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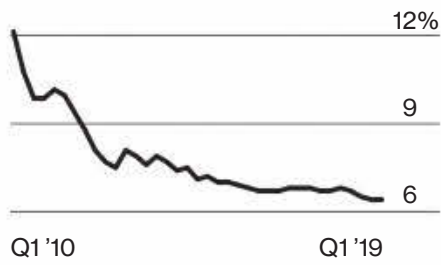
Janet Yellen

Former Chair, U.S. Federal Reserve Board of Governors and Distinguished Fellow, The Brookings Institution



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● China posted second-quarter domestic output growth of 6.2%, the lowest rate in nearly three decades.



A 9.8% surge in retail sales in June was discounted as a one-off. Meanwhile, the U.S. said negotiators may head to Beijing to restart trade talks.

● North Korea's economy, hit by sanctions, may be in its worst shape since the 1990s famine that killed up to 10% of the population.

South Korea is also suffering, from a cooling tech boom, the U.S.-China trade war, sky-high consumer debt, and tensions with Japan.



● Stella McCartney, who in March 2018 bought back a 50% stake in her label from Kering, is joining with rival LVMH to push more sustainable luxury fashions.

● Ryanair Holdings said it would have 5 million fewer passengers than expected in 2020, because Boeing would deliver only about half of the 58 737 Max 200s the airline ordered. The planes were grounded after crashes in Indonesia and Ethiopia.



● The EU accused the U.K. of trying to bully it into concessions over Brexit as the specter of a no-deal divorce sent the pound to depths it hasn't seen since early 2017. On July 16 it was trading at

\$1.24

Five years ago, sterling was worth \$1.70.



● A multilateral report from the Zimbabwean government and NGOs in the drought-stricken country says as much as \$218 million may be needed to prevent 5.5 million from going hungry. That's almost 60% of the population.

● Turkey said it would pursue energy exploration in Mediterranean waters also claimed by the ethnic Greek sector of Cyprus, a member of the European Union. Ankara has occupied northern Cyprus since 1974.

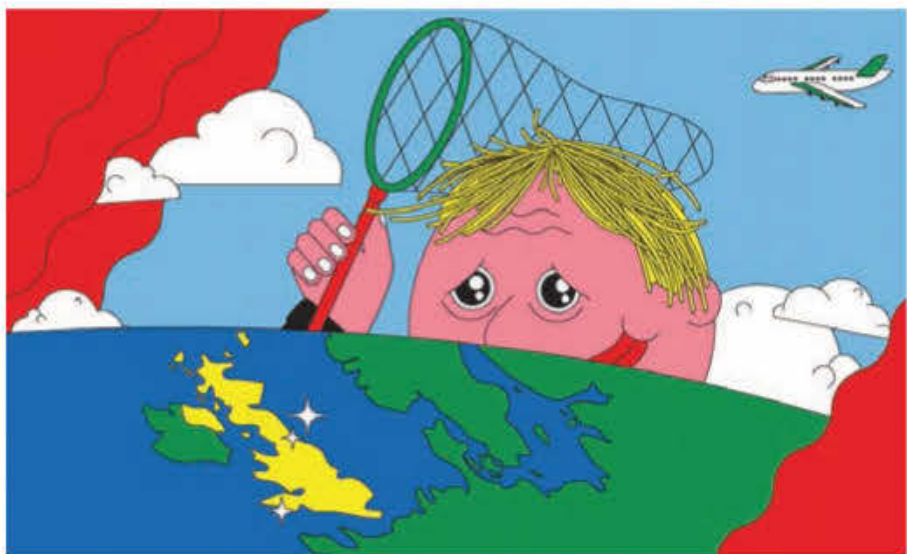
● **“Do not take the bait. This is simply a disruption and a distraction from the callous, chaotic, and corrupt culture of the administration.”**



Ayanna Pressley, joining fellow Representatives Alexandria Ocasio-Cortez, Ilhan Omar, and Rashida Tlaib in pushing back against President Trump, who tweeted they should “go back” to where they came from rather than criticize his policies. All are American; only Omar was born overseas.

● Deputy Premier Matteo Salvini—whose League forms half of the fractious coalition that rules Italy—remains embroiled in allegations that an associate sought Russian funding for the party. Salvini has denied the claims.

- Foxconn founder Terry Gou was defeated by a pro-China mayor in the Kuomintang primary for president of Taiwan.
- Netflix reported a surprise loss of U.S. customers for the second quarter, renewing concerns about its growth prospects.
- Congo's Ebola outbreak is an international public-health emergency, the World Health Organization said.
- Nestlé said it had patented a way to use cocoa bean pulp to make chocolate without adding extra sugar.



► Will It Be BoJo?

The U.K.'s Conservatives will announce the tally of their leadership ballot—mailed to all 180,000 party members—on July 23. The next day, either former London Mayor Boris Johnson or Foreign Secretary Jeremy Hunt will succeed Theresa May as prime minister.

► Pakistani Prime Minister Imran Khan meets President Trump on July 22 at the White House, where they'll seek greater cooperation between the two nations.

► Amid growing uncertainty in global trade, the WTO General Council will convene on July 23 in Geneva.

► On July 23 the European Union will decide on Vodafone's \$22 billion bid for Liberty Global's cable assets in Germany and central Europe.

► On July 24 former special counsel Robert Mueller testifies before two congressional committees on his report on Russian election interference.

► More than 5,000 participants are expected to attend the Nextrise startup conference in Seoul, which begins on July 23.

► AB InBev, which recently nixed plans for a Hong Kong IPO, Volkswagen, and other major European companies will report earnings on July 25.

■ BLOOMBERG OPINION

10

No Way to Pick a Leader

● The new European Commission president should fix the system that landed her the EU's top executive-branch job

The new president of the European Commission, Ursula von der Leyen of Germany, will have no shortage of pressing tasks on her agenda. Among the most urgent should be reforming the dysfunctional process that got her the job.

As the head of the European Union's executive branch, the commission presidency is powerful. Its occupant sets the EU's policy agenda, allocates key portfolios, and directs a civil service of more than 30,000. Von der Leyen will face challenges including a Brexit deadline, slowing EU growth, a trade dispute with the U.S., and disagreements about further integration—not to mention the possibility of another euro crisis.

Deciding who fills this essential role, however, is a mad-dening game of thrones. To become the nominee, a candidate must win over a qualified majority of the national leaders who comprise the European Council. They're supposed to "take account" of the most recent parliamentary elections in making their choice. Once nominated, the candidate must then win an absolute majority in the European Parliament.

That's convoluted enough. But the process has also tended to get mixed up in continentwide horse trading over the EU's other top jobs. National leaders wrangled behind closed doors over the right mix of geographic diversity, party

representation, policy preferences, demographic attributes, and so on. It was not exactly a model of transparency.

In 2014 the European Parliament sought to take this process out of the smoke-filled room and give voters a greater say. Under the so-called *spitzenkandidat* system, the main party groups are supposed to nominate candidates, who are then expected to publicly campaign for the job. This time, though, both major party groupings failed to get their candidates through, thanks to a more fragmented Parliament. Weeks of haggling led to a surprise deal in which von der Leyen got the top commission job, Christine Lagarde of France was nominated to head the European Central Bank, and Charles Michel of Belgium was tipped as president of the European Council.

All three picks were defensible. But the process left the Parliament weakened and was hardly open or democratic. Von der Leyen shouldn't shy from trying to reform it. One approach would be to add transnational party lists to European Parliament elections, helping to make EU lawmakers accountable to a broader electorate. Giving national parliaments a bigger say in EU policymaking would also help, improving engagement and providing valuable feedback for EU legislators. Such changes could help ensure that the higher turnout in the recent parliamentary elections—it reached nearly 51%, reversing recent declines—will be translated into broader support for the EU project.

The goal should be to make Europe's institutions less distant and bewildering to voters. If von der Leyen pushes for that, she'll have proved an inspired choice after all. **B**

Written by the Bloomberg Opinion editorial board

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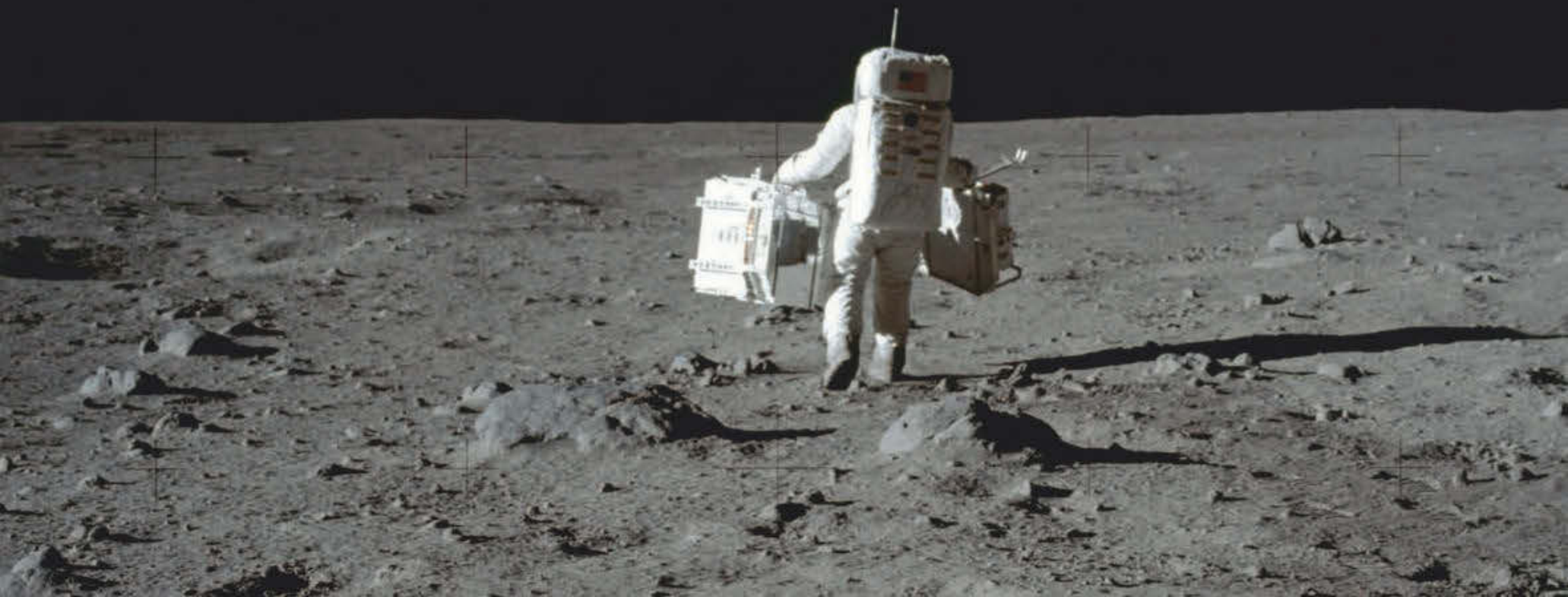
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Management Lessons From The Moon



● Five things we can learn from how NASA put astronauts on the moon and brought them safely back 50 years ago

● By Peter Coy

There's something faintly embarrassing about the 50th anniversary of the first moonwalk. It was just so long ago. It's no longer "we" who put a man on the moon, it's "they" who put a man on the moon. So why can't "we" do it? It's hard not to feel that for all the technological advances of the last half-century, America has lost something—the ability to unite and overcome long odds to achieve greatness.

At one level this is silly. The U.S. stopped going to the moon because Americans stopped seeing the point of it, not because they stopped being capable of it. The lack of fresh footprints on the lunar surface is not evidence that the U.S. has fallen into a new Dark Age.

Still, the historic Mercury, Gemini, and Apollo programs do have something to teach us. They were a shining success story of building and managing a complex, decentralized technological enterprise that accomplished an audaciously ambitious goal. In November 1968, seven months before the moon landing, the journal *Science* wrote that the space program's "most valuable spin-off of all will be human rather than technological: better knowledge of how to plan, coordinate, and monitor the multitudinous and varied activities of the organizations required to accomplish great social undertakings."

Mission management is as important now as it was in the '60s. The new moonshots include curing disease, ending poverty, and fixing climate change. But a million things can go wrong when there are a million moving parts. Consider the problems with Boeing Co.'s grounded 737 Max airliner or Lockheed Martin Corp.'s costly F-35 fighter jets. And what about billionaire Elon Musk's unrelenting challenges, down on the ground, in manufacturing electric vehicles at Tesla Inc.? Each case involves difficulties in mission management.

So, here are five management lessons Apollo taught us:

Have a clear objective. President John F. Kennedy vastly simplified NASA's job with his May 25, 1961, address to Congress committing to "the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth." From then on, any decision was made by whether it would aid or impede the agency in meeting that deadline. Experiments that were too bulky or heavy were shelved, however valuable they might have been. Technologies that were superior but not ready for deployment were set aside for later. The Pentagon wanted NASA to research solid fuels, which would be useful for ballistic missiles. But going to the moon required kerosene, liquid hydrogen, and liquid oxygen—so they got the green light.

Having a North Star to follow was essential, because skeptics

and critics abounded. Up until 1969, polls consistently found that 45% to 60% of Americans thought the U.S. was spending too much on the space effort. On the left, the tie-dye generation was about thinking small and getting back to the land, not blasting off to outer space. Many people said the money would be better spent feeding and clothing the poor; Gil Scott-Heron performed a protest song called *Whitey on the Moon*. On the right, Apollo was perceived as a Democratic boondoggle. Republican congressmen applauded in 1963 when Dwight Eisenhower, Kennedy's Republican predecessor, said, "Anybody who would spend \$40 billion in a race to the moon for national prestige is nuts." Amid protests over the Vietnam War, race riots, and a series of assassinations that punched the nation in the gut, NASA engineers kept their heads down and their slide rules busy.

Contrast that with today, when the direction from the top is lacking or, worse, conflicting. In March, Vice President Mike Pence said he was unhappy with NASA's goal of getting Americans back to the moon by 2028, saying it should happen "by any means necessary" by 2024. Skeptics pointed out that 2024 is the year Pence could be running for president. Then President Trump muddied the waters in June, tweeting, "For all of the money we are spending, NASA should NOT be talking about going to the Moon—We did that 50 years ago." In fairness, Trump may have meant NASA should go to the moon, just not be talking about it. But even that is proving difficult. On June 19 the Government Accountability Office said the new moon mission is behind schedule and over budget.

Harness incongruence. In any large organization there is pressure to squelch dissent. That can be deadly, as it was for NASA in the two space shuttle failures, each of which killed all seven crew members. *Challenger* broke up 73 seconds into flight in 1986; *Columbia* disintegrated on reentry in 2003. Leading up to both tragedies, "Engineers grew concerned about a technical problem they did not fully understand, but they could not make a quantitative case" and were consequently ignored, David Epstein writes in a new book, *Range: Why Generalists Triumph in a Specialized World*.

There was more tolerance for ambiguity and doubt during Apollo. Wernher von Braun, the former Nazi who became the chief architect of the immense Saturn V rocket, "went looking for problems, hunches, and bad news," Epstein writes. Two days after the *Eagle* landed, he zeroed in on one engineer's guess about why a liquid-oxygen tank lost pressure, even though it was no longer relevant to the mission. "We must know whether there's more behind this, that calls for checks or remedies," von Braun wrote, according to Epstein.

After the bad years of the shuttle disasters, the practice of harnessing incongruence, and learning from mistakes, has staged something of a revival at NASA, which has successfully sent unmanned craft to Mars, Jupiter, Saturn, Neptune, and the remote Kuiper belt. Adam Steltzner of the NASA-affiliated Jet Propulsion Laboratory, who helped design the sky crane that gently plopped the *Curiosity* rover down ►

◀ on Mars in 2011, advises engineers—and others—to “hold onto the doubt.” In *The Right Kind of Crazy: A True Story of Teamwork, Leadership, and High-Stakes Innovation*, Steltzner writes, “Listen to all that the problem has to say, do not make assumptions or commit to a plan of action based on them until the deepest truth presents itself.”

Delegate but decide. NASA realized early on that it needed help. About 90% of Apollo’s budget was spent on contractors. Boeing built the first stage of the Saturn V. North American Aviation built the massive F-1 engines for the first stage, as well as the second stage and the command and service modules. Douglas Aircraft Co. made the third stage. Grumman Corp. built the buglike lunar module. International Business Machines Corp. made the computers. And so on. NASA itself was more of a confederation than a single agency. Units included the Marshall Space Flight Center in Huntsville, Ala.; JPL, administered by California Institute of Technology; Ames Research Center in Silicon Valley; and Langley Research Center near Washington.

With so many players involved, turf wars were unavoidable. NASA Administrator James Webb was a blustery North Carolina Democrat who’d come of political age during the New Deal. He coined the phrase Space Age Management to describe how he tried to manage conflicts and ensure final decisions were made by headquarters. “Personal relationships and a sensitivity to the total environment are essential parts of leadership responsibilities if the system is to work at all,” he wrote in the foreword to a 1982 book published by the agency, *Managing NASA in the Apollo Era*.

One of Webb’s masterstrokes was to advocate for the Manned Spacecraft Center to be located in Houston. The choice pleased Al Thomas, the Texas congressman who controlled NASA’s appropriations and whom Kennedy needed for votes on other issues. And it created a new power center to balance Marshall in Huntsville, where the formidable von Braun held sway, writes Piers Bizony in *The Man Who Ran the Moon: James E. Webb, NASA, and the Secret History of Project Apollo*.

Unfortunately, Webb’s mastery of the complex network was not as thorough as he believed. The death of three astronauts during a routine test on a Cape Canaveral launch pad in 1967 was traced by congressional investigators to deficiencies at North American Aviation of which Webb had been unaware. The deaths cast a pall over NASA and led to Webb’s resignation. Failure, in this case, was as instructive as success.

Effectiveness over elegance. Aesthetically, the Apollo mission was a poor substitute for the Buck Rogers vision of space travel that began to intrigue Americans in the 1930s. The module that touched down on the moon looked like an oversize version of a kid’s cardboard-and-foil science project, all right angles and spindly legs.

Apollo’s return to Earth was equally unglamorous. The spaceship that left the launch pad was awesome, but it shrank as it went. Three stages of rocket were cast off as their fuel was

used up. The base of the lunar module was left behind on the moon. Then the service module was ejected as the astronauts began to descend to Earth. That left nothing but a stubby cone, the command module, weighing just 0.2% of the majestic original. By plan, the astronauts had to be rescued from it by frogmen after splashing down in the Pacific Ocean.

But what looks clunky and awkward to an outsider may appear elegant—i.e., efficient, effective—to an engineer. The lunar module was angular because there is no atmosphere on the moon, so streamlining was superfluous. Form followed function. Likewise, the tininess of Apollo 11’s payload in comparison to the hugeness of the rocket engines was dictated by the difficulty of escaping from Earth’s gravity. It was once calculated that giving the astronauts one more 8-ounce shaver would require adding 150 pounds of fuel. There was no sense even trying to build a rocket that would come down looking the same as it went up.

Engineering inelegance, by contrast, is redesigning a machine without fully anticipating the consequences. That seems to describe Boeing’s botched efforts on the 737 Max, which to save fuel carries wider-diameter engines than its low-slung design from the 1960s called for. Boeing had to move the engines forward and make other changes to keep them from scraping the tarmac. But those alterations caused the plane to pitch upward at times. The software patch inserted to counter that tendency is the leading suspect in the two recent crashes that killed 346 people.

Improvising. Making stuff up on the fly is not in anyone’s manual, but sometimes it’s essential. The need for grace under pressure is why military pilots were often chosen as astronauts. As the *Eagle* was coming in for a landing, its onboard guidance computer started flashing warnings. The underpowered computer was getting overloaded by spurious data. Buzz Aldrin and Mission Control quickly nailed the solution: Reduce the strain on the itchy-bitsy machine by asking for navigation data from Houston instead. And then ignore the alarms. Seconds later, Neil Armstrong realized the *Eagle* was headed for a crater and boulder field. He took over the controls and coolly steered past them to a smoother spot.

Improvisation averted another crisis after one of the astronauts bumped and broke off the plastic switch for rearming the engine that would lift them off the moon. Aldrin saved the day with a felt-tip pen. “I inserted the pen into the small opening where the circuit breaker switch should have been, and pushed it in; sure enough, the circuit breaker held,” he recalled in his 2009 memoir, *Magnificent Desolation: The Long Journey Home From the Moon*. “We were going to get off the moon, after all.”

Most of the people alive today had not yet arrived on the planet when Armstrong, Aldrin, and Command Module pilot Michael Collins returned to it after their historic voyage. Never mind that, though. The moon landing was a victory for all of the human race, past, present, and future. The lessons it taught are enduring. ●

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Cannabis

BUSINESS

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The Real Cannabis Rush

● Forget weed. The big winner of the cannabis craze is hemp and the CBD trove it's unlocking

Mention legal cannabis, and many people think of the weed stores that have sprung up in Boston, Denver, Seattle, and other major U.S. cities. Inside, infused brownies and vape pens are sold next to branded joints and neatly packaged bags of marijuana presented in a way that wouldn't be out of place in any American mall. In Canada you can even order pot through the mail, and some of the world's alcohol giants have set up shop there to develop weed beer.

But the business of getting people high is only part of the cannabis craze. Marijuana is still banned

for recreational use across much of the world, and even medical access, while expanding, is restricted in most countries. So players in the \$340 billion global cannabis market are turning their attention to weed's less-regulated cousin, hemp.

Hemp is a strain of cannabis whose fibers have traditionally been used in textiles and rope, and farmers can grow it even in countries with strict drug laws because it has different properties from marijuana. Most important to law enforcement officials, it's low in THC, the compound that gets you stoned. But businesses are buzzed about its other defining characteristic: a higher concentration of cannibidiol, or CBD, a nonpsychoactive chemical at the center of a wellness trend sweeping the U.S. and expanding worldwide.

CBD is being pitched as an all-natural way to alleviate ailments including pain, inflammation,

anxiety, and insomnia. Despite a paucity of science to back up such claims, CBD has become a coveted ingredient in a host of consumer products, from skin lotions to sparkling water to tinctures to dog biscuits. The surge in demand is fueling a global Green Rush, even in countries where a legal market for cannabis products was unthinkable just a few years ago. “We are getting phone calls from big pharma groups in Asia, all parts of the world: ‘Can you get product? Can you supply to us?’” says Glenn Davies, chief executive officer of industrial hemp grower CannAcubed Pte. The Singapore-based startup planted its first commercial hemp crop in May in China’s Yunnan province. “It’s all about hemp.”

One of the first plants ever domesticated, cannabis was used for thousands of years for fiber, food, and medicine. Yet for the better part of the last century it’s largely been traded on the black market, banned in many countries alongside cocaine, heroin, and other controlled substances. Much of that bad-boy reputation faded last year when Congress legalized CBD in the U.S.

Researchers estimate the market for CBD in the U.S. alone could be worth almost \$24 billion by 2023. In Canada sales of legal cannabis may reach \$4.7 billion by that time, up from about \$570 million last year, according to BDS Analytics. Annual sales of CBD could potentially be larger than those of marijuana, analysts say, because of the large number of products in which it can be used.

Investors are pouring money into massive CBD extraction facilities and processing plants in the U.S., hoping to be ready when Coca-Cola Co., Procter & Gamble Co., and other consumer giants finally embrace cannabis. Colorado CBD company Mile High Labs has developed technology to remove unrefined hemp extract from the plant, and it recently paid \$18.8 million for a 400,000-square-foot former Novartis factory where it will make products such as lotions and tinctures.

American farmers are plowing into the hemp industry in Colorado, Kentucky, Montana, Oregon, and other states. This year, more than 200,000 acres of hemp are licensed to be planted in the U.S., up from roughly 25,000 two years ago. Asia, which has a long history with natural medicines, is also seeing growing interest in cannabis (page 21). In 2017, China planted at least 113,000 acres of hemp, according to New Frontier, an industry researcher. Cultivation is also on the rise in Colombia, Greece, Jamaica, and even the southern African nation of Lesotho. “You get the domino effect: The farmer in Bulgaria looking across at peers in Greece and asking questions, putting

pressure on the government to make similar steps,” says Shane MacGuill, an analyst at Euromonitor International. “The more it happens, the more quickly we get the spread of cultivation.”

Hemp producers in Asia and other lower-cost regions could ultimately undercut U.S. farmers, especially as the quality of their crop improves and a global market takes shape, with hemp moving freely across borders like any other agricultural commodity. In June, CannAcubed leased two factories in Yunnan, one of only three Chinese provinces that allows the production of hemp; it plans to expand them into CBD research and extraction facilities.

Not everyone is so sanguine. Mark Mees, CEO of Setek Therapeutics in New Zealand, sees cannabis becoming another agricultural commodity, with prices racing downward. And Mees, whose company has a license to grow medical marijuana in the country, says the CBD business has been overhyped. “You get a few hippies and that’s great. One thing that’s missing is old-fashioned business sense,” he says. “We will see a train wreck of small companies that completely underestimated the costs and the complexity of what they’re trying to do.”

Restrictions on medical pot are loosening globally. More than 50 countries, including Australia, Brazil, and Germany, have legalized access to medicinal cannabis, according to Bloomberg Intelligence, making it easier for farmers to plant hemp or marijuana. But dealing with pot can still be tricky. In New Zealand, companies can grow medical weed only for research, though the government is working on a commercialization plan. Cannasouth Ltd. has struggled as New Zealand’s sole publicly traded cannabis company, with its shares falling 24% since its IPO on June 19.

As countries remove restrictions, cannabis prices could fall. That would hurt farmers, ▶

● Marijuana 101

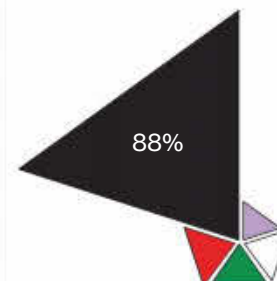
THC
Tetrahydrocannabinol is the chemical in marijuana that produces a high.

CBD
Cannabidiol, a nonintoxicating compound, can be derived from hemp and marijuana.

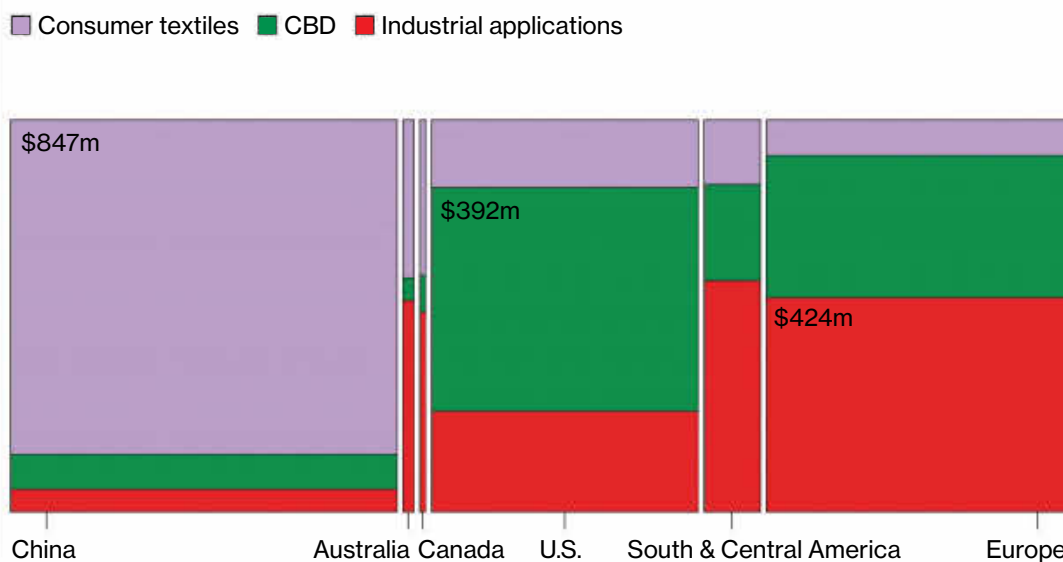
CANNABIS
Hemp and marijuana are both types of cannabis. Hemp faces fewer restrictions because it’s generally cultivated with lower levels of THC.

● U.S. hemp imports by source, 2017

- Europe
- Canada
- China
- South & Central America
- Other



Global Hemp Market Share and Sales by Product Category in 2018



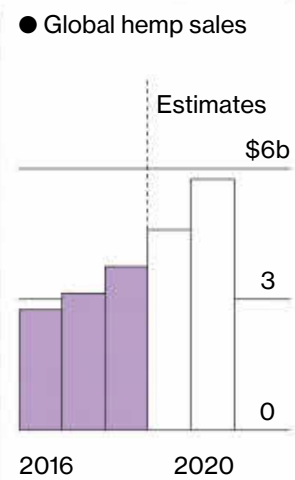
◀ but potentially boost the profit margins of companies using cannabis as an ingredient. Worries about an industry bubble surfaced earlier this year in China after investors flocked to companies linked to cannabis. Regulators sought to rein in the enthusiasm, with the Shenzhen Stock Exchange telling companies to warn investors about uncertainties facing their industrial cannabis projects.

Canadian farmers have seen a hemp boom-and-bust cycle before. The crop was legalized for production in 1998, and farmers benefited when hemp seed took off as a health-food product. Business peaked in 2015 as South Korean demand

drove the market. But China, becoming a cheaper supplier for Korean buyers, sucked profit away from Canada's hemp-seed farmers. Still, that hasn't deterred Canadians from trying to cash in on CBD. This year, hemp acreage in the country is expected to more than double, to about 82,000 acres.

In Asia, CannAcubed's Davies is also unfazed by the risks. "Everybody is trying to have the same outcome and objective: Get this industry moving," he says. —*Craig Giammona and Bruce Einhorn, with Ashley Robinson*

THE BOTTOM LINE Fueled by growing demand for CBD as a health-enhancing ingredient in foods and beauty products, sales of the cannabis derivative could hit \$24 billion in the U.S. by 2023.



Pets Need to **Calm Down**, Too

● Forecasters estimate that almost 10% of CBD could soon end up in products for Fido or Fluffy

Two years ago, Dingo was going to be put down. The 14-year-old basenji, in pain from arthritis in her neck and spine, could barely walk and wouldn't eat. She suffered from anxiety and had early-stage kidney disease. Then she started taking cannabis.

Kelsey Brown, Dingo's owner, decided to dose her with drops of CBD, or cannabidiol, three times a day, using a tincture that runs \$120 for a 1-ounce bottle. It was a last-ditch effort to ease the dog's pain and anxiety before euthanasia became a reality. "Within a week she could actually jump on the couch again," says Brown, a dog trainer in Mora, Minn.

Demand for CBD, a nonintoxicating compound found in hemp and marijuana, has exploded in the U.S. since December, when Congress passed a new farm bill that decriminalized industrial hemp. The CBD market could be worth almost \$24 billion in the U.S. alone by 2023, with about 7% of sales coming from the pet market, according to Brightfield Group, an industry researcher.

The regulatory situation is still murky for CBD—the Food and Drug Administration hasn't yet ruled it's safe to put it in food or drinks, and there are no approved pet products—and its benefits are largely unproven. But that hasn't stopped pet owners from embracing it as an all-natural way to alleviate a wide range of creature ailments, including pain, arthritis, and anxiety, without getting them high.

Like Brown, whose Dingo is now 16 and thriving, many pet owners swear by the benefits of cannabis.



● Brown and Dingo

Nadia Knight, a health-care worker from Portland, Ore., says vets in her area refused to talk about CBD, so she consulted “Dr. Google” before beginning to give her poodle mix CBD oil twice a day earlier this year. The dog’s near-daily vomiting episodes have all but stopped. Akanah Fallanassi, an animal caretaker in Germany, gives both his Goffin’s cockatoos CBD to ease anxiety that would normally have them chewing their feathers. For Karen Hayton of Vancouver, the hemp extract is a better alternative for her Havapoo than sedatives to calm the stress of going to the groomer. “It seems to relax him without making him spaced-out,” she says.

In recent years, growth in the \$130 billion global pet market has been fueled by dog and cat owners’ willingness to spend heavily on premium products, such as grain-free foods or organic treats. Companies are wagering that CBD will become the next profit-boosting premium ingredient.

The \$400 million pet CBD market is fragmented: Startups are finding customers online and getting their products into some stores, while the large companies that dominate the pet market are waiting for the regulatory situation to be clarified. For example, at one of the larger U.S. brands, Therabis, a unit of the Denver-based marijuana company Dixie Brands Inc., co-founder Chuck Smith partnered with a veterinarian to create dog CBD products. The company’s Calm and Quiet, Up and Moving, and Stop the Itch have been on the market since 2017 and are sold in more than 100 stores.

Small brands could become buyout targets for the world’s biggest pet food sellers, including Mars, Nestlé, General Mills, and J.M. Smucker. Canopy Growth Corp., the world’s largest marijuana company, has partnered with Martha Stewart to develop CBD pet products. “Once the Purinas enter the space, they’re going to buy these guys out or take over major retail channels,” predicts Jamie Schau, a CBD research manager at Brightfield Group. Nestlé, the No. 2 pet-care company behind Mars, started selling a line of CBD products in April, offering capsules, oils, and sprays under its Garden of Life brand, which it acquired in 2017. One product, a 1-ounce bottle of peanut butter-flavored drops, sells for \$35.99 on its website. Purina, Nestlé’s top pet brand, says it’s considering making CBD dog food.

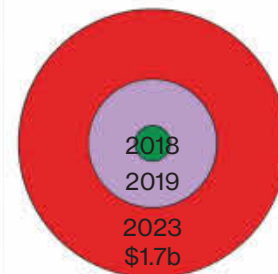
Vets are prohibited by law from recommending CBD, according to Jim Penrod, executive director of the American Association of Veterinary State Boards. Absent formal advice, pet owners are developing do-it-yourself cannabis dosing programs, falling back on a basic premise: It seems like the stuff works, and there’s little risk of harm.

Anecdotal results are promising, but more research is needed to figure out if CBD can truly treat such things as pain and seizures in dogs, says Stephanie McGrath, a professor at Colorado State University’s veterinary teaching hospital who’s doing a clinical study on CBD. McGrath is relatively comfortable that the substance is safe for dogs, at least in the short term. But that assumes the hemp extract is free of contaminants and THC, the compound in hemp and marijuana that produces a high and is known to be harmful for dogs. She’s also skeptical of marketing that’s positioned CBD as a wellness panacea for pets. “The owners want to believe that it’s helping,” she says. “There’s a huge placebo effect.”

Such skepticism isn’t likely to slow CBD’s march into pet stores. Gregory Baumel, a chef who founded Cozy Bones, a line of CBD dog treats (\$22 for a dozen) made in Brooklyn, N.Y., is sanguine about the potential downsides of giving cannabis to a canine: “The worst thing that can happen? It will get the best nap of its life.” —*Corinne Gretler and Craig Giammona*

THE BOTTOM LINE Despite the paucity of formal research about their efficacy, CBD products for pets could account for 7% of the \$24 billion in annual sales forecast for CBD goods within four years.

● Estimated size of the pet CBD market



Big Weed Has a

Grass Ceiling

● As VCs and corporate money move in, women say they’re being pushed aside

When Nancy Whiteman, 61, founded her marijuana edibles company, Wana Brands, almost a decade ago in Boulder, Colo., the legal industry was relatively diverse and dominated by local startups. It helped that Wall Street banks and institutional investors took a hands-off approach to cannabis, leery of getting involved with a drug that’s still banned by the federal government. “It was a pretty even playing field for everybody—men, women, anybody who was interested,” Whiteman says.

These days, however, the industry is increasingly dominated by men. The influx of venture money and Wall Street dollars, in addition to the rise of larger companies operating in several states, has made things harder for startups and, by extension, female-led businesses. In 2015, 36% of pot ►



● Whiteman

◀ executives in Colorado were women, but two years later that had dropped to 27%, according to *Marijuana Business Daily*. Some in the industry fear the same lack of diversity that's characterized such sectors as finance and technology will become the norm for the fast-growing pot world.

"It's the double-edged sword of capitalism," says Fahed Sultan Al Essa, a graduate student at the University of California at Berkeley's Haas School of Business who's researching the cannabis industry and hosted an inaugural summit on gender diversity in the sector earlier this year. "As the industry gets more and more appealing, more money comes in and sexism comes in." Women in the industry interviewed by Bloomberg say they've experienced sexism, from being told to dress in heels and a skirt for a meeting with investors to being asked when they plan to have children and having questions redirected to male colleagues.

Among the 20 most valuable publicly traded cannabis companies in the U.S. and Canada, there are only two female chief executive officers and not a single chief financial officer. There's also a noticeable lack of women on boards: At those same businesses, just 13% of board members are women, compared with about 31% for the top 20 banks. Six of the top marijuana companies have no female board members. "The boards are mostly made up of old white guys," says Jeannette VanderMarel, who founded Green Organic Dutchman, a Canadian pot company worth more than \$600 million, and is now co-CEO of Toronto-based 48North Cannabis Corp. "A glass ceiling certainly already exists."

Canopy Growth Corp., the world's most valuable cannabis company, has only one woman on its board. Boosting diversity is part of the mandate of Hilary Black, an industry veteran who joined the Ontario-based company in 2015 and became chief advocacy officer earlier this year. She says the dearth of women and minorities is a result of the nascent industry's focus on growth. "When people criticize Canopy and the industry for the lack of diversity, it's important to understand that it's not something that happened consciously," she says. "It's not like there was a group of men sitting in a boardroom stroking their beards going, 'Hmm, how are we going keep all the ladies out of this?' It's a matter of how fast everything grew."

Weed was dominated by men when it was strictly a black market business; as the legal industry has evolved, some of that gender imbalance has lingered. Some pot companies, including ones run by women, are trying to make the business more female-friendly, with executives frequently talking about pulling in customers from outside the base

of stoner dudes, who buy the lion's share of weed. But even with the focus on soccer moms and professional women looking to swap chardonnay for a vape pen, there are still concerns that female founders and executives are getting pushed aside.

"I've watched one woman after another take in some type of capital or partnership deal for her business, and next thing you know she's no longer the CEO," says Jessica Billingsley, co-founder and CEO of Akerna Corp., which provides consulting services



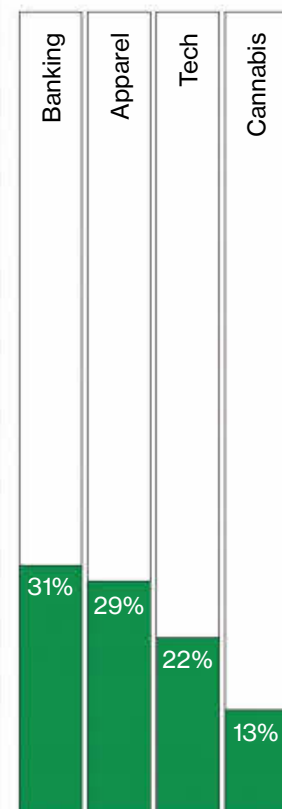
and compliance software to the cannabis industry. It recently became the first female-led cannabis business to list on Nasdaq. "It's a discouraging trend."

VanderMarel says that's pretty much what happened to her. She lost her daughter to Dravet syndrome, a rare form of epilepsy, and became an advocate for medical access to cannabis after seeing a mom use it to help boost her son's appetite during chemotherapy. She and her husband built an indoor pot farm and founded Green Organic Dutchman in 2012. After it won a sought-after Canadian license to produce weed in 2016, as legalization for recreational use approached, venture capitalists became controlling shareholders and eventually installed a CEO. VanderMarel says she decided to leave after her responsibilities were cut to a part-time role.

Now she shares the CEO role with Alison Gordon at 48North, which has three female board members. While VanderMarel is hopeful corporate cannabis can turn the tide on its gender problem, she acknowledges it will be difficult. "It's an uphill battle," she says. "It takes years to change boards." —Ellen Milligan, Kristine Owram, and Jordyn Holman, with Sam Unsted

THE BOTTOM LINE The nascent pot industry was expected to be female-friendly. But the top 20 cannabis companies include just two female CEOs and few women directors.

● Share of women on boards, by industry*



Thailand's Unlikely Embrace of Cannabis

● Despite a history of tough drug laws, it's set to be a major supplier as the substance goes global

The forecast for the legal cannabis market in Asia is rosy—it's expected to swell to \$8.5 billion by 2024 from practically nothing today. One of the main questions surrounding this potential market is which country will establish an early lead as a supplier. Surprisingly, Thailand has a good shot.

Although laws on its books can penalize possession of marijuana with up to 15 years in prison and a huge fine, the country was also one of the first in Asia to legalize medical marijuana. Thailand is looking to become the region's cannabis capital with its potent strains. Yet to claim that title, it must move fast to pass legislation making pot legal for recreational use. Neighboring countries are following suit in legalizing medical marijuana and could cut in on the market.

The country last year legalized medical marijuana with the approval of Prime Minister Prayuth Chan-Ocha, who then led Thailand's junta and now heads the civilian government following a disputed general election in March. A key member of his coalition is pushing for full legalization of Thailand's marijuana market, projected to grow to \$661 million within five years, according to cannabis industry researcher Prohibition Partners.

Anutin Charnvirakul, the millionaire leader of political party Bhum Jai Thai, helped Prayuth form a ruling coalition and is expected to use that platform to try to deliver on his campaign promise of legalizing marijuana. The prospects of such a move increased on July 10 when Anutin was named deputy prime minister and public health minister in the newly formed cabinet. He's seeking to remove restrictions that have made it difficult for even those approved for medical marijuana to easily access cannabis, he said in a June 21 party statement. Anutin's two key positions make it easier for him to submit regulatory changes to legalize the crop. Thailand's tough anti-trafficking laws aren't expected to change even if recreational weed becomes legal.

It's not the only nation rethinking cannabis. Malaysia and Laos are considering legalizing

medical use of the crop, and the Philippines' lower legislature has passed a medical cannabis measure. "For Thailand to become the Asian leader in the cannabis space, it would most likely require that neither China nor Japan legalize cannabis," says Alexandra Curley, Prohibition Partners' head of insights.

Although marijuana remains illegal in China and Japan, the two nations could be the biggest segments of the Asian cannabis business over the next five years, with markets forecast at \$4.4 billion and \$2.1 billion, respectively. China's large consumer base and Japan's lofty cannabis prices—the world's highest at \$53 a gram, according to the United Nations Office on Drugs and Crime—explain why the two markets are so valuable.

Thailand's proximity and close business ties to both countries mean it could draw patients looking for traditional remedies or export its medical cannabis products if laws change around the region. South Korea and Australia already allow import and export of medical marijuana.

"The Asian market will challenge and perhaps surpass the North American markets in the next 5 to 10 years," says Brian Armstrong, chief executive officer of Vinzan International, a Canadian agricultural trading company that takes cannabis crops from cultivation partners in low-cost markets and processes them for export. Vinzan is building cannabis operations in Laos and eyeing expansion into Thailand.

The Thai government has taken steps to limit operating approvals for overseas investors, after critics voiced concerns about foreigners monopolizing the market. "We want to be a leader in marijuana," says Sophon Mekthon, president of the Government Pharmaceutical Organization, the state's cannabis research effort. "Our brand is strong, and we have traditional Thai medicine knowledge that's over 300 years old."
—*Natnicha Chuwiruch*

"The Asian market will challenge and perhaps surpass the North American markets"

● Estimated size of Thailand's marijuana market within five years

\$661m

THE BOTTOM LINE A top member of the coalition government of Thailand wants to legalize recreational marijuana, allowing the nation to grab a share of the growing demand for legal cannabis in Asia.

Instacart Doesn't Want 'No' For an Answer



Dozens of workers say the company's app hectors them to take on grocery deliveries that aren't worth their time, and that it doesn't stop there

When Instacart Inc.'s eponymous grocery delivery app gets a new order, it typically alerts a nearby "full-service shopper," its term for the worker who gathers and delivers the groceries, by sending the order to the worker's phone with a bright green "ACCEPT" button and a repetitive pinging sound. But even if that shopper—who ostensibly has the flexibility to reject a gig—decides the latest one isn't worth the time and effort, the on-demand

food delivery platform usually doesn't offer an option to decline.

Workers are forced to entirely mute their phone, close the app, or sit through about four minutes of that strange pinging, which many say sounds like a submarine's sonar and some compare to a time bomb. Those who wait it out sometimes wind up having to do it all over again when the same job pops back up in their queue.

To avoid that, people often have taken jobs they didn't want, says Eric Vallett, an Instacart worker in Buffalo who's tapped ACCEPT more than once to avoid another series of pings. "You just want to get away from that sound," he says.

The four-minute sonic barrage is among a slew of tactics Instacart uses to push workers to handle low-paying tasks they otherwise might reject, according to interviews with dozens of shoppers. They say the company has hounded them with phone calls, text messages, and threatening in-app messages, and that it quietly but explicitly punishes them for rejecting undesirable tasks by limiting their gig options and income. "We should have a right to say 'I don't want it' without being penalized," says Theresa Thornton, who shops for Instacart in Missouri City, Texas.

How much Instacart controls its shoppers isn't just a matter of morale or public relations—it's an existential question. Like Uber, Instacart's classification of workers as contractors means they don't enjoy the protections and benefits that employees get. The company's business model centers on keeping costs low enough to satisfy investors and keeping deliveries swift and reliable enough to win over customers, without exerting the kind of clear management authority that might lead a court to rule that the app's shoppers are employees and therefore covered by such laws as minimum wage.

An Instacart spokesperson, who declined to be quoted directly, says the four-minute wait ensures workers have time to make a decision about whether to accept the task, using the info Instacart provides on the number of items, retailer, distance, and estimated earnings involved.

Workers say Instacart isn't really providing the sort of flexibility it advertises. The company reserves many of its jobs for people who sign up ahead of time to be available during particular shifts. To get substantial work through Instacart's app, shoppers say, they need to earn "early access" to the shift sign-ups by working 90 hours over the prior three weeks, or 25 hours over the prior three weekends. And that privileged status can be threatened if workers turn down jobs, or "batches," they deem undesirable. They say Instacart may prematurely end their shift or add a "reliability incident" to their profile, which hurts their chances of getting the better work. Instacart says most workers select hours without getting early access and that many appreciate that the reward system offers them a goal to pursue.

One in-app message that Instacart has sent workers warns them to "Watch it!" because their "reliability decreased" when they failed to "acknowledge a batch in time." Another tells workers who chose

not to accept a batch that to continue shopping, they should confirm in the app that they're available. "Not doing so may affect your future ability to select hours for services," the message says. In Washington state, Instacart worker Ashley Knudson says she was punished with a reliability incident even after she told the company she was stopping work for the day because her car had been broken into and was full of glass. "It's certainly not flexible," she says. The app prompts workers to explain why they rejected an offer. The possible explanations it offers include the batch being too big or small and "other," but not insufficient pay.

Instacart says reliability incidents are meant to make sure the company offers work to shoppers who are available, not to punish them. Workers who believe they've been wrongly given an unreliability incident can contact support staff to get it removed, the company says, and it will do so in such cases as car trouble or illness. The reliability incidents go away over a 30-day period and don't lead to workers being permanently banned, according to Instacart.

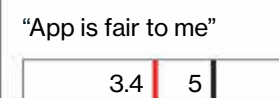
In addition to the app notifications, workers say, waiting the requisite four minutes to dodge an offer they don't want also can trigger an automated text message to their phones that says, "Your batch has been removed." Every so often, Instacart's "Shopper Happiness" staff calls to push a worker to handle a certain batch. "They'll call you repeatedly. They'll be like, 'You're the only shopper available,'" says Kristin Klatkiewicz, an Instacart worker in Covington, Wash. "Sometimes they're like, 'You need to take this order.'"

Instacart says a bug recently caused its app to send workers text messages when they didn't accept a task, rather than in-app notifications, and that it's fixed that bug. The company says that absent extenuating circumstances, its support staff shouldn't be contacting workers unprompted, and it doesn't force anyone to take on unwanted tasks.

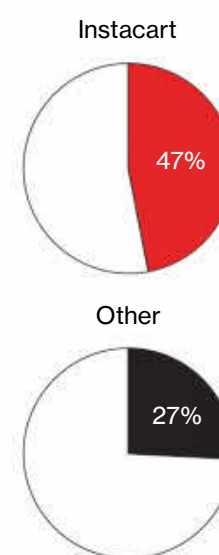
This spring, Instacart released an "on-demand" feature that it said would make its app more accessible and flexible for workers by making some tasks available to whoever logs on in a certain region, not just to people who've signed up for those particular hours. But some workers who've tried it say the on-demand system pushes down their earnings and makes it tougher for them to figure out what's worth their time. The tasks are offered simultaneously to a bunch of workers in the same area and assigned to the first person who accepts them, so usually at least one is willing to gamble—often within seconds, with no time to read the offer carefully. "It's like *Hunger Games*," says Instacart worker Heidi Carrico in Portland, Ore. "If you don't accept it, ►

● Average response of platform food delivery workers, on a scale of 1 to 7

- ▬ Instacart
- ▬ Other



● Share of platform food delivery workers who say they "would work with a fever"



◀ someone else will.” Ryan Calo, a law professor at the University of Washington, says such systems are “designed to be manipulative and coercive.”

“Instacart seems to demand that workers behave like employees, but they have none of the benefits of employment,” says Kathleen Ann Griesbach, a research fellow at Columbia University’s Interdisciplinary Center for Innovative Theory and Empirics and author of a forthcoming study of app-based food delivery work.

Since last year, Instacart and its peers have been lobbying officials for relief from a new threat to their business model: a ruling by the Supreme Court of California dictating that workers can’t be considered contractors under the state’s wage law unless the work they’re doing is outside of a company’s usual course of business. Like DoorDash, Lyft, Postmates, and Uber Technologies, Instacart

has been meeting with labor leaders and politicians to lobby for a legislative compromise that would let it avoid reclassifying its workers as employees. The company says it’s working with lawmakers and other relevant parties to modernize laws and maintain flexibility and choices for workers.

“The way these platforms have been allowed to develop has allowed the creation of this fiction that algorithms are distinct from management systems,” says David Weil, former head of federal wage and hour enforcement under President Obama. “The system that Instacart has created bears little resemblance to one composed of independent contractors,” he says, and “in almost every respect looks like employment.” —*Josh Eidelson*

THE BOTTOM LINE Instacart delivery workers say it’s tough to get the preferable shift times they need—or to hear themselves think—if they reject jobs that aren’t really worth the pay on offer.

Elon Musk Preps For Brain Surgery

● Neuralink, his implant startup, just unveiled its tools and timetable for human trials

Elon Musk has had a lot to show off over the past 25 years, including an early online bank, solar roof tiles, a tunnel-digging machine, an electric car, a reusable rocket, and even the occasional electric car riding a rocket. He may have just topped them all with the help of a tubby brown-and-white rat.

The rodent belongs to Neuralink Corp., a company Musk founded to develop a data transmission system between people and computers. Neuralink has been supersecretive about the nature of its work since its founding in 2017, until now. During its first demonstration in front of a reporter, the startup showed it can record a rat’s brain activity via thousands of tiny electrodes surgically

implanted alongside the animal’s neurons and synapses. To do this, Neuralink, based in San Francisco, appears to have achieved a number of breakthroughs that let it place high-speed computing systems inside a brain, while causing less damage than existing techniques.

The company will seek U.S. Food and Drug Administration approval to start clinical trials on humans as early as next year, according to President Max Hodak. The goal is to drill four 8-millimeter holes into paralyzed patients’ skulls and insert implants that will give them the ability to control computers and smartphones using their thoughts. Yes, really. Neuralink, which has raised more than \$150 million from investors, including at least \$100 million from Chief Executive Officer Musk, is betting that millions of people will eventually elect to become cybernetically enhanced. “This is going to sound pretty weird, but ultimately we will achieve symbiosis with artificial intelligence,” Musk said at a press conference on July 16. “This is something that I think will be really important on a civilization-level scale.”

Philosophers, sci-fi enthusiasts, and daydreamers have long imagined what it might be like to turbocharge their brainpower or read someone else’s

◀ Neuralink says its robots can insert wires one-quarter the width of a human hair into a patient’s skull



thoughts. Lately, a number of startups have tried to find out. Companies such as CTRL-labs Corp. and Kernel are working on external devices to detect neurons' firing patterns from outside a person's body and transmit them to a computer. The next level up is figuring out how to safely insert a device into the brain, where the neural signals are the strongest and the process can go much faster. This has proved tricky, to say the least.

Musk's 100-person startup is counting on its advances in materials and robotics to get there. To insert the needed wires into the brain, it built a robot about the size of a barbecue grill that uses high-end optics to peer into holes drilled in the skull and then place the wires precisely. Each wire is one-quarter the width of a human hair and laced with dozens of electrodes.

In a research paper released on July 16, Neuralink said it's performed at least 19 surgeries on animals with its robots and successfully placed the wires, which it calls "threads," about 87% of the time. In a secret Bay Area lab, a recent patient, that brown-and-white rat, moved around a large, rectangular plastic cage filled with wood shavings and Parmesan cheese. A wire attached to a USB-C port in its head transmitted its thoughts to a nearby computer. The crackle of its neurons firing could be heard over a speaker while software recorded and analyzed its brain activity, measuring the strength of brain spikes.

Of course, lots of treatments that work in rodents have failed to make the leap to successful human testing. While Musk confirmed at the press conference that Neuralink has tested its technology on primates, he has yet to reveal much else about this work. Even if the implants function as expected, the company will need to show that it can do something safe and useful with them by providing therapies—something many scientists see as an open question. Only when all that is done can other consumers begin to opt for some light skull-drilling.

Neuralink's electrodes, once placed in the holes in a patient's skull, are supposed to register brain activity and relay it to a small device implanted behind the ear that transmits the data to a computer. Hodak says the first surgeries will take place under general anesthesia, but he hopes local anesthetics will suffice in the future. "We will painlessly laser-drill the holes into the skull, place the threads, plug the hole with the sensor, and then you go home," he says. "It'll basically be an experience like getting Lasik." —*Ashlee Vance*

THE BOTTOM LINE The Neuralink team says it's about ready to test its brain implants on human patients, but first it'll have to persuade the FDA—and some patients.

BW Talks

Antonio Neri

Since 2015, when HP split into Hewlett Packard Enterprise (networking and consulting) and HP Inc. (PCs and printers), Neri has helped define HPE's scope, overseeing product development and key acquisitions.



- Succeeded Meg Whitman as chief executive officer of Hewlett Packard Enterprise in 2018
- Started in Hewlett Packard's customer service department in 1995
- On the boards of HPE and health insurer Anthem Inc.

What challenges do you see at this company as you look at how things are rapidly changing and moving to the cloud?

The cloud has to move closer and closer to where the data is being generated. It's cheaper to move the cloud to where the data is, not the data where the cloud is, so we promised last year to invest \$4 billion to develop that set of road maps and technologies.

The situation we're in creates uncertainty, and when there is uncertainty, customers tend to step back a little bit. Obviously, there needs to be a fair approach to trade, but we live in a global economy, and the supply chains we've put in place over the last few decades are complicated.

How much pressure are you feeling from Google, Amazon.com, Microsoft, these big companies that have really put their stake in the cloud?

There's no doubt that many of the workloads have moved to the public cloud. But big customers realize it's cheaper for them to run things on their premises in their data center or in a sort of hybrid model. We believe there is a ton of opportunity to modernize that infrastructure and help customers decide what is the right mix.

You've acquired a lot of companies, including a recent \$1.4 billion deal for Cray Inc. Is there another piece you need to add on?

More and more intelligence comes through the security analytics that make infrastructure more autonomous. Valuations tend to be a little bit erratic of late, but if it makes sense, we'll consider it.

There's a lot of money out there in the world, especially in the private equity market. Anybody knocking on your door to maybe buy you?

No, not at all. We're focused on making this company relevant for the future, to become a trusted adviser to our customers. And I have to say, we're having a ton of fun.

You guys have manufacturing in Mexico. You're in 172 countries. How do you view the trade wars under way, and how might they affect you?

● Listen to *Bloomberg Businessweek With Carol Massar and Jason Kelly*, weekdays at 2 p.m. to 5 p.m. ET on Bloomberg Radio

Wall Street's

● Investors love refrigerated warehouses, and that could hurt some small food companies

While his friends played in the Florida sunshine, Elliot Greenbaum, then 11, was often bundled up in coat and hat, sweeping the floors in his dad's refrigerated warehouse. As a teenager, he operated the forklift and loaded Danish canned hams into station wagons bound for Cuban sandwich shops.

Now 73, Greenbaum is closing the business he inherited from his Polish immigrant father, unable to compete in a \$6 billion refrigerated storage industry dominated by institutional investors scaling up to serve food giants such as Unilever NV and Nestlé SA. As a result, some of his smaller customers—which recently included a specialty frozen-dog-food maker and a kombucha startup—are at risk of getting shut out of the cold. “We’re losing the exotic things that make America great,” says Greenbaum, who just sold his last warehouse. “Now other people far away are deciding how your ice cream should taste.”



► Greenbaum is closing the business his father built

Ice Cream Buyout

Cold storage is the kind of niche business that Wall Street long ignored—it amounts to just 3% of public warehouses—but now it has become its latest darling. Roughly two dozen private equity firms have latched on to this corner of industrial real estate. They’re seeking to capitalize on the growing preference for home grocery delivery, which requires warehouse space, and looking for a hedge in the next recession. (Eating isn’t cyclical.) And two companies, Americold Realty Trust and Lineage Logistics, have grabbed 60% of the sector in the U.S. and Canada, expanding through a rapid-fire series of acquisitions.

Eleven-year-old Lineage Logistics, named by its private equity owners in a nod to the many family-owned companies it absorbed, is now the biggest operator in the U.S. Billionaire Ron Burkle took the 116-year-old Americold public early last year, making it the industry’s first and only publicly traded company. Its shares have since doubled in value, to about \$34. Americold is trying to institutionalize a business where contracts were little more than handshakes and customers of all sizes were welcome. Now manufacturers with truckloads of food get priority, and smaller ones can squeeze in, if there’s room, for a higher fee.

As packaged food conglomerates have grown, they’ve depended on the supply chain to grow with them. And that’s exactly what big cold-storage operators are now built for. While Americold works with many smaller companies, its top 25 customers account for 59% of revenue, says Chief Executive Officer Fred Boehler. The key to success is volume and efficiency: Americold employs 13,000 people but would need thousands more if it operated like a traditional warehouse, Boehler says. Software controls the flow of business. Chicken moves to the front of the warehouse just before a large grocery chain puts it on sale, and employees who unpack and transport products get bonuses based on how fast they complete tasks assigned by computers. The temperatures

are low, but workers still sweat—even those dressed in shorts, Boehler says.

Americold likes working with smaller startup food companies, he says, because they can grow fast. But if those companies don’t sign long-term leases, aren’t able to keep their allotted space full, and require Americold workers to frequently pull out goods for small shipments, there’s a cost to that. Americold has a sophisticated tracking system and knows exactly which companies are being undercharged, and sometimes small companies don’t like to hear that. “It’s making sure everybody is paying their fair share,” Boehler says.

Lineage co-founder Kevin Marchetti also says the industry is getting smarter about pricing, with rates for a given amount of space declining as a client’s storage needs rise. Still, while the food giants are taking more space, the company has fostered the growth of promising startups, including Siggi’s yogurt, Marchetti says. Big cold-storage companies have money to invest in modern technology and facilities across the country. “For better or worse, scale is critical,” he says. “The retailers are getting bigger. Everybody is getting bigger.”

In April, John Lowe, CEO of Jeni’s Splendid Ice Creams, traveled to a resort in Santa Ana Pueblo, N.M., to speak at a conference for the cold-warehouse industry. He offered this advice: If a small company reaches out, return the call. Even Jeni’s, the 17-year-old company that’s been credited with inventing salted caramel ice cream, struggles to find space. It has more than \$50 million in annual revenue and products in Whole Foods, but it was kicked out of Americold twice recently to make room for larger competitors, he says.

To grow, Jeni’s has had to be nimble, creating its own makeshift frozen supply chain, putting freezers in traditional warehouses, and expanding storage in its scoop shops so fewer deliveries are necessary. About 18 months ago, it was forced to move out of an Americold distribution center in St. Louis. It started delivering buckets from a Chicago facility ▶

● Space covered by the largest refrigerated warehouse companies in North America, in cubic feet

Lineage Logistics 1.1b	
Americold 1.0b	Other 1.4b

◀ five hours away, Lowe says. This year, Americold pushed the company out of an Atlanta building. “Getting kicked out of a warehouse and going across the street would be one thing,” Lowe says. “But there is no across the street anymore. Americold, or whomever, often owns a great deal of the market. It adds to our costs in a way that the biggest players in our industry don’t have to deal with.”

Americold spokeswoman Michele Huffman confirmed that the company asked Jeni’s to move out of facilities to make room for larger food companies. But in the Atlanta case, it offered an alternative in another warehouse that didn’t meet Jeni’s needs, she says. Americold has a team of 30 employees focused on working with smaller customers, which are critical to its growth strategy, Huffman says. She forwarded a July 2018 email from a dessert startup, thanking Americold for agreeing to accommodate them in a Dallas facility. While big accounts make up most of Americold’s revenue, most of its customers are small, she says.

Demand for public cold space from online grocery sales alone will grow by up to 100 million square feet, or about 50% of the current inventory, over the next five years, according to CBRE. That’s equivalent to about 200 regional malls’ worth of space. But warehouses are rarely built without an individual user in mind, because construction costs are up to three times higher than for unrefrigerated space and the electricity and labor costs can quickly put an operator out of business if vacancies rise. Institutional investors like cold storage, in part, because the facilities, constructed on top of thick concrete slabs that are warmed underneath to prevent freezing, are so expensive to build. The high barrier to entry keeps out competitors.

Scott Pertel wants to create more room. He just started Cold Summit Development, based in Sun Valley, Idaho. He’s now talking to investors about creating a warehouse in an urban location designed for small companies. One challenge: construction financing. Building a business dependent on untested companies selling unusual products is a tough sell to banks, he says. “The consumer demand is there,” Pertel says. “Every big guy was once a small guy.”

In August, Greenbaum will close his family’s last warehouse. The Greenbaums owned eight at one time, and their facilities served as important Florida hubs a few decades ago for imported beef from Central America and New Zealand. But the big accounts go to corporate warehouses, and you can’t beat institutional investors when it comes to ruthless efficiency, he says. Besides, Greenbaum’s kids are professionals and have no

interest in continuing the business. He’ll be busy in retirement, writing poetry and novels, he says. But what’s going to happen to great customers such as Edgardo Dangond, he wonders.

Dangond’s Foods produces ready-to-cook frozen ingredients for empanadas, cheese bread, and other Colombian delicacies. Dangond was just about to make a real go of it, expanding from home deliveries to restaurants and retail, potentially tripling his cold space in Greenbaum’s warehouse. Now he’s scrambling, talking to jam and cookie makers about renting a shared warehouse that could also accommodate his production facilities. “We have no other choice,” he says. “We have to find a group of companies with the same issues and try to put a solution together.” —Prashant Gopal

THE BOTTOM LINE As refrigerated storage becomes a bigger business coveted by private equity, it has also become more focused on the needs of a handful of giant food companies.

\$till the Boss

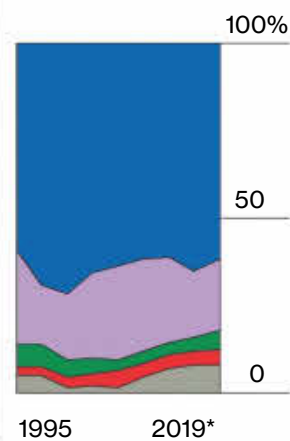
● The euro hasn’t knocked the dollar from its top spot. Can the yuan do it? How about Facebook’s Libra?

The U.S. gets perks from the dollar’s lofty status in international trade, starting with the ability to borrow more cheaply. So the dollar has long faced wannabe competitors. The euro was created partly to chip away at its dominance, and China has been pushing for the yuan to be used more widely. Neither currency has dislodged the greenback from its perch. According to data going back to 1989, the dollar hasn’t lost any of its share in central banks’ foreign currency reserves, in currency trading, or in the cross-border liabilities of banks. Its share of debt issued in foreign currency has grown.

Yet challenges keep coming. There’s digital currency, such as Facebook Inc.’s planned Libra, and President Donald Trump’s trade wars and isolationist policies, which have given other countries an extra nudge to seek alternatives. Europe is attempting to circumvent U.S. sanctions against Iran by establishing an alternative payment system that wouldn’t depend on dollars.

But currency watchers and economists say potential substitutes for the dollar all present bigger problems than the status quo. “The dollar

● Central bank reserve currencies
 ■ U.S. dollar
 ■ Euro
 ■ Japanese yen
 ■ British pound
 ■ Other



doesn't have to be great, it just has to be the least worst one," says Paul Sheard, a senior fellow at Harvard and former chief economist of S&P Global. "China is still a communist country transitioning slowly. Europeans point out themselves that the monetary union is still a work in progress. It will take decades for either to get to a point to be real alternatives."

Because of U.S. sanctions, Russian and Iranian central banks have partially moved away from the dollar in their holdings. Yet that's done very little to tip the scales, especially as much of the diversification has come in the form of rising gold reserves. Europe's special financial channel for trade with Iran is so far only for food and medicine—which U.S. sanctions already allow—and has failed to persuade Iran to stick to the nuclear agreement it struck in 2015.

Facebook, which counts almost a third of the world population as users, is a formidable force that has upended many legacy systems. Yet Libra at this stage sounds more like an alternative payment system than a new currency. Visa Inc. and Mastercard Inc. are among the project's initial backers. And the value of the Libra coin will be based on a basket of traditional currencies. "You need state backing for any legitimate currency," says Philip Suttle, a former Bank of England economist who now runs his own advisory firm. States are unlikely to let Libra become a freewheeling global medium of exchange, especially if it jeopardizes anti-money-laundering efforts. And Visa and Mastercard's backing won't last if the project runs into regulatory hurdles, according to Morgan Stanley analyst James Faucette.

Facebook executives faced skeptical U.S. lawmakers during hearings in mid-July. Sherrod Brown, a Democratic senator from Ohio, called the project "delusional," adding: "Look at Facebook's record. We would be crazy to give them a chance to experiment with people's bank accounts."

As for the euro and the yen, holding them has limited appeal now because bond yields and interest rates in the euro zone and Japan are so low—in some cases negative. And there's an added problem in Europe: "There's no central euro bond, making the continent's bond market fragmented with lots of different issuers, more like the U.S. municipal debt market," says Marc Chandler, chief market strategist at Bannockburn Global Forex.

The yuan is a relatively new challenger as China's economy has grown rapidly to become the second-largest in the world. Its share in reserves, global transactions, and currency trading has been growing fast, albeit from a very low



base. The International Monetary Fund didn't even break out the yuan's share in global foreign exchange reserves, including it in "other currencies" until 2016.

A big hurdle for the yuan is that China's policymakers manage its value, which makes market players wary of it. "The yuan will definitely play a bigger role, but how much depends on how fast they'll liberalize their currency," says Fred Bergsten, the founding director of the Peterson Institute for International Economics.

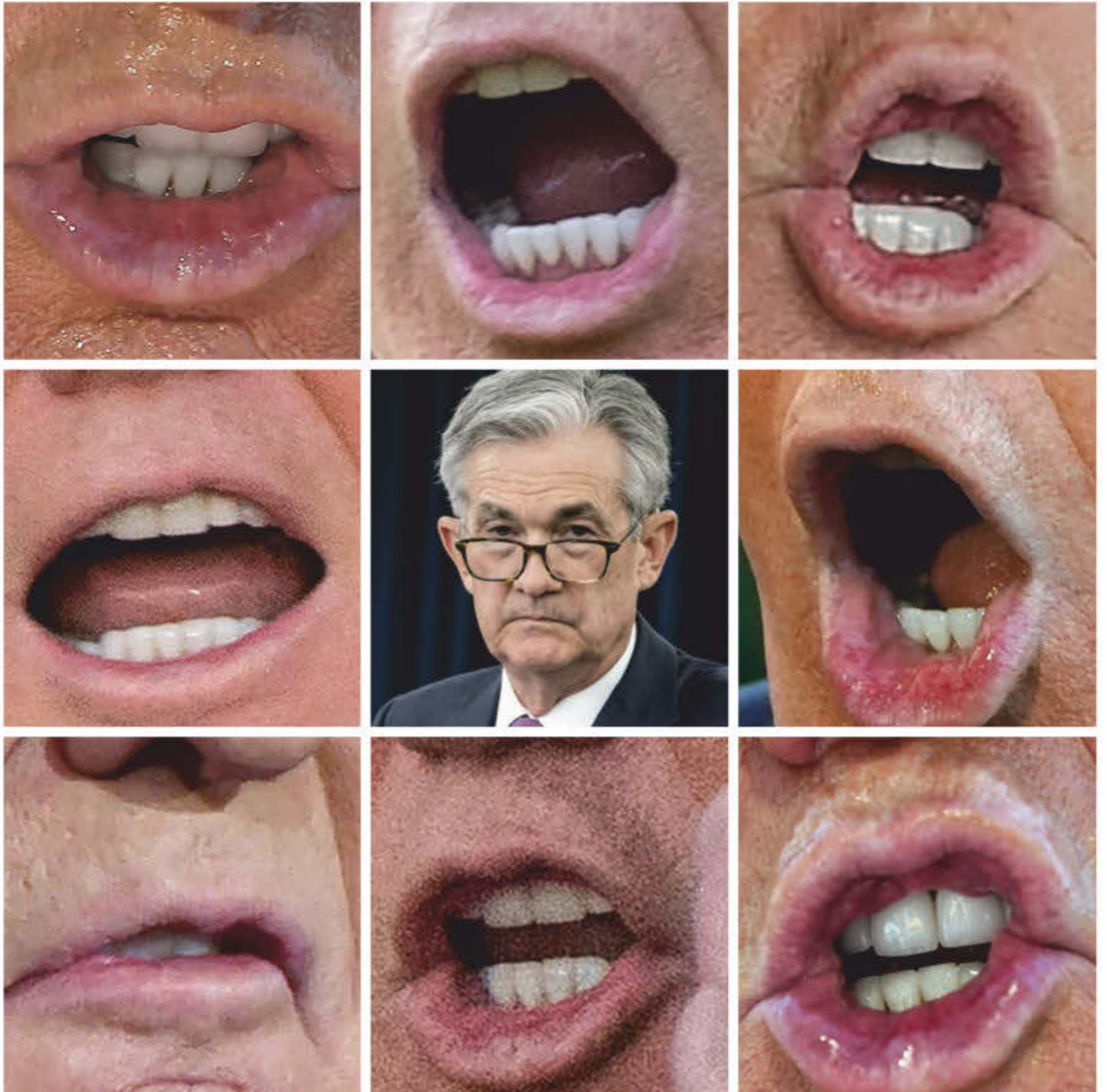
Given all that, the biggest threats to the dollar would have to come from the U.S. itself. Policies that could lead to high inflation might erode confidence in the currency, according to former BoE economist Suttle. That could happen if Trump replaced the Fed chairman and packed the central bank with governors who'd follow his orders in his second term—or if the same happened under a populist Democratic president. "Fiscal expansion financed by the Fed could crash the dollar," says Suttle.

But Congress would have to go along with both the Fed appointments and the budgetary expansion. The more likely scenario, Bergsten says, is for the euro and yuan to become more important in the next few decades, leading to a multipolar currency regime. Even so, the dollar will probably remain in first place. "If the U.S. screws up massively, Europeans and Chinese do the right things, with all three happening together, the dollar could lose its top spot," Bergsten says. "That's not an easy combination to get to." —*Yalman Onaran*

THE BOTTOM LINE Trump's trade wars and aggressive foreign policy have some longing for a serious rival to the dollar. But other currencies have their own challenges.

4

STOICISM



● The president's tweets are just a nuisance compared with his push to pack the central bank with partisans

Stoicism, the classical philosophy of emotional resilience, logic, and virtue, has long been a handy guide for anyone dealing with a crazy boss. Seneca the Younger, a first century Roman statesman, found it helpful in managing the famously volatile Emperor Nero. Federal Reserve Chairman Jerome Powell also seems to be a fan. He has a mantra, a simple phrase he uses frequently in private and occasionally in public, that sounds straight from the stoic's guide to a happy life: "Control the controllable."

For a full year, Powell has been on the receiving end of an unprecedented barrage of abuse from President Donald Trump, who's called the Fed "loco," as well as "the biggest threat" facing the U.S. economy. This from the man who tapped him for the job. Powell enjoyed five quiet months at the helm of America's central bank after he took over from Janet Yellen in February of last year. But as he and his colleagues ratcheted up borrowing costs, the president's ire rose. Trump took his first shot last July, and things only got worse as the Fed plowed ahead with four interest-rate hikes over the course of the year, the last in December as officials also penciled in two rate hikes for 2019. That, along with the global economy already showing signs of strain, sent financial markets into a temporary tailspin, further inflaming the president.

That's when Trump began asking aides about his ability to oust the Fed chief in discussions

reported by Bloomberg News on Dec. 21. Advised that he doesn't have the authority to fire Powell outright, the president asked White House lawyers in February to explore whether he could strip him of his chairmanship, a legally dubious move that could lead to a messy court battle. After Bloomberg News reported this twist, Trump claimed on June 23 that he has the power to demote Powell.

During this period, the president's assault on the Fed took a turn. He'd already filled three openings on the bank's seven-member Board of Governors and elevated Powell to the top job, picks that were well received inside and outside the institution. Clearly disappointed with their performance, however, he then began a concerted effort to fill two additional openings with individuals who would toe his line on interest rates. Candidates interviewed for the governor job this year have been asked whether they would support a rate cut if they were on the board now, according to two people familiar with the meetings.

According to one senior insider, Trump's effort to pack the Fed has spooked the central bank's staff and leadership far more than his public rantings. At the very least, it could drag partisan politics straight into the central bank's closed-door meetings on monetary policy. Worse, it could pose a more elemental threat to the institution.

Judy Shelton, a former economic adviser to Trump who's among his latest central bank picks, is the embodiment of all these fears. In the same way that the president's choices to lead the Environmental Protection Agency and the Consumer Financial Protection Bureau have sought to undermine the missions of those agencies, Shelton could bring a level of iconoclasm rarely, if ever, seen at the Fed.

In the meantime, even an end to rate hikes hasn't bought Powell any peace. By January he was backing away from further tightening as market turmoil continued. A majority of Fed officials then shelved projections for 2019 rate hikes in March as the risks of a worldwide slowdown mounted, in large part because of uncertainty caused by Trump's trade war. That's when the president pivoted and began beating the drum for rate cuts. The economy would be "like a rocket ship" if only Powell & Co. heeded his call and began easing monetary policy, he said this month.

Trump isn't the first American president to bully his Fed chair. Lyndon Johnson summoned William McChesney Martin to his Texas ranch in 1965 for a tongue-lashing during which, according to one account, he shoved him while yelling, "Boys are dying in Vietnam and Bill Martin doesn't care."

And former Chairman Paul Volcker revealed in his recent memoir that in 1984, Ronald Reagan ordered him, through chief of staff James Baker, not to raise rates. Yet since Bill Clinton, U.S. presidents have, at least publicly, left the Fed alone in deference to its independence. Trump, desperate to keep the economy purring and the stock market soaring, has laid waste to that tradition.

Ironically, he may have made it harder for the Fed to give him what he wants, because Powell and the rest of the rate-setting Federal Open Market Committee don't want to be seen as caving to the president's demands. That's the very reasoning President Clinton's economic team used in the 1990s to convince him that pressuring then-Chairman Alan Greenspan would be counterproductive. "If the case is clear that they should cut, they will cut," says David Wilcox, who joined the central bank in 1986 and retired late last year as head of its critical research and forecasting unit. But in this atmosphere, he adds, "when the Fed eases, the evidence would have to be just a little bit stronger."

It's looking increasingly likely, even if there's a higher hurdle, that Trump will get his wish when the FOMC meets on July 30-31. After trade and manufacturing continued to show signs of weakness, and the rock-solid jobs market suffered a hiccup, Powell signaled in June that the case for a cut had strengthened. He continued pointing in that direction when he testified before Congress this month, despite a strong June jobs report.

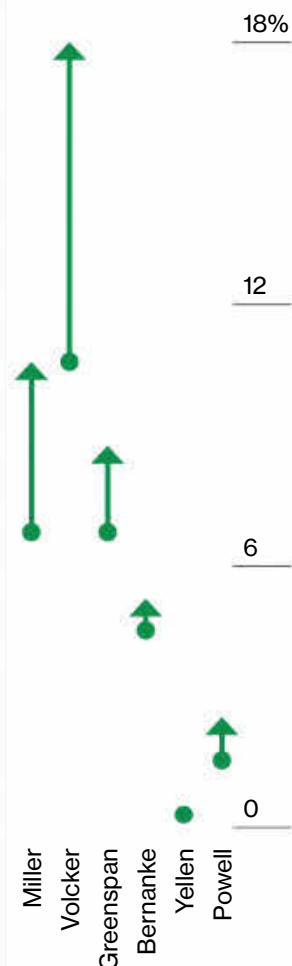
Some in Washington have begun to wonder whether Powell might crack under the pressure of the almost daily invective, perhaps even throw up his hands and quit. "Inconceivable," says David Rubenstein, co-founder of the Carlyle Group, where Powell was a partner from 1997 to 2005. "He's not a person who just walks away from things. He's a very tough person, and I think he's got the right personality for this."

Rubenstein is far from alone in that view. In interviews with *Bloomberg Businessweek*, several former colleagues said they were certain Powell would continue to shrug off Trump's barbs and remain focused on his job.

The 66-year-old, Ivy-educated lawyer has spent more than two decades working in Washington, during which time he's developed a granite exterior. He also built himself a multimillion-dollar fortune in the private equity business before joining the Treasury in 1990. After another stint in the private sector, Powell, a registered Republican, joined a think tank, the Bipartisan Policy Center, before President Barack Obama appointed him to a seat on the Fed in 2012. ▶

"We've never had an open rebellion against a chair of the Fed"

● Federal funds target rate during Fed chairs' first 17 months on the job



◀ Powell was a governor for six years, earning the respect of fellow policymakers and the bank's army of brainy economists because of his studious and thoughtful commitment to work. Along the way, he's also won a reputation for keeping his cool. "In some people, it's just their nature to be straightforward and not get flustered," says G. William Hoagland, senior vice president at the Bipartisan Policy Center.

That doesn't mean Powell has been entirely passive in the face of his tormentor. Although he's carefully avoided a direct clash with Trump, he's made it clear the Fed won't cave to political pressure when setting rates, something that would be tantamount to a moral failure in Powell's book. "We're human. We'll make mistakes," he told an audience in New York on June 25. "But we won't make mistakes of integrity or character."

Powell has also worked to cultivate allies in Congress, the Fed's real boss. He's made good on his 2018 pledge to "wear the carpets of Capitol Hill out," holding almost 150 meetings or phone calls with legislators since becoming chair, according to his public calendar through May.

His pilgrimages to Capitol Hill appear to be paying off. Several Republicans have voiced support for him in recent months. Pennsylvania Senator Pat Toomey told Bloomberg TV on July 10 that any attempt by Trump to remove the Fed chief "would be a very, very bad idea."

While the president's criticism of the central bank generates headlines, there's no hint that it's disrupted the way Powell and the rest of the staff go about the business of crafting monetary policy. This is an intensely focused—some would say notoriously insular—organization. Its circadian clock is set to the calendar of FOMC meetings, of which there are eight a year.

Each cycle features an intense preparatory process aimed at developing policy proposals that can be defended before a roomful of macroeconomic experts. Political views are taboo. Gut calls don't cut it. "If one of them has a strong view and they can't articulate it, they're not going to get anybody else to go with them," says Nellie Liang, former director of the Fed's Division of Financial Stability. Liang was nominated to serve as a Fed governor by Trump in September, but she withdrew her name in January, saying a prolonged confirmation process would leave her "in professional limbo for too long."

The bank has a culture that puts a premium on professional competence and breeds a fierce loyalty to the institution. It's not that the Fed never screws up: Speaking before Congress this month, Powell admitted the Fed may have overtightened

rates by underestimating certain fundamental shifts in the U.S. economy. Still, the staff and leadership approach their work convinced that no one else is likely to do better, not because they're smarter, but because they have no agenda other than getting policy right. It's a quality that comes across as valiant to their allies and self-righteous to critics.

After more than seven years at the Fed, Powell is thought to be as loyal to those ideals as anyone in the building. A decision to up and quit would constitute a mammoth betrayal. "What would cause deep and long-lasting damage is if Jay were to step down and some person was nominated whose only credentials were their political partisanship," Wilcox says.

In 2016, with two seats open on the Board of Governors and Yellen's term set to expire in 2018, that fear emerged as soon as Trump won the presidency. For a while, however, his nominations proved a pleasant surprise. Although he shunted aside the widely respected Yellen, he made entirely conventional choices in promoting Powell and in tapping Richard Clarida as vice chair and Randal Quarles as vice chair for banking supervision.

But the profile of Trump's picks has changed now that Lawrence Kudlow, director of the National Economic Council, has assumed full control of the process of identifying potential nominees for the president's approval. On the outs is Treasury Secretary Steven Mnuchin, who championed Powell's candidacy for the chair, though insiders say he still retains influence through Kudlow.

Kudlow, a Wall Street analyst-turned-TV personality, struck out with his first two choices this year. One was his friend Stephen Moore, a fixture of conservative think tanks and a lifelong advocate of supply-side economics. The other was Herman Cain, a businessman who briefly ran for the Republican Party's presidential nomination in 2018. Neither was coy about suddenly calling for lower rates under Trump. However, their loyalty to the president couldn't compensate for an assortment of personal and professional shortcomings that presaged a difficult confirmation process. Both withdrew their names before being formally nominated.

Kudlow's latest picks are safer bets. Christopher Waller, research director at the St. Louis Fed, has decidedly dovish views on monetary policy that are in sync with Trump's. Nonetheless, his status as a Fed insider and his long record of academic work explaining his views pretty much guarantee the respect of his colleagues on the FOMC.

Shelton, whose selection was revealed in a Trump tweet on July 2, is something altogether different and potentially troubling to anyone who believes in the established conventions of central

Trumping The Fed

The president's picks for the Board of Governors have become more partisan over the past year

- Confirmed
- Withdrew
- Nomination expired
- Yet to be nominated



Randal Quarles

Like Powell, he's a lawyer who made a fortune in private equity and served as a senior Treasury official.



Richard Clarida

A Columbia University professor who identifies as a New Keynesian, he was tapped for the post of vice chair.



Michelle Bowman

A former state bank commissioner of Kansas, she was chosen for her expertise in community banking.



Nellie Liang

The three-decade Fed staff veteran took herself out of the running because she anticipated a drawn-out approval process.

banking. Best described as a libertarian intellectual and author, she's a hardcore inflation hawk who in past years has pushed for a return to the gold standard. In the absence of a gold standard, targeting superlow inflation generally means calling for high interest rates—certainly higher than they are now. But since it first emerged that she was being considered for a Fed job, Shelton's views on rates have changed. In May she told Bloomberg News she wouldn't do anything to threaten the president's pro-growth agenda. Last month she went further, telling the *Washington Post* that as a Fed governor she would seek to lower interest rates "as expeditiously as possible."

Asked about the apparent flip-flop, Shelton said in an email that her comments on lowering rates were directed "specifically at the mechanism through which the Fed carries out its interest-rate targeting decisions." That's a reference to the Fed's practice of paying interest on bank reserves. Shelton says that policy incentivizes banks to park their money at the central bank instead of channeling it into new loans.

Shelton, who currently serves as the U.S. envoy to the European Bank for Reconstruction and Development, has long been a passionate advocate for the concept of "sound money." In this view of the world, the stable value of the currency is a moral imperative and should be fixed to a unit of measure, like a weight in precious metal. This makes her far more than a hawk in dove's clothing. It suggests she rejects the very notion that a central bank ought to modulate the supply of credit in an effort to smooth the booms and busts that can wreak havoc in an economy.

On that count, Shelton pleads both guilty and innocent. She readily admits to questioning long-held assumptions about the connection between monetary policy and economic growth. "I would welcome the chance to challenge the status quo at the Fed," she said in an email. While she denies that her objective is to curb the Fed's role in taming the economy's ups and downs, she questions whether central banks have succeeded in achieving this goal by setting benchmark interest rates. "That task is better performed through the interaction of free markets in determining the cost of capital," and not, she says, by "a small group of officials meeting in Washington, D.C., every few weeks."

Alan Blinder, a former vice chairman of the Fed, says the central bank can manage an apostate on the Board of Governors without much disruption. "It's possible that a very eccentric member of the board could be accommodated, and so what?" Blinder says. "She would be intellectually

isolated." But given Trump's disdain for Powell, Shelton would, if confirmed, represent a potential chair-in-waiting. One administration official familiar with the matter told Bloomberg in July that's an option once Powell's term expires, or even before.

If promoted to the top job, Shelton could tip the institution upside down. "I'd like to think that's an unthinkable outcome," Blinder says. "We've never had an open rebellion against a chair of the Fed. You have the potential, should this happen, to have an open rebellion."

There are two paths to that still unlikely scenario. In one, Trump wins reelection and waits out Powell's four-year term before nominating Shelton, by then a governor, for the chair. In the second, he moves to demote Powell after Shelton is confirmed as a governor. Unsurprisingly, Sherrod Brown, the Ohio senator who serves as the ranking Democrat on the Senate Banking Committee, has blasted her candidacy, saying she's unlikely to get any Democratic support. "She is singularly unqualified," he says. "She's far too political. She brings into question the independence of the Fed." Democrats would need at least four Republican senators to join them in rejecting Shelton, however, putting Powell's relations with Congress to a test.

The second scenario could lead to entirely uncharted territory. If Trump were to demote the current Fed chief, Powell could challenge the move in the courts. The Federal Reserve Act, which established the central bank in 1913 and set out the rules governing it, doesn't explicitly protect the chair from demotion, but Powell could make a solid case against his unilateral removal by the president. "There's an argument there, but it's murky and untested," says Deepak Gupta, founding partner of Gupta Wessler in Washington, who specializes in appellate and Supreme Court litigation. "It's anyone's guess how that would come out if there were an actual court challenge."

The odds of such a crisis appear low for now. Congress will probably recess for the summer without holding hearings on the Shelton and Waller nominations, and a rate cut in late July could quiet Trump, at least temporarily. But come autumn, the Fed could face dangers it never imagined. What counsel might Seneca have for Powell? This bit of wisdom from the Roman sage seems appropriate: "To bear trials with a calm mind robs misfortune of its strength and burden." —*Christopher Condon, with Saleha Mohsin and Laura Litvan*

THE BOTTOM LINE Trump's picks for the Fed have become increasingly partisan as the president seeks to ensure that the central bank is in lockstep with him on keeping rates low.



Herman Cain

His candidacy ran aground on allegations of sexual harassment, which eroded support among Senate Republicans.



Marvin Goodfriend

The former research director at the Richmond Fed is known for emphasizing inflation targeting. After a rocky hearing, he never got a full Senate vote.



Stephen Moore

A supply-sider and Trump adviser who co-authored the book *Trumponomics*, he withdrew after an uproar over his past comments disparaging women.



Judy Shelton

A longtime gold bug, she abhors any inflation above zero yet favors lowering rates, which can boost inflation.



Christopher Waller

The St. Louis Fed research director has challenged the notion that low unemployment is linked to surging inflation.

5

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34

The Man Who Pulls the Strings In Brazil

Maia ▶

Edited by
Jillian Goodman



● President Bolsonaro sees the head of Brazil's lower house as a potential rival

After getting wind of a possible congressional proposal to strip him of some powers, Brazil's President Jair Bolsonaro complained that the country's lawmakers want to make him a ceremonial head of state, like the queen of England. That hasn't happened yet, but when it comes to setting the nation's legislative agenda, it's clear who has the real power: Rodrigo Maia, the speaker of the nation's lower house.

On July 11, the 49-year-old politician from the center-right Democratas party pushed a revamp of Brazil's generous social security system past its first and highest legislative hurdle. Pension reform is a necessity that has eluded four previous administrations. Before successfully getting it through the lower house, Maia had spent months uniting 17 fractious parties to finally deliver a measure expected to save almost 1 trillion reais (\$267 billion) over the next decade. "Rodrigo Maia built a parliamentary base, which the government doesn't do and doesn't have," says Alexandre Frota, a congressman from Bolsonaro's own Social Liberal Party (PSL). "Brazil is going to thank him in the future."

Bolsonaro has squandered much of his political capital because of his belligerence and penchant for fighting culture wars. That leaves Maia to deliver or frustrate the government's agenda—and to hold Brazil's democracy together. Maia himself says he's merely filling a void. "Until now, the executive power has not put forward an agenda for the main issues, from my point of view," he said in a text message interview.

The speaker has embraced pro-market aspects of Bolsonaro's program but blocked some of the president's more inflammatory proposals, including a decree to loosen gun control laws. Maia also delayed anticrime plans pushed by Justice Minister Sergio Moro, a hero to rightists for his role in imprisoning former President Luiz Inácio Lula da Silva on corruption charges and an ally of Bolsonaro's.

Nowhere have Maia's skills been more evident than in his handling of the social security bill—a flagship economic policy, albeit one Bolsonaro himself has embraced with scant enthusiasm. Brazil spends more on pensions than most of its peers and offers favorable terms to its well-paid civil servants, many of whom retire in their 50s. The retirement fund runs on a deficit, which drives

up Brazil's public debt and risks consuming the entirety of the budget. Education receives only a tenth of what's spent on pensions. With a rapidly aging population and a constitutional limit on overall federal spending, the current system threatens to devastate Latin America's biggest economy.

Maia had to steer the bill down a perilous path through the Chamber of Deputies. The body boasts no fewer than 26 parties, and the PSL itself represents only about 10% of its lawmakers. After a final vote in the lower house, the bill will move to the Senate in August. "Without Rodrigo Maia, we wouldn't have gotten to this moment," PSL Congressman Waldir Soares de Oliveira said as he declared his party's support.

Born in Santiago, Chile, where his father was in exile during Brazil's military dictatorship, Maia attended college in Rio de Janeiro but didn't earn a degree. After a brief banking career, he followed his father into politics and is in his sixth term representing the state of Rio. Pale, paunchy, and soft-spoken to the point of seeming shy, he occasionally displays a nervous facial tic—and a ferocious temper. Once, during a protest of a labor-reform bill on the house floor, he cursed one lawmaker and shoved another.

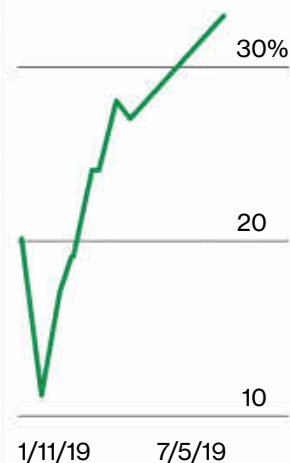
First elected as speaker in 2016 after the polarizing impeachment of President Dilma Rousseff, Lula's successor, Maia proved adept at handling the house's warring factions. Those include some who loathe Bolsonaro and support Lula and Rousseff's Workers' Party; others who support Bolsonaro and loathe the Workers' Party; and the amorphous "big center," a group of ideologically flexible parties that gravitates toward money or power.

His failures have been few: Maia is shrewd enough to avoid scheduling votes on issues he's unlikely to win. In 2017, however, he suffered a narrow defeat in the lower house in a vote over changes to a labor reform bill. Undeterred, he scheduled another vote on the same question 24 hours later and won. Opposition lawmakers condemned him as a coup-monger, but the tactic worked. Since Bolsonaro came to power, Maia has "embraced the economic agenda of the government, he's put a brake on the values agenda," says Thomaz Favaro, lead Brazil analyst at consulting firm Control Risks.

Right before the final vote on pension reform, Maia assailed those who attack Brazil's institutions, a pointed reference to Bolsonaro's more radical supporters, who want to retire the courts and Congress and render all government power to Bolsonaro. "There will be no private investment, even with a tax reform, even with a pension reform, if we don't have a strong democracy," ►

"Without Rodrigo Maia, we wouldn't have gotten to this moment"

● Share of survey respondents who say Jair Bolsonaro is doing a "bad" or "awful" job as Brazil's president



◀ he said. “Long-term investors don’t invest in a country that attacks its institutions.” Maia wept as his supporters gave him a standing ovation.

Effective but uncharismatic, Maia may have a ceiling on his ambitions. Although he’s been reelected repeatedly, he won his latest term with relatively few votes. When he ran for mayor in Rio de Janeiro in 2012, he garnered less than 3% sup-



port. “What politicians see in politicians isn’t necessarily what the people see,” says PSL Senator Major Olímpio. Maia’s biggest accomplishment may be making the traditionally compliant lower house a force of its own. “In the past, the legislature was treated as a kind of appendix of the executive,” says Michel Temer, himself a former three-time house speaker, who became president after Rousseff’s fall. “Congress is going through a great moment.”

Marcos Pereira, deputy speaker of the lower house and former minister, says the legislature is a bulwark against those who would return the nation to autocracy. “This is democracy, and not handing over power to the hands of a sovereign,” he says. “Bolsonaro’s voters don’t understand this.”

Bolsonaro’s son Carlos has repeatedly whipped up his massive social media following against Maia. At one point, Maia threatened to walk away from the pension bill in protest. When the pension measure passed, Maia made no reference to Bolsonaro. He didn’t need to. “Maia’s come out stronger from this,” Favaro says.

“Pressure, criticism is always important so that we can reflect on what we are doing,” Maia said in a text message. “What sometimes bothers me is that there is a group of people around the president that is very radical, that isn’t really against me or deputy A, B, or C, or this or that senator or Supreme Court judge. They’re against the institutions.” He added, “They’re a movement, an antidemocratic fringe and this doesn’t pressure me, but it does worry me.” —*Simone Iglesias and Samy Adghirni, with Rachel Gamarski and Mario Sergio Lima*

THE BOTTOM LINE Although he lacks Bolsonaro’s magnetism, Maia has succeeded where the president fails by patiently and painstakingly building coalitions—and power.

◀ An inflated version of the lower house speaker at a São Paulo protest

Bureaucratically Assured Destruction

● Europe has few levers to pull to defuse tensions between the U.S. and Iran

On July 9, French President Emmanuel Macron sent his top diplomatic adviser to Tehran on a mission to ease spiraling tensions between the U.S. and Iran. Having cultivated direct lines to President Trump and Iranian President Hassan Rouhani and spoken to each since Trump ordered and then canceled airstrikes on the Islamic Republic in June, Macron saw the potential for dialogue. For all the chest thumping, he was confident the Iranians didn’t want further escalation, according to a person familiar with the French president’s thinking. Trump’s aggressive approach, Macron reasoned, was nothing but a tactic from his past life as a real estate dealmaker.

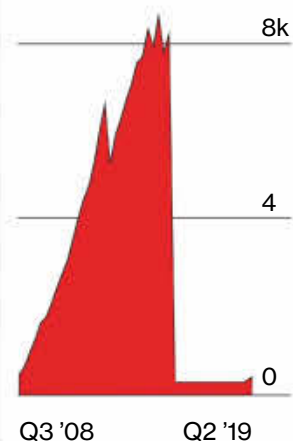
The message that envoy Emmanuel Bonne delivered to Tehran was simple: A pause in nuclear activities, which Iran had restarted a year after the U.S. violated the 2015 Joint Comprehensive Plan of Action

(JCPOA) by exiting it and imposing new sanctions, would be to its advantage. But during Bonne’s meeting with Rouhani, Trump fired off another incendiary tweet, accusing Iran of having long violated the nuclear deal in secret and pledging to “substantially” increase sanctions. Hours later, reports emerged that Iranian vessels had tried to impede a U.K. tanker in the Strait of Hormuz, a claim Iran rejected.

European nations, especially France and Germany, have been trying to save what’s left of the JCPOA, which promised to plug Iran into global trade in exchange for curbing its nuclear program. But their efforts have been frustrated by Trump’s unpredictability, which has unsettled already fragile relationships with the Islamic Republic.

Iran says its activities hardly constitute a violation, pointing to Article 26, which says it could

● Iran’s uranium stockpile, in kilograms





◀ Bonne, left, meeting with Ali Shamkhani, secretary of Iran's security council

“cease performing its commitments” in “whole or in part” should the U.S. reimpose certain sanctions. Given the deal’s “reliance on temporary suspensions of sanctions, waivers, and other workarounds, it very much depends on the support of the American president to function as envisioned by its architects,” says Torbjorn Soltvedt, an analyst at global risk consulting firm Verisk Maplecroft in the U.K.

Europeans have gotten pushback from some top U.S. officials, including national security adviser John Bolton, who advocate the use of force against Iran and have signaled their preference for regime change. Since May, when the U.S. suspended waivers that allowed for surpluses of low-enriched uranium to be sent abroad, Iran has surpassed limits on its stockpile. It’s now also enriching to higher levels of purity than those allowed under the JCPOA. Enriched uranium is used to fuel nuclear plants but can also be used to build bombs.

These moves, while provocative, don’t pose an imminent proliferation risk, and Iran has said they could be reversed “within hours” if sanctions were suspended. Nevertheless, the country has attempted to use them as leverage to push the remaining parties to the deal—the U.K., France, Germany, Russia, and China—to accelerate attempts to get around U.S. trade prohibitions. “The Europeans believe that this was important for their security. If it is important for their security, then you invest in your security,” Iranian Foreign Minister Mohammad Javad Zarif said to Bloomberg Television in a July 17 interview. “The Europeans need to take the necessary action.”

France, the U.K., and Germany have worked over the past year to develop Instex, a financial channel meant to provide European companies with a trading vehicle to sell goods and services to Iran without using dollars, routing transactions through U.S. banks, or moving money across the Iranian border. Instex has yet to process its first transaction and

would initially be limited to food and drugs, which aren’t targeted by U.S. bans. Iran also wants the tool to process oil sales, the main source of revenue for the country and subject to U.S. penalties.

“Europe neither has the will to face up to the U.S., nor is it capable of acting as a fully sovereign and united entity in a global financial system dominated by the U.S.,” says Ali Vaez, director of the Iran Project at the Brussels-based International Crisis Group. Still, getting Instex up and running, even in its current form, would send a message to Iran that Europe is a credible partner. It would also help Rouhani push back against hardliners at home who advocate maximum resistance against the U.S.

Ellie Geranmayeh, senior policy fellow at the European Council of Foreign Relations, says other small initiatives could be possible with help from Russia and China. If Iran were to freeze its nuclear escalation for a few months in return for a “realistic deliverable,” she says, “this will provide a cooling-off period and create space for Europeans to think more creatively about what they can deliver.”

One deliverable, floated by Iranian Vice President Eshaq Jahangiri in state media in early July, might be for the European Union and China to help find buyers for Iranian oil supplied in the future, in return for advance investment, goods, or services, allowing it access to credit. “The idea is to keep the basic pillars of the JCPOA in place until the 2020 elections in the U.S.,” Geranmayeh says. “From the Europeans’ perspective, this would be a real achievement.”

Regardless of who gets elected, she says, “it’s going to be easier for any administration to engage Iran if the nuclear issue is somewhat in check rather than having to start from scratch.” —*Ladane Nasseri and Helene Fouquet*

THE BOTTOM LINE The terms of the JCPOA make it harder for Europe to salvage the deal with Iran, whose nuclear activities the EU nations also oppose.



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Prognosis



SCIENTIFICATIONS

Beyond Opioids

Researchers are unlocking the genetic underpinnings of pain to develop innovative treatments

July 22, 2019

Edited by
Dimitra Kessenides
and Rick Schine

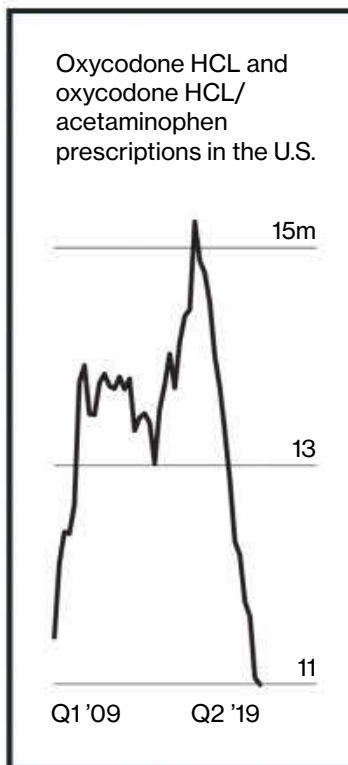
The pain in Susan Hahla's feet started as pins and needles, then progressed to flickering fires. Each month, Hahla found herself in a different doctor's office, waiting for another disease to be crossed off the list: no restless leg syndrome, no rheumatism, and no, thank goodness, multiple sclerosis.

Finally, doctors at Oslo University Hospital in Norway diagnosed her with small-fiber neuropathy, a disorder caused when nerves misfire. "It gave me a good feeling that I wasn't dreaming up something," says Hahla, 71. But finding a treatment proved elusive. Some drugs had no effect on the pain; one, usually prescribed for epilepsy, left her forgetful and unable to walk a straight line.

After suffering for more than a decade, Hahla agreed to become the only subject in an unusual test. A team of German scientists took a sample of cells from her skin, then, in a delicate, monthslong process, reprogrammed them into a type of stem cell, then into nerve cells. Using tiny electrical shocks, they found a drug—normally prescribed for people with seizures—that seemed to block the pain signals at the cellular level. Within five days of using it, she was almost pain-free.

Hahla's experience is illustrative of a more targeted approach to treating pain. In the wake of the opioid crisis, politicians and doctors alike have called for a substitute for the narcotics once wielded against all sorts of pain. The need is acute: Some 400,000 people died of opioid overdoses from 1999 to 2017 in the U.S., according to the Centers for Disease Control and Prevention. But a recent crop of opioid replacements from big pharmaceutical companies has been underwhelming. The National Institutes of Health last year almost doubled funding, to \$1.1 billion, for research into opioid alternatives through a program called the HEAL (Helping to End Addiction Long-term) Initiative. "If we could replace the entire opioid pharmacopoeia, I think everybody would be really happy," says Ted Price, a neuroscience professor who directs the newly formed Center for Advanced Pain Studies at the University of Texas at Dallas.

The treatments may take decades to develop, but scientists are inching closer as a bevy of smaller players research solutions from RNA sequencing to products adapted from snail venom and hot peppers. Price is advising one startup that's launching its first human trial of a compound that aims to replace opioids for immediate and long-term pain. Another he co-founded



is exploring whether a new type of experimental cancer drug, MNK inhibitors, could stop chronic pain by preventing neurons from sending a constant flow of "it hurts" signals even when a stimulus is no longer present.

A third startup, EicOsis, is an example of almost serendipitous research. It was founded by Bruce Hammock, a University of California at Davis entomology professor who's spent five decades researching an enzyme that helps insects metabolize the hormones they need for metamorphosis. Working with Alonso Guedes, an associate professor of veterinary anesthesia and pain medicine at the University of Minnesota, Hammock noticed that the enzyme, helpful to bugs, might prove harmful to mammals. The two began to test the idea that blocking the enzyme might have an impact on pain in horses.

The breakthrough came when Hammock and Guedes were called to the stall of Hulahalla, a 4-year-old mare with horse racing royalty in her bloodline—her great-grandfather was Triple Crown winner Seattle Slew—who'd suddenly been immobilized with a hoof inflammation disorder called laminitis. When UC Davis caretakers decided the only humane course of action would be to euthanize Hulahalla, Guedes asked to try the compound they'd developed. That same day, the horse was back on her feet.

Some in the scientific establishment ridiculed the idea that tests on horses and pets could be relevant to people, Hammock says. But after a series of academic papers showed similar results, EicOsis raised enough government grant money to move into human trials.

"For those of us in academia, there was basically no way to get from an idea to a drug," says Robert Gereau, director of the Washington University Pain Center in St. Louis. "There's a lot happening right now. There's a lot of innovation in drug discovery happening in academia that's being spun out into small companies." NeuroLux, which emerged from NIH-funded research, sells a wirelessly controlled research tool that can be implanted into the brains of genetically modified mice. Animals fitted with the device have glowing red or blue dots on their heads, and researchers can use the light to control their neural circuits—essentially, to flip the pain pathways in their brains off and on during experiments.

The long-term goal is to show if it's possible to use the technique, called optogenetics, to relieve pain, Gereau says. That would mean using gene therapy to introduce a light-sensitive protein from a different source, such as algae, into the neurons of the brain and spinal cord. Researchers might then essentially use light to "hack into neural circuits and control their activity at will" and stop them from transmitting pain signals, Gereau says. First, his lab must show the device can work in animals bigger than mice.

Others are pushing the limits of manipulating human

nerve cells in the lab. It's challenging research: You can't cut a nerve out of a living person to study without doing lasting damage. In Texas, Price has obtained some from cancer patients who underwent a rare spine surgery. Others, like the German team that helped Hahla, are creating nerve cells in a petri dish. The goal is to experiment directly on human tissue. "Pain is such a complex experience," says Angelika Lampert, a physiology professor at Germany's Aachen University who found the treatment for Hahla. Pain doesn't happen in the neurons that detect stimulus, she says—"it's really an experience in the brain."

And sometimes miracle cures aren't all they seem to be. The pill Lampert's team gave Hahla was an epilepsy medicine called Vimpat, made by Belgian drug-maker UCB SA. Its side effects helped to kill its prospects as a pain medicine more than a decade ago. UCB didn't respond to requests for comment. And while

the medicine worked to control Hahla's pain, it left her unsteady on her feet, and eventually she started having memory problems again. Ultimately, Hahla decided that was worse than the pain, and after consulting with her doctor in Oslo, she stopped taking Vimpat. She distracts herself with walks along the fjord and movie outings with friends. "I'd much rather have a life that I could enjoy than be on these pills," she says.

To dull her foot pain now, Hahla cools her feet on the bathroom tiles before going to bed, then tries to fall asleep before they warm up again. And on bad days, she simply stays home. "I just close my door," she says.

—Naomi Kresge

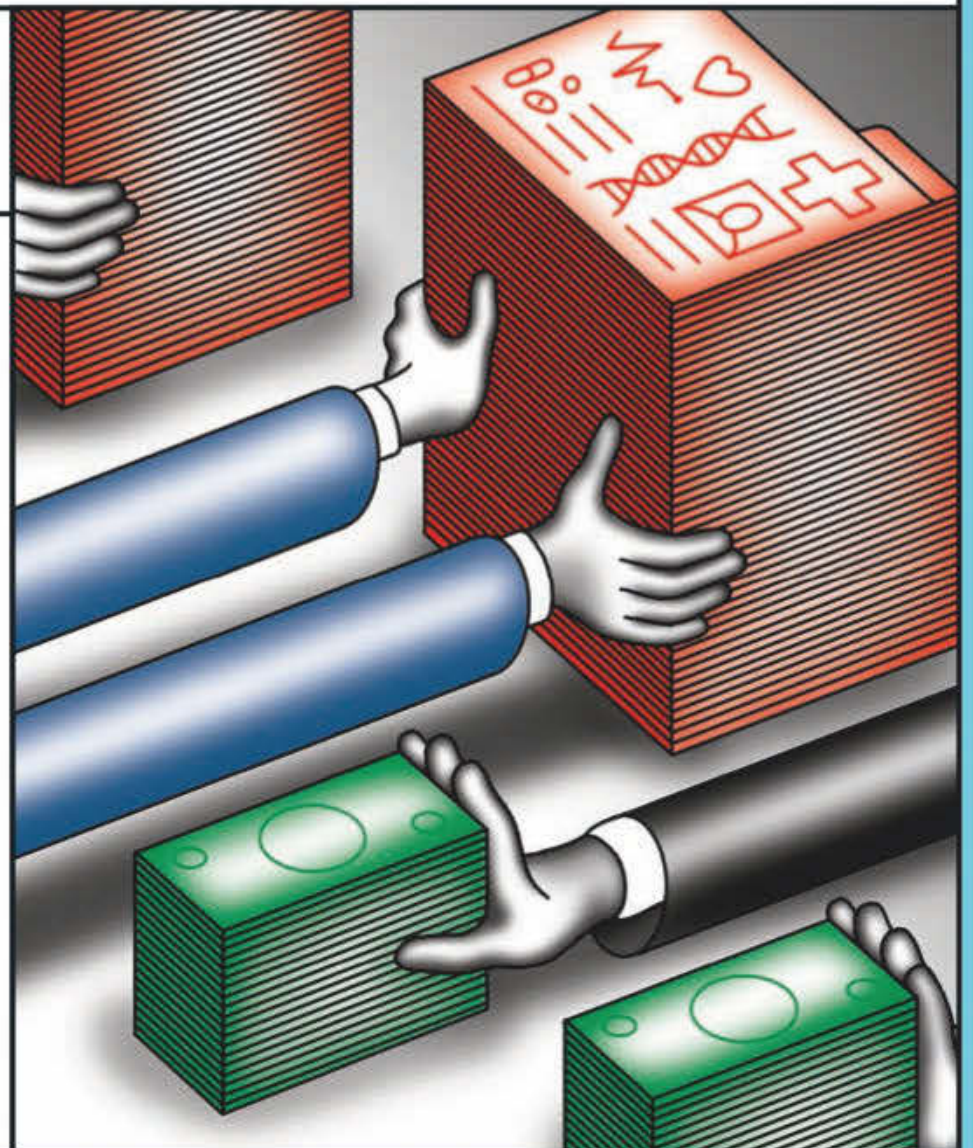
THE BOTTOM LINE With opioids a double-edged solution, startups are looking for more targeted therapies to help treat chronic pain; while the treatments may take decades to develop, scientists are inching closer.

Turning the U.K.'s Health Data Into Gold

A plan to funnel cash into the National Health Service by selling access to patient data

Paul Drayson, born blind in one eye, has never forgotten the treatment he received as a child from England's National Health Service, which provides free care to all residents. Now, as the health program's finances face increasing pressure, Drayson, a former U.K. science minister, is on a mission to help save the government-funded NHS by selling access to patient data to drug and device companies. "This country has to pay its way in the world," he says of the U.K. "How the NHS works with the global life sciences industry is key to the health of the nation."

Drayson founded Sensyne Health Plc, a for-profit company that's trying to get divisions of the NHS to agree to put patient information, including DNA sequences, into a large database. Over its 71-year history, the NHS has collected records on its patients and, in recent years, launched an intensive drive to collect and use patients' DNA data for care and research. Sensyne's initial target is to gather information on 5 million NHS patients; ultimately, Drayson says, he would like to have access to the data on all 55 million members. According to a ▶



◀ coming report from EY consultants, the data could be worth as much as \$12 billion annually in better patient care and health, and benefit to the U.K. economy. So far, Sensyne has signed up six of the NHS's 150 hospital divisions, known as trusts, representing about 3 million patients, with each trust receiving Sensyne shares worth about \$3 million.

Private companies increasingly have tapped into the NHS data—contracting with trusts for access or through companies providing access—to inform their own efforts to develop new drugs and devices. As rising costs, poorly planned expansion, and the Brexit-fueled worker flight threaten the NHS, U.K. lawmakers and patient advocates say it should be compensated for its data. “Our issue is that the IP value of patient data is being drained away by Big Tech,” says Parry Mitchell, an independent member of the House of Lords. “I wouldn’t call it a concern—it’s an obsession.”

Governments, drugmakers, and hospitals are racing to amass and exploit patient data. U.S.-based Intermountain Healthcare just announced a partnership with Amgen Inc. to map and study the genomes of half a million patients. Israel is spending \$300 million to commercialize its patient health records. And companies such as Nebula Genomics broker individual patients’ DNA data to buyers in the health industry.

Drug companies are betting that patients’ records documenting symptoms and side effects will help reduce the need for costly human studies, thus lowering the estimated \$2 billion required to bring a new drug to market. One of Sensyne’s more prominent customers is German-based Bayer AG, which has a large U.K. research facility. Meanwhile, entrepreneurs see apps to be developed, devices to be designed, surgery techniques to be refined, and post-operative protocols to be optimized, all based on analysis of patients’ records. “The value of the NHS is enormous,” says Kari Stefansson, who founded Iceland’s Decode Genetics, now a unit of Amgen, a quarter of a century ago to look for clues to disease in genes and patient histories. “Just the familiarity and comfort with these huge amounts of data are making more discoveries possible,” he says.

Protections on patient information became tighter with the introduction of new privacy laws last year. Polling shows that U.K. residents are willing to share data if it’s used to improve care, but they’re wary it will get into the hands of companies that they fear won’t have their best interests at heart. And any citizen has the right to block the sale of his or her individual data.

Some of the NHS’s efforts to collaborate with companies have gone awry. Five years ago, U.K. patients were shocked to find that millions of medical records they thought were for biomedical research were in fact shared with insurance companies.

Drayson promises to safeguard the data Sensyne collects. Researchers are allowed to analyze it only within a safelike, reinforced, “air-gapped” room that has no internet wires in or out, and thus no risk of viral attack. Sensyne works with trusts and a data watchdog—called a Caldicott Guardian—to oversee privacy measures and determine whether proposed research projects have the potential to provide value for patients. The company’s clients don’t see or take the data: They only see the results of the analysis.

Drayson orchestrated the sale of vaccine maker PowderJect to a U.S. rival for about \$800 million in 2003, when he served as the company’s chief executive officer. After the sale, he landed an appointment to the House of Lords and served in the government for five years, including a stint as science minister from 2008 to 2010. A lifelong car nut who drove as an amateur in the 24 Hours of Le Mans in 2009 and 2010, he started Drayson Racing Technologies to develop electric racing vehicles. After breaking his back in a 2014 crash, he left the racetrack and founded Drayson Technologies, a medical device company.

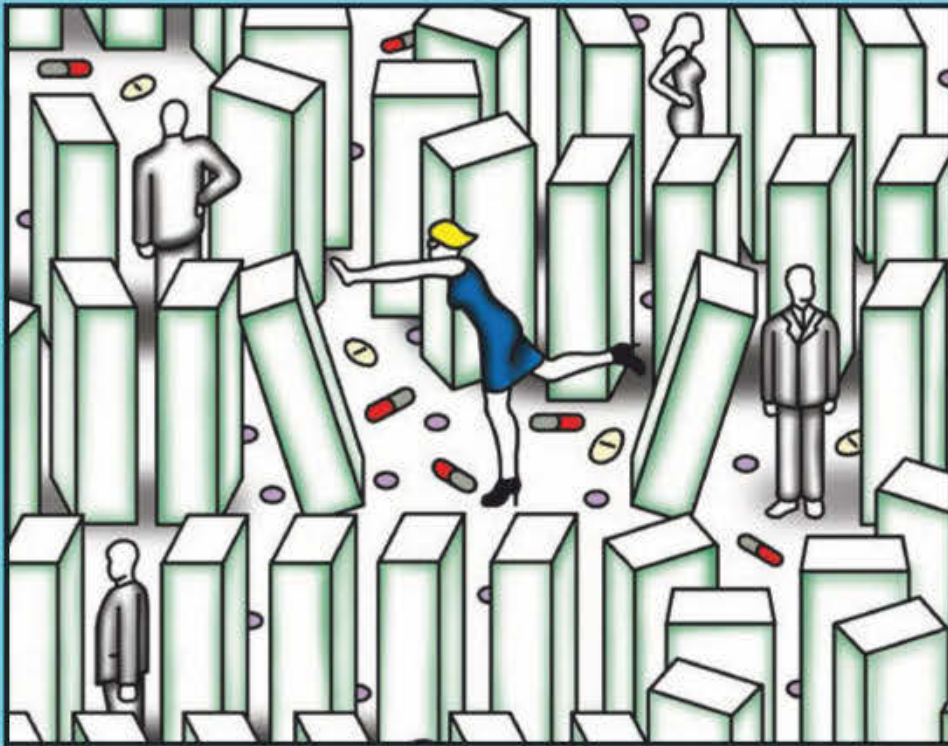
Turning medical records into cash could prove to be Drayson’s biggest challenge yet. “For the NHS to continue delivering great care in the future, it’s got to meet its challenges,” he says. “How can it use that data to improve care for patients and strengthen and fund the NHS? It’s really important.” —*John Lauerman*

THE BOTTOM LINE U.K. lawmakers and patient advocates say England’s cash-strapped National Health Service should be compensated for the use of its patient data.

Redesigning Glaxo

CEO Emma Walmsley has replaced 100 managers and is focused on cancer treatments

When GlaxoSmithKline Plc bought cancer-treatment maker Tesaro for \$5.1 billion last year, skeptics panned the deal, and the stock tumbled. On July 15 a key medicine acquired in the transaction yielded positive results, a small victory in Chief Executive Officer Emma Walmsley’s bid to overhaul the British drugmaker.



Seeking to catch rivals in the race to produce blockbuster drugs—and silence critics who see Glaxo as a lumbering giant—Big Pharma’s first female CEO is engineering a radical shake-up, taking a different path than Bristol-Myers Squibb, Takeda Pharmaceutical, and AbbVie, which are reinventing themselves with megadeals.

Walmsley has replaced about 100 of her top 125 managers since she took over in 2017. She hasn’t stopped there—almost a third of the experimental drugs in Glaxo’s pipeline are gone, as well as 3,800 employees. And she’s revealed plans to separate Glaxo’s consumer-health business through a joint venture with Pfizer Inc. that combines products ranging from Sensodyne toothpaste to Advil.

Glaxo’s path has resembled those of European companies like Volkswagen AG and Nestlé SA, corporate titans that have found themselves vulnerable to disruption from new technologies and market shifts. The largest pharma companies are grappling with ballooning development costs, mounting pushback on prices, and daunting odds—studies suggest more than 90% of potential drugs fail to make it through human testing to the market.

Before Walmsley settled into the role, Glaxo had pulled back in cancer treatment, whiffing on a wave of therapies that have revolutionized the field and led to top-selling products for competitors. Now she’s rebuilding Glaxo’s position in oncology to revitalize its list of drug candidates.

Still, the company’s stock has barely moved since April 2017, reflecting investors’ lack of enthusiasm for Glaxo’s new direction. Shares of British rival AstraZeneca Plc have surged about 30% over the same period. “What understandably people want to see is evidence of a future pipeline that’s going to drive growth,” Walmsley says.

Her strategy has revolved around focusing on fewer, but potentially more lucrative, opportunities rather than massive takeovers, such as AbbVie’s agreement in June to buy Allergan for \$63 billion, Bristol’s \$74 billion deal for Celgene, and Takeda’s \$62 billion acquisition of Shire.

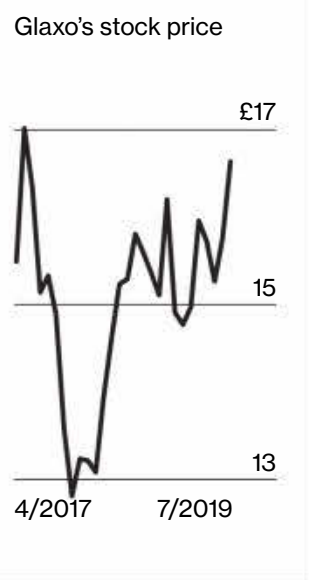
While Walmsley has signaled interest in more transactions since the Tesaro purchase and a partnership struck in February with Merck KGaA, she questions the logic of huge deals. “Companies can die of indigestion just as easily as they can die of starvation,” she says. “I’m not completely convinced that scale is a huge advantage.”

Walmsley wasn’t the obvious choice to lead the drug-maker into the next frontier of therapies to fight cancer and other diseases. After 17 years at cosmetics company L’Oréal SA, she moved in 2010 to Glaxo’s consumer unit, home to brands including Tums and Nicorette. That experience led some investors to incorrectly assume she would hang on to that business.

The Oxford-educated CEO is relying on a new team of high-profile specialists to help carry out her plans. She hired Hal Barron, a drug hunter with close ties to the California biotech sector, as head of research and poached Luke Miels from Astra to run the pharma division. “What has surprised me is how much impact changing even a few people can have,” Walmsley says, adding that her mission is to achieve a “culture shift.” Of the roughly 100 management changes she’s made, about 1 in 3 new leaders comes from outside Glaxo.

Walmsley has eagerly sought experts’ opinions and turned her lack of pharma experience into an advantage, says Laurie Glimcher, a Glaxo board member and CEO of the Harvard-affiliated Dana-Farber Cancer Institute. “Coming from the outside to a fresh area is sometimes the best thing you can do.”

Ultimately, Walmsley will be judged on whether she brings Glaxo back into the top tier of R&D performers. The company has launched a shingles vaccine that quickly achieved \$1 billion in



annual sales, rolled out HIV treatments, and moved ahead with three oncology drugs it hopes will be available in 2020. Glaxo in May revamped the way it pays sales reps to better reward individual efforts, reversing a policy introduced several years ago following allegations that it improperly promoted some of its products.

With a slimmer but sharper stable of drugs, patience is required. “Her biggest challenge is time,” says Darrell Baker, the former head of Glaxo’s respiratory business who left in 2015. “It’s like a rosebush in the winter. After the pruning stage, you have to wait to see how much it’s going to blossom.” —James Paton

THE BOTTOM LINE Since taking over Glaxo in 2017, Big Pharma’s first female boss has shaken up the British drugmaker—with some promising results. Shareholders, however, have yet to respond positively.



EXCLUSIVES

AN AMAZON GO STORE IN SEATTLE

THE ZILLION-DOLLAR CONVENIENCE STORE

Seven years ago, Jeff Bezos started an ambitious effort to rid the world of checkout lines. Has Amazon Go invented a new retail paradigm or a ridiculously expensive way to sell lunch?

**By Brad Stone and Matt Day
Photographs by Ian Allen**

In the fall of 2015, Amazon executives in charge of a top-secret project to revolutionize grocery stores invited Jeff Bezos to evaluate their work. They'd leased a warehouse in south Seattle and converted part of the ground floor into a 15,000-square-foot mock supermarket, with plywood walls, shelves, and turnstiles, mimicking technology that would scan shoppers' smartphones when they walked in.

The Amazon chief executive officer and several assistants pretended to shop, pushing grocery carts down aisles stocked with canned food and plastic fruit and vegetables. There were specialty counters where Amazon employees posing as baristas, butchers, and cheesemongers took orders and added items to Bezos' imaginary bill.

Afterward, according to a person who was there, Bezos gathered the project executives and told them that while they all had done a fabulous job, the experience felt disjointed. Customers would have to wait for meat, seafood, and fruit to be weighed and added to their bill, which would have been fine except that the major selling point of

the store was supposed to be the absence of time-wasting checkout lines. Bezos asked the group to lose the meat and cheese and focus on getting rid of lines and cashiers. "It was one of those Amazon things," another employee recalls with regret. "We love it—let's change everything!"

Almost four years later there are 14 Amazon Go stores in Chicago, New York, San Francisco, and Seattle. They're about a quarter the size of the original mock-up, located in downtown office districts and offering a small selection of sandwiches, meal kits, and convenience store items such as sodas, jams, and potato chips. Just as Bezos had hoped, there are no cash registers. Once customers have scanned a screen from a special app on their phone at the entrance, they just grab their items and walk out the door, while Amazon magically charges their credit card. By all accounts, the company intends to open more of these stores in the months and years ahead.

From a technological perspective, the Go stores are a marvel—a succinct demonstration of Amazon.com Inc.'s ►

◀ capacity to devote vast resources toward applying the state of the art in artificial intelligence to an everyday problem. They also illustrate the company's tendency to pursue technology for technology's sake (see: the Fire Phone), resulting in a store that offers all the selection of a 7-Eleven, but with more complexity and cost. Scores of cameras pointed at all angles hang from the ceilings to track shoppers as they wander the aisles, while precise scales embedded in the shelves tabulate products down to the gram to figure out which ones have been picked up. Behind the scenes, sophisticated image recognition algorithms decide who took what—with Amazon workers in offices available to review footage to ensure shoppers are accurately charged. Each store also has a local staff on hand to help people download the Go app, restock shelves, and, in locations with a liquor section, check IDs.

Will all this work be worth it? Some Go stores seem almost deserted except for the lunchtime rush. Employees familiar with Amazon's internal projections say the outlets in Chicago, in particular, are falling short of expectations, and the company has had to resort to raffles and giveaways of tote bags and other branded goodies. Yet, as the turbulent history of the project suggests, the Go store isn't so much the culmination of the company's efforts but something closer to an ongoing experiment. And the potential prize—a big piece of the \$12 trillion grocery industry—is one that Amazon, with its limitless resources and appetite for risk, may be in the best position to claim.

Analysts and investors for years asked Bezos whether Amazon might open stores. His answer was usually some variation of “We would love to, but only if we can have a truly differentiated idea,” as he told an interviewer in 2012. “One of the things that we don't do very well at Amazon is do a me-too product offering.”

It was that summer when he started to think seriously about the opportunity offered by physical retail, which captures 90% of total retail sales in the U.S., according to the Census Bureau. Bezos could see that for a company of Amazon's size to keep growing, it would have to get into new industries. (The development of the voice-activated Alexa assistant and the creation of the Amazon Studios division, which produces shows such as *Bosch* and the forthcoming *Lord of the Rings* prequel, were undertaken around the same time.) To lead the initiative, Bezos tapped Steve Kessel, a senior vice president who'd been in charge of the company's efforts to develop the Kindle and drag the publishing industry into the age of digital books.

Kessel asked Gianna Puerini, who'd overseen Amazon's homepage and product recommendations division and who at the time was retired, restoring houses in the Seattle area, to lead the development of the product. Puerini (who



KUMAR

retired again earlier this year) set up in a nondescript six-floor building in South Lake Union, a few blocks from Amazon's headquarters. Because the project was to be secret even from other Amazon employees, one of her first tasks was selecting a code name so boring that no one would pay attention to it, a former colleague says. For the next few years, the team would go by the name IHM, or “inventory health management.”

To oversee engineering, Kessel recruited Dilip Kumar, Bezos' shadow, or technical adviser—the Amazon employee with the high-profile role of essentially following the CEO around and sitting by his side in meetings for a year. Kumar occasionally dabbled in stand-up comedy at local open-mic nights, but colleagues say at work he was known to be intense and combative.

IHM employees say the early months were filled with open-ended brainstorming and debate. They considered whether they should do Macy's-style department stores, Walmart-style supercenters, or even electronics stores. One discarded idea involved two-floor stores, with Amazon's disk-shaped warehouse robots assembling orders on the top floor and then conveyor belts and robots delivering them to customers' waiting vehicles below.

After a few months, Kumar, Puerini, and their colleagues conceded that most stores in the real world already operate tolerably well, except for one glaring exception: the supermarket, with its irksome checkout lines. Americans shop for groceries an average of two times a week, and the experience of waiting in a checkout line epitomized—to Amazon's crack team of Type A disrupters, anyway—the spirit-draining unproductivity of offline shopping. “We realized that there's a lot of good things about shopping in physical stores, but waiting in lines was not one of them,” Kumar says.

Plenty of companies have tried to address this hassle. Apple has employees roving its stores with credit-card-reading tablets, and China's BingoBox offers self-checkout using RFID chips attached to product packaging. The IHM team wanted to eliminate the bottleneck altogether. In an Amazon tradition meant to ensure teams are working backward from customer needs, they started with a press release, or “PR Faq” in Amazon-speak, announcing the opening of a store without a checkout line. Then they began working on the actual technology to make the store a reality.

It would turn out to be much more difficult, and expensive, than anticipated. To figure out who was buying what in a store without checkout lines, IHM engineers considered using RFID, tracking customers' cellphones as they walked the aisles, and scanning their face with facial recognition technology. They also discussed asking customers to quickly scan QR codes when they selected items, but even though that would make Amazon's job easier, it could be weird or unnatural for

customers. Finally they settled on using computer vision, a relatively new technology that allows digital cameras and computers to identify items by their visual appearance alone, without any special tracking chips or codes.

Kumar hired computer vision and machine learning scientists, often from other parts of Amazon, without telling them exactly what they'd be working on beforehand. He set deadline after deadline, using upcoming presentations to Bezos or Kessel to motivate them. Engineers put in 70 to 80 hours a week, answering emails and writing Amazon's classic six-page documents, narrative memos that outline a proposal, in any illusory free time they had on nights and weekends. "We were all living in a cave," says one.

At first, the IHM team envisioned large-scale stores of about 30,000 square feet, roughly the size of a suburban supermarket. But after a few months, the group decided such a megamarket was overly ambitious and cut the size of the proposed store in half.

Puerini's group created the first models of stores using kids' blocks, bookshelves, and other items lying around the office. As the project neared a hoped-for introduction in mid-2015, the company retrofitted the warehouse in south Seattle for a mock-up to show to Bezos. For its first actual store, it also anonymously leased the ground floor of a new luxury apartment building in Seattle's wealthy Capitol Hill neighborhood. Permits filed with the city included plans for large produce and dairy coolers and an on-site kitchen for preparation of fresh foods.

But then Bezos visited the mock-up with the cheesemongers and put a halt to the progress, betting customers would be drawn to a more streamlined experience—the physical equivalent of the company's famous one-click ordering—even if it lacked the personal touches of a farmers market or boutique butcher shop.

Kessel convened a team meeting after the Bezos demo and broke the news: They were pivoting to convenience stores. Some engineers were relieved that they were reducing complexity by eliminating items of varying weights, such as produce and meat. Others were crestfallen and left the project, either exhausted from the nonstop pace of work or disappointed by the scaled-down vision. For the next three years, the storefront on Capitol Hill would sit abandoned, in the heart of one of Seattle's most well-trafficked neighborhoods, its windows mysteriously covered in brown paper.

Bezos and Kessel were growing impatient. So in March 2015, while Puerini and Kumar reworked their concept, they formed a separate group under Kessel to open bookstores. Books were the opposite of food—nonperishable, consistently priced, easy to stock, and, of course, the product category Amazon had the most history with. And because people tend to shop bookstores at a more leisurely pace, it wouldn't be necessary to try to displace cashiers with technology.

That fall, as the company prepared its first Amazon Books outlet in an upscale mall in Seattle, speculation over how the company would enter physical retail was so feverish that a ▶

READY, SET, GO

1 Customers scan their phone and receive a digital identifier the software uses to track their visit.

KASHI OATMEAL RAISIN FLAX COOKIES, NUTTER BUTTER BITES, NUTELLA & GO! HAZELNUT SPREAD & BREADSTICKS

2 Every spot is covered by multiple cameras to make sure a customer is tracked from one frame to the next.

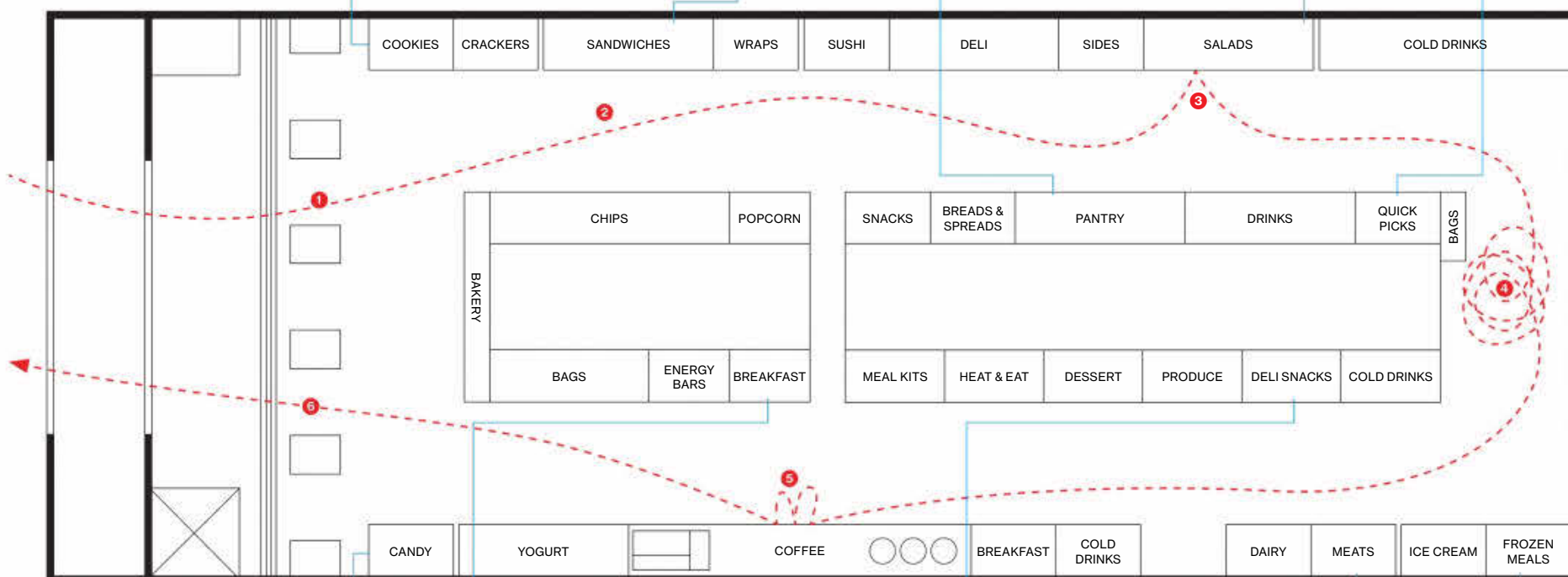
PROPER FOOD CHICKEN & HUMMUS ON CIABATTA, TUNA SALAD ON CIABATTA, CHICKEN SALAD ON CIABATTA

DUNCAN HINES FUNTASTIC CONFETTI CAKE FOR ONE, CAMPBELL'S CHUNKY CHILI WITH BEANS

3 The software decides which items have been selected using camera depth sensors and weight sensors in the shelves.

CAJUN-STYLE POTATO SALAD, CHICKEN CAESAR SALAD, BROCCOLI CRUNCH POWER BOWL WITH CHICKEN

PEPTO-BISMOL, GLIDE FLOSS PICKS, EXTRA STRENGTH TYLENOL CAPSULES, CLASSIC CHERRY CHAPSTICK



6 As customers leave, the software bills their credit card. If there's a problem, it sends the order to a human to review.

HERSHEY'S MILK CHOCOLATE BAR, YUM EARTH ORGANIC LICORICE, SOUR PATCH KIDS, ALTOIDS MINTS

EPICURED STRAWBERRY ROSE CHIA SEED PUDDING, PROPER FOOD CHIQUITO BREAKFAST BURRITO

5 In-shelf cameras verify when a customer puts back an item, and trigger notifications for staff to restock things.

ACME WHITEFISH SALAD, DEAN'S FRENCH ONION DIP, OLLI GENOVA SALAMI, SABRA HUMMUS, READY SET SALMON!

PRE RIBEYE STEAK, PRE NEW YORK STRIP STEAK, PRE BURGER PATTIES, OSCAR MEYER ORIGINAL CENTER CUT BACON

4 If the software loses track of someone, it uses appearance, trajectory, and other inputs to figure out who's who.

STOUFFER'S FIVE CHEESE LASAGNA, AMY'S BEANS & RICE BURRITO, MARIE CALLENDER'S CHICKEN POT PIE

◀ reporter for *GeekWire* used a pole with a camera attached to it to peek inside. Around the same time, Bezos sneaked in through a back door to see it for the first time and was delighted. He said he felt as if Amazon's business was coming full circle.

To longtime members of the IHM project, watching Amazon Books form and take off within the span of a few months was dizzying. They'd been working for three years, and their project didn't even have a formal name yet. To get one, in early 2016, Puerini's team came up with the Go brand to convey speed. "Even the word itself is only two characters," she says. "You can literally grab and go."

To continue developing the technology, Kumar's engineers set up a top-secret lab store on the ground floor of the team's new building, dubbed Otter, on the corner of Fifth Avenue and Bell Street in downtown Seattle. The lab in Otter was accessible only from inside via a pair of locked doors. At first, shelves were packed with fake food fashioned from clay and Styrofoam; shredded green construction paper stood in for lettuce. Employees were frequently asked to visit and to try to fool the technology. They wore heavy coats, walked with crutches, or pushed wheelchairs. They put items back in the wrong place, generating an automatic "untidy item" alert that directed a store clerk to restock the item on the proper shelf. One day, everyone was asked to bring in umbrellas to see if they'd obscure the cameras' view; on another, employees all wore Seattle Seahawks jerseys to confuse algorithms that distinguished among shoppers based on the color of their clothing.

When the fake food was eventually replaced with real items, employees were asked to shop but under specific scenarios: for example, Puerini recalls, "You're running to a meeting: Buy a salad and a drink for lunch," or "You're in a rush to pick up the kids from day care: Grab milk, strawberries, and cereal for tomorrow morning." On another day, parents were asked to bring in their young kids, who fidgeted, ran around, and grabbed things, further stress-testing the system. To augment these real-life experiments, the company also developed a digital simulation of the store and populated it with computer-generated shoppers.

Kumar's engineers were trying to solve one of the trickiest problems in the history of retail: how to figure

"WE PUT UP A BIG POSTER THAT SAID, 'NO, REALLY, YOU CAN JUST WALK OUT!'"

out what people are grabbing without going through the items one by one at checkout. After years of work, the team had concluded that visual identification of products solely with overhead cameras wasn't possible. Changes in lighting conditions over the course of a day, the depth of a product's placement on shelves, hands and bodies that concealed the customized product stickers, or out-of-control toddlers could easily confuse the system.

Eventually they decided to add scales and place more cameras inside shelves. ("Weight provides an additional signal we can use, but most of the heavy lifting is done by the cameras and the vision algorithms," Kumar says.) Amazon then combined the data to decide who was buying what.

But humans were still needed to supervise these judgments. Separate teams were formed to review footage when the system wasn't sure about a purchase, a so-called low-confidence event. The creation of the groups led at least some employees to question the entire effort. It "was a tricky thing," one former participant says. "If we have an army of people looking at footage, is that scaling properly?" (Amazon says human intervention is rare.)

People had another role to play as well: They had to develop meal kit recipes and prepare the daily lunch fare (lamb sandwiches, chicken banh mi, caprese salads). To get ready for the opening of a scaled-down prototype store on Amazon's new downtown Seattle campus in late 2016, the company hired chefs and staff from chain restaurants. It opened both a kitchen inside the prototype store

and a commercial-grade test kitchen near the old warehouse in south Seattle. Uncharacteristically, Amazon splurged. It bought German commercial ovens that cost tens of thousands of dollars each. When something smelled off in the pilot kitchen, Amazon hired a pair of professional smellers to solve the mystery. (The culprit: pickled daikon.)

The kitchens, along with Amazon's penchant for pursuing rigorous and sometimes inhumane efficiencies in its operations, brought with them another set of unexpected challenges. Because food safety was a top priority, the commercial kitchen was kept bitterly cold, and Amazon initially refused requests from the staff, who had to stand on their feet during shifts, to install mats on the facility's chilly concrete floor, one employee recalls. After a senior manager from headquarters spent a day observing operations at the cookhouse, the company issued

A CUSTOMER SCANS IN



the kitchen staff hoodies and other cold-weather gear. The people involved in the service industry, it turned out, were proving as tricky to manage as Kumar's algorithms.

The original Go store opened to Amazon employees in December 2016, but a public opening, scheduled for early 2017, was delayed another 12 months. The system tended to freeze when 20 or more shoppers were in the store at the same time. It lost track of products when shoppers picked them up and set them down on a different shelf. The shoppers themselves also got confused. "We noticed lots of customers hesitating at the exit, asking the entry associate if they really could leave," Puerini says. "In tests we put up a big poster that said, 'No, really, you can just walk out!'" A version of the sign is still there.

Amazon also tinkered with food preparation. It started relying less on its own kitchens and buying more food from outside vendors, including Taylor Farms, which makes salads and sandwiches for Starbucks and 7-Eleven, among others. Those pricey German ovens apparently still sit unused in the original store.

Early on, the Go team envisioned thousands of stores, in every major urban area. "We always wanted to be on every corner," a former executive says. "We wanted to be as common as Starbucks." But now, seven years into the project, Amazon is just getting to its 14th store, in San Francisco's downtown Embarcadero Center. The company has also dramatically slowed the opening of Amazon Books and introduced Amazon 4-star stores, another new format that features a selection of well-reviewed items and Amazon gadgets. These experiments in physical retail hardly affect the company's financial results in the way Bezos had in mind when he instigated the project in 2012. It's easy to imagine the CEO cutting bait: He's talked in the past about trialing concepts for seven years before expecting a financial return.

At the pace it's going, the Go store will greatly exceed that span before it can hope to pay off the investment. People familiar with the project estimate Amazon has spent hundreds of millions on it, including from \$2 million to \$3 million on the pilot store alone. One former employee claims it's one of the most expensive research and development projects in the company's history, though Kumar disputes that, saying the stores use off-the-shelf hardware and Amazon's existing cloud computing infrastructure. Still, considering the dense placement of cameras and sensors, and the tech-support crews that are on call at all hours of the week, it's much more expensive than running, say, a 7-Eleven, which could be staffed by a single cashier and—with the possible exception of the Slurpee machine—have little in the way of bespoke technology.

In customary Amazon fashion, Kumar professes that it's "still early" for the Go project and notes that "customers love the experience" of walking out without stopping to pay. Analysts (and Yelp reviewers) mostly agree, comparing the experience to the feeling of going through TSA Precheck in the airport: Once you get used to it, you don't want to go back. That, Kumar says, gives the project "a lot of latitude and degrees of freedom to be able to try other kinds of things."

It's those "other things" that beguile investors and observers of the company. Incidents of flops that subsequently lifted

Amazon pepper its history, such as the early auctions business, which led to the wildly successful introduction of third-party sellers, and the Fire Phone, many of whose engineers later applied the lessons of failure on Alexa. "Like so many things Amazon does, I'm sure it doesn't look at it as a convenience store, doesn't look at it as a bookstore, but looks at it



DISRUPTING THE DESK SALAD

as a data experiment," says Neil Stern, a senior partner at McMillanDoolittle, a retail consultant. "The stores themselves are not the big idea."

Kumar himself is cagey about future plans but notes the Go technology could be adapted outside the convenience stores. "If it makes sense for other things, we'll do it there," he says.

Meanwhile, Amazon's commitment to physical retail seems to be expanding. Over the past few years, Kessel has been given oversight of Prime Now and AmazonFresh, the company's fast-delivery and fresh food operations. When Bezos acquired the Whole Foods Market franchise over the summer of 2017, Kessel was also put in charge of 500 or so Whole Foods stores—and thousands of conventional checkout lanes that require the old-fashioned act of waiting to pay.

And then there's the midsize grocery store on Capitol Hill that Bezos scotched in the fall of 2015. Earlier this year, Amazon quietly filed new plans with the city of Seattle and, to the relief of neighbors, resumed work on the empty space. Plans for an on-site kitchen were withdrawn, and "optical speed lanes" were added to the blueprints. The store, at more than 10,000 square feet, is significantly larger than the conventional Go format, and the newer concept remains tightly under wraps, with window frosting obscuring the facade that looks out onto East Pike Street.

But if you stand on the sidewalk and squint through a gap in the frosted glass, you can just make out the telltale shelving of what appears to be an Amazon Go store. **B**

Business partners

HARVEY WEINSTEIN
MORT ZUCKERMAN
JAMES DOLAN
DONNY DEUTSCH
NELSON PELTZ

Joined Epstein and others in a losing bid for *New York* magazine in 2003. (Investment banker Bruce Wasserstein got the prize.)

EHUD BARAK

The former Israeli prime minister established a limited partnership in 2015; Epstein invested in it.

JEAN-LUC BRUNEL

Head of modeling agency MC2, through which Epstein allegedly courted girls. In 2015, Brunel said, "I strongly deny having committed any illicit act or any wrongdoing in the course of my work."

STEVEN HOFFENBERG

The convicted Ponzi schemer claims Epstein conspired with him in the '80s and '90s, which Epstein has denied.

Staff

LESLEY GROFF
SARAH KELLEN
NADIA MARCINKOVA
ADRIANA ROSS



Named "potential co-conspirators" in Epstein's plea deal and given immunity. The employees were "an extension of my brain," he told the *New York Times* in 2005.

ALFREDO RODRIGUEZ

Epstein's butler died in 2014 after a six-month battle with cancer.

RICHARD KAHN
DARREN INDYKE

Executives of Epstein's Southern Trust Co.

LAWRENCE VISOSKI

Epstein's pilot for three decades.

Patron

LESLIE WEXNER



For years, Epstein managed many aspects of the financial life of the billionaire founder of L Brands Inc. Wexner told employees this month that he wasn't aware of any illegal activity and regretted crossing Epstein's path.

Assets



NEW MEXICO RANCH

A 10,000-acre property with an airstrip.



PALM BEACH ESTATE

Five-bedroom home valued at \$12.4 million.



9 E. 71st ST.

Manhattan town house Epstein bought from Wexner in 1998.



PARIS APARTMENT

In the 16th arrondissement, near the Arc de Triomphe.



LITTLE ST. JAMES

Private island in the U.S. Virgin Islands he bought for \$8 million in 1998. Nicknamed by locals "Orgy Island," "Pedophile Island," and "Island of Sin."

GREAT ST. JAMES

Private island adjacent to Little St. James he bought for \$18 million in 2016.

BOEING 727

Dubbed by the tabloids "Lolita Express," this plane flew Bill Clinton to Africa.

GULFSTREAM IV

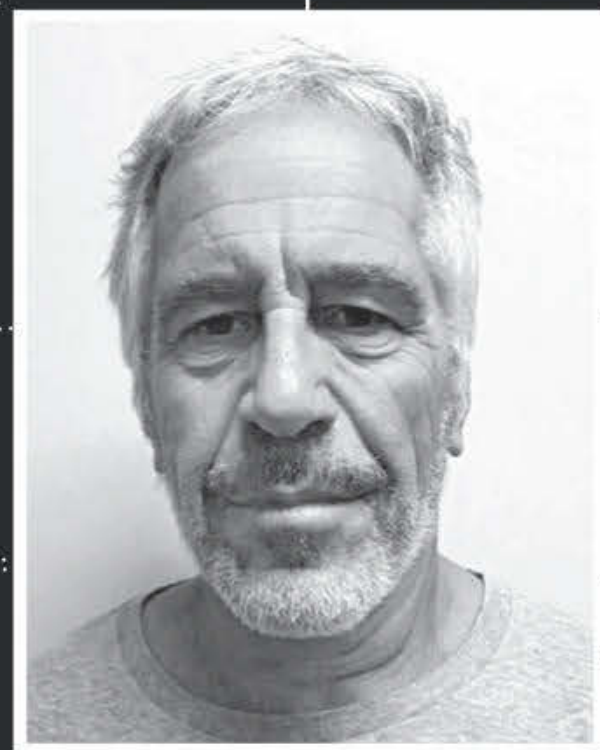
Aircraft Epstein bought in 2013 and sold in June.

GULFSTREAM G550

Long-range jet he bought in 2017.

BELL 430

Seven-seat helicopter that ferried him to Little St. James.



Epstein's Orbit

Entities



FINANCIAL TRUST CO.

Epstein's financial management firm, which is based in the U.S. Virgin Islands, is said to trade in currencies, real estate, and commodities, though there's little evidence of such activity.

J. EPSTEIN VIRGIN ISLANDS FOUNDATION

The vehicle through which he made some of his most prominent donations, including \$6.5 million to establish the Program for Evolutionary Dynamics at Harvard.

SOUTHERN TRUST CO.

Little is known about this business, other than that the U.S. Virgin Islands entity employs more than 10 locals, which makes it eligible for tax breaks. Its website describes the business as "providing extensive DNA database & data mining."

Investments

D.B. ZWIRN SPECIAL OPPORTUNITIES FUND

Financial Trust held a \$121 million position in this fund, which wound down in 2008 after concerns about its accounting practices caused investors to pull their money.

BEAR STEARNS HIGH-GRADE STRUCTURED CREDIT STRATEGIES ENHANCED LEVERAGE FUND

Financial Trust had voting power over 10% of the equity in this fund (a \$64 million stake), whose July 2007 collapse is seen as a prelude to the global financial crisis.

ENVIRONMENTAL SOLUTIONS WORLDWIDE INC.

The company's 2012 annual report listed Financial Trust as a 6% stakeholder, a position that would have been worth about \$320,000. Black was also a shareholder.

Jeffrey Epstein knew a who's who of people in finance and beyond, and sometimes those people knew each other. Now they want nothing to do with the accused sex trafficker. A map of his world

BY TOM METCALF



He flew to his Caribbean islands on private jets and counted royalty among his friends. His business interests—those that can be identified, that is—were just as rarefied. Federal prosecutors, who say Epstein's worth more than \$500 million, arrested him earlier this month and charged him with sex trafficking of minors and conspiracy. The allegations came more than a decade after a deal in Florida saw him plead guilty to state charges of soliciting prostitution instead of facing more serious federal sex-trafficking charges. Since Epstein's arrest, Wall Street, Manhattan society, and corporate America have tried to distance themselves from the disgraced financier, who has pleaded not guilty. But the more that's revealed about his life—and the tangle of political, legal, and business connections that sustained him—the more questions are raised. The piles of cash, diamonds, and an expired foreign passport—with Epstein's photo and a different name—that prosecutors found in a safe in his Manhattan mansion only add to the intrigue. Getting a clear picture is challenging, but here's a partial accounting of his entanglements. **B**

Betsy DeVos is the Best Sec

Betsy DeVos is the Best Secr

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Betsy DeVos is the Best Sec

Betsy DeVos is the Best Sec

Betsy DeVos is the Best Sec

Betsy DeVos



Secretary of Education DeVos.

Secretary of Education DeVos.

Secretary of Education DeVos.

Secretary of Education DeVos.

Secretary of Education DeVos.

Secretary of Education DeVos.

She said government “sucks.” Now she’s part of it—and using her power to roll back Obama-era protections

By Devin Leonard and Shahien Nasiripour
Photograph by Janelle Jones

For all the years since Jimmy Carter picked Shirley Hufstедler in 1979 to be the first holder of the title, it's been a tradition for the U.S. education secretary to address the annual gathering of the hundreds of journalists covering their department. Two years ago, Betsy DeVos, who'd recently been confirmed as President Donald Trump's education secretary, turned down an invitation from the Education Writers Association.

The next year she did so again, raising the possibility that she might be the first person with the job to snub the organization altogether in almost 40 years.

So the association's members were excited when DeVos agreed to appear this year. What would their reluctant keynote speaker say? The tables in the ballroom on Baltimore's inner harbor quickly filled with journalists. The slim 61-year-old walked onstage wearing a light blue pantsuit, sparkling gold heels, and a forced smile. "The simple truth is," DeVos said, sighing, "I never imagined I'd be a focus of your coverage. I don't enjoy the publicity that comes with my position." She gave her audience a plaintive look. "I am an introvert," she said, placing her hand on her heart. Then she became defiant: "And as much as many in the media use my name as clickbait or try to make it all about me, it's not."

Once she was finished, DeVos took a seat onstage, leaning back in her chair as if she wished she could disappear rather than take questions from Erica Green, a *New York Times* education reporter. But Green was gracious, as were most of the audience members who asked questions. An under-

performing

DeVos's pro-"school choice" stance includes subsidies for parents who opt for private schools

voucher program in Louisiana? She didn't think much of it either. A proposal in a Tennessee education bill targeting undocumented students? She was pretty sure it didn't wind up in the final version, so what was there to say?

There's something mildly disingenuous about DeVos's contention that she's been the subject of undue scrutiny. She came to Washington in 2017 to serve Trump, who had agreed to pay \$25 million the previous winter to settle claims that his namesake for-profit university bilked students. For decades, DeVos has promoted what she refers to as "school choice," arguing that parents should be able to decide which school their children attend—with the government providing subsidies in the form of vouchers if they select a private one. Small wonder she has encountered opposition not just from Democrats and their teachers' union allies, but also Republicans in rural states where traditional public schools are often the sole option.

DeVos hasn't been the best advocate for her policies, either. She's made some spectacular gaffes since entering public life, starting with her difficult confirmation hearing, in which she seemed perplexed about federal education law. She hadn't been in office for a year before a Huffington Post/YouGov poll showed more Americans had a "strongly unfavorable" opinion of her than of any other Trump administration cabinet member at the time. She's also had to weather what former White House aides and people close to Trump now describe as the president's indifference. Several say they've never heard him mention her name, though that might not be the worst thing in the Trump White House. Elizabeth Hill, DeVos's spokeswoman, says the secretary can get a meeting with Trump anytime she wants.

The embarrassments have continued. In March she attracted bipartisan ire when she publicly advocated eliminating funding for the Special Olympics, only to backtrack and say that she'd always opposed the cut after Trump casually overruled her. Some in the school reform movement have had enough of the drama at the

department. Michael Petrilli, president of the Thomas B. Fordham Institute, a conservative education think tank, says regretfully that DeVos should step down because she's damaging her own cause: "She's so unpopular that she's making it harder for education reformers at the state and local level."

Yet DeVos has been surprisingly effective on one front. In early May she was feted by the conservative Manhattan Institute in New York, where she reeled off a list of the Obama-era initiatives she'd overturned or was in the process of reversing concerning civil rights and student protections. It was almost as if she were displaying a collection of trophies. "We're breaking the stranglehold Washington has on America's students, teachers, and schools, starting with all the social engineering from the previous administration," she boasted. Outside, protesters all but called for her head. Inside the marble-columned banquet hall, listeners repeatedly interrupted her with applause.

Much has been written about DeVos's privileged background: how she grew up in a tightly knit Dutch-American enclave in western Michigan and attended religious schools and a nearby college named after John Calvin, the 16th century theologian who believed in predestination; how her father, Edgar Prince, became wealthy by inventing the lighted automobile sun visor; how she married Dick DeVos, son of the late billionaire co-founder of the Amway direct-selling empire; and how together they've used their riches to advance conservative educational causes in Michigan.

Somewhat less has been written about the results of such policies in her home state. In a study of federal data from 2003 to 2015, Brian Jacob, a professor of economics and public policy at the University of Michigan, found that the state's fourth and fifth graders had lower growth rates in math and reading scores than any of their peers around the country. He says many things could have contributed to this, including poverty, but DeVos's initiatives, such as promoting a lightly regulated charter sector

with a large number of schools run by for-profit companies, haven't helped. "Personally, I think there is evidence that the very deregulated form of private school involvement hasn't been good for education in Michigan," Jacob says. Hill responds that another study shows charters in Michigan outperforming traditional public schools, and that the state is lagging because it hasn't fully embraced her boss's policies.

Undaunted by Michigan's shortcomings—or, some would say, oblivious to them—DeVos co-founded the American Federation for Children in 2009, a dark-money-enabled advocacy group that she chaired until 2016. During this time, says John Schilling, the federation's president, she worked with sympathetic former Republican governors, including Indiana's Mike Pence, to double the number of states with private school choice programs. According to the federation, 26 states and the District of Columbia and Puerto Rico now offer some form of private school tuition supports, such as vouchers and tax credits.

Given her conservative allegiances and oft-stated distrust of government, DeVos might seem like someone who would have gravitated in 2016 to Republican presidential candidate Trump, who the previous year devoted a chapter in his book *Crippled America: How to Make America Great Again* to scorning the Department of Education. But at the Republican National Convention that year, she expressed qualms about what she described as Trump's "erraticisms." "A lot of the things he's said are troubling," she told *Bloomberg Businessweek* at the time, "and I don't think reflective of the kind of leadership and temperament it takes to be president."

Yet after Trump's victory, DeVos allies such as Vice President-elect Pence promoted her as a candidate for education secretary. In late November he nominated her for the job, calling her "brilliant." She would have little power over K-12: The federal government provides only 7% of the \$818 billion spent annually for U.S. elementary and secondary education. But the position gives DeVos a national pulpit from which to evangelize about school choice. And it casts a longer shadow over higher education, overseeing the \$1.4 trillion federal student loan program. "When the opportunity arose, I couldn't say no," she said earlier this year at a meeting of the Conference for Christian Colleges & Universities in Washington, D.C.

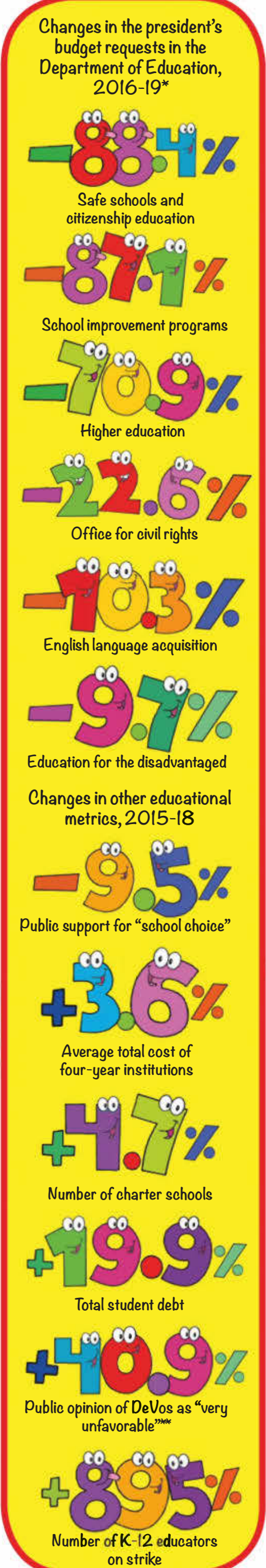
Having never served in government as an

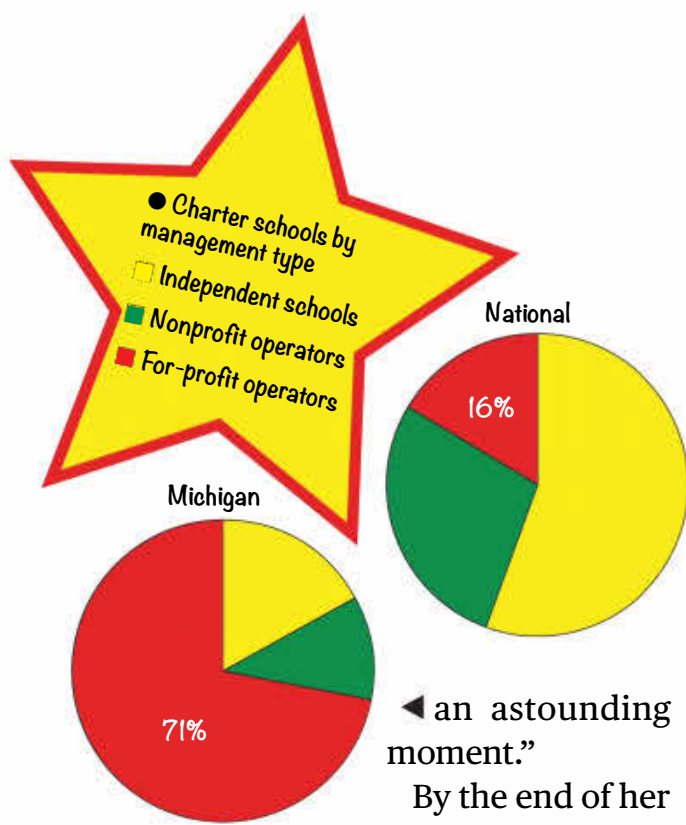
elected official, or an appointed one for that matter, DeVos struggled in her new role. Her January 2017 confirmation hearing was a circus-like proceeding, with Democratic senators pouncing on her mistakes and raising questions about her fitness for the job. (She declined to comment for this story.) In private, her new employees found her more knowledgeable than they'd expected, if somewhat blinkered in her perspective. "She really does care about helping kids in this nation," says a former high-level department official, who spoke on condition of anonymity because she was no longer there. "She just has some very specific ideas about how to accomplish that."

In public, though, DeVos kept floundering. Protesters greeted her when she visited schools, starting with her first trip to a public one in February 2017. Demonstrators surrounded her SUV and tried to keep her from entering Jefferson Middle School Academy in Washington, D.C., chanting "Go home!" and "Shame, shame, shame!" Once inside, she impressed teachers. "It seemed like she was for public education," says Ashley Cobb, an eighth grade math teacher and the local union rep.

The next day, though, DeVos obliterated whatever goodwill she'd earned by telling conservative columnist Cal Thomas that the school's teachers had been lulled into passivity by the government's "top-down" approach to education policy: "They're waiting to be told what they have to do, and that's not going to bring success to an individual child." Cobb says DeVos's remarks infuriated instructors, many of whom have master's degrees. "We had a community meeting to let the students know that was unacceptable," she says. "No one is going to come into our house and bad-mouth us, especially when it's inaccurate."

The next month, DeVos met with LGBT leaders concerned about her decision to withdraw an Obama administration letter to school districts advising them to let transgender students use the bathroom conforming to their gender identity. Mara Keisling, executive director of the National Center for Transgender Equality, was there with several parents of transgender students. She says one of them argued that she should have a choice in how her child was treated at school. "The secretary just lit up and said, 'Well, that reminds me, when my choice proposals come out, I hope that's something we can all get together on and you can support me on,'" Keisling recalls. "It was actually ▶





◀ an astounding moment.”

By the end of her first year, DeVos had adopted a defensive crouch. Her congressional appearances were rare, and she'd often repeat the same innocuous responses when pressed by Democrats—how she cared about all students and was just following the law—who, in fairness to DeVos, often seemed more intent on tripping her up than hearing what she had to say. Then came her disastrous March 2018 appearance on *60 Minutes*, in which she seemed confused about Michigan's educational progress or lack thereof. The White House noticed. A presidential aide called one of DeVos's people to say that Trump thought the interview was a catastrophe, says one person familiar with the situation. (Hill, DeVos's spokeswoman, says, "I did not receive that call.") After that, DeVos tended to talk to friendlier media such as Fox News and the *Weekly Standard*, along with local reporters in such places as Benton, Ky., and Tulsa, who might not grill her like their Washington counterparts.

Her efforts to promote school choice on Capitol Hill didn't fare much better. Her allies talked about including a tax credit to benefit privately funded local school vouchers in the Tax Cuts and Jobs Act, but it never made it into the final

bill. DeVos settled for a weaker measure letting parents use money in tax-advantaged college savings accounts for private school. She concedes this helps only families who already have enough money for tuition, not the lower-income ones whom she frequently argues need access to private education the most.

Earlier this year, DeVos held a press conference extolling legislation to create a \$5 billion-a-year tax credit to support a variety of locally run school choice initiatives, including subsidized private school. It doesn't seem to be going anywhere: House Democrats are dead set against it. So far, Trump's support hasn't exactly been full-throated, either. He seemed disinterested when DeVos briefed him on it, says a source familiar with the meeting, adding that this was indicative of his lack of interest in education, not a knock on DeVos. Hill, her spokeswoman, disputes this, saying Trump personally signed off on it. "The first thing he asks [DeVos] almost every time they talk is, 'How are we coming on school choice?,'" she says.

Still, there was much DeVos could do within the department that didn't require legislation. Under Obama the department had taken an expansive approach to protecting minorities, campus sexual assault victims, and students who had suffered at the hands of unscrupulous for-profit college operators. It was not without controversy and had a distinct social justice underpinning. "Every one of those issues, it was always about trying to fight for the powerless, those that were being hurt by the system," says Arne Duncan, Obama's longest-serving education secretary.

To hear DeVos tell it, the Obama people had turned the department

into a lab for dubious social and legal experimentation. She was particularly galled by the administration's habit of advancing its policies by sending guidance letters to schools rather than going through the formal regulation process, which would have required the department to seek public comment.

These letters were much easier to rescind than actual rules, though, and soon after DeVos arrived, she began doing so. Most notably, she pulled back a letter advising colleges to handle sexual assault cases by adopting a lower standard of evidence favoring accusers. It had been welcomed by survivors' rights groups, but advocates on both the right and the left argued it had the potential to infringe on the rights of the accused. DeVos did the same in 2018 with a letter warning schools that they would face civil rights investigations if they disciplined minority students at higher rates than whites, regardless of whether overt racial bias could be proven.

It seemed harder for her to justify her equally zealous unraveling of the Obama administration's efforts to rein in the for-profit college industry. Naturally, DeVos, who told an audience in 2015 that "government really sucks," has long been interested in free-market educational alternatives, but for-profit colleges have been plagued by scandal. A Senate investigation in 2012 detailed how many of the industry's top chains, which relied on federal dollars, including student loans and Pell Grants, for the bulk of their income had used boiler room tactics to recruit lower-income students. Some also misrepresented their graduation rates and their ability to place pupils in jobs lucrative enough for them to pay off their debt. The fly-by-night nature of some of the

"I always go back to the fact that in my view there's an audience I play to. It's just an audience of one"

largest players became evident before the end of Obama's second term when Corinthian Colleges Inc. and ITT Educational Services Inc. went bankrupt, stranding more than 50,000 students without degrees.

The Obama administration responded with a number of measures, most notably drawing up the "borrower defense" regulation in 2016, which automatically forgave loans for students who had attended imploding schools if they hadn't enrolled in more stable degree-granting institutions within three years. The regulation also banned schools from protecting themselves by requiring students to sign mandatory arbitration agreements and class-action lawsuit waivers as a condition of enrollment. "It's not like this just came out of nowhere," says Ben Miller, a senior policy adviser at the department under Obama. "All these things were driven by real, documented problems and abuses."

The Obama-era department also tried to wake up the nation's 53 accrediting agencies, which serve as gatekeepers for the student loan program. Accreditors were supposed to ensure that colleges gave students decent educations, but they had a history of coddling schools. In 2016 the department withdrew its recognition of the Accrediting Council for Independent Colleges & Schools, or ACICS, which had overseen schools run by ill-starred Corinthian and ITT Educational.

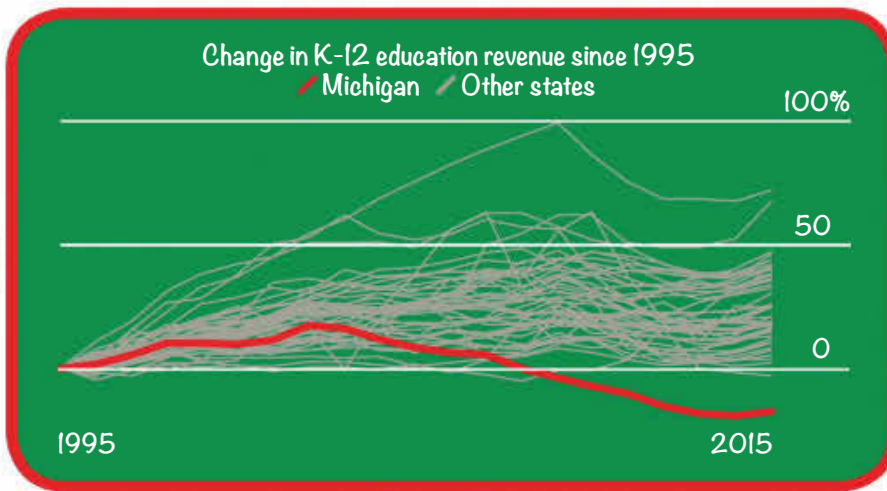
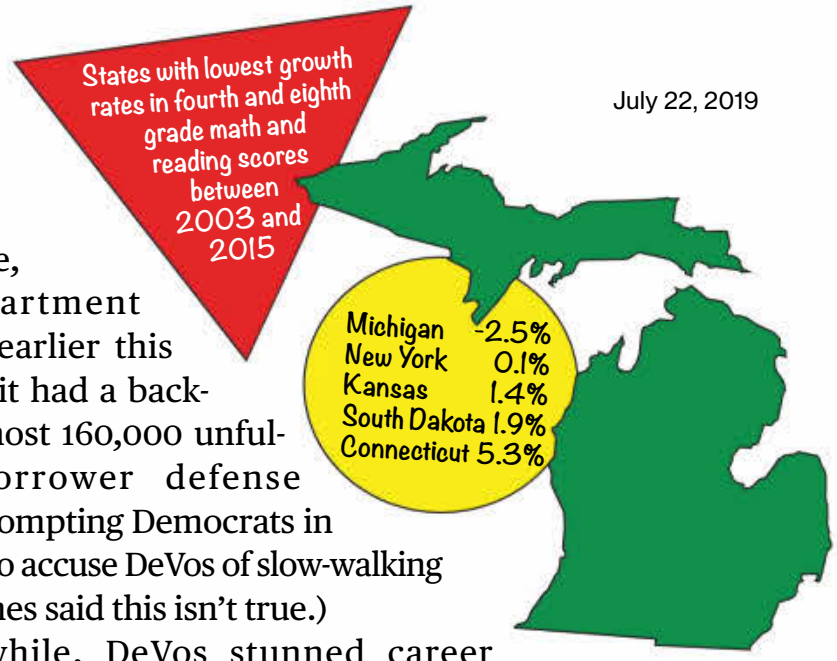
To DeVos, however, it was the department that had acted abusively, impeding innovation in the sector, and she surrounded herself with former for-profit college executives who were likely to agree. One of these

was Diane Auer Jones, DeVos's principal deputy undersecretary, who had done a stint as a senior regulatory affairs officer at Career Education Corp. from 2010 to 2015, a time during which its chief executive officer resigned after the company admitted to falsifying career placement data, according to the Senate report. (A DOE spokesperson says that it was Jones who alerted the department to her former employer's "job placement irregularities.")

In her early months, DeVos put borrower defense on hold just before it was scheduled to go into effect and began crafting a more industry-friendly rule that, at least in an early version, would have done away with automatic loan repayment waivers, allowed schools to reinstate arbitration and class-action stipulations, and required students to prove that their college had intentionally defrauded them. In a May interview in Washington, Jones contended that the final rule should be fairer to students and colleges. "We had concerns about due process rights," she said, as two public-relations people sat on either side of her peering at their phones. The department's efforts have been hampered by legal challenges, but Jones said she was confident that the new regulation would be finalized by November.

Meanwhile, the department revealed earlier this year that it had a backlog of almost 160,000 unfulfilled borrower defense claims, prompting Democrats in Congress to accuse DeVos of slow-walking them. (Jones said this isn't true.)

Meanwhile, DeVos stunned career employees in November by restoring the department's recognition of ACICS. The department had to reconsider the decision, she said, because ACICS had successfully challenged the previous administration's decision in court, saying it had failed to fully review tens of thousands of documents. Two weeks after ACICS was back in the department's good graces, there was another catastrophe: The Education Corporation of America, a large for-profit chain with schools under ACICS's purview, said it was going out of business, leaving nearly 20,000 students out in the cold. Both Jones and ACICS President Michelle Edwards say there's little the department or the accreditor could have done to prevent this.



Unlike some public schools and Capitol Hill, the January meeting of the Council for Christian Colleges & Universities was a setting where DeVos clearly felt at ease, even as she was pushed up the center aisle in a wheelchair. An aide positioned her next to Shirley Hoogstra, the council's president, who settled into a green chair. DeVos explained that she was recently in a bike accident and broke her pelvis and her hip socket.

"Ooh, ouch," Hoogstra said. She proceeded to tell DeVos that she was a role model to students in the room and pursued a friendly line of questioning. "What have you found satisfying in your role as secretary?" she asked.

DeVos talked about her work to revamp accreditation and get rid of those Obama letters, which she called "the bane of a lot of our existences." She gave her host a knowing look.

"I'd like you to tell the students in the room about tackling big endeavors when you are going to get criticized and praised," Hoogstra said.

DeVos spoke nostalgically about her early years in religious schools. "I always go back to the fact that in my view there's an audience that I play to," DeVos said. "It's just an audience of one. If I can keep that perspective at all times..."

"That's the true North Star," Hoogstra said.

"I think there's no doubt that every day I'm regularly called," DeVos said. "I refer often to Micah 6, verse 8. 'What does God expect of me? To seek justice, love mercy, and walk humbly with him.' That's a refrain that never leaves me." —With Jennifer Jacobs, Josh Eidelson, and Emily Wilkins

DATA: NATIONAL CENTER FOR EDUCATION STATISTICS; C/O DAVID ARSEN, TANNER DELPIER, AND JESSE NAGEL OF MICHIGAN STATE UNIVERSITY; BROOKINGS INSTITUTE; BELLWETHER EDUCATION PARTNERS (2014-2015 SCHOOL YEAR)

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From celebrity seating warfare to dogs sipping Champagne, there's never a dull moment at Nobu, America's most famous sushi joint

July 22, 2019

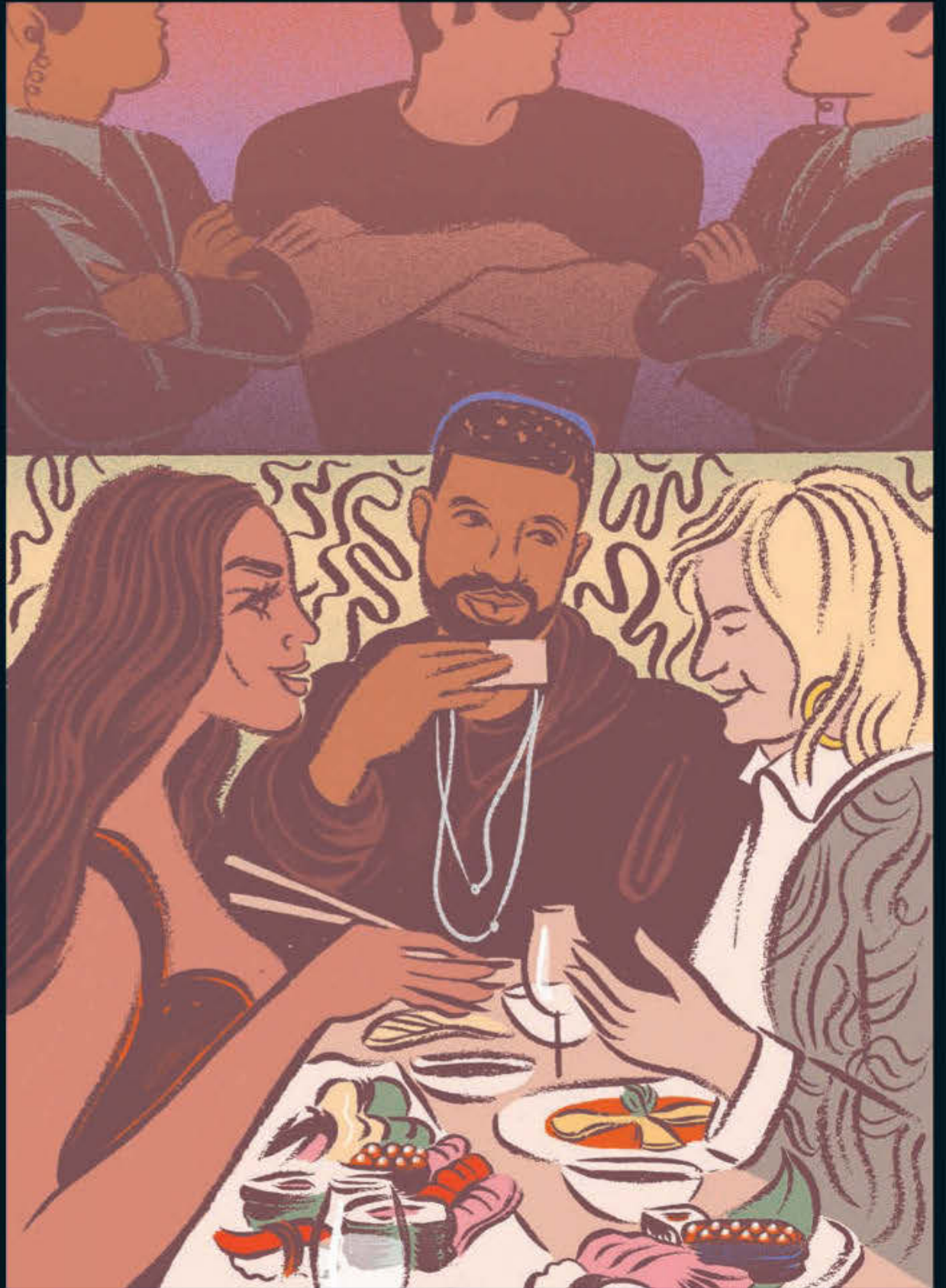
Edited by
Chris Rovzar
Businessweek.com

The year was 1999, and a flamboyant Italian man dined night after night at Matsuhisa, chef Nobu Matsuhisa's eponymous Beverly Hills sushi joint. He'd heard the restaurant was lucky: Eat here before the Academy Awards, and you're guaranteed to take home the prize. The man in question was Roberto Benigni, who, sure enough, nabbed the Oscar for best actor in *Life Is Beautiful*. The recipe for success had proved effective the year before, too, when Robin Williams snacked on its signature yellow-tail sashimi with jalapeño, then won the trophy for best supporting actor in *Good Will Hunting*. By then the establishment was swamped with A-listers.

One such star was Robert De Niro, who spent four years convincing Nobu that an enterprise in the actor's native New York City would be lucky, too.

Fast-forward to now, and Bob and Nobu-san, as they're called, have expanded their restaurant business into a global lifestyle brand that includes hotels and condos and forecasts revenue of more than \$1 billion in the next five years.

To understand the unflagging fervor for all things Nobu, I happily accepted an offer to maitre d' at both New York locations: Nobu Fifty Seven in Midtown and Nobu Downtown in the Financial District. The position is usually reserved for a staffer who's clocked well more than a decade with the company. From fetching deodorant for fragrant patrons to shuttling orders for black cod via private jet, here's everything I learned.



NOBU RESTAURANTS ARE DESIGNED FOR VIPs

During my 10-day stint, I recognized over 20 undisguised names on the reservations roster, including two Oscar-winning actors, an Emmy-winning showrunner, a Marvel Comics actress, several famous-for-being-famous socialites, a legendary singer-songwriter, a trending fashion designer, a Super Bowl winner, a rapper, and J-Lo and A-Rod on a date. "We fully appreciate that we're a cafeteria for A-listers," a manager says.

About 50% of VVIPs come with their own security. You can expect at least one table a night to be clandestinely filled with bodyguards acting like regular guests. The restaurant has security as an additional courtesy, though the in-house team is also there to back up the staff.

De Niro prefers the "sake table" in an alcove space at Nobu Downtown. But that beautiful shelf of vases around it isn't a decorative accent—it's a strategic barrier to create what the staff calls "visual privacy." Curtains can be drawn to section off areas, and both New York restaurants have secret entrances for VVIPs—Nobu Fifty Seven has no fewer than three. If you spot a notable patron at a Nobu, it's because they want you to see them.



THE SEATING CHART IS A GAME OF RISK

Manager Amanda Stymeist spends 45 minutes before each dinner “dressing the room” at Nobu Downtown. First comes the offense: slotting movie stars into shaded corners where they won’t be gawked at, placing Wall Street guys at quiet positions to talk business. “Everyone wants one of our four booth tables—it’s like constructing a puzzle with 14 corner pieces,” says Johnny Hildreth, another Nobu Downtown manager. At both New York locations, the booths are the best see-and-be-seen options. “We even have subscriptions to *People* and *Us Weekly* to read up on the latest

who’s who—and who shouldn’t be seated near whom,” Hildreth says. The hosts, a decade younger, are tapped to spot the YouTube stars.

When the doors open, the strategy switches to defense as all types arrive: bachelorette parties with obscene balloons, or guests with animals. Before a canine is let in, two questions are asked: “Is it a service animal?” and “What service does it provide?” Nobu doesn’t feed pups—but it once got a request to fill a Pomeranian’s bowl with Champagne. “I brought them the bowl and put the bottle of bubbly on the table,” Hildreth says. “That’s where I drew the line.”

TAKE-AWAY ORDERS ARE DELIVERED BY PRIVATE JET

Officially, Nobu doesn’t offer take-away—a decision made to safeguard quality—but there’s always an exception to the rule. The restaurants’ most common version of takeout arrives via personal plane. “We’ll do at least 20 orders a month and more during busier weeks like spring break,” says Anne Yamamoto, special events manager for the Nobus in New York and the mastermind behind the delivery of lunches and dinners to VIP clients as they shuttle around the globe.

For casual to-go dining at home, a slew of celebs have the restaurants’ managers on speed dial. One of the *Ocean’s 8* gals has Stymeist’s cell number so

the manager can troubleshoot a weekly take-away order from the nearest Nobu location. During my shift, from the oceans she ate: sashimi, sliced extra thin, and the standard yellowtail jalapeño and black cod—plus crispy rice, extra crispy, and two orders of beef tenderloin with a side of chopped onions and scallions, which was a pretty normal order for her. A different film and TV star obsessively orders take-out when she’s in New York. She placed two dinner orders during my short gig—it’s a good thing her traveling pants have an elastic waistband. Her yellowtail jalapeño has to be sliced thin, with absolutely no red bloodlines showing.

Staff try to steer orders away from dishes that involve rice, because the combination with raw fish is fragile, but caviar requests are honored, including from an *Avengers* star who recently requested a buffet’s worth of after-dinner roe to go.



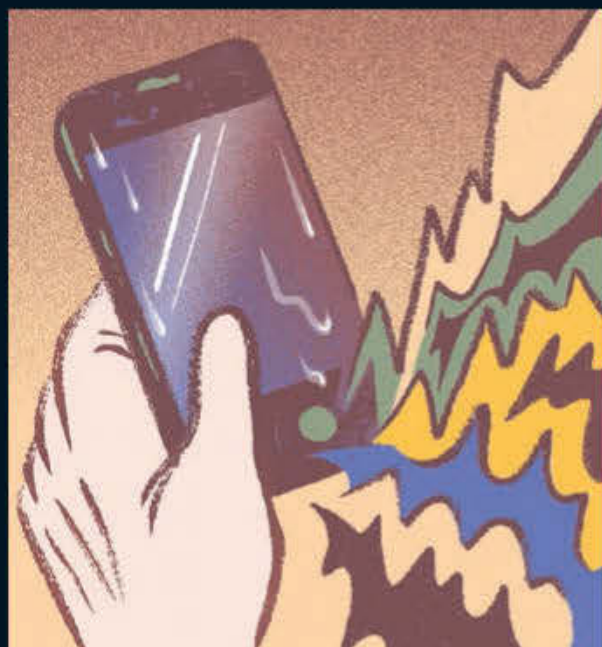
BUT THERE’S A LIMIT TO CELEBS’ SPECIAL TREATMENT

Surprisingly, celebrities don’t have access to a secret phone number: All bookings for the New York restaurants wind up with the centralized reservations team. VIPs are offered passwords to expedite bookings and to avoid fakers imitating them. Often it’s a first name and some numbers, but some codes—like “JuicyBooty” for a certain pop diva—are

easier to remember.

With seatings, celebrities such as Drake, Martha Stewart, and the Kardashian coven are wild cards. They tend to book in the late afternoon on the day they dine to minimize the eyeballs on their reservation; it’s not uncommon for a pro athlete to request a last-minute 15-seater after a basketball game, for instance.

Once a famous recording artist with a reservation for 15 arrived with a party of 30 and stayed well past closing. All was forgiven when, at 1:30 a.m., he serenaded the staff. If a guest is rude on the phone, it’s usually one who isn’t famous, says a reservationist: “We brace ourselves for three to four ‘Do you know who I am?!’ conversations a day.”



YOU'LL NEVER SCORE A 7:30 P.M. RESERVATION



Legends of A-listers unable to get a table fill the annals of Nobu—Tom Cruise was famously turned away; Madonna had to wait 30 minutes—and today you'll still never get a 7:30 p.m. seating. Here's why: The reservations team creates two service cycles a night, one at about 6 p.m., the other at about 8:30 p.m. It's simple math. Parties of two tend to take two hours to dine, and for groups of three to six, add an additional 30 minutes. Larger tables take about three hours. Guests

then are seated every 15 minutes from 5:45 p.m. to 6:15 p.m. and from 8:15 p.m. to 9 p.m., ensuring a steady flow of service for the 300 to 500 customers per evening. Generally the team overbooks the restaurant by about 10% each night to allow for no-shows and last-minute cancellations. For non-VIPs, the best way to snag a table is to call the restaurant about 4 p.m. on the day before you want to dine—the sweet spot between last-minute cancellations and eleventh-hour bookings.



NEW YORK PATRONS ARE LESS RUDE THAN THE REST OF THE WORLD

"The New York City clients are largely the best behaved," says Jad Marouche, beverage manager at Nobu Fifty Seven and Nobu Downtown. The stories from his time at the Los Angeles branches (West Hollywood and Malibu) get the most eye-rolls from his colleagues, such as when a well-known movie director acted as if the cost of an extra \$10 bottle of Fiji water was the end of

the world. A few weeks later, Marouche heard the director say he'd installed a Fiji tap in his home that even piped the premium water through his shower. Another thorn in Marouche's side was the Hollywood fixture so similar to the character he portrayed on a well-known sitcom that he always showed up drunk and slurry, yelling at waitresses as they passed.

Mistreatment of staff

(touching or swearing at them) will get you permanently barred, a decision that comes all the way down from the owners. But Nobu is discreet; an evictee has to take it upon himself to make a ban newsworthy—like when billionaire Stewart Rahr threw a hissy fit to management in an email on which he copied everyone from Leonardo DiCaprio to Alicia Keys.



THE STAFF WILL MAKE DEODORANT RUNS

The reservations team estimates that more than 70% of the names in their database have at least one bulleted item appended, ranging from

“tap water, no ice” to “always likes to talk to a manager.” A designer who lives in Tribeca allows no one to touch anything on her table—servers can place dishes, but water glasses must stay on the table when they’re refilled, and napkins may not be refolded. Another regular, a supermodel from the ’80s, always brings in sugar-free ingredients and splashes around mixing the sauces. “I’ve thought of asking if she wants a chef’s apron,” says Hildreth. He’s even left Nobu to pick up deodorant for a businessman not-so-fresh off a London flight.

THE FANCY SUSHI YOU’RE EATING WAS PROBABLY FROZEN

The U.S. Food and Drug Administration strongly suggests all fish served raw should be frozen first, a practice that’s now law in New York City. Yes, you read that correctly: Almost every slice of sushi slung in the Big Apple has been freezer-treated, which means you’re never eating fish delivered that day. At Nobu, the soon-to-be sashimi goes into a medical-grade fridge that flash-freezes the product

at -90F. “We’re using the same freezer hospitals have to keep blood, so the fish cells don’t break down upon defrosting,” says Matt Hoyle, executive chef at both New York Nobus. Fish that will be cooked doesn’t need to be frozen. Generally, special items such as *kisu* (Japanese whiting) and *tobiuo* (flying fish) arrive at Nobu on Tuesdays or Wednesdays; premium cuts come on Wednesdays and Thursdays.



UPTOWN CUSTOMERS EAT MORE THAN \$1 MILLION WORTH OF BLACK COD A YEAR

Chef Nobu’s legendary cuisine has changed America’s concept of Japanese food. Pioneering dishes, such as black cod with miso or yellowtail sashimi with jalapeño, have been replicated at restaurants nationwide. At Nobu Fifty Seven, the black cod dish represented more than \$1 million in sales in 2018. The yellowtail jalapeño did more than \$1.5 million. Nobu’s

Midtown hub isn’t even the empire’s most profitable location—that honor goes to the one in Malibu.

In New York the average person spends \$120, not including tip; the number rises with large parties when sake magnums are toted out. A big spend is considered anything from \$400 to \$500; epic tabs come in at more than \$1,000 a person. The omakase—a prix fixe sampler of some of the finest dishes—starts at \$135. High rollers can set their own omakase price for premium eats, which ranges from \$250 to \$500 a head.

Extremely strict rules govern precise dish rollout. Even the tufts of lettuce are weighed before they’re incorporated into a salad (70 grams a plate). Separate line cooks man each station—salads, soups, tempura, sauté, grill, and pastry—supervising only a few recipes each.



threw a chair at a manager and threatened not to pay his \$6,000-plus bar tab because the manager wouldn’t sing happy birthday to the kingpin’s girlfriend. The manager was able to talk him down. The cartel member eventually apologized and extricated a hefty wad of cash from his briefcase to pay.

RICH PEOPLE WILL DINE AND DASH, TOO

Some diners attempt to get away with not paying for their meal. “Oh, we’ve definitely had people who’ve tried,” says a manager. There are other payment challenges: Once at the Miami location, a known cartel member

There are, of course, exceptions in the other direction. The Downtown service team still talks about a gratuity left more than six months ago by a high-profile chief executive who was out dining with six friends, including an A-list actress and a model. He left an extra \$22,000 on an \$8,000 bill. Everyone working that evening reaped the benefits of his drunken generosity/miscalculation.

The front half of a 1952 Bentley R-Type Continental, one of the brand's most recognizable models



Bentley's Future Perfect

As it celebrates 100 years of making cars, the British automaker tries to overcome the trauma of the last few. *By Brett Berk*

"Birthdays are a time for reflection, but they're also a time for planning forward," says John Paul Gregory, head of exterior design for Bentley Motors Ltd. "To figure out what type of person—or brand—you want to be."

To celebrate its centenary, on July 10 the exclusive British brand unveiled a concept car, the EXP 100 GT. Two feet longer than a Cadillac Escalade but featuring only two doors, the battery-powered grand tourer boasts sustainably sourced paint and wood. And everything from the extensive battery range to the high-tech window glass is meant to showcase the company's plan for top-tier motoring in 2035. That vision includes self-driving technology that can still provide a visceral connection to the road and retains the joy of driving.

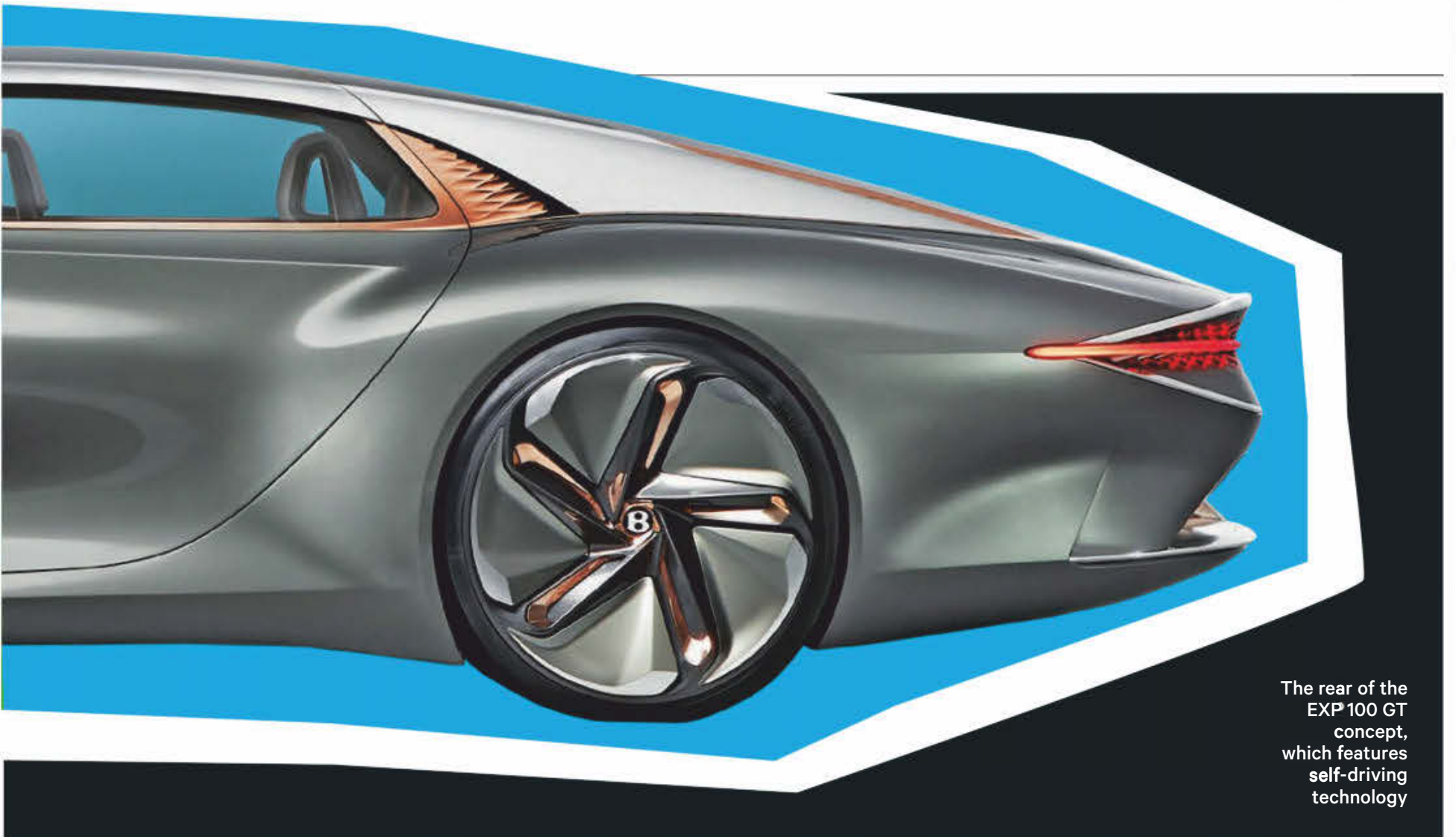
Sadly, of late the brand's own ride has been rather not joyful. "The 100-year anniversary comes at a good time, because the 99th year of the company was probably the worst year in our history," says Adrian Hallmark, who was appointed Bentley's chief executive officer in February 2018.

He refers to a series of seemingly avoidable disasters that began with the early 2017 unveiling of the third-generation, all-new Continental GT. Replacing the brand's best-selling

line, the \$200,000-plus coupe and convertible were meant to roll out globally for the 2018 model year. That didn't happen.

As production got under way, the build process for the cars was found to be far more time-consuming and costly than Bentley had estimated. It took six months, an eternity in the car world, to streamline it. Next, the company realized it hadn't properly contracted for the numerous independent evaluations necessary to certify the engines for global fuel and emissions standards. This rendered the twin turbocharged power plants churning with 8 or 12 cylinders unusable until the company met all the requirements.

The launch of the Continental had to be delayed for more than a year in key regions such as China, the U.S., and the European Union. "We ran for 50% of last year, with 50% of the models, in 50% of the markets," Hallmark says. This is a brand that sells just 10,000 vehicles a year globally—fewer than Ford Motor Co. sells every two days in the U.S. "I would say the luxury segment, more than any other marketplace, is driven by new product," he says. Falling behind can be catastrophic, especially in an echelon where purchases are often based on having something other people don't.



The rear of the EXP 100 GT concept, which features self-driving technology

In the absence of new product, Bentley's fickle, au courant target consumers are presented with a proliferation of posh options these days. "Bentley really shot up in volume and visibility with the first Continental GT back in 2003 by attacking a market that didn't otherwise exist," says Karl Brauer, executive publisher of automotive research outlet *Kelley Blue Book*. There weren't that many \$150,000-plus ultraluxury automobiles then. "Now that market is pretty well blanketed," he says.

These troubles led to Bentley's worst fiscal years since it was acquired by the Volkswagen Group in 1998. Sales plummeted 16% from 2016 to 2018, to 9,559, despite a growing ultraluxury market and the debut of the brand's SUV, the Bentayga. The company had a loss of €288 million (\$325 million) in 2018 on revenue of about \$1.5 billion. Pet programs, such as a two-seat sports car and an electric powertrain, were scrapped or pushed far into the future. And Bentley had to restructure, eliminating or retiring 10% of its workforce.

Cutbacks in manufacturing and employee costs were the first step in Hallmark's five-point recovery program. The second is refocusing on the new Continental GT coupe and convertible and the Flying Spur sedan, which will all have gone on sale globally by early next year. The third is planning for the next round of stringent emissions tests, scheduled to go into effect in 2024, to avoid delays. The fourth is adding a plug-in hybrid option to every vehicle in the lineup by 2023 to decrease the carbon footprint and broaden sales. The last is the creation of the first all-electric Bentley, though its introduction has been delayed until 2025, long after battery-powered cars will have rolled out from competitors such as Porsche, Mercedes-Benz, and Aston Martin.

Concept cars are dreams disguised as statements, and

as such, the EXP 100 GT is a rolling symbol of how Bentley might propel itself out of trouble. Interestingly enough, for a brand that prides itself on delivering a certain kind of profigate British opulence, the coupe focuses on sustainability. "Luxury is generally synonymous with excess, maybe a certain level of disconnection to consequences," Gregory says. But in the minds "of the next generation of customers, which then feeds into all of our customers, sustainability has become a really important topic. And what we want to offer is guilt-free luxury."

This means exterior paint made from recycled rice husks, faux leather seats made from winemaking byproducts, and wood veneers carved from 5,000-year-old trees found in bogs. It means playing with "luxury theater" in a car's interior by using glass that refracts natural light and technology that harvests and plays back natural sights, sounds, and smells. And it means using next-generation, lighter, more energy-dense batteries to give it a projected 435-mile range.

"Sustainability," then, has a double meaning here: The company hopes the concept's priorities will propel the brand successfully into its second century. But there are still hurdles. "I'm not convinced that tech or these other ideas will cause a huge uptick in sales," *Blue Book's* Brauer says. Plus, there's the cars' elite aura to consider. "Theoretically, the whole point of a brand like a Bentley is to not see one every five minutes when you're driving around," he adds.

Bentley says it can afford to make more cars and keep its cool. "We will focus on putting the definitive grand tourer into every product segment," Hallmark says. "So we cover all bases—ultrapformance, ultraluxury, and ultrarefinement and relaxation. And that's what makes a Bentley." **B**

How Elvis Found His Kingdom

Presley in Vegas shouldn't have worked. But it did, and it changed both forever

By James Gaddy

The summer of '69 permanently altered the landscape of popular music. A certain concert was so unprecedented, so unforgettable, that it would serve as a touchstone for an entire generation.

No, not Woodstock. Elvis. In Las Vegas.

At least that's what *Time* contributor Richard Zoglin argues in *Elvis in Vegas: How the King Reinvented the Las Vegas Show* (Simon & Schuster, \$28). In the book, the author retraces the events that transformed Elvis into a sequin-jumpsuited hunka-hunka burning love. Zoglin writes that the sheer *spectacular*-ness of the performance influenced the most successful acts to follow, whether Celine Dion or Blue Man Group, Cirque du Soleil or Lady Gaga.

Elvis was not cool in '69. "You have to remember how the counterculture hated him," rock critic Richard Goldstein is quoted as saying. "He was doing music we considered plastic." Elvis had spent the '60s woodenly starring in formulaic Hollywood musicals, but a televised "comeback special" in December 1968 suggested a still-relevant singer lurked inside.

And he felt at home in Vegas. Elvis had been infatuated with the place since his first performance there in April 1956, just as *Heartbreak Hotel* hit No. 1, and he returned often just for fun. For Elvis's first live performance in a decade, his manager, "Colonel" Tom Parker, made arrangements with the new International Hotel, Vegas's largest, which had a 2,000-seat showroom. Elvis would be paid a then-record \$125,000 a week—more than \$850,000 today.

Rock 'n' roll was not cool in Vegas. It might have dominated radio, but the Strip's biggest acts remained Frank Sinatra, who earned \$100,000 a week at Caesars Palace, and Dean Martin, at the same rate, at the Riviera. "Even as the '60s revolution was challenging old taboos,"

Zoglin writes, "Vegas was still conservative. Its mostly middle-aged Middle American audiences didn't want to be provoked. They wanted reassuring entertainment." In retrospect it wasn't that much of a gamble. By '69, Sinatra's power was ebbing, and Elvis was the change that Vegas had been waiting for. He did two shows each night for four weeks and played his '50s hits, including *Mystery Train*, *Don't Be Cruel*, and *Blue Suede Shoes*.

Even by Vegas standards, the show was over-the-top: almost 60 musicians onstage, including a full orchestra, two backup singing groups, and a rhythm band. Elvis wore a jumpsuit designed by Bill Belew to show off his beloved karate kicks. Vegas regular Tom Jones taught him the trick of wiping his face with a handkerchief, then throwing it into the crowd. People got seriously shook up. The show set an all-time record for attendance, drawing 101,500 people, and every performance sold out.

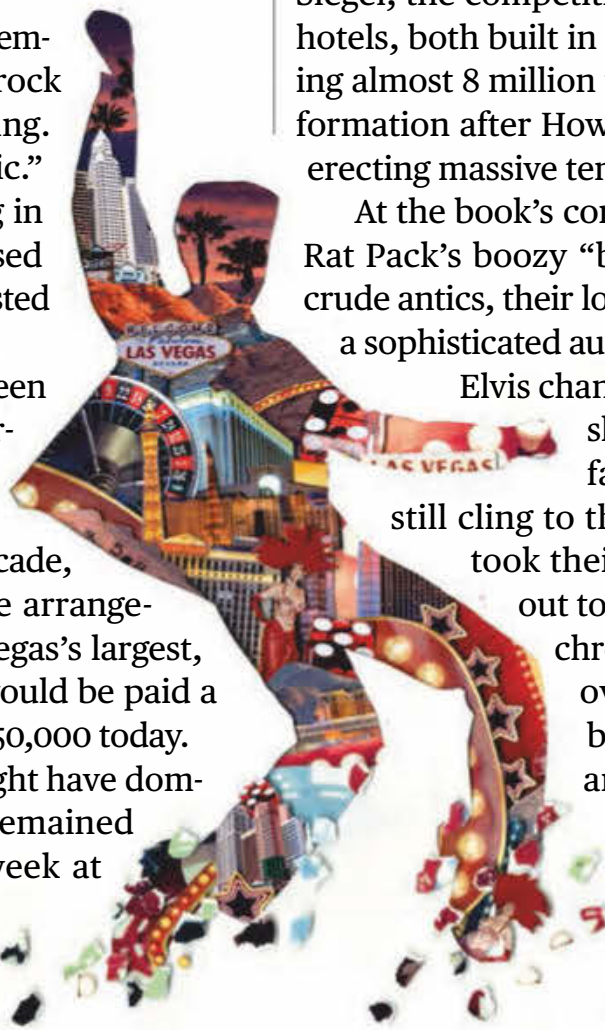
Peter Guralnick covered a lot of this ground in his landmark two-part biography, *Last Train to Memphis* and *Careless Love*, and Zoglin cherry-picks some of Guralnick's choicest quotes. My favorite: "He loved Vegas for one reason above all: time was meaningless here, there were no obligations. It was a place where you could lose yourself, a place you could indulge your every fantasy."

The real achievement of the book then is how Zoglin traces the evolution of Vegas itself, from its incorporation in 1905 as a stopover for railroad passengers heading west, to the seismic changes in 1931 when gambling was legalized and construction on the Hoover Dam began, introducing an itinerant workforce looking to blow off steam. Zoglin recounts the rise of the Flamingo in 1946, funded largely by mobster Bugsy Siegel; the competition between the Sahara and the Sands hotels, both built in 1952 when the city was already averaging almost 8 million tourists a year; and its corporate transformation after Howard Hughes and Kirk Kerkorian began erecting massive temples in the desert dust.

At the book's core are the shows. Zoglin delves into the Rat Pack's boozy "broads-and-dagos" routine. For all the crude antics, their lounge acts were intimate affairs aimed at a sophisticated audience and high rollers.

Elvis changed that calculus. His "bombastic stage shows came to symbolize the gaudiness, fakery, and middlebrow bad taste" that still cling to the city, writes Zoglin. As the excesses took their toll, this career resurrection turned out to be a temporary one. Through his well-chronicled drug abuse, Elvis did 636 shows over seven years, every one a sellout—but with the diminishing returns of an addict.

As we know now, the house always wins. "I make the same [money] as other entertainers who work in Vegas," Jack Benny once joked. "The only difference is that I take mine home." **B**



The Original Sunblock

Carefree style meets quality construction in a chic straw chapeau. *Photograph by Robin Stein*

There's no such thing as a neutral hat, or so the saying goes, and never are the sartorial stakes higher than in summer. Hot days demand a topper that blocks the sun without locking in the temperature. Enter Janessa Leoné, an English major-turned-designer whose eponymous Los Angeles-based brand sells straw fedoras, boaters, and more that

are handwoven in the U.S. Her \$250 Eloise hat is wide enough at the brim to offer shade—or privacy, for the chic introvert—but light enough to give it a breathability normally achieved by mesh alone.

THE CASE

Leoné's pieces are fabricated out of straw sourced from Latin America and woven by a single artisan. It's a process that takes more than eight hours but yields high-quality construction intended to last many seasons. The classical shapes and minimal design accents, such as the elegant black stripes on the Eloise, make a simple, bold statement—whether in Miami or the Mediterranean. \$250; janessa-leone.com

THE COMPETITION

- With prices starting at \$49, Wyeth, also based in L.A., has a wide variety of beach hats and crushable derbies with sweet details like raffia crochet strips and grosgrain ribbons.
- The granddaddy for aficionados is Italian brand Borsalino, which has made impeccable caps since 1857. Options include

travel-friendly woven hemp sombreros with a brim wide enough to cover your shoulders (\$425) and asymmetrical fedoras in turquoise (\$395).

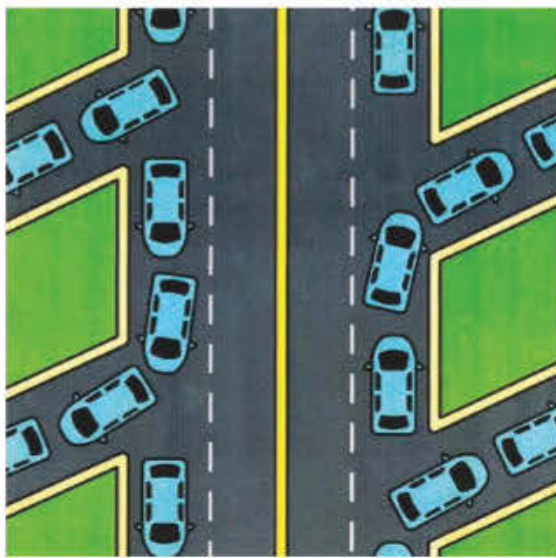
- An advanced move in hat circles is to wear New York-based NTTE, which offers one-of-a-kind, deconstructed straw and leather cowboy hats and other vintage numbers in its Boho Rock line. Prices hover around \$500.



Uber Should Become the Amazon of Routing

By Shira Ovide

More than a decade ago, Amazon.com Inc. started letting other businesses rent its computer horsepower by the hour and store digital files on Amazon's computing infrastructure. This side hustle is now one of the most important innovations of the internet age—and a highly lucrative one. Amazon Web Services, or AWS, may not be as widely known as Amazon's online shopping mall. But it has become essential plumbing for the technology industry, and it's a key ingredient in Amazon's appeal to investors.



That brings us to Uber Technologies Inc. Amazon began AWS partly because it needed flexible computer resources for its digital mall and figured other companies had similar needs. Uber has spent a decade honing technology for its own needs. Could that be the seed for its own AWS?

Uber software quickly matches people who want a ride with drivers nearby, calculates prices that can motivate drivers to hit the road, and plots efficient routes. These are tasks many companies now build for themselves, whether it's Airbnb Inc. connecting homeowners with people looking for lodging or Instacart matching couriers with people asking them to do the weekly grocery shopping. Uber could make versions of its mapping, routing, matching, and fraud detection and payments technology available for sale to those companies and many others.

This isn't purely a pie-in-the-sky idea. Thuan Pham, Uber's chief technology officer, said at a tech conference in early July that the company imagines one day offering

its technology to other businesses, comparing this to Uber's twist on AWS. "We don't see why we can't ultimately offer that to other people," he told attendees. But he also stressed that Uber doesn't plan to pursue this idea anytime soon.

Copying AWS isn't a trivial task, and it might be unwise. Part of Uber's advantage is its technology foundation, and it could undermine the company if it sold its secret formula to others. Plus, AWS had the advantage of just about every business in the world requiring comput-

ing resources, whereas there's naturally a smaller pool of customers for supply-demand matching and routing software. Still, it's easy to imagine a half-measure that could be feasible. Might transit agencies be willing to buy Uber's mapping and dispatch technology?

One area where selling Uber software to other companies could help is in the finance department. Software tends to generate profits—lots of profits. Amazon Web Services reports a profit (excluding some items) of about 29¢ for each dollar of revenue. Uber doesn't have lots of profits. On the same basis, it had a loss of 30¢ for each dollar of revenue in the last 12 months.

Companies that sell technology to other companies are also among the most beloved investments for stock buyers. Meanwhile, Uber's shares have dipped below the stock price in the company's May initial public offering, and as of mid-July are lower still than Uber's private stock sales in late 2015. **B** —Ovide is a tech columnist for Bloomberg Opinion

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