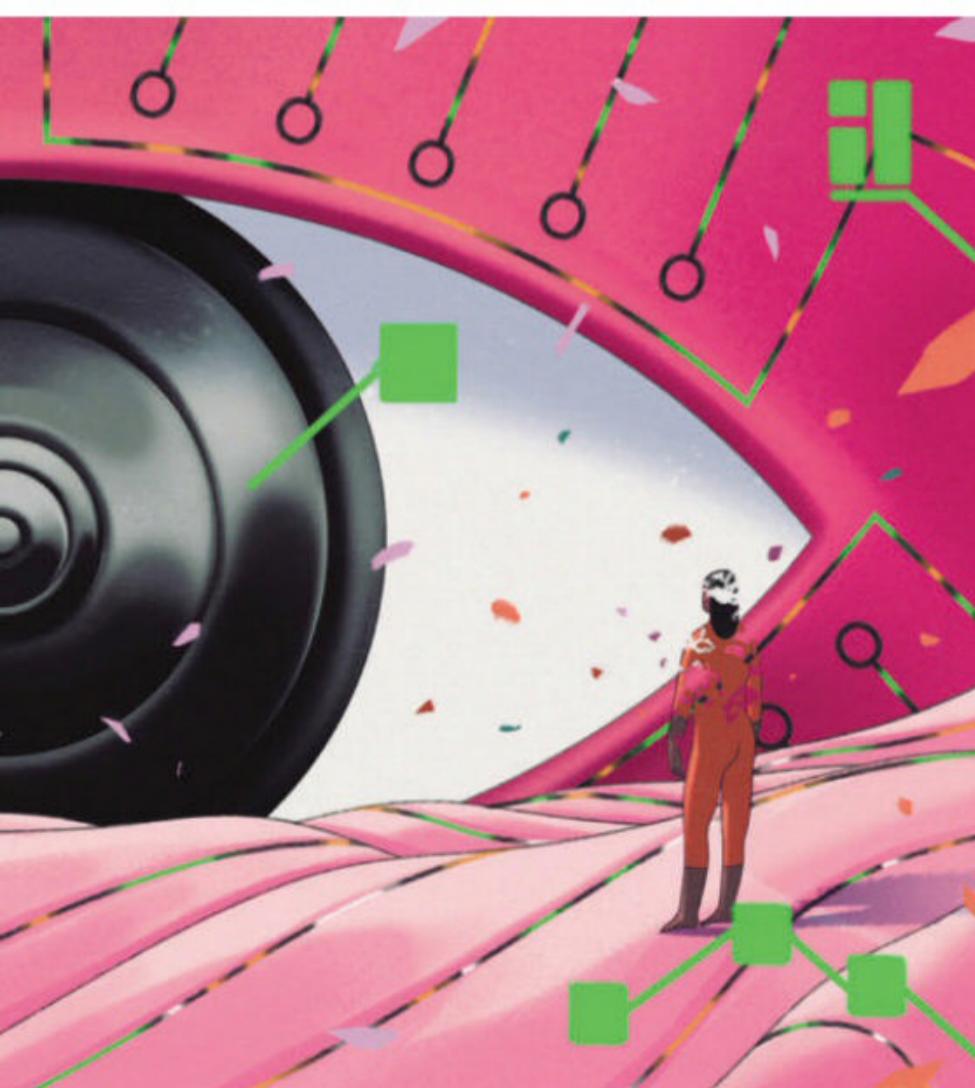
AI-coaches help with all that, some with the level of personal detail typical of an organised, doting or even despotic spouse. BlueStar, an app for diabetes, combines data on a patient’s diet, activity, sleep, social interactions and state of mind, as well as medications and tests, automatically bringing in data from the laboratories and pharmacies the patient uses. People can connect it to all sorts of devices such as smart weight scales, continuous glucose monitors, fitness trackers and blood-pressure cuffs. They are told daily what a particular meal, bedtime schedule or exercise does to their blood sugar, with advice on what they should change. Clinical trials have found that BlueStar, when added to patients’ usual care, reduces the amount of haemoglobin A1C (a biomarker of long-term blood-sugar level) by two to four times more than it is reduced by the most widely used diabetes drugs alone.

Such apps could also make a difference for chronic conditions for which existing treatments do not always work. Perfood, a German startup, is testing an AI-based app for migraine that has a personalised-nutrition component. Some studies suggest that for some sufferers a low-glycemic diet may provide as much relief as some of the commonly used migraine medications.

And breathe

Though chronic-care apps are likely to become the blockbuster category of digital therapeutics, some of the most exciting innovation is directed at less common health problems, including some debilitating conditions for which existing therapies are of limited benefit. One example is Freespira, a digital therapy for panic attacks and post-traumatic stress disorder. It consists of a breathing sensor placed in the nose and connected to a tablet that patients use twice a day for four weeks. People with panic disorders breathe in a particular way that leads to a build-up of carbon dioxide, thought to set off the physiological chain that causes panic.

Freespira trains them to normalise their breathing. Acacia Parks, a user whose panic attacks began when her husband was hospitalised after a car accident, is a trained psychologist. She says current treatments available for panic are awful. “You’re essentially pushing yourself towards the thing that’s causing your panic, so that you could purposely induce a panic attack and then learn to cope with it. Nobody wants to do that.” Several clinical trials,

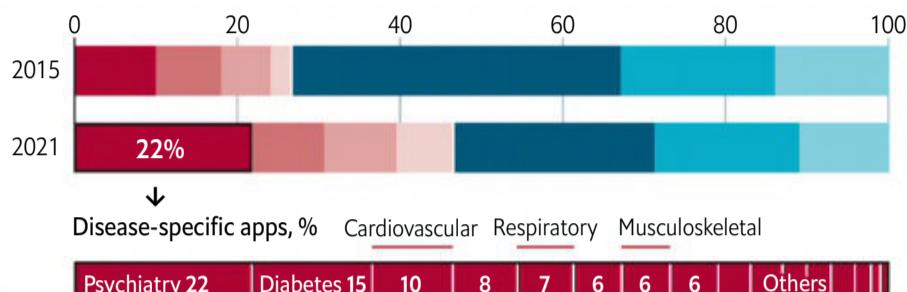


Not just for joggers

Health-care apps*, by category, %

Health-condition management

Disease-specific	Women's health & pregnancy
Medication reminders/info	Health-care providers/insurance



*Apps in the AppScript App Database
Source: IQVIA Institute

though small, suggest that most users have decreased symptoms or are in remission after six months or longer. Ms Parks says the app has helped her a lot.

Even the most ground-breaking therapeutics, digital or otherwise, will not help many patients if they are not a good business proposition for health-care payers, such as insurers, national health-care systems and employers who provide health benefits to their employees. That message is not lost on some of the more established digital-therapeutics companies. They are starting to invest in studies that show their products deliver good value.

In profit-oriented health systems like America's, some doctors see prescribing digital therapeutics as a way to be more efficient. Such apps provide them with data at a glance on what their chronic-disease patients have been up to, so a consultation can be shorter and focus on pressing concerns.

The smartness of such apps means that, effectively, they set their own dose. That means they can be prescribed to a large population without worrying too much about an individualised response. Some American health-care systems are integrating these therapeutic apps into the system-specific apps that patients already use to book appointments and see test results.

This allows them to "push" new digital therapeutics that may be relevant to patients with certain conditions straight onto their smartphones. Dr Driver's team at Advocate Aurora Health, for example, recently batch-prescribed an app for pre-diabetes to thousands of patients who had received worrying test results. The team had thought it might need up to five weeks to enrol 250 people, but so many people signed up that enrolment had to be closed after just 36 hours.

Connectivity needed

The two biggest problems that have emerged for health-care providers exploring these possibilities are finding the most suitable apps and making various computer systems—from the patient's watch to the records system in his doctor's office—talk to each other. In recent years a cottage industry of specialised firms has emerged to help with that. Orcha and AppScript are just two of the companies that review and rank apps for effectiveness, user experience and privacy, and prepare bespoke digital formularies for specific conditions or patient groups. Companies like Xealth specialise in integrating a range of health-software systems and devices for clients like Welldoc and Advocate Aurora Health to make the flow of data seamless.

Marc Sluijs, a consultant, estimates that about \$11bn has been invested so far in the 349 digital-therapeutics companies that he has identified. Most of them are small. The top 20 of them have raised \$7bn of that between them. But some of the pioneers in this

nascent industry are already going public. Pear Therapeutics, developer of the first FDA-approved health app, a cognitive-behaviour therapy for addiction called reSet, went public in December 2021 in a deal that increased its valuation to \$1.6bn. Akili Interactive, which makes video-game based therapies for ADHD, plans to go public in the summer.

The regulator-approved digital therapeutics behind such valuations are being positioned as high-margin products. Some of their features have been patented and their algorithms are proprietary, which protects the firms from having their products copied. In America, Pear Therapeutics sells a three-month course of its insomnia app Somryst for \$899. Akili's EndeavorRx therapy for ADHD is \$450 for a three-month course. In Germany most of the digital therapeutics that have been vetted by regulators are priced at €400-500 (\$450-560) per course.

For all their promise, digital therapeutics are still a novelty among doctors. Matteo Berlucchi, a "serial digital entrepreneur" who founded Healthily, an AI self-care app and website, reckons that it may take as much as 15 years for digital therapies to be used as much as pills are today. It often takes a decade or two for innovative drugs to become widely used because clinicians and insurers are very conservative groups, says Murray Aitken from IQVIA, a research firm.

That is why the makers of some digital therapeutics are partnering with pharmaceutical companies, which have the sales teams to market their products to doctors. Financially this is small beer for big pharma. Analysts put the digital-therapeutics market at \$3.3bn in 2020, when pharmaceutical sales reached \$1.1trn. But the market is expected to grow by about 20% a year for the next five to ten years. And such deals offer other benefits. Some pharma companies think digital therapeutics could increase their drug sales by boosting the efficacy of their drugs and the brand loyalty of their customers. If patients exercise, sleep and adhere to their drug regimen, they feel better and may have fewer side-effects. In these medication-centred models the app often has the company's branding. For some drug makers, the biggest draw may be the fact that the apps generate vast amounts of real-time intelligence on their customers.

Even in a supporting role to conventional health care, though, digital therapeutics could eventually transform medicine. Those that target the workings of the brain are some of the most exciting. MedRhythms, based in Portland, Maine, has produced a therapy that uses music to restore movement-related brain connections in people undergoing rehabilitation after a stroke. Sensors attached to patients' shoes measure gait and feed the results into an AI-based algorithm that mixes a customised beat into a playlist chosen by the patient—like a personalised DJ of sorts. The therapy is in clinical trials for strokes and there are plans to test it for Alzheimer's, multiple sclerosis and Parkinson's disease.

Chrissy Bellows, a 74-year-old stroke survivor in Maine, is one of the early-trial participants. She had been told that improvement in her condition was highly unlikely more than two years after her stroke. That meant being dependent on her husband to walk, a few steps at a time. After the MedRhythms treatment, however, she can walk up to 100 metres without support. Her husband recalls a therapy session in which she was walking towards a set target but suddenly stood still, as if her leg couldn't move. It turned out the music had stopped. Such is the power it has over the brain's control of the body.

Cognito's Mr Vaughan thinks that digital therapeutics will play a big role in conditions that are now hard to treat, such as brain disorders. "I think that 15-20 years from now the idea that you give someone a systemic drug, either a pill or an injection, hoping that some small amount of it gets into the brain and then it actually changes electrical activity in the brain before the rest of it piles up in your liver or kidneys and causes a problem...I think we're going to look back on that as going after flies with hammers." ■

Measuring the masses

The pulse of the people

Data from wearable devices are transforming disease surveillance and medical research

AS SOON AS the covid-19 pandemic began, several research institutes around the world set up studies asking people to share data from their wearable fitness trackers. On most devices, signing up involved just a few clicks, and people did so enthusiastically. The biggest study, the Corona Data Donation project set up by the Robert Koch Institute in Germany, enrolled more than 500,000 people. Over 30,000 signed up for DETECT, a study by the Scripps Research Institute in California.

When it comes to disease surveillance, the most useful biomarker is fever, a direct sign of infection. But most wearables do not measure temperature, because accurate readings are hard to do. So a proxy had to be created using the standard things they do measure, such as heart rate, sleep and activity level. Resting heart rate, measured when people are sitting still, varies a lot from person to person—anything between 50 and 100 beats per minute counts as normal—but each person's rate is generally stable. When the body fights an infection, however, the rate goes up, often dramatically. With covid-19, data from wearable devices showed that this uptick happened four days before people felt any symptoms. By one estimate 63% of covid cases could be detected from changes in resting heart rate before the onset of symptoms.

Before covid came along, a team from Scripps led by Jennifer Radin had shown that, in America, weekly changes in the proportion of people with abnormal results in heart rate, sleep and activity—all measured from wearables—align neatly with the prevalence of flu-like symptoms as measured by established surveillance systems. These track flu outbreaks by canvassing doctors' offices to find out if more people with such symptoms are starting to show up. Because people usually seek care 3-8 days after symptoms appear, by the time these data are collated, an epidemic is usually at a different stage, possibly requiring different public-health measures. More timely insights are sorely needed.

That said, data from wearables have quirks of their own. One day the Koch Institute team saw a sudden peak in the measurement derived from step count and heart rate they were developing as a proxy for fever. It turned out that Apple had changed the algorithm that calculates resting heart rate on its devices. Such software updates have been a headache for the team because their data come from about a dozen different devices. They also have to sort out various gaps. Apple Watches are usually charged at night, which means that they give no sleep data. Once through its teething problems, though, the project proved a success. "It is not 100% accurate but it does a pretty good job," says Dirk Brockmann, who leads the team.

Other research teams have taken a different approach to population-based surveillance with wearable devices. They have developed algorithms that examine deviations in each individual's metrics, based on whatever data their particular device collects. They establish the person's baseline levels of various biomarkers and then look for changes that suggest he may be experiencing some sort of anomaly in physiology. When lots of such changes occur all of a sudden, different as they may be from person to person, it is reasonable to suspect that lots of people are falling ill, and probably from the same thing.

One thing researchers now need to work out is whether the disease-surveillance algorithms based on wearable devices might systematically miss what is happening with some types of people,

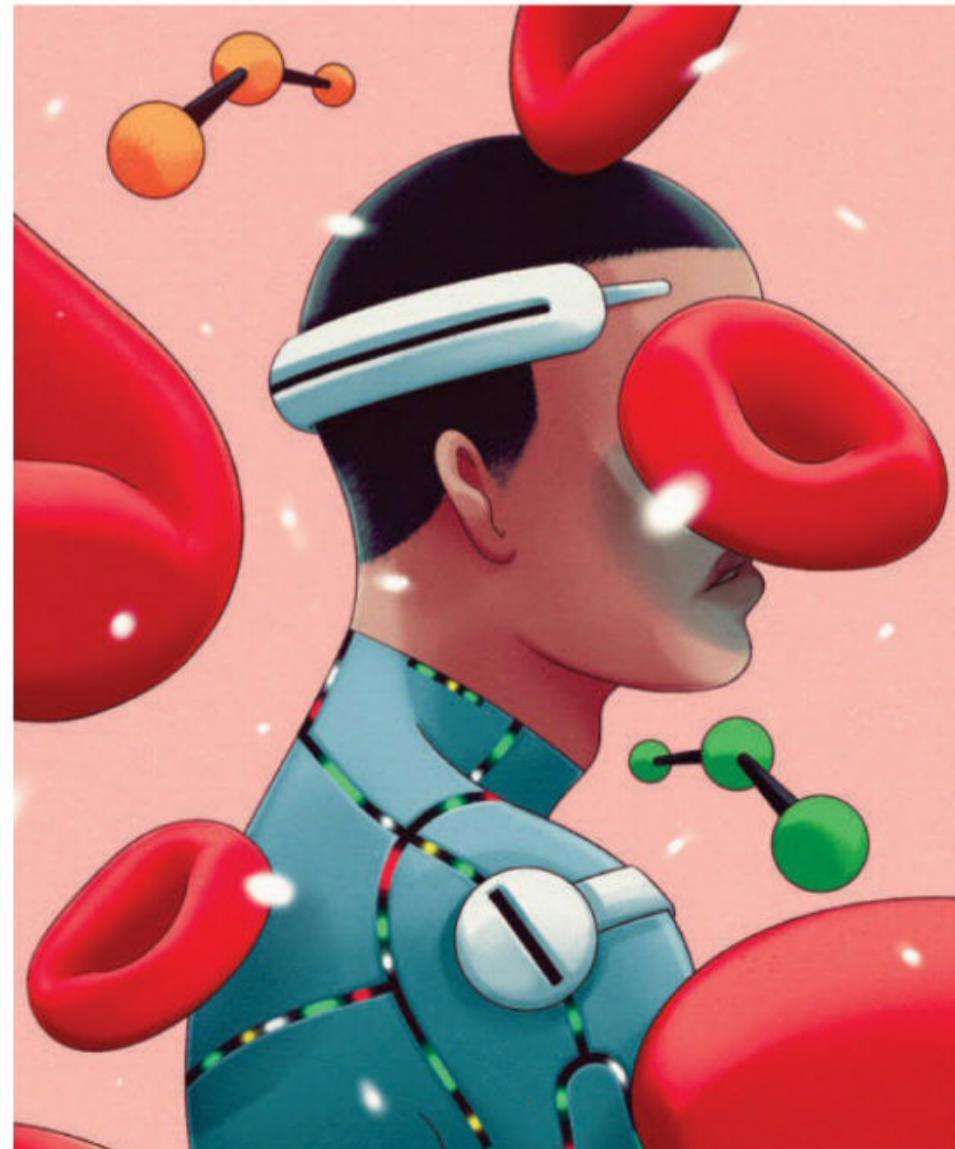
says Leo Wolansky from the Rockefeller Foundation's Pandemic Prevention Institute. For example, algorithms might unwittingly be optimised for spotting outbreaks in wealthy areas where people are more likely to have been using high-end wearables for longer. In poorer areas, where people may have different underlying health conditions (which often affect digital-biomarker measurements), the algorithm for wearables might be a lot more likely to miss an outbreak. "As they often say in this field, 'Garbage in, garbage out', and we still have to better understand whether the data we've captured has some garbage in it," says Mr Wolansky.

Medical scans that look for a particular problem routinely turn up other things, known as incidental findings. Something similar has occurred with the mass scan of human bodies that has taken place thanks to all these data from wearables. The German team found that resting heart rate was higher in areas that had been in East Germany than those in former West Germany. "We still don't know why this is," says Mr Brockmann. "Is it because women work more in East Germany? Or is it because people eat differently?"

Another mysterious finding is that Germans in all parts of the country are sleeping less in 2022 than in 2020 and the resting heart rate of the nation has gone up. One guess is that this may have to do with the extra weight that people put on during lockdowns, but nobody really knows for sure. The data from wearables has been "a question generator", says Mr Brockmann, raising queries about health that would not have been asked otherwise.

The ability to examine lots of human bodies as they go about their daily lives is also changing how clinical studies of new drugs are done. According to IQVIA, a research firm, 10% of late-stage clinical trials in 2020 used connected devices to monitor people, up from 3% in 2016. A catalogue by the Digital Medicine Society, an American organisation, lists more than 300 examples of digital biomarkers that are used in trials.

Activity measures, such as step count, for example, are a for-►



► mal outcome in drug trials for asthma, arthritis, heart failure, Parkinson's disease and cystic fibrosis. Measuring how much a person walks can provide a more objective, or at least complementary, picture of a drug's effect on pain or mood than the standard practice of asking people to give a rating on a scale.

Most important, devices that unobtrusively monitor patients as they go about their lives have allowed medical researchers to see, for the first time, how patients experience a given disease and treatment in their natural habitat. Nobody sleeps well in a pharmaceutical company's sleep lab. The most widely used test of cardiovascular and physical fitness is the "six-minute-walk test", which is the distance that someone can walk in the span of six minutes. It involves a patient pacing up and down a hospital corridor while a nurse with a clipboard records the result.

This has been simplified by fitness trackers, some of which have added the six-minute test to their repertoire of movement metrics. An Apple Watch, for example, makes its estimates using multiple metrics from its sensors that are passively observed over long periods of a user's normal behaviour (rather than a single six-minute walk). Validation studies in people over 65 show that this algorithmic estimate is highly accurate.

The inclusion in drug trials of measures that reflect patients' quality of life might help people choose treatments that best suit their priorities. At the moment, new cancer drugs are considered a success even if they prolong patients' lives by just a few months. Many cancer patients, however, care much more about what they can do in the months that they survive the disease than about stretching their lives a little longer.

They would choose a treatment that might promise fewer extra days but a greater chance that they would be able to do what matters to them, such as being able to lift up their grandchildren. Pharmaceutical companies are starting to include such metrics among the goalposts they set for new drugs.

Wearable sensors have also opened clinical trials to patients who would otherwise be excluded from them, says Andy Coravos from HumanFirst, an organisation which helps drug companies deploy connected devices for monitoring trial participants at home. She raises the example of Duchenne muscular dystrophy, a muscle-wasting disease. The typical primary outcomes for medicines developed for the disease are a six-minute-walk test and a four-stair climb test. But 60% of sufferers are in wheelchairs, which means that they cannot participate. So it is unclear what the treatments can do for them. An armband tracking upper-body motion makes it possible to include them in trials.

Academic studies of non-drug interventions, such as behavioural nudges to increase physical activity, are also using more data from fitness trackers rather than asking participants to keep a diary or fill in a questionnaire. One analysis of clinical trials registered in America found that the number using connected devices grew from 88 in 2007 to more than 1,100 in 2017. The majority of those trials have not been by pharmaceutical companies, but by research organisations such as the group led by Euan Ashley at Stanford University which focuses on precision medicine.

Dr Ashley's group was among the first to run, in 2019, a fully digital trial in which participants never met a researcher face-to-face. Not long ago, he says, recruiting trial participants involved putting up posters with tear-off bits of paper listing a number for them to call. They would then need to go to the hospital and sit down with a nurse to go over 17 pages of consent forms to sign up. "If you could get 200 people in a few months, you'd be pretty happy," he says.

Now, people can download the app for a study and sign up while waiting in line for their coffee. The first time Dr Ashley's

team used this method for a study on physical activity 40,000 people enrolled in just two weeks and results were ready in a matter of months. That was not an unalloyed benefit. Though the study was very easy to join, it was also very easy to leave and about 80% of participants had dropped out before the end, which was just two weeks in. Even so, the final group was about ten times the usual size for this line of research.

The quantified life

This report has argued that wearable health and fitness trackers can change the way people try to stay healthy and alleviate illness, the way their doctors care for them, and the way population-level health interventions are deployed. The digital health care that wearables enable could make treatment more efficient, personalised and effective. In America digital therapies are used by lots of people who might otherwise not receive care at all. Mental-health care from an AI-therapist may not always be as good as from a human being. But it can be accessed a lot more easily by people who cannot afford the payment or time off to see a doctor, or where there is a shortage of mental-health specialists.

Automated, round-the-clock monitoring of patients with chronic conditions (the biggest users of health care) can greatly improve their treatment and outcomes. Done right, it can also help doctors treat more of them without being overstretched. This model of care can make a big difference in poor countries, where there are not enough specialists.

About a third of deaths globally are from cardiovascular disease and more than three-quarters of those deaths are in low- and middle-income countries. It may seem hard to imagine that wearable devices with heart-monitoring functions will become widespread in developing countries like India. But look at smartphones. In 2021, 54% of Indians already owned one. Deloitte, a consulting firm, reckons that by 2026, the country will have 1bn smartphone users, and will be the world's second-biggest manufacturer of the devices. Many African countries have skipped developing a personal-banking sector by establishing mobile-phone payment systems that are now used for almost everything.

But even in a developed country like America, a digital divide exists whereby many people cannot afford internet access or lack the digital literacy needed to make use of new health technology. The new sensors and wearables technology are all very exciting, says Yuri Maricich of Pear Therapeutics, but "how can we reduce that to something that [works for] a single mom in the state of Kentucky who is in a very difficult life situation, or a trucker who is always on the road and trying to make ends meet?"

This sort of question is, all too often, an afterthought when new consumer technologies are being developed. To ignore it with digital-health products would be squandering a big opportunity to improve health care for all. ■

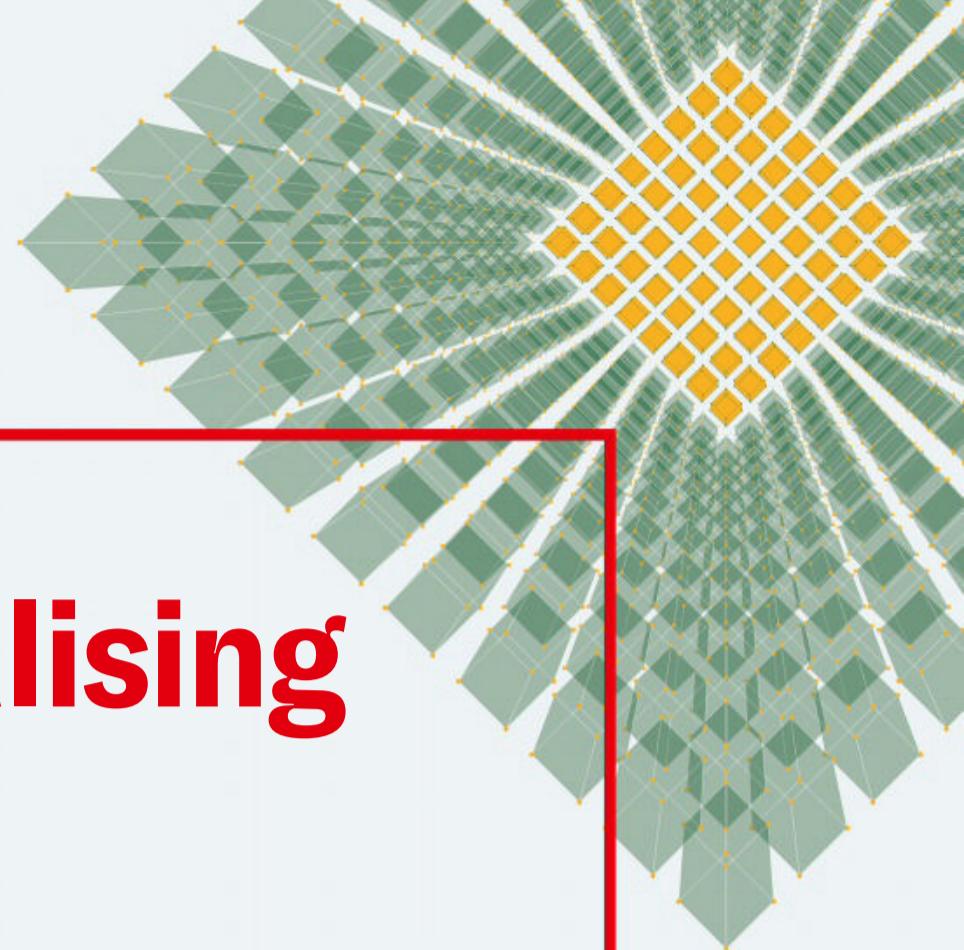
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