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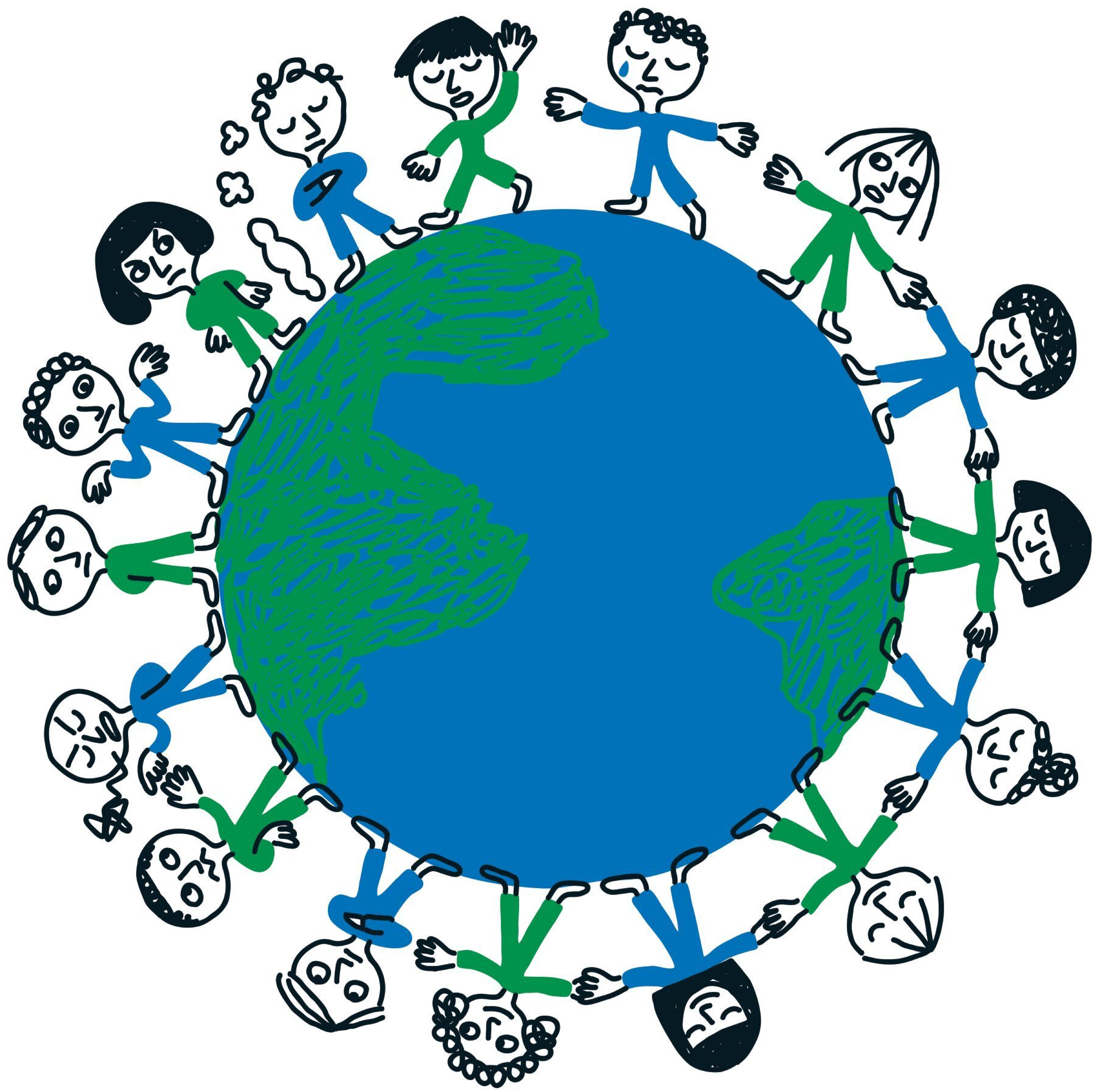

The World ♥ Corporate Taxes

For the first time, rich and poor nations are coming together to squeeze multinationals

10

HYUNDAI MOTORSTUDIO BEIJING

HYUNDAI MOTORSTUDIO SEOUL

HYUNDAI MOTORSTUDIO MOSCOW

HYUNDAI × RHIZOME NEW MUSEUM

THREE STRATEGIES TO KEEP UP WITH E-COMMERCE FULFILLMENT DEMAND

E-commerce in the U.S. was already on a tremendous growth path prior to COVID-19, growing at about a 15% compound annual growth rate for the last decade plus. The pandemic accelerated e-commerce growth exponentially, bringing the overall penetration of online retail in the U.S. up from just 11% at the end of 2019 to nearly 30% in the second quarter of 2020, and 45% over the 2020 holiday period, according to Digital Commerce 360.

For supply chain logistics and transportation, the acceleration and increasing penetration of e-commerce has profound implications, both in terms of the buildout of warehouses, distribution centers, and fulfillment centers to place inventory closer to consumers, as well as how products are routed and shipped.

This accelerated growth has caused a multitude of U.S. companies to be met with an enormous, rapid, and unexpected influx of e-commerce demand. As a result of the proliferation of e-commerce and the pandemic, sales at most retailers' brick-and-mortar store locations have decreased. This shift in buying behaviors requires retailers to have an exceptional and flexible supply chain in place to be able to smoothly manage this transition.

Because implementing an e-commerce strategy on their own can be costly, many retailers, big and small, are turning to third party providers like Ryder for expertise and a solution that lowers costs. Here are three ways partnering with a provider can set retailers up for success.

Infrastructure & Diversification

One of the top lessons of 2020 is the need to diversify fulfillment operations. Having one location to hold inventory or working with one carrier has a great risk associated with it. Retailers with single locations found they were capped, delayed, or shuttered, which can negatively affect an operation. Diversifying locations and carriers has proven to be a successful solution.

Partnering with a provider like Ryder can help. It allows retailers to take advantage of a vast network and place inventory at multiple locations. This improves fulfillment and customer satisfaction. Additionally because of the infrastructure, retailers can take advantage of being in a multi-client facility, which allows them to spilt costs with other retailers and eliminates upfront costs. This applies to transportation as well, a provider like Ryder works with numerous carriers to ensure orders are fulfilled on-time and at the lowest operating cost.

Technology

Having technology systems in place that allow the operation to flex and adapt quickly to change creates success. For example, at the end of 2019 just 7% of business offered curbside pickup. By August 2020, 43% of stores offered it, according to Digital Commerce 360. Without the proper technology already in place, companies would not have been able to pivot so quickly to provide this service. Additionally, the right warehouse management, order fulfillment, and transportation management technology can provide data on where to locate inventory and fulfill orders across the network.

Ryder is able to implement the technology necessary for retailers to keep e-commerce fulfillment operations moving and provide visibility across the entire network. This technology also includes analyzing data of where to place inventory, carrier scheduling and routing, and allowing companies to pivot their strategies to meet consumer needs.

Creating Resilience

The demand from consumers continues to grow, creating a greater need for flexibility and resilience. Whether its expedited fulfillment, free shipping, curbside pickup, or hassle free returns, constant pressure is being put on retailers' supply chains to keep up.

With the trajectory of e-commerce growth continuing to accelerate, outsourcing distribution and logistics becomes a logical approach. A third party provider, like Ryder, is well positioned to help companies overcome various challenge from pandemics to labor shortages, seasonal peaks, and shifts in consumer behavior. Ryder provides the people, space, and systems to quickly pivot strategies to help companies develop a supply chain that is well prepared for any future disruption.

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◀ Lim at his home in Vancouver, Wash., which doubles as the headquarters for his company VanwaTech

PHOTOGRAPH BY BRENDAN BURTON FOR BLOOMBERG BUSINESSWEEK

FEATURES

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■ COVER TRAIL

How the cover gets made

1

"This week we're looking at a global effort to get multinational corporations to pay higher taxes."

"Like…all the world joining hands together to solve a seemingly unsolvable problem?"

"Probably overly optimistic, but—"

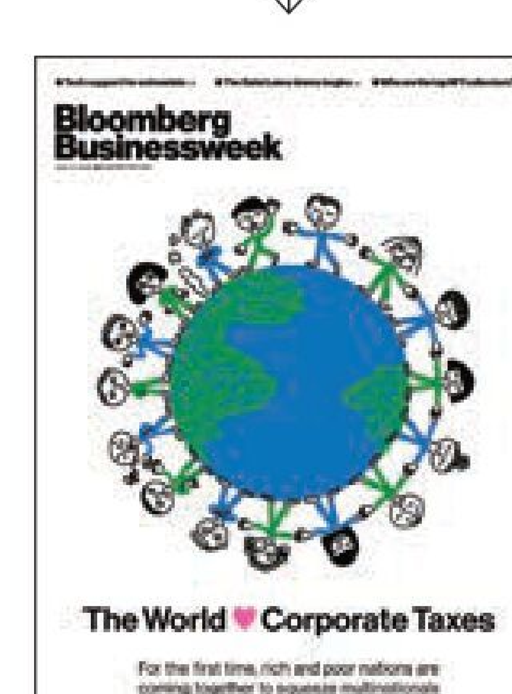
"I'd like to teach the world to pay…their share of corporate tax… Da-doo-doo-doo… I'd like to make—"

"Um, what are you doing? We're in the middle of a conversation."

"Singing that song from the Coke commercial! You know, the one Don Draper made in *Mad Men*!"

"I worry WFH is warping your sense of reality. Maybe come back to the office soon?"

"Joe Exotic, Lady Whistledown, and I will discuss at the watercooler."



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● There have been nearly 138 million cases of Covid-19 worldwide, and almost

3m

have died. Globally, more than 817 million vaccine doses have been given. The U.S. paused use of the Johnson & Johnson shot on April 13 after six women who got it developed a rare and severe form of blood clotting.

● Guillermo Lasso won Ecuador's presidential election. Investors in the debt-default-prone country welcomed the victory of the 65-year-old self-made millionaire.

● With the Derek Chauvin murder trial entering its second month in Minneapolis, protests erupted on April 11 when police in nearby Brooklyn Center killed another Black man, Daunte Wright, during a traffic stop. Kim Potter, the officer who shot Wright, was charged with second-degree manslaughter on April 14.

● Microsoft agreed to buy speech-recognition pioneer Nuance Communications in an all-cash deal valued at

$19.6b

The purchase would rank as Microsoft's second-largest, behind its 2016 takeover of LinkedIn.

● Russia continued to mass troops on the Ukrainian border.

The buildup has heightened tensions between the neighbors to a level not seen since President Vladimir Putin annexed the Crimea region in 2014. In a phone conversation with Putin, President Biden called on Russia to reverse the escalation.

● Coinbase Global, the largest U.S. cryptocurrency exchange, had its debut on April 14 through a direct listing on the Nasdaq. On its first day of trading, shares of COIN closed at $328.28, giving the company a valuation of

$86b

● China fined Jack Ma's Alibaba a record $2.8 billion, saying the e-commerce giant had abused its market dominance.

Ma also agreed to transform his payment business Ant Group into a financial holding company, giving Chinese authorities more supervision powers.

● Charles Schwab accidentally sent $1.2 million to the account of a woman in Louisiana.

The recipient, Kelyn Spadoni, had requested just $82.56. Her fortune turned when the bank caught the error: She was fired from her job at the Jefferson Parish Sheriff's Office—and briefly jailed by her former colleagues—for using some of the money to buy a house and a car.

● "I cannot say that I am the greatest. However, I'm the first to win a major, and if that's the bar, then I set it."

Japan's Hideki Matsuyama, 29, became the first Asian-born champion of the Masters at the Augusta National Golf Club, winning the 85th edition of the sport's most prestigious tournament by one stroke on April 11.

● Bernard Madoff, the

Wall Street adviser who defrauded investors out of $19 billion in the world's biggest Ponzi scheme, died in prison on April 14 from natural causes. He was 82.

MINNESOTA: MARK JUHN/GETTY IMAGES. MADOFF: JIN LEE/BLOOMBERG. MATSUYAMA: AUGUSTA NATIONAL/GETTY IMAGES

One Crucial Lesson From Brexit's First 100 Days

What lessons can be drawn from the first 100 days of Brexit? Fewer than one might wish. The chaos of recent months underlines the difficulty, and maybe the pointlessness, of even trying to make forecasts amid such uncertainty.

For a start, the pandemic has overwhelmed the short-term results of the U.K. quitting the European Union. All those calculations of the effects on the country's growth, trade, and employment have been rendered null. Because of Covid-19, the economy has slumped, trade volumes have crashed, and many jobs have disappeared, perhaps never to return. Moreover, adjustment to Brexit has barely begun. Many temporary arrangements are still in place. Crucial agreements, including deals that will shape the City of London as a financial hub, have yet to be negotiated. It'll be some time before the full legal meaning of Brexit is clear, and years after that before its enduring effects can be judged.

At the moment, the harder you look, the more such complications compound. For instance, who would have predicted even three months ago that the pandemic might accrue to Prime Minister Boris Johnson's credit? At that point, the U.K.'s management of the crisis vied to be among the worst in the world, with extremely high infection and death rates and the government's fluctuating analysis and muddled messaging only aggravating the problems. In most of the EU, the crisis seemed to be under far more skillful management.

Then the U.K. managed its vaccine rollout well, and the EU botched it completely. What a difference that's made. A poll for Bloomberg shows that Brexit support has actually grown since the referendum in 2016, with almost two-thirds of adults saying that being outside the EU helped the country's vaccination program. If a referendum on Brexit were conducted now, the survey found, it would pass by a bigger margin than before.

Here's another, and especially dangerous, Brexit contingency. Recent sectarian rioting in Northern Ireland has revived memories of the long conflict that preceded the Good Friday Agreement of 1998. Intractable underlying issues—avoiding a hard border between Northern Ireland and the Republic of Ireland, and minimizing restrictions on trade between the province and the rest of the U.K.—frequently dogged the Brexit negotiations. In the end, the matter was fudged, as it had to be. Now, as they experience the results, many of the North's unionists are enraged. Frustration is boiling over.

The other shoe yet to drop is Scottish independence. The pro-EU Scottish National Party expects to do well in forthcoming elections, and if it does, pressure for a referendum on a Scottish exit from the U.K. (and reentry to the EU) will grow.

Despite all the uncertainty—and accepting that, for the foreseeable future, Brexit won't be reversed—there's one chief lesson the U.K. and the EU should draw: It's vital that they get past the bitterness of their split and start acting like friends. To defeat the pandemic and restore economic growth, they each need the cooperation of the other on vaccine manufacture and distribution, travel restrictions, and so on. And though the friction in Northern Ireland can't be entirely neutralized, it can be mitigated with flexibility on both sides, starting with the recognition that preserving peace should be a higher priority than stringent regulation of any economic border.

In the fullness of time, the U.K.—or what's left of it—will come to recognize that Brexit was a tragic error. But this doesn't mean that, in the meantime, it and the EU are condemned to inflict further needless harm on each other. Ⓑ

For more commentary, go to bloomberg.com/opinion

■ AGENDA

ILLUSTRATION BY MIN HEO

► A Hot Swiss Mess

On April 22, Credit Suisse reports earnings for its first quarter, a period marked by missteps and upheaval. The bank was badly burned by the collapse of Greensill Capital and the downfall of hedge fund Archegos Capital.

► Netflix reports first-quarter earnings on April 20. With more than 200 million subscribers, the streaming giant has withstood increased competition from Disney+ and Amazon.

► Germany's Greens will unveil their candidate for chancellor in the September general elections on April 19. Support for the party has surged, particularly among younger voters.

► The European Central Bank sets interest rates on April 22. Borrowing costs are expected to remain at zero as the EU grapples with a slow recovery and a botched vaccine program.

► President Biden hosts a virtual climate summit on April 22-23. He's invited 40 world leaders to participate, including Russia's Vladimir Putin and China's Xi Jinping.

► Executives from Twitter, Novartis, Slack, and other companies will mingle with the likes of Paris Hilton and Chelsea Clinton at the Collision tech meeting from April 20-22.

► In the second crew launch to the International Space Station by a private company, four astronauts will board a SpaceX Crew Dragon spacecraft on April 22.

Stopping the Race to the Bottom on Taxes

● The U.S. is energizing a global effort to put a floor under corporate tax rates

● By Peter Coy

When I interviewed Kimberly Clausing in 2017, she was an economics professor at Reed College in Portland, Ore., with intriguing but seemingly unachievable ideas for how to make multinational corporations pay taxes. I wrote that her plan was worth studying "if only to see how much better things could be if politics didn't get in the way."

Well, look at her now. In January, just five days after starting a new job at UCLA School of Law, she was offered the position of deputy assistant Treasury secretary for tax analysis. She took a leave from UCLA a month later to make the move to Washington. Her boss, Treasury Secretary Janet Yellen, and her boss's boss, President Joe Biden, have embraced international cooperation in fighting tax avoidance. And the long-shot agenda that Clausing and a circle of academics and activists campaigned for is suddenly looking doable. "There is a strong international consensus around addressing these problems, and our action can encourage action abroad," she said in February in testimony to the Senate Finance Committee.

After decades of undermining one another, 139 rich and poor nations are closing in on a framework for taxing multinational corporations that would be the biggest change in the system since 1923. The goal is to create a united front to prevent corporations from playing one country off against another, recognizing that a race to the bottom in taxation has no winner, only a bunch of revenue-deprived losers.

Multinationals are worried. On April 12 the Business Roundtable, which is the voice of large U.S. corporations, released a member survey showing 76% of chief executive officers believe that one key plank of the Biden plan—doubling the rate on profits earned abroad—would do "moderately" to "very" significant harm to their competitiveness. "The proposed tax increases on job creators would slow America's recovery and hurt workers," Business Roundtable President and CEO Joshua Bolten, who was President George W. Bush's chief of staff, said in a statement.

Taxation of multinationals is a brain-taxing subject, filled with reform jargon like Pillar One, BEPS, GloBE, and Gilti and minimization tactics such as "patent boxes" and "the double Irish with a Dutch sandwich." The complexity is the outcome of a cat-and-mouse game in which regulators close loopholes and corporate tax lawyers quickly discover new ones.

The underlying problem is simple, though. Individual nations operating on their own, no matter how big and powerful, can't easily corral corporations that operate across borders and can shift operations—or even just reported profits—to tax havens such as Bermuda and the Cayman Islands. The Organization for Economic Cooperation and Development estimates that this shell game deprives government coffers of as much as $240 billion a year. So joining forces is essential.

The Biden administration's enthusiasm for squeezing more tax revenue out of multinationals has given fresh impetus to a yearslong project of the Paris-based OECD and the Group of 20, which includes many of the rich countries in the OECD, along with others such as Brazil, China, India, and Indonesia. Almost 100 smaller nations have been invited to participate, making it a truly global effort.

For the U.S., the top priority is plugging the tax revenue leak opened up by tax havens. For Europe, it's taxing the U.S. tech giants, which make a lot of money in Europe but pay little tax there because they have few employees or facilities in the region. For developing countries, it's a taxation formula that gives them a bigger share of the pie, since they're the most dependent on corporate income taxes to fund government. For all, it's about reversing the decades-long flow of income toward capital and away from labor.

The emerging agreement has two parts, or what the OECD calls pillars. The first would change how the right to tax corporations is allocated between countries, relying less on a company's physical presence as the main criterion. The second pillar attempts to stop the race to the bottom in tax rates by creating a global minimum rate.

We are in what Reuven Avi-Yonah, a professor at the University of Michigan Law School, calls the fourth age of regulation of international corporate taxation. In each age, diplomats, accountants, and economists have wrestled with the same set of issues and come up with different answers.

Taxation of corporate profits began in 1909 but became significant during World War I to pay for the war. The first age of coordination began in 1918, when the U.S. adopted the foreign tax credit, and was crystallized in 1923, when the League of Nations—predecessor of the United Nations—named four economists to solve a basic problem: How to make sure corporate profits got taxed once and only once.

The panel, consisting of economists from Great Britain, Italy, the Netherlands, and the U.S., came up with two guiding principles that are still honored today. "First bite of the apple," as it's now known, dictated that the country where the profit was earned had the first chance to tax it. The country where it was headquartered could also tax it, but only after giving the company credit for taxes paid abroad, as the U.S. did with its foreign tax credit. The other, called the "benefits principle," determined that the right to tax flowed from benefits conferred by the taxing government, so business income should be taxed where companies had a physical presence. Multinationals were required to use an "arm's-length" standard in dealings with their foreign subsidiaries, setting prices for transactions equal to those that would prevail in an exchange between independent parties. The goal: to prevent the shifting of profits to affiliates in lower-tax jurisdictions by underpricing sales to them and overpricing purchases from them.

The second age began in the 1960s, when the U.S. was the world's most powerful economy but was beginning to suffer the balance-of-payments problems that ultimately forced it off the gold standard. Multinationals were deferring taxation on foreign profits indefinitely by keeping the money (nominally) abroad, so in 1962 the Kennedy administration won passage of Subpart F of the Internal Revenue Code, which allowed the government to tax certain profits of foreign subsidiaries as if they'd been repatriated.

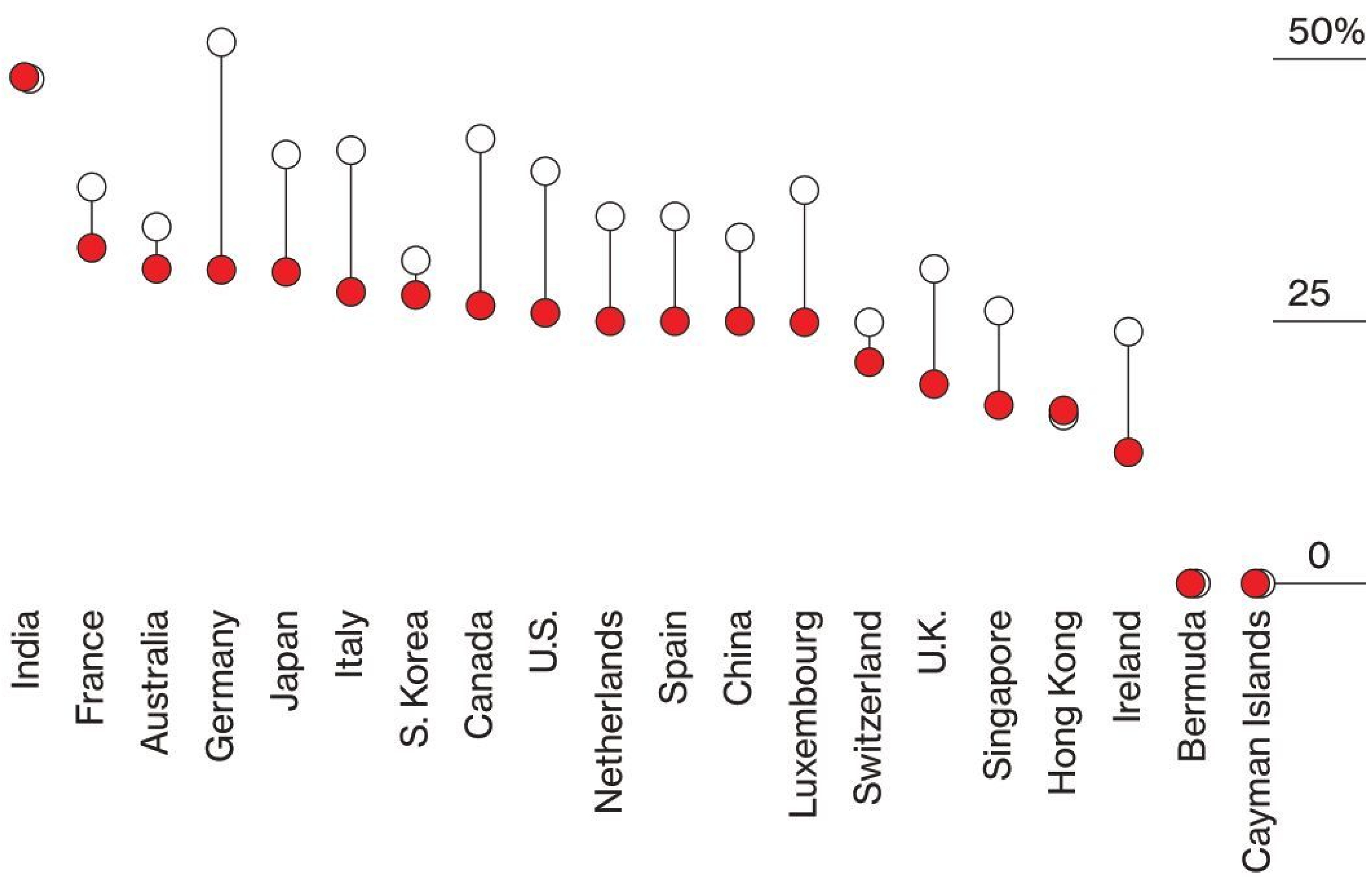
The race to the bottom in tax rates defined what Avi-Yonah calls the third age of tax policy, starting in the early 1980s. As rates fell overseas, President Ronald Reagan and his cabinet were motivated by a fear that U.S. multinationals would lose competitiveness if overtaxed at home. In the name of attracting foreign capital, the U.S. lightened taxation of interest income earned in the U.S. by foreigners. In the 1990s the U.S. narrowed Subpart F, making it easier for U.S. companies to defer taxes on earnings abroad.

By 1998 or so, though, it was becoming clear to government leaders that this race to the bottom benefited no one ▶

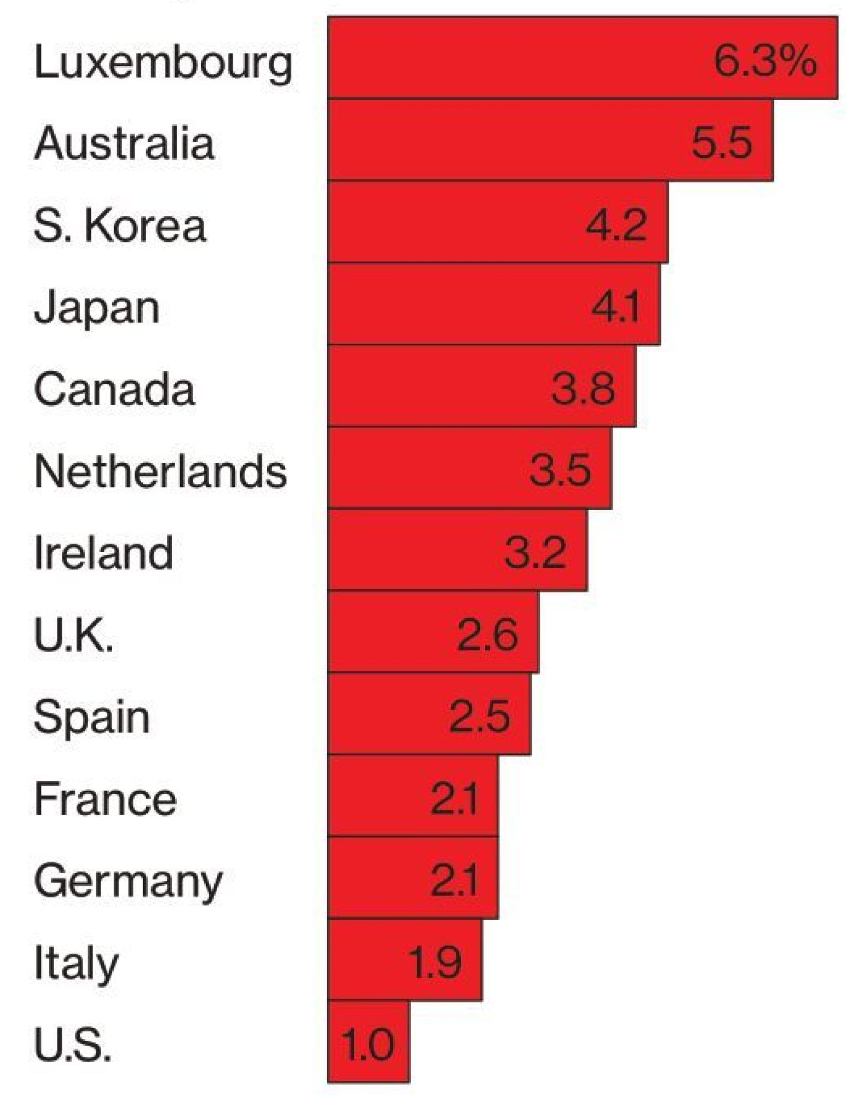
Slippery Slope

Statutory corporate income tax rates

○ 2000 ● 2020



Taxes on corporate income as a share of GDP, 2018



Selected companies paying no U.S. federal income tax in 2020

	Effective tax rate*
Danaher	-20.3%
FedEx	-18.9%
DTE Energy	-16.1%
Nucor	-14.5%
Dish Network	-9.1%
American Electric Power	-6.4%
Nike	-3.8%
Xcel Energy	-0.9%
Salesforce.com	-0.5%
Charter Communications	-0.2%
Consolidated Edison	-0.2%
Advanced Micro Devices	0.0%

*INCLUDING 2020 TAX CREDITS. DATA: OECD, INSTITUTE ON TAXATION AND ECONOMIC POLICY

◀ but the corporations themselves and the handful of nations that taxed them lightly in exchange for getting more of their business. The fourth age–cooperation–began haltingly and then gained impetus from the global financial crisis. In 2015 the OECD completed its first set of standards aimed at fighting erosion of the tax base and profit-shifting. Those proved insufficient, so now it's trying again.

President Donald Trump's Tax Cuts and Jobs Act of 2017, which landed in the midst of the OECD talks, did one good thing for international taxation. To suppress avoidance, it imposed a minimum tax on profits from intangible assets such as patents, trademarks, and copyrights that are attributed to low-tax jurisdictions. This provision is called Gilti, which stands for global intangible low-taxed income and is pronounced "guilty," as in "caught you cheating."

But the main thrust of the 2017 act was to lower taxes on U.S. corporations. Trump didn't get along well with the Europeans in the OECD, fearing their real agenda was to impose taxes on the digital revenue of U.S. tech giants. In June 2019, then-Treasury Secretary Steven Mnuchin asked for the OECD's new system to be set up as a "safe harbor" so U.S. companies could either opt into it or stay with the old system. In January 2021, Trump authorized, then suspended, 25% tariffs on $1.3 billion in French goods, including handbags and lipstick, in retaliation for a 3% tax on digital services the country imposed in 2019. Austria, Italy, Poland, Spain, Turkey, and the U.K., among others, have since introduced similar levies.

Biden is no happier than Trump about digital-services taxes on the likes of Facebook Inc. and Alphabet Inc.'s Google, but his administration isn't just saying no. It's proposing a formula that would apply to about 100 of the world's biggest companies, not single out American tech. Countries would be able to tax companies in proportion to the share of profit, or perhaps revenue, they made in the country, even if the company had little or no physical presence there, according to a draft document first reported on by the *Financial Times* and subsequently viewed by Bloomberg News. Also, Yellen has taken back what Mnuchin said about wanting the OECD plan to be just an option for U.S. companies. Biden is proposing to roughly double the U.S. tax on foreign income of U.S. multinationals, to 21%, which is well above the 12.5% global minimum tax that was under discussion in the OECD/G-20 talks.

America's peers in the OECD speak glowingly about the new spirit of cooperation from Washington. "Finding an agreement by summer is within reach, especially now that the United States have confirmed they are dropping the safe harbor principle," French Finance Minister Bruno Le Maire said in February. He got even more enthusiastic after hearing Biden's plan in April, telling reporters that "what is on the table is a real tax revolution."

The OECD estimated last year that its two pillars, along with the U.S.'s Gilti provision, would increase taxes on multinational corporations by as much as $100 billion a year. The tax take could be larger if Biden manages to push through higher rates and other nations followed suit. Would that discourage companies from investing and hiring? No, says economist Thomas Philippon, a finance professor at New York University's Stern School of Business, because a substantial share of those untaxed or undertaxed profits are "excess"–meaning they're above what companies require to grow. (Excess profits, an economic concept rather than an accounting one, are generated by companies with monopolies or near-monopolies in their market sectors.)

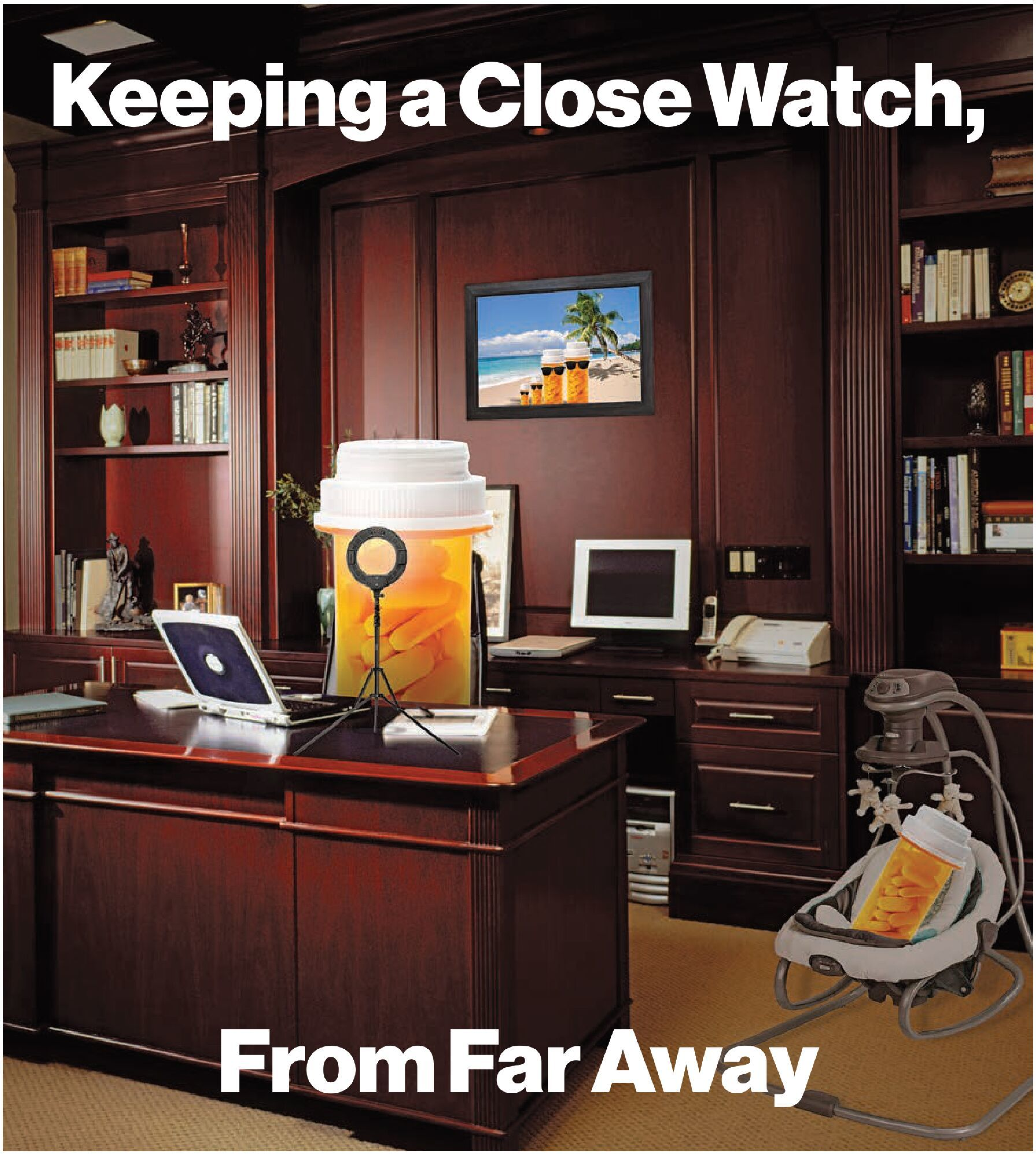
Opposition in the months ahead will come from multinationals and tax havens, especially the seven that Clausing named in her February testimony because they have either low statutory tax rates or large loopholes: Bermuda, the Cayman Islands, Ireland, Luxembourg, the Netherlands, Singapore, and Switzerland. Compromises will have to be struck over rates and formulas, but returning to the status quo ante is no longer conceivable. Pascal Saint-Amans, director of the OECD's Center for Tax Policy and Administration, likes to say there's no Plan B if the project fails, but there is a Plan C: chaos. Ⓑ

IT'S UP TO YOU
COVID-19 VACCINATION

ad COUNCIL

Get the latest information about COVID-19 vaccines at **GetVaccineAnswers.org**

Keeping a Close Watch, From Far Away



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● With travel restricted by the pandemic, the FDA will allow remote inspections of drug plants

For the past year the pandemic has brought a halt to in-person inspections of many pharmaceutical manufacturing facilities around the world. With a backlog of more than 1,000 audits to clear, the U.S. Food and Drug Administration is facing pressure to embrace something it's long eschewed: virtual inspections of foreign drug plants.

Inspectors from some Western nations, including the U.K. and Japan, plus the Council of Europe have tried alternatives to in-person audits, such as assessments that use head-mounted cameras, mobile Wi-Fi hotspots, web conferencing, and confidential document-sharing tools. Although remote audits have allowed the global flow of medicine production to continue during the pandemic, some inspectors say that on-site audits allow better scrutiny, including the ability to conduct surprise inspections, ask questions in real time, and fully review sterile conditions inside facilities.

Still, the FDA on April 14 published general guidelines that could pave the way for the wider use of remote factory evaluations of things like ▶

Edited by James E. Ellis

◀ safety and whether the ingredients used are of the strength level claimed. The agency said the remote inspection guidelines could be used "for the duration of the Covid-19 public health emergency." FDA officials have held talks with international counterparts who've already conducted virtual inspections in places such as India, according to a person familiar with the matter, who asked not to be named because the deliberations weren't public.

About 40% of facilities producing pharmaceuticals that are shipped to the U.S. are in China and India. The FDA prefers in-person plant audits as a way to spot potential quality lapses—such as the soiled uniforms and overflowing toilet drains its inspectors found in an Indian plant in 2013. It has been reluctant to rely on the type of remote monitoring of foreign plants recently used by the U.K. and the European Directorate for the Quality of Medicines and HealthCare (EDQM) because of past problems with some international manufacturing facilities.

Millions of blood pressure pills with active ingredients produced in Asia, for instance, have been recalled in recent years because they were tainted with carcinogens. In 2013, India's Ranbaxy Laboratories Ltd. pleaded guilty to the manufacture and distribution of adulterated drugs, and paid a $500 million penalty to the U.S. Department of Justice, after widespread data manipulation was found at two of its factories.

Although manufacturers rarely welcome the tense, meticulous factory audits from Western agencies that act as gatekeepers to some of the most lucrative drug markets, they complain that the disruption caused by the pandemic has created a backlog of more than 1,000 such reviews, which is hurting their business. "It definitely has created a slowdown in the movement of medicines," says Sireesha Yadlapalli, a senior director in India at the U.S. Pharmacopeia, a more than 200-year-old organization that creates standards for the global industry. The inspection pause also "has the potential to erode trust" in foreign plants that had won approvals years before but are not now undergoing periodic reinspections to make sure they're still meeting standards, she says.

Almost a dozen factories run by three of the biggest Indian pharmaceutical companies were waiting to resolve warning letters and official action requests slapped on their plants by the FDA before the Covid-19 outbreak, according to a report in January by AllianceBernstein LP. A delayed facility tour has also held up U.S. approval of a biosimilar version of the cancer treatment Avastin that's being produced by Bengaluru-based Biocon Ltd.

One regulator exploring remote inspections is the EDQM. From November to February the regulator ran three virtual test inspections at Indian plants and toured the facilities using mobile phone and tablet cameras. "It could become an additional pillar" of supervision, says manufacturing practices inspector Cristina Baccarelli. She's part of a team that typically visits 40 pharmaceutical production facilities a year but has been grounded since April 2020, when the EDQM curtailed overseas travel.

The U.K.'s Medicines and Healthcare Products Regulatory Agency (MHRA) has conducted more than 750 inspections since last April, including an unspecified number that have been done remotely. This year it audited the Serum Institute of India Pvt Ltd., the world's largest vaccine maker, which is supplying Britain and most of the developing world with millions of doses of AstraZeneca Plc's Covid shot.

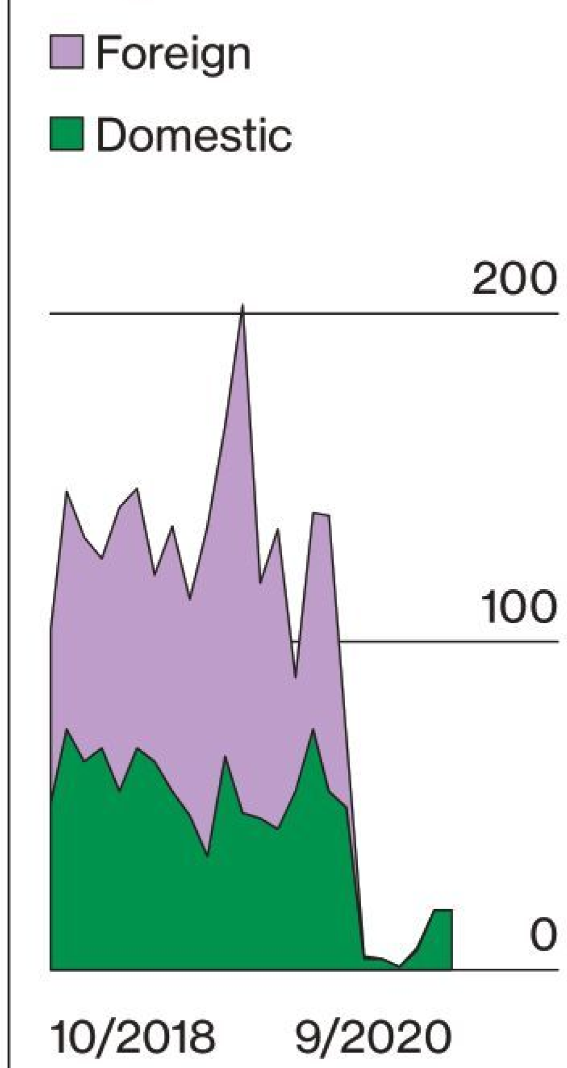
"We intend to continue with a hybrid approach of both remote and on-site activities post-pandemic," says Paula Walker, a unit manager for inspection operations at the MHRA. Remote inspections, she says, have enabled the agency to continue its mission "of ensuring patient and public health, and security of the supply chain during the pandemic."

Such approaches are dogged with challenges: patchy internet speeds, particularly in remote regions; equipment that isn't standardized; and, perhaps most crucially, the lack of the element of surprise, a key tool in policing an industry that has a history of manufacturing fraud. "It is not easy to substitute certain elements of on-site inspections, such as body language interpretation, direct and immediate interaction with all operators, quick and unpredicted changes of the inspection agenda," Baccarelli says.

Virtual approaches also aren't well suited for certain areas, such as sterile facilities, Walker says. And the USP's Yadlapalli says data assurance is harder and access is limited, with inspectors unable to look into trash cans for shredded documents or, in extreme cases, sleuth out fake "show" facilities. "Those types of deep dives are hard," says Yadlapalli, who predicts post-pandemic use of remote technology will probably be limited to checking on established low-risk manufacturers. "There are some definite challenges."

Although the FDA is only now issuing expanded guidance for virtual plant audits, it's adapted to the pandemic by using "additional tools such as remote interactive evaluations, record requests,

▼ Inspections of drug manufacturing facilities by the U.S. Food and Drug Administration



PHOTOGRAPH BY ANDRIA LO FOR BLOOMBERG BUSINESSWEEK. DATA: GOVERNMENT ACCOUNTABILITY OFFICE ANALYSIS OF FOOD AND DRUG ADMINISTRATION DATA and leveraging information from trusted regulatory partners," says a spokesperson for the agency.

The FDA has also conducted a few "mission critical" in-person visits, including some in India, since January, the spokesperson says. But the agency's overseas offices are short-staffed, and inspections are considered only for companies producing Covid-related treatments or drugs that are in short supply. The scale of the oversight is daunting, with 550 FDA-approved plants in India that need to be monitored, the most outside the U.S., according to the Indian Pharmaceutical Alliance.

Unless the FDA–which typically conducts about 1,500 domestic and international surveillance trips annually–somehow speeds up the pace of inspections, the agency will face bottlenecks for years to come. Pandemic restrictions could potentially increase the number of plants going more than five years without an audit, the U.S. Government Accountability Office warned in a report in March.

As those holdups linger, anxious Indian drugmakers are continuing to lobby the FDA to start virtual evaluations. At an online industry event in February, an executive from Mumbai-based Lupin Ltd., which is waiting for multiple plants to be inspected, asked an FDA official why the agency wasn't following the lead of other nations' regulators. "We get that question a lot," responded Christopher Middendorf, an inspector who's based in India. The FDA is "considering all options. Nothing is off the table." —*Chris Kay*

THE BOTTOM LINE The FDA typically conducts 1,500 domestic and international drug plant inspection trips annually. Covid travel restrictions have led to a backlog of more than 1,000 reviews.

The Food Fight in Fake Meat

● Beyond Meat was an early leader. But rival Impossible Foods and others want to eat its lunch

When Beyond Meat Inc. went public in May 2019, its shares soared 163% on its first day of trading, making it the best-performing large IPO in the U.S. in more than a decade. That boffo stock market debut might have led many to think that Beyond had a lock on the faux meat market. But don't tell that to Bareburger, a 38-location, New York-based upscale burger chain with a mix of meat and vegan options. It took Beyond's products off its menu in the spring of 2020, while continuing to serve those of archrival Impossible Foods Inc. "It wasn't a hard decision to move away from Beyond," says Jonathan Lemon, Bareburger's director of culinary operations. The chain had been serving both Beyond's and Impossible's fare for more than two years, and decided it wasn't worth keeping Beyond's patties in stock when they drew so few orders from its customers. "We were moving a lot more Impossible," Lemon says.

A few years ago the big question was whether fake meat would take off. Now that it's moving into the mainstream–the global market is projected ▶

◀ to reach $450 billion by 2040, according to global consulting firm Kearney—the new question is: Who will ultimately command the industry?

In the U.S., the race has been largely between Los Angeles-based Beyond and Silicon Valley-based Impossible. From the numbers alone, Beyond is the clear leader: It's in more U.S. retailers (28,000 compared with Impossible's 20,000), more restaurants (42,000 in the U.S. vs. 30,000-plus), and more international markets (more than 80 vs. 5). The company reported a 36.6% net revenue increase for 2020 and in 2021 has announced new or expanded partnerships with McDonald's, Yum! Brands, and PepsiCo. It has strong footholds in China and the European Union, where doors remain closed to Impossible's products because of heme, the genetically modified ingredient they contain.

But Beyond's lead may be narrowing. Its food-service sales dropped precipitously during the pandemic, because of lockdowns and the company's heavy dependence on small sit-down restaurant chains and independents. While those eateries suffered big losses as dining out was restricted, larger chains fared better thanks to their established ordering technology and Covid-friendly drive-thrus.

That's caused a shift in Beyond's profile. Its split of big restaurants-to-small operators, hotels, colleges, etc., went from 30%-70% at the end of 2019 to 42%-58% by the summer of 2020, and not because it added more large chains. "That revenue change that's occurring is predominantly being driven by that decline in the smaller-account business," Chief Executive Officer Ethan Brown said during the company's investor call in August.

The recently introduced expansion of Beyond sausage breakfast items to the Peet's Coffee and Caribou Coffee chains should help lift the company's food-service numbers, as will the partnerships with McDonald's and Yum! as they join Dunkin' as major restaurant companies selling Beyond products. But Brown has said those big fast-food deals won't yield results before late 2021.

In the meantime, Impossible has been expanding its footprint in restaurants. In June it announced a breakfast sandwich would be sold at a majority of U.S. Starbucks locations—Beyond's marquee restaurant partner in China. The coffee chain joined major players like Burger King, White Castle, Red Robin, and Qdoba in selling Impossible products. That's resulted in most of Impossible's restaurant customers being large chains with pandemic-resilient takeout, drive-thru, and delivery options—exactly the kinds of eateries where Beyond is weaker. "That's an example where Covid may have actually helped us," Impossible President Dennis Woodside said in January, explaining that the ease of ordering through an app was improving his products' sales growth.

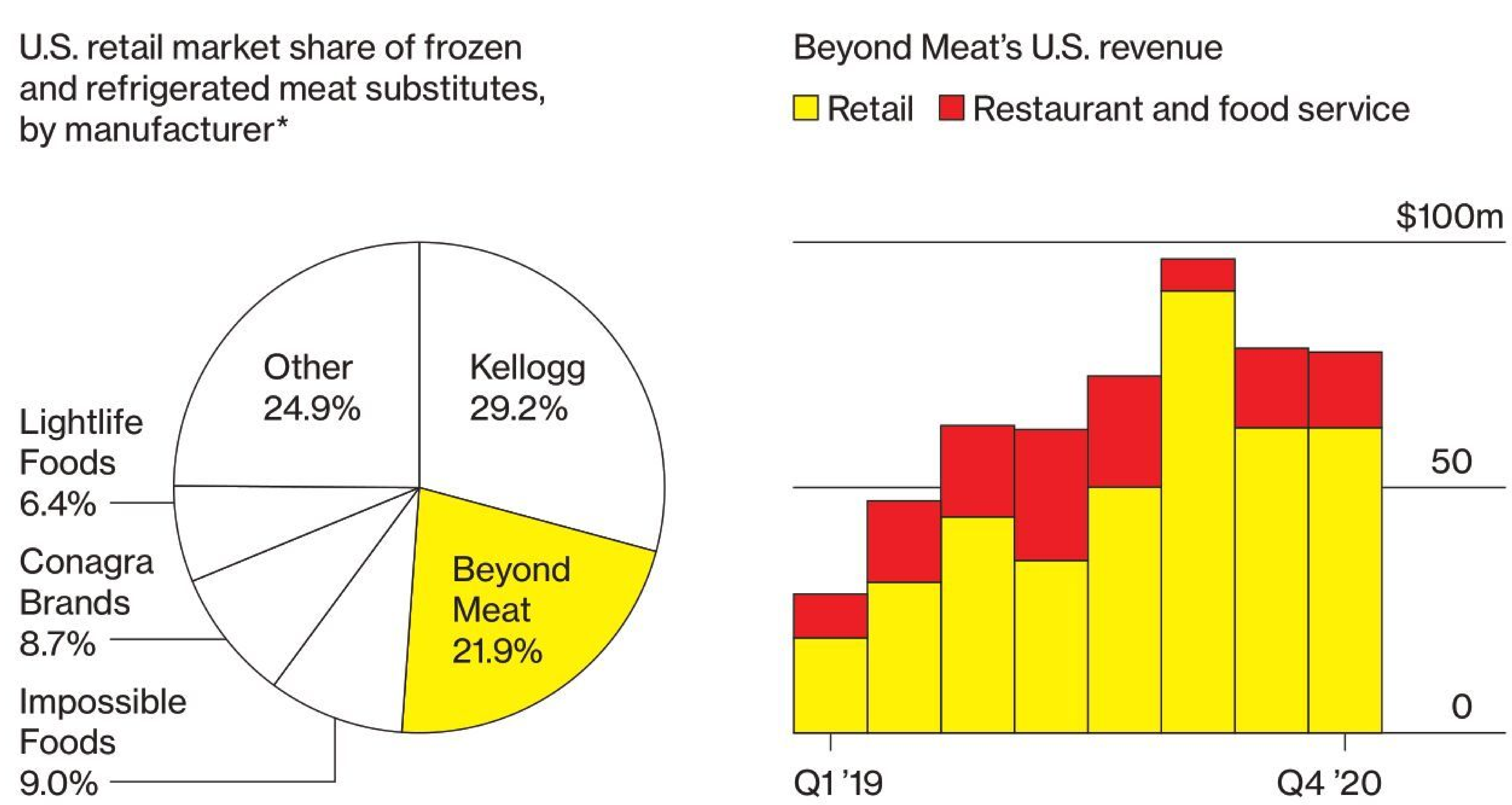
Even in supermarkets, long a stronghold for Beyond, Impossible has made significant inroads. During the pandemic, Impossible has increased its presence in U.S. supermarkets from about 150 to more than 20,000. That catapulted Impossible from a 5% market share in fresh plant-based patties sold at retail to 55%, largely at Beyond's expense, according to an AllianceBernstein analysis. Beyond is still in more stores and sells sausage products, too, but the gap in locations has narrowed to just several thousand, and Impossible's sausage is certain to reach supermarkets eventually.

This year Impossible cut its prices for restaurants and grocery stores, undercutting Beyond and edging closer to the cost of beef. Beyond, in turn, offered its most aggressive promotional pricing at retail so far, says Faith Garrard, a senior category manager at California-based Raley's supermarkets. Its burgers and ground beef retain the two top spots in the meat alternatives category, she says, but the brands are still neck and neck. Beyond says any promotions were planned months in advance of Impossible's price cut.

Competitors are also elbowing their way in. Livekindly Collective, an international company with $335 million in fresh funding that's led by former Unilever Plc executive Kees Kruythoff, sells a range of faux meats, including a crispy "chick'n" nugget that uses a slogan close to Beyond's marketing pitch. "Eat what you like," it says on the back of the product packaging, a near-echo of Beyond's "Eat What You Love" slogan. Beyond has sold crispy

Where's the Beef?

Beyond Meat is among the leaders of the U.S. retail market, but its restaurant sales took a hit during the pandemic.



*MARKET SHARE FOR THE 26 WEEKS ENDED MARCH 21, 2021. DATA: IRI, BLOOMBERG

CINDY ORD/GETTY IMAGES

chicken through trials with KFC's restaurants, but has yet to sell it in a supermarket. "We will launch a chicken when we feel we have one that we feel is a groundbreaking, best-in-class chicken product," says Chuck Muth, Beyond's chief growth officer. "I can't give you an exact date right now; I would say coming sometime in the relatively near future."

Retailers are also moving into plant-based substitutes in their private-label products, which often have lower prices than brand-name goods and benefit from guaranteed shelf space. Supermarket chain Kroger Co.'s Simple Truth brand has put out more than 50 vegan meat and dairy alternatives, including dips, desserts, and, of course, faux meats. Wegmans, Albertsons, and smaller regional chains now sell their own versions, too. And major meat producers Smithfield Foods Inc. and JBS SA have rolled out products. All of them are benefiting from the exposure Beyond and Impossible are creating for the whole sector.

"They're educating the public for us," says Danny O'Malley, a former Beyond sales executive who's the founder and president of Before the Butcher, a maker of private-label plant-based products. His company doesn't have the budget for marketing and publicity to match Impossible and Beyond, he says—but thanks to them, he doesn't need it. "I'm proud of the fact that we hang on to the coattails of leaders of the industry."

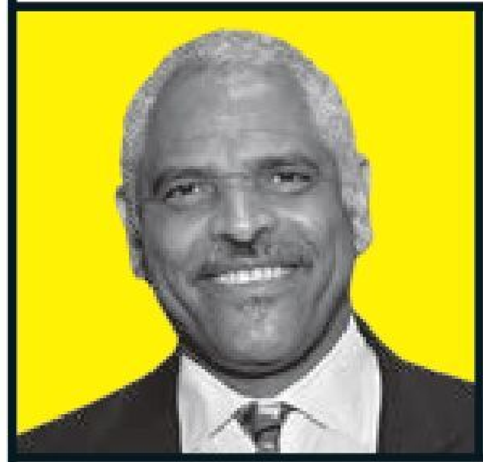
Beyond is now in production in Europe (with a local partner) and China (with its own, just-opened factory), giving it significantly wider international reach than Impossible. But there are local players around the world, some with their own lucrative fast-food contracts, that can't be ignored. Even McDonald's, which in February named Beyond its "preferred supplier" for the McPlant, has said that restaurants that already sell competing faux meats can continue to do so.

The world's insatiable appetite for meat should leave plenty of room for everyone trying to sell substitutes. Sales of plant-based meats are only 2.7% of packaged meat sales in the U.S., their makers say. But that doesn't mean Beyond can rest easy. Although Bernstein's Alexia Howard recently wrote that she "suspect[s] that Beyond Meat and Impossible Foods will remain the market leaders," she also sounded a note of caution for Beyond, recalling the soda wars that knighted a clear and sustained sales winner: "Impossible may become the category's Coke to Beyond's Pepsi." *—Deena Shanker, with Leslie Patton*

THE BOTTOM LINE Plant-based meat substitutes could be a $450 billion market by 2040. That prospect has drawn more rivals for pioneers Beyond Meat and Impossible Foods.

BW Talks Arnold Donald

Carnival Corp.'s U.S. business has been halted by a yearlong ban on cruises from U.S. ports. The chief executive officer questions the fairness of restricting cruises while allowing other travel modes with less-stringent health protocols. —*Carol Massar*



● Donald has been CEO of Carnival, the world's largest cruise company, with nine lines, since 2013 ● Carnival's eponymous U.S.-based unit said on April 6 it may consider moving its ships from U.S. home ports ● The U.S. later said it might allow restricted cruising by midsummer

Was mentioning possibly leaving U.S. ports a threat to the Centers for Disease Control and Prevention?

No, there was no threat. It's just a practical reality that if we're not able to sail from the U.S.... soon, we would have to sail from elsewhere.

So what's next with U.S. officials?

We're hopeful we'll be able to meet with the administration and the CDC and come up with something that's practical and will allow people to return to their choice of vacation travel—and get a lot of Americans back to work. Over a half-million people are impacted in the U.S. in jobs associated with the cruise industry, outside of the cruise lines themselves.

Are cruise lines being treated unfairly?

Today you can board a plane, fly to a country, get on a cruise ship and sail, fly back from that country, and come back to the U.S. You'd have to do certain testing, but you can do that. Yet, even if vaccinated, you can't get on a cruise ship in the U.S. If you look at arenas where people are able to attend sporting events, restaurants, hotels, resorts, air travel, there's a level of risk management and mitigation. So we would like to just be treated similarly to the rest of the travel and tourism sector.

Are travelers ready to resume cruising?

When we announced three brands with sailings in July in the U.K., Princess had its second-highest-ever single-day bookings. P&O had its highest in seven years, and Cunard its highest in a decade. There's plenty of pent-up demand.

Will you require passengers to be vaccinated, like Norwegian Cruise Line just announced it will?

No. We would encourage everyone to get vaccinated, but today vaccines are not accessible to everyone. And we respect personal choice. So we'll follow what the regulations are wherever it is.

● Interviews are edited for clarity and length. Listen to *Bloomberg Businessweek With Carol Massar and Tim Stenovec*, weekdays from 2 p.m. to 5 p.m. ET on Bloomberg Radio.

In Hot Pursuit

Chris Urmson's company, Aurora, has merged with Uber's self-driving unit to take on Waymo

On Feb. 11, about a month after closing on the acquisition of Uber's Advanced Technologies Group, or ATG, the self-driving-car startup Aurora held an all-hands meeting. Like every other company meeting since the pandemic began, it took place via videoconference, and included the simulacra of in-person office interactions. When managers handed out awards, there was no applause from co-workers. Instead, Aurora co-founder and Chief Executive Officer Chris Urmson hit a button that produced canned cheers and clapping. "I am so looking forward to not having that button," Urmson said after setting it off for the third time.

The weeks leading up to the meeting had been full of upheaval at Aurora Innovation Inc. Uber Technologies Inc. had essentially paid it to take ATG, forking over $400 million for a stake in the combined enterprise, which was valued at $10 billion. The deal allows Uber to unload a unit that was hemorrhaging cash while keeping a foothold in autonomous vehicles. Aurora, in return, adds almost 1,000 employees, more than doubling its workforce to 1,600 and bolstering its bid to become a credible competitor to Alphabet Inc.'s

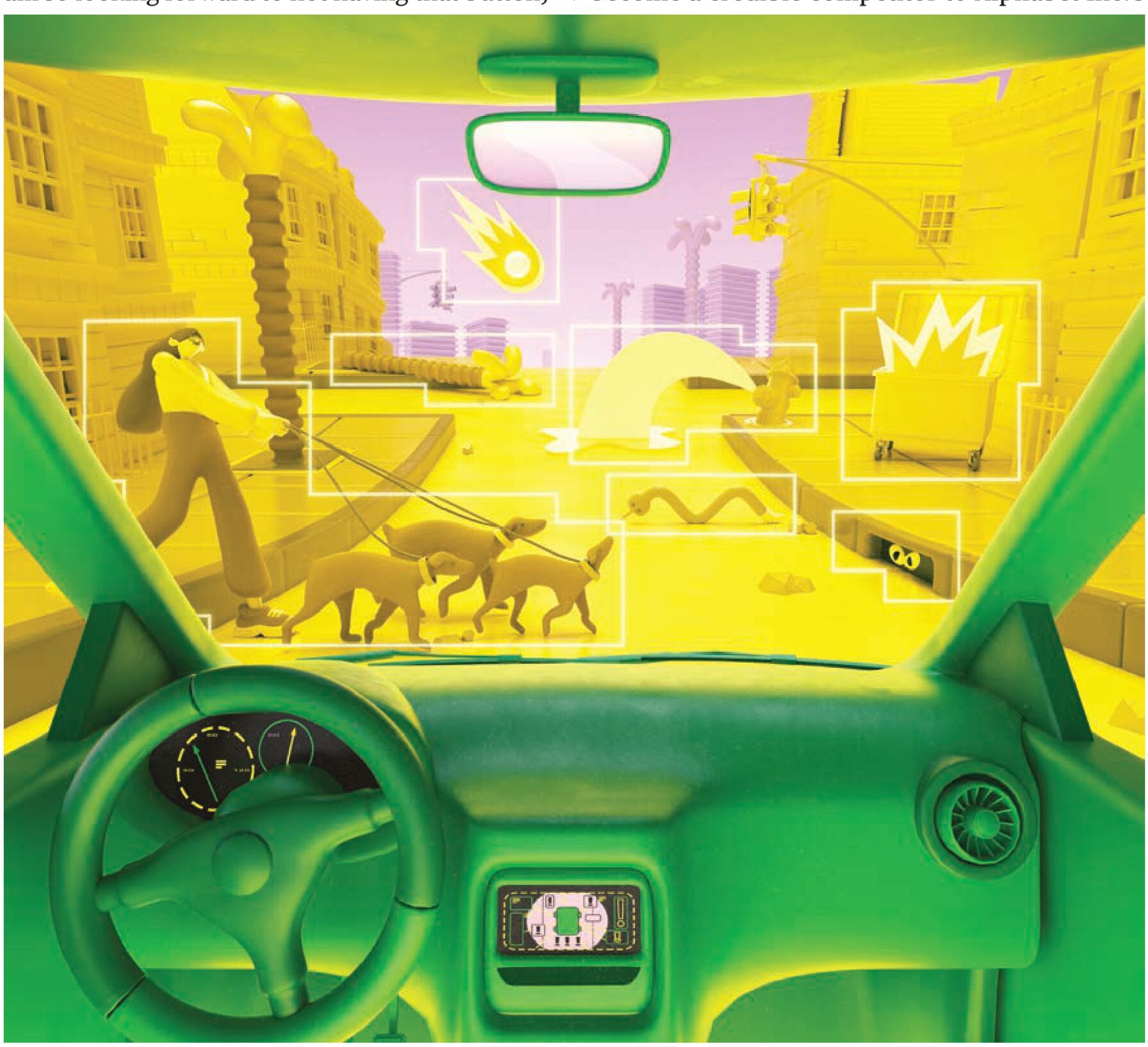


ILLUSTRATION BY JOSEPH MELHUISH. URMSON: COURTESY AURORA

Edited by Joshua Brustein

For more on self-driving technology and the commercialization of space, go to bloomberg.com/hyperdrive

Waymo. The deal also gives Aurora what could be a bigger prize: the right to provide robo-taxis to Uber's ride-hailing network.

"Having a strategic relationship with Uber is an incredible advantage," Urmson says. Over the past two decades he's done more than perhaps anyone to push the development of autonomous-driving technology. Now he's in a leading position to be the first to truly commercialize it. But with the addition of hundreds of highly paid engineers and a large pool of potential customers, Urmson is under more pressure than ever to bring a product to market.

Since co-founding the company in January 2017—with former Tesla engineer Sterling Anderson and Drew Bagnell, who came from ATG—Urmson has been lining up deals to ensure that buyers will be waiting when his robot drivers are ready. The plan is to begin with long-haul trucking. Earlier this year, Paccar Inc. and Volvo Group signed agreements to install Aurora's automated driving system in their trucks. The two companies would then offer these trucks, capable of operating themselves for long stretches, to their shipping customers, who would pay Aurora for the hours of automated driving.

After establishing itself in trucking, Aurora would begin cherry-picking the easiest, most lucrative trips from Uber's ride-hailing network. A customer looking to go 25 miles, mostly by highway in light traffic, might be greeted by a driverless car. Aurora already has a deal with Toyota Motor Corp. to build robo-taxi fleets.

A 2019 investment from Amazon.com Inc. sets the company up for a similar strategy in delivery, allowing it to service the easiest routes for e-commerce customers. If all goes right, its robot drivers would take over entire fleets of cars, trucks, and vans.

Urmson says Aurora's driving system can become better than the average trucker in a matter of years, not decades. He has a target in mind for when the first trucking product will be ready, though he's not yet willing to share it. He knows as well as anybody how the work of building autonomous vehicles can expand endlessly. At 44, Urmson has been working on self-driving cars for most of his adult life, first as a 27-year-old graduate student at Carnegie Mellon University, where he led teams that competed in three Defense Advanced Research Projects Agency (Darpa) challenges, winning the final race in 2007. He then spent eight years with Google's self-driving-car project, now known as Waymo.

Urmson left in 2016, shortly after Google passed him over for the CEO job and instead hired former Hyundai Motor Co. executive John Krafcik. "I'd been leading and building that team and, for all intents and purposes, general managing it for years," he says. "Of course I wanted to run the program." (Krafcik announced in April that he was leaving Waymo.)

▲ Urmson

Aurora was born from meetings Urmson had with Reid Hoffman, the LinkedIn co-founder and venture investor, and Mike Volpi of Index Ventures. The three thought that the automotive industry wouldn't tolerate a Google monopoly in self-driving technology and that Urmson was the one to develop a viable alternative. "Chris had already gone through and solved the problem once," Hoffman says, "and now knew which things he would rebuild entirely differently."

"Having a strategic relationship with Uber is an incredible advantage"

In 2018, Hoffman's firm Greylock Partners and Volpi's Index co-led a $90 million fundraising round in Aurora, which has now raised more than $1 billion. It's likely to take even more before Aurora will be able to support itself. "I don't understand how Aurora is going to be able to survive without raising more capital," says Grayson Brulte, co-founder of Brulte & Co., a consulting firm focused on transportation. The acquisition of ATG and its hundreds of engineers adds to that burden. "It's like taking two money pits and making a bigger one," says one former Aurora manager who asked to remain anonymous when talking about his past employer.

Urmson doesn't shy away from the possibility the company may need to raise more money, and he's confident it would be able to do so. He says the ATG merger is already showing tangible benefits. Before the deal, Aurora spent hours calibrating the sensors on each of its vehicles, with workers walking around holding placards at set distances to be sure the sensors measured accurately. ATG devised a faster, automated process using large turntables to rotate the vehicles. On the February call, a former ATG engineer said the turntables would soon be in place at all of Aurora's vehicle depots. ▶

◀ Aurora will need every possible advantage in the race to bring autonomous vehicles to market. The leading competitor is Urmson's old shop, Waymo, which, in addition to launching the first fully driverless ride-hailing service in suburban Phoenix last year, has a passenger-sharing agreement with Uber's top rival, Lyft Inc. A handful of startups that have joined forces with auto manufacturers, including Cruise with General Motors Co. and Argo AI with Ford Motor Co., also promise to be formidable.

Urmson sees Aurora's singular focus as its advantage. He doesn't have to worry about quarterly earnings in other parts of the company or trying to keep the Detroit office at arm's length. "This is the thing we do," he says. "This is what we're going to be excellent at."

During the February meeting an employee asked if TuSimple, a San Diego-based autonomous-trucking startup that's going public in April, might beat Aurora to that market. "We do think that we are going to be first or at least meaningfully first," Urmson replied. He defines "meaningfully first" as a commercial product that can be scaled safely.

Urmson also believes Aurora's lidar—the laser sensors that most autonomous vehicles use to perceive the world around them—is superior, giving it an edge. In 2019 the company bought the Montana startup Blackmore Sensors & Analytics, which makes a type of lidar called frequency-modulated, continuous-wave, or FMCW, that allows the sensors to simultaneously measure range and velocity, which vastly simplifies the problem of predicting the movements of faraway objects. "When you're driving a truck at 65 miles an hour on the freeway and you want to react to the rare events, you need to see 300 meters down the road," says Urmson. He says no one else in the industry can match that performance.

TuSimple and Waymo—which started its trucking division, Via, in 2017—also promote the superiority of their sensors. A wild card is Tesla Inc., whose CEO, Elon Musk, sees the lidar arms race as a never-ending fool's errand. For the past six years the automaker has been using its millions of electric-vehicle customers as test subjects in a large-scale public road experiment in camera-based autonomous systems, offering an "autopilot" that allows drivers to relinquish control to the car. Musk has said Tesla owners will eventually be able to use their vehicles as robotaxis during downtime. Urmson is skeptical. "It's just not going to happen," he says. "It's technically very impressive what they've done, but we were doing better in 2010."

In 2015, Urmson gave a TED Talk in Vancouver called "How a Driverless Car Sees the Road," explaining how Google's software was learning to recognize cars, buses, cyclists, and pedestrians and anticipate their movements. At the end he displayed a photo of his two sons. "My oldest son is 11," he said, "and that means in four and a half years he's going to be able to get his driver's license. My team and I are committed to making sure that doesn't happen." His son, now 17, still doesn't have his license, but he does have a learner's permit. Over the past few months, while trying to teach trucks to drive themselves, Urmson has also spent a few hours teaching him to drive. "He's working towards it," he says. "I'm not actively sabotaging him." —*Ira Boudway*

THE BOTTOM LINE After merging with Uber's self-driving unit, Aurora has a plan to start with autonomous trucks before moving into ride-hailing and delivery.

The U.K. Wants to Clean Up Space

● The amount of debris in orbit is an increasing danger—and a potential market opportunity

A defunct satellite spent early April hurtling through space toward the body of an old rocket, threatening a collision that the European Union's Space Surveillance and Tracking Consortium estimated could generate more than 4 million pieces of debris.

In the end, the two objects just missed each other, but the incident was a reminder of the increasing prevalence—and danger—of space junk. There are more than 8,000 tons of garbage in orbit, made up of about 26,000 objects wider than 10 centimeters, according to the European Space Agency. Any object of that size could destroy an active satellite, posing a constant threat to the systems that provide everything from weather observation to disaster management to military communications. The worst-case scenario is what's known as the Kessler Syndrome, in which collisions create additional debris, leading to more collisions until whole swaths of orbit become unusable.

A startup called Astroscale Holdings Inc. is trying to solve this problem by using a spacecraft with a robotic arm to snag inoperative satellites, an

▼ Estimated number of satellites launched into orbit from Earth since 1957

■ Total
■ Still in space
■ Not functioning but intact

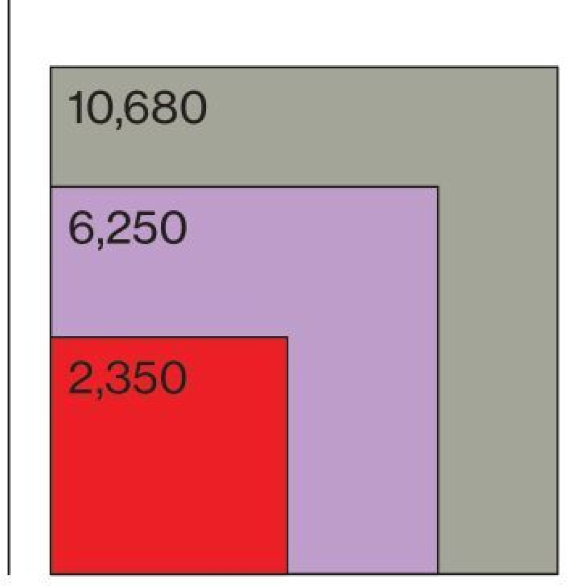


PHOTO ILLUSTRATION BY 731; PHOTOS: ALAMY (1); GETTY IMAGES (1). DATA: THE EUROPEAN SPACE AGENCY alternative to projects from recent years that aim to clean up space with huge nets and junk-grabbing harpoons. If Astroscale's craft can grab debris without losing control in the process, the next step would be to push dead satellites toward Earth so they'll burn up as they reenter the atmosphere.

John Auburn, Astroscale's managing director and group chief commercial officer in the U.K., says that not only could this make space safer, but it could also reinvigorate his country's space sector. "What the U.K. industry is pushing now is a complete end-to-end debris removal mission," he says. "This would be the ultimate post-Brexit space mission."

Although it has more space-focused startups than any country except the U.S. and China, the U.K.'s space program has faced years of underinvestment. Its exit from the EU has further complicated matters, leading to the end of some joint projects, which has deprived both sides of technical expertise. The biggest immediate impact for the country is its loss of access to the most secure tier of Galileo—the EU's answer to the U.S. military's GPS—a project into which the British government has invested hundreds of millions of pounds.

Prime Minister Boris Johnson reset the U.K.'s space ambitions last year when he spent $500 million to bail out OneWeb, a London-based rival to Elon Musk's Starlink network. OneWeb is launching more than 600 satellites into the most congested orbital plane, about 150 of which are already in orbit. Had the U.K. allowed the venture to fail, it may have been liable had one of them smashed into something. OneWeb's satellites are equipped with docking plates to couple with Astroscale's cleanup vehicle, which would make it easier for the startup to remove the satellites after they're decommissioned.

The OneWeb deal and the damage Brexit has caused to the U.K. space industry have added momentum to an idea that's been brewing for years. In a series of conversations in mid-2019, government officials and industry representatives agreed that leading the way on removing debris and improving space management was a significant opportunity, according to a government official familiar with the matter, who wasn't authorized to speak publicly.

"If you recognize that space is a strategic capability, you want to make sure you take care of the operating environment," says Alice Bunn, international director at the U.K. Space Agency. "It turns out we're quite good at that, actually."

The U.K. has expertise in space law, regulation, and insurance, as well as infrastructure for monitoring space weather that can affect satellites. A Royal Air Force space operations center is already developing techniques to observe and categorize debris. The private Space Data Association, based on the Isle of Man, tracks most geostationary satellites to warn operators of potential collisions, and there's a move to create a similar body for satellites in low-Earth orbit, according to Nick Shave, chairman of the trade organization UKspace.

British diplomats are pushing for a legal framework that would require spacecraft owners to take responsibility for destroying their equipment at the end of its life and to allow one nation's cleanup vehicle to remove another country's junk.

There's concern that the effort to clean up space may be coming too late. Space junk remediation efforts, says Mark Dankberg, chief executive

officer of U.S. satellite operator Viasat Inc., aren't "consistent with risk and forms of damage that are likely to occur," because any single collision could massively accelerate the risks for future events. Increased space traffic will make the job harder, but it will also push up demand. On March 16, General David Thompson, the U.S. Space Force's vice chief of space operations, said that if it were possible to remove debris from orbit, the U.S. would be willing to "pay by the ton." —*Thomas Pfeiffer and Thomas Seal*

THE BOTTOM LINE The U.K.'s struggling space program aims to carve out a niche for itself by clearing low-Earth orbit of old rockets and satellites.

Turning the Corner on Covid

A recent Bloomberg New Voices discussion asked several prominent women working in scientific fields about what they'd learned over the course of the pandemic and their perspective on the path forward.
—*Alix Steel*

● KATHRIN JANSEN
Senior vice president, head of vaccine research and development, Pfizer Inc.

What is Pfizer doing to address Covid variants and boosters?

It was very clear pretty much from the beginning that we would probably encounter mutations, since we're dealing with an RNA virus. We found that our vaccine-induced antibodies were perfectly capable of neutralizing these virus variants we've been seeing very efficiently. So far, we haven't seen what I would call truly a variant of concern. That said, viruses can be very crafty.

There's the potential for boosters, but you can also think about wider applications. The RNA platform could have therapeutic uses as a delivery vehicle for antibodies. It opens up a host of other potential approaches.

● FEI-FEI LI
Sequoia professor, Stanford computer science department; co-director, Stanford Institute for Human-Centered Artificial Intelligence

How can artificial intelligence improve health care?

We have been working on this idea of ambient intelligence using very smart AI sensors to help clinicians keep patients safe. The population I care the most about is the aging population, and with ambient sensing technology we can watch for changes of gait, the lack of mobility, or the changes of activity patterns. All these can indicate risks, whether it's a fall risk or a chronic disease exacerbation risk.

There's a lot of basic science work we still need to do with AI in health care. Covid has really opened up a technological opportunity in medicine to help people. It gives us a window and the motivation to work on technology that can directly benefit them. But for that to happen, it needs to be safe, and it needs to be respectful.

● PRISCILLA CHAN
Co-founder, co-chief executive officer, Chan Zuckerberg Initiative

What have you seen with regard to vaccine hesitancy?

We knew vaccine hesitancy was going to come, and there's different levels of acceptance of the vaccine by gender, by political orientation, by racial background. We are continuing to monitor whether or not we are seeing populations change their mind. In our research we're seeing that people who are undecided actually move, and very quickly, from "on the fence" to "Yes, I'll go get the vaccine when it's available to me." The harder part is going to be people who never considered it. We're not seeing a lot of movement there yet.

● ANNE SCHUCHAT
Principal deputy director, Centers for Disease Control and Prevention

How much better prepared will we be the next time a pandemic strikes, and what do we have to do to improve our readiness?

The principal thing that's changed is that we don't have a false sense of confidence that we're different, that nothing's going to happen here, and that we're all ready for everything.

It's been a devastating experience for the country, as well as the world, and we have a pretty long list of what needs to be done. We know that our local and state public-health infrastructure was not ready for this, that we were not ready on the laboratory front, whether it's the ability of the public or the commercial or the clinical labs to surge. We don't have the workforce with the skills. We were not ready to innovate.

There's a huge amount that needs to be done. I think there's a broader recognition that public health is important, and that strengthening that, addressing the supply chain, linking health care and public health, and really embracing the data era are going to be critical. There are resources now that are helping. But we're still in the middle of this pandemic, so we are tackling where we are as well as getting ready for the next one.

● Interviews are edited for clarity and length.

CHAN: COURTESY CHAN ZUCKERBERG INITIATIVE. JANSEN: COURTESY PFIZER. LI: COURTESY STANFORD. SCHUCHAT: TOM WILLIAMS/CQ-ROLL CALL/GETTY IMAGES

● Arthur Hayes faces U.S. prosecution over how he ran his overseas Bitcoin exchange

Ever since Arthur Hayes became a star in the Bitcoin universe, he's been called many things, from trailblazer to anarchist. On April 6 the former chief executive officer of crypto exchange BitMEX surrendered to U.S. authorities in Hawaii to face a more consequential label: alleged criminal. Six months ago, prosecutors accused him and three others of failing to implement adequate money laundering controls. Hayes pleaded not guilty and was released on \$10 million bond pending federal court proceedings in New York.

His legal troubles come at a pivotal moment for the asset he championed. Regulators as well as Wall Street are stepping in to remake the crypto industry as the value of Bitcoin surges. It recently traded at more than \$60,000, up from about \$7,000 a year ago.

A 35-year-old American who's long lived in Asia, Hayes had no problem playing the crypto rebel who charged through the guardrails of traditional finance. In 2014 he launched BitMEX, where traders could invest not in Bitcoin itself but in contracts linked to its price moves. (The name is an apparent nod to older markets such as Nymex or Comex where traders swap oil or metals futures.) Contracts can allow traders to take positions quickly, to bet on prices falling as well as rising, and to use leverage to magnify their potential return and risk. "I just loved the fact that with Bitcoin there wasn't much out there at that time," the former Citigroup Inc. equities trader told Bloomberg News in a 2018 story. "It was an opportunity to do something on my own, to take some risk, rather than going to some structured, monolithic corporation."

BitMEX became a force in the burgeoning crypto industry, handling about \$65 billion a month in trades by the summer of 2020. Hayes became rich, with some media organizations reporting that he and his two co-founders had become billionaires.

Edited by Pat Regnier

ILLUSTRATION BY 731. HAYES: MICHAEL NAGLE/BLOOMBERG

BitMEX, which still operates with offices in Hong Kong and elsewhere, permits traders to take on bets leveraged up to 100 times, a risky way to play a volatile asset. It doesn't handle normal currency; investors fund their accounts with Bitcoin. Under Hayes, prosecutors say, BitMEX didn't necessarily ask a lot of questions of people who wanted to trade there. The indictment says its website once advertised that "no real name" or other forms of verification were needed to get an account, just an email address.

Hayes's motto has been, "I'm a businessman, not a priest." He spoke of crypto as one of the world's last free markets, saying at a 2019 industry conference in Taipei that "Bitcoin represents an opportunity–instead of using courts, laws, and violence to govern how money is transferred between individuals and parties, we use open source software, cryptography, and math." Discussing traditional financial institutions' criticism of Bitcoin as a tool of criminals and money launderers, Hayes told Bloomberg News in the 2018 story: "I don't think banks have a leg to stand on." (Numerous big banks have paid hefty fines for lapses in anti-money-laundering rules.) He said Bitcoin's technology made transactions more transparent than cash. Hayes incorporated his venture in the Seychelles and at the 2019 forum joked that the main difference between the island nation's regulators and those in the U.S. was that the Americans cost more to bribe.

That flippancy was on brand for the crypto world but may have proved Hayes's undoing. The grand jury indictment in New York says, "BitMEX made itself available as a vehicle for money laundering and sanctions violations." Hayes allegedly knew of claims that hackers who'd ripped off a cryptocurrency exchange were using BitMEX to launder the proceeds of their crime, the court papers say. He also allegedly had knowledge that Iranian residents could be customers, and Iran is subject to U.S. prohibitions. In both instances, BitMEX didn't implement an anti-money-laundering policy in response, the indictment says.

Hayes and his two co-founders also face civil charges from the Commodity Futures Trading Commission that they ran an exchange without being registered in the U.S. The company was supposed to turn away U.S. customers, but BitMEX solicited them en masse from 2014 through the fall of 2020, says the CFTC. It says BitMEX paid U.S. customers to recruit other clients. Citing internal emails, the CFTC alleges that BitMEX personnel were well aware U.S. customers were using VPNs–virtual private networks–to cover their tracks.

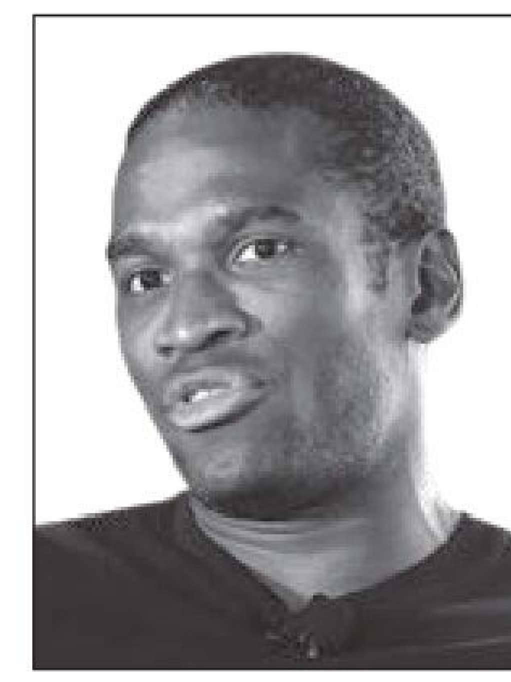
Co-founders Benjamin Delo and Samuel Reed have also pleaded not guilty in the criminal case and were released on bond. Longtime employee and executive Gregory Dwyer, charged criminally but not in the civil matter, is at large; his lawyers say the government knows his location. Attorneys for all four vow to fight the charges and say the U.S. authorities' actions are unfounded. "Arthur Hayes is a self-made entrepreneur who has been wrongly accused of crimes that he did not commit," his lawyers said in a statement.

The case could lay down legal markers as crypto moves fitfully into the mainstream. It often takes authorities a while to catch up with technological leaps in finance, but U.S. regulators have hit other crypto companies with a flurry of civil cases and probes in the past year. Instead of fashioning rules to deal with Bitcoin and its ilk, they are leaning on existing laws. "The Department of Justice is sending a clear message–if you try and skirt U.S. law and regulations, we will come after you, and not just with a civil action but with a criminal case," says Braden Perry, a former senior trial attorney at the CFTC who's now in private practice. He says that as alleged bad actors exit, more conservative financial institutions may become interested in crypto.

Hayes and his co-founders resigned their executive positions. The new executive running BitMEX, Alexander Höptner, has set about changing the company's policies and tone. BitMEX says it's verified its active customers' identities. A statement on its website says it's now "one of the few crypto derivatives exchanges outside the U.S. to be implementing know-your-customer requirements before a user can complete their initial deposit and first trade." In a March interview with Bloomberg News, Höptner said he's "bringing the crypto side to the regulated world." A spokesperson for BitMEX's holding company says the company disagrees with the charges and always sought to comply with "applicable U.S. laws."

For many people excited about Bitcoin, its ability to put transactions beyond governments' reach has long been part of the appeal. But the crypto world is changing. "BitMEX had a tremendous impact, no question about it," says Steve Ehrlich, CEO of Voyager Digital Ltd., a cryptocurrency brokerage in New York. "I'm a crypto guy, I get it. There are so many people where it's all about no regulations and power to the people, but that only works until there is a major scandal. You can't get the masses to adopt something new unless there's trust." —*Benjamin Robertson and Edward Robinson, with Zheping Huang*

THE BOTTOM LINE BitMEX created a Wall Street-style financial market for crypto. U.S. authorities say it didn't follow anti-money-laundering rules.



● Hayes

"The Department of Justice is sending a clear message"

Playing Catch-up With Mobile Money

● Glitchy bank networks could slow India's digital payment revolution

Even before the pandemic, Indian consumers were taking up mobile payment technologies with remarkable speed. There's just one problem: The networks of India's biggest banks have struggled to keep pace, crashing again and again.

The failures are exposing years of underinvestment in technology and a surprising lack of preparedness, analysts and executives say. The problems have been especially embarrassing for HDFC Bank Ltd., the country's top bank by market value. It's touted its online prowess, only to be blasted on Twitter by frustrated customers and banned by India's bank regulator from offering new digital products until its technology is fixed.

The banks are coming up short in a hotly competitive market. India's central bank estimates the number of online transactions increased 500% in the past five years. Prime Minister Narendra Modi's government has called for homegrown solutions to bridge the country's yawning digital divide, but overseas companies have moved aggressively into payments as well. Amazon.com, Facebook, and Google are pouring billions of dollars into building their own ecosystems for apps, linking payments to the retail networks of thousands of mom and pop stores. They've been able to piggyback on India's innovative Unified Payments Interface, a retail payments platform that lets banks and apps interact seamlessly.

In India's tightly regulated financial sphere, fintech companies still need banks to complete transactions and offer services such as loans. But banks in India risk seeing a repeat of what's happened in China, where customer engagement and loyalty have shifted from conventional banks to fintech brands. "Over a period of time these global big tech firms will be able to take away market share," says Mahesh Ramamoorthy, managing director of banking solutions at FIS India. "Banks will be more on the back end settling these transactions than facing online customers."

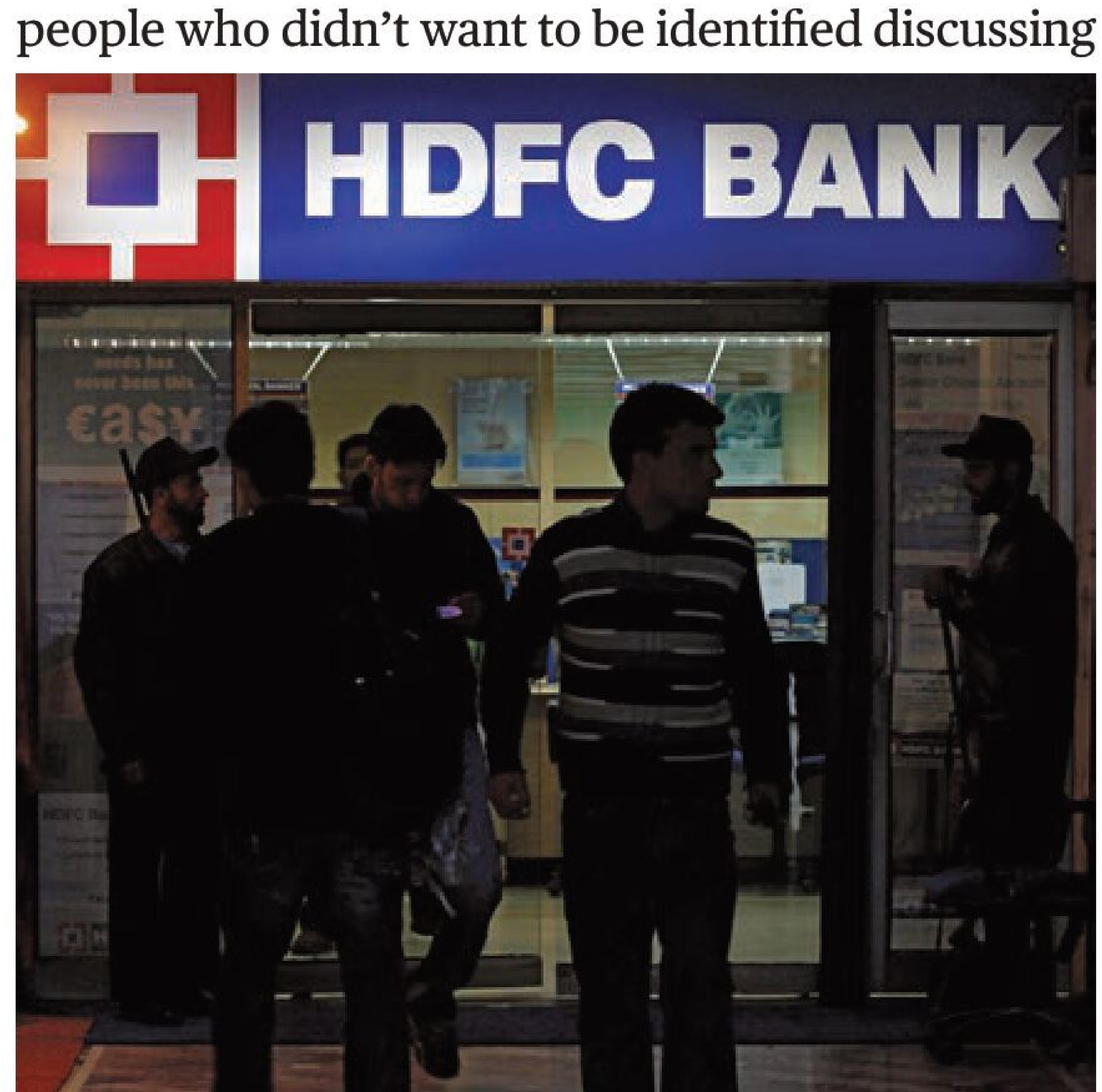
On the afternoon of Nov. 21, online transactions for HDFC Bank's 56 million customers crashed when diesel-powered backup generators at its data center on the fringes of financial capital Mumbai failed to fire up after the main power failed. The outage lasted several hours and also disrupted service for some customers of Google Pay, HDFC Bank's online payments partner.

HDFC Bank staff had flagged risks stemming from a lack of adequate tech infrastructure as early as 2017 after they started noticing brief but frequent downtimes, according to people familiar with the matter who didn't want to be named because the information isn't public. But it took HDFC Bank more than three years to shift to a new data center, and the transition wasn't complete when the November failure happened, the people say.

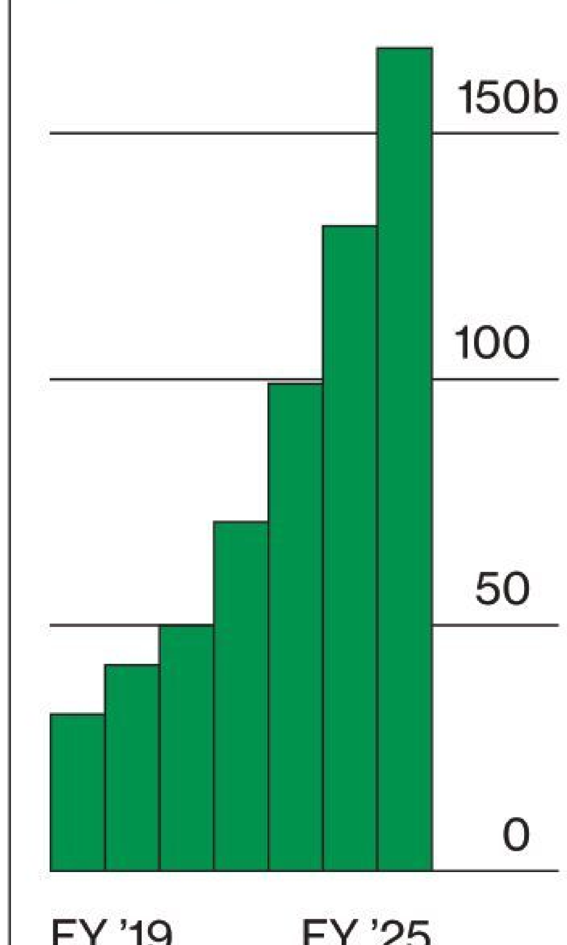
It was one of about 14 tech glitches for HDFC Bank over the past 12 months. The government-backed State Bank of India (SBI) has seen its internet and mobile banking go down 68 times over that period, while the second-largest private lender, ICICI Bank Ltd., had 21 failures, according to data published by Downdetector, which monitors outages. Ten of India's top 30 banks recorded a 3% failure in transactions over the payments backbone in September 2020, according to a PwC report.

Sashidhar Jagdishan, chief executive officer of HDFC Bank, has said the lender is working on "war footing" to strengthen its digital capabilities. A central bank investigation will determine when the ban on new digital offerings will lift. "We have also utilized the time to not only reinforce our platforms but also strategize and re-skill our work force," a bank spokesperson said in an emailed statement.

The Reserve Bank of India, the nation's central bank and top financial regulator, has also questioned SBI about the reported glitches on its internet banking and mobile apps, according to people who didn't want to be identified discussing



▼ Digital payments in India, transaction volume*



◀ A branch of HDFC Bank in Srinagar

ILLUSTRATION BY TOMI UM. BANK: FAYAZ KABLI/REUTERS/ALAMY. *PROJECTED FOR 2021-25. DATA: PWC (INDIA), U.S. FEDERAL HIGHWAY ADMINISTRATION (MILES) nonpublic information. SBI is putting more resources into its private cloud and expanding the capacity of its data centers, they say. SBI didn't respond to emails seeking comment. The central bank didn't respond to questions about the failures. But at an industry conclave in March, Reserve Bank Governor Shaktikanta Das urged banks to strengthen cybersecurity and tech infrastructure.

Despite the problems, online transactions are expected to keep increasing quickly. But for that, banks will need to spend more on technology and infrastructure. "It is as if the living room was kept clean but the attic was messy," says Vivek Belgavi, a partner and leader of the fintech practice at PwC India. *—Suvashree Ghosh and Anto Antony*

THE BOTTOM LINE India has built an unusually good system for allowing new apps to connect with banks, but some lenders need to shore up their infrastructure.

Insurance Premiums By the Mile

● Americans drove less in 2020, spurring many to try programs that track their time on the road

The Covid-19 shutdowns that swept the U.S. have been a boon for a newer auto insurance product: pay-per-mile coverage.

During the pandemic, Allstate Corp. has seen interest surge in its Milewise offering, which lets customers pay car insurance premiums for just the amount of driving they do, says Glenn Shapiro, president of Allstate's personal-property liability operations. The number of cars insured through Milewise was about six times higher last year than in 2019, and there were roughly four times more policies, with some covering multiple vehicles.

Credit Suisse Group AG analyst Mike Zaremski says the future of auto insurance will entail more pay-per-mile policies as well as telematic offerings, which use devices that allow insurers to track driving behavior and reward better and safer customers. "The pandemic has accelerated the adoption of pay-per-mile and telematics, because there are a lot of people realizing that 'I'm not driving as much,'" Zaremski says.

He says the technologies can benefit insurers because "if you have the ability to deploy this technology successfully, the volatility of your earnings should be much smoother." More driving generally means more accidents and more claims, so charging by the mile can allow insurers to link their premiums more closely to the true risk they're covering. While there can be execution challenges with insurers building out the proper technology, Zaremski says, companies that don't adopt it could lose good customers looking for better prices, potentially leaving worse drivers behind as clients.

Over the past few years, companies including Allstate, the fourth-biggest U.S. auto insurer, and startups such as Metromile Inc., which went public this year, have pushed to expand by-the-mile coverage with new offerings and policies linked to newer technology.

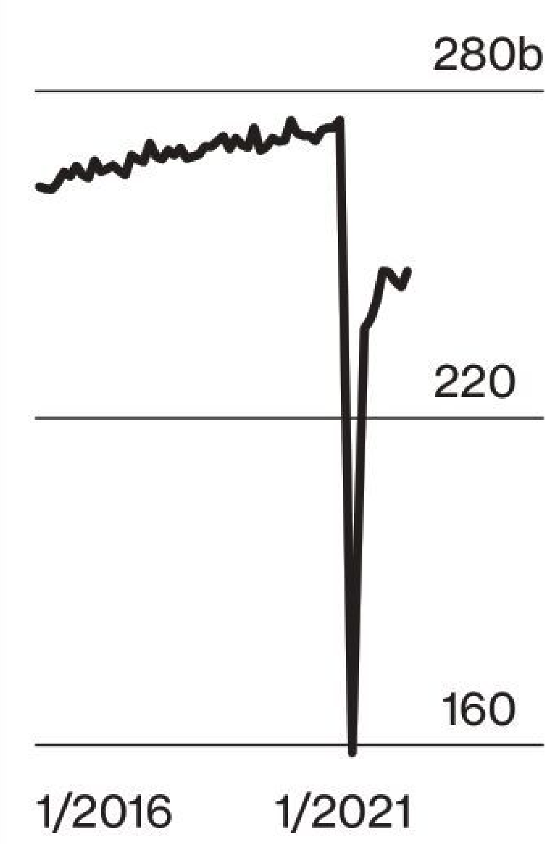
Insurers are hoping that once customers get used to the product, they'll stick. "While the pandemic has certainly accelerated that trend and spiked it for a period of time, I also think there'll be an element of that that persists," says Allstate's Shapiro. "There was a really good business case for pay-per-mile pre-pandemic, and there will be post-pandemic."

While the majority of recent interest in Allstate's pay-per-mile program came from new customers, some existing clients switched as they cut back on driving. The offering, available in 19 states, typically uses a plug-in device to track a customer's driving. Some newer Ford Motor Co. vehicles have embedded modems that share data with the program.

Auto insurers initially benefited last year as the pandemic spurred shutdowns across the country, leading to an almost 40% drop in driving last April and a total 13% decline in 2020. Companies including Allstate chose to return some premiums to account for the fact that so many people were driving less often. *—Katherine Chiglinsky*

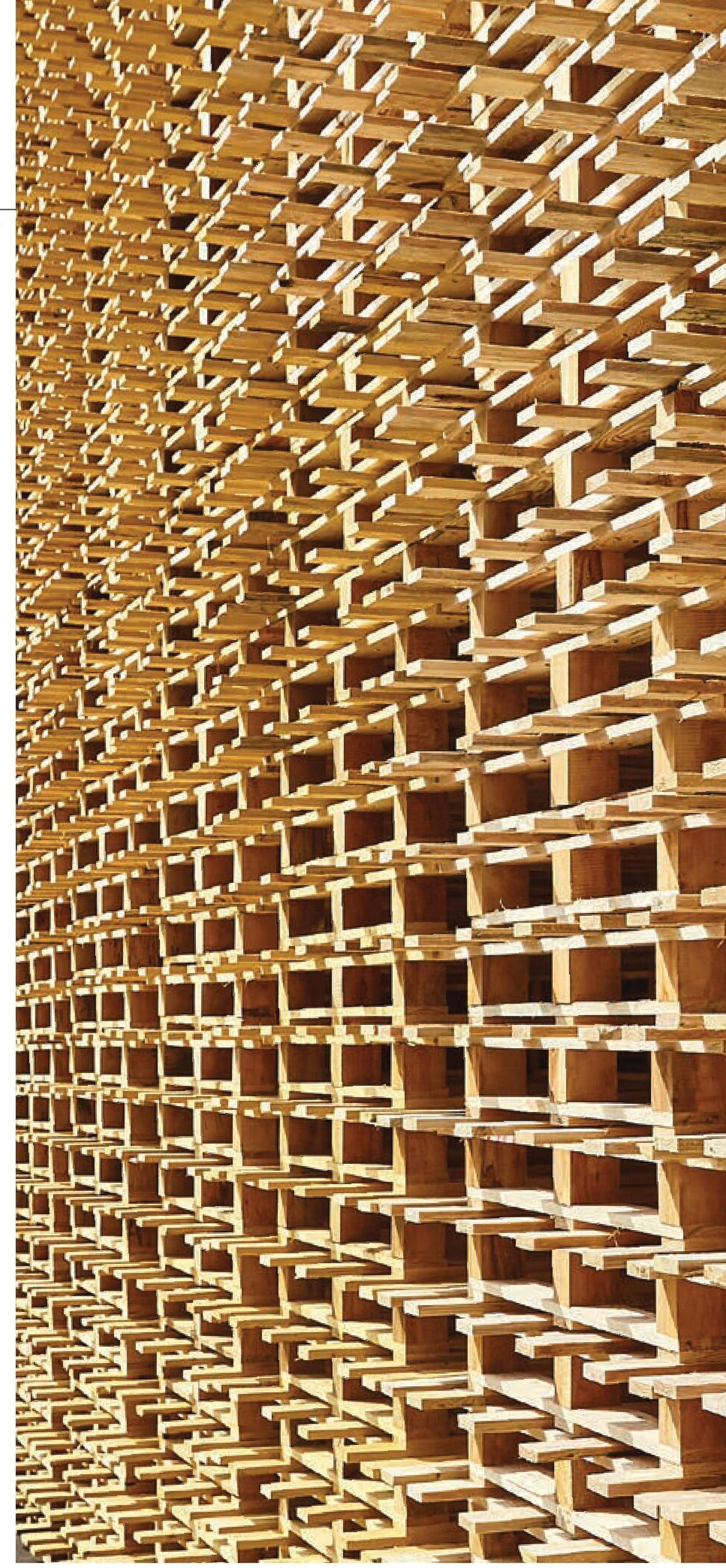
THE BOTTOM LINE Technology has made it easy for insurers to track mileage and other driving behaviors. Those who don't offer the option risk getting stuck with more expensive drivers.

▼ U.S. vehicle miles traveled, seasonally adjusted



Peak Pallet

● Prices for a warehouse staple are at a record, buoyed by the boom in e-commerce



After carrying the weight of the global economy since World War II with little fanfare, the lowly shipping pallet is finally commanding some respect.

Demand for the platforms used to haul consumer goods and industrial materials is soaring amid a surge in e-commerce, forcing retailers and manufacturers to expand warehouses or pile inventories higher. At the same time, two key production inputs—cheap lumber and low-wage labor—are scarce, and even nail costs are rising.

The result: Pallet prices have hit record highs, according to a U.S. Labor Department index, while European gauges show big jumps from the U.K. to Germany. The market may stay hot through the peak home construction season in the springtime and as Covid-19 vaccines help revive restaurants and event venues—adding to inflationary pressures rippling across supply chains. "Supply is just barely keeping up with demand," says Howe Wallace, chairman and chief executive officer of PalletOne Inc., a producer based in Bartow, Fla., with facilities across the Southeast. "It's a pretty dicey situation."

Pallets serve as the base of a so-called unit load, a standard way to ship products so they're easy to move with forklifts and jacks. They're generally bought or leased by manufacturers and get baked into transport packaging costs. When a retailer or other end user is finished with pallets, recycling companies collect, repair, and resell them. Some industries, such as bottling companies, manage their own pallet pools.

There are about 5 billion pallets in use worldwide and an estimated 2 billion in the U.S. alone—enough to go two-thirds of the way to the moon if stacked on top of each other. About 90% are wooden, and the rest are made of plastic, metal, or cardboard. Each year about 513 million wooden ones are built in the U.S., and an additional 326 million are repaired and put back in circulation, according to Laszlo Horvath, director of Virginia Tech's Center for Packaging and Unit Load Design.

Depending on the region, the usual price tag of $9 to $12 per wooden pallet may approach $15 this year. U.S. government data published on April 9 showed the wood pallet component of the producer price index jumped in March by the most since 1993. "New pallets, used pallets, rental pallets—they're all raising their prices," says Chaille Brindley, editor and publisher of *Pallet Enterprise* magazine and Pallet Profile, a market report.

Pallets are made with lower-grade hardwood and softwood than is used for construction and furniture. In the mid-Atlantic region, the price of pallet-grade hardwood rose to $635 per 1,000 board feet in March from $530 a year earlier, and Southern California softwood more than doubled, to $520. Meanwhile, nail

TODD MCLELLAN/GALLERY STOCK. DATA: BUREAU OF LABOR STATISTICS

Edited by
Cristina Lindblad

prices gained from November to March, along with a 36% jump in the cost of wire rod, Brindley says.

Adding to the squeeze is a dearth of workers willing to do a strenuous, monotonous job. "The market's right for a second shift, but there are no people to add a second shift," Wallace says.

Such strains would seem to provide an opening for plastic pallets, which are lighter, built to last longer, and easier to sanitize, and which pose fewer hazards, such as splinters and protruding nails. The downside to plastic pallets: They're about three times as expensive, meaning a shift from wood to plastic turns what most companies view as throwaway packaging into pricey assets that need to be managed.

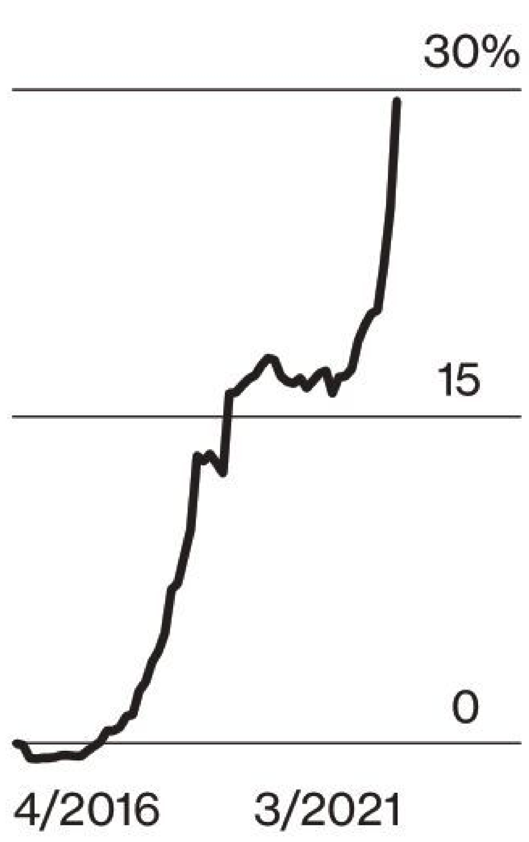
The increased use of robotics and artificial intelligence in warehouses and distribution centers favors pallets that don't warp, crack, or splinter and can be outfitted with tracking technology—top selling points of plastic, says Jeff Pepperworth, CEO of Orlando-based iGPS Logistics, the largest plastic pallet leasing company in the U.S. "In the past, automation looked at the pallet as the dumbest asset in the process," he says. "In the future, the pallet is going to be the smartest asset in the process."

The wood pallet lobby has heard such arguments before. "Companies will always look to build a better mousetrap," says Brent McClendon, president and CEO of National Wooden Pallet & Container Association in Alexandria, Va. "They keep coming back to wood."

With lumber prices so high, the logistics world is intrigued by a pilot program that Costco Wholesale Corp. is running using plastic pallets. The wooden variety are fixtures on the sales floor of its warehouse-like stores. In an email reply to questions about the trial run, Costco Chief Financial Officer Richard Galanti said, "We wouldn't have any comments."

The leasing company working with Costco ▶

▼ Monthly change in the U.S. producer price of wood pallets and pallet containers



◀ is CHEP, a unit of Sydney-based Brambles Ltd. Brambles CEO Graham Chipchase indicated on a conference call in February that CHEP, known for its pool of bright blue wooden pallets, is proceeding cautiously into the plastic variety so it doesn't weaken the wood business. "Because plastic pallets are so much more expensive than wooden ones, we feel that if this is a solution for Costco, we don't think it's likely to spread across the whole system quickly because of the price premium," he said.

Marshall White, a Virginia Tech professor emeritus and developer of pallet design software, says it's reasonable to expect plastic could reach 10% of the market over the long term, from about 5% to 6% now. Says White: "Wood pallets will continue to dominate until the time that we find the physics to dematerialize toilet paper at Procter & Gamble and rematerialize it in my house with some magic device." *—Brendan Murray*

THE BOTTOM LINE Soaring demand for the humble wooden pallet looks set to take prices as high as $15 this spring, which is why some companies are contemplating a shift to plastic.

Hong Kong Longs for Its Maker Past

● The government is offering generous subsidies to companies setting up plants in the territory

After decades overseeing the outsourcing of electronics production to low-cost destinations in China and Southeast Asia, Roberto Leone has chosen an unlikely location for his latest manufacturing venture: one of Asia's most expensive cities, Hong Kong. Nirotech Ltd., the company Leone co-founded, has been pumping out 30,000 video door intercoms a month since December from the district of Yuen Long, near the border with mainland China.

Such factories are a rare sight in Hong Kong, which experienced one of the world's most rapid deindustrializations. Manufacturing's share of the economy went from more than 30% in the 1970s to only 1% today. Now, after decades of positioning the territory as the front office for mainland China and prioritizing financial and business services, Hong Kong's leadership is offering billions of dollars in subsidies to lure factories back. The goal: to revive an economy that was stagnating even before the coronavirus pandemic and help provide well-paying jobs for young people whose discontent about dwindling opportunities has contributed to years of pro-democracy protests.

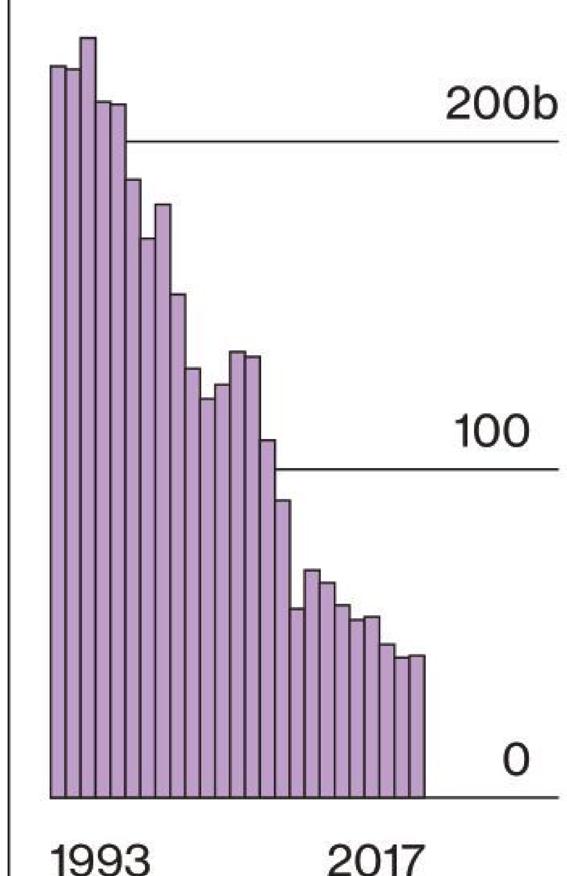
Hong Kong's economy has been hit hard by the travel restrictions imposed by local authorities to cut down on transmission of the coronavirus, which kept tens of millions of visitors from the mainland and elsewhere from frequenting the city's restaurants, hotels, and shops. As a result, Hong Kong's gross domestic product shrank 6.1% last year even as the territory managed to keep a lid on Covid-19 cases. White-collar industries, led by financial services, were less affected, but these generate well-paying jobs for only a highly educated minority. "Finance will not be enough to resolve inequality," says Heiwai Tang, an economist at Hong Kong University. "Manufacturing jobs are mostly 'good' jobs, with potential for upward mobility."

The pandemic has highlighted the benefits of having a robust manufacturing sector. Across much of the world, industrial production has rebounded quickly, but services are taking longer to recover because customers continue to stay at home. Governments in the U.S. and Europe are promising to reverse decades of offshoring that hollowed old-line industries while at the same time pledging support for emerging ones, such as green power. And advances in automation are making it cost-effective for companies to shift some production from low-wage locales to higher-cost ones.

With the statutory minimum wage in Hong Kong about twice the levels that prevail across the border, Nirotech's assembly plant depends on labor-saving technologies, such as the German-made machine that solders components onto circuit boards imported from Vietnam. Robot arms affix electronic screens and touch-sensitive sensors to each intercom. A dozen or so workers perform tasks such as fastening and testing, about a fifth of the number the company employs to make the same product in mainland China.

If manufacturing is to have a future in Hong Kong, it'll be populated by small, nimble operations such as Nirotech's. That would echo the city's manufacturing past, which began with factories fleeing the Chinese Communist revolution. The Korean and Vietnam wars boosted Hong Kong's textile exports, with local mills supplying the U.S. Department of Defense with materials

▼ Hong Kong's merchandise exports, in Hong Kong dollars*



LAM YIK/BLOOMBERG. *EXCLUDES RE-EXPORTS (NON-DOMESTICALLY PRODUCED GOODS ROUTED THROUGH THE TERRITORY.) DATA: HONG KONG CENSUS AND STATISTICS DEPARTMENT for uniforms. By the 1960s, tens of thousands of workshops employing as much as 40% of the city's workforce were making textiles, footwear, and inexpensive consumer goods, such as plastic toys, wigs, and artificial flowers—the line of business that jump-started tycoon Li Ka-shing's career. "It was low-cost and short term," says Peter Hamilton, author of *Made in Hong Kong*, a book about the city's industrial development. "One day they were making belt buckles, and the next day they were making automotive parts."

Unlike the export-oriented tiger economies of Asia, whose governments actively fostered the development of electronics production hubs, Hong Kong's colonial government took a hands-off approach where manufacturing was concerned. "It was completely outcompeted by Taiwan and eventually mainland China," Hamilton says. "There just wasn't the government help."

This time is different. Manufacturers that are setting up operations in Hong Kong can tap a HK$34 billion ($4.4 billion) Innovation and Technology Fund created in 2015. Nirotech will receive a cash rebate equal to 40% of the company's HK$12 million investment. Not all comers are welcome: "It has to be high-tech, not using a lot of labor and land," says Mohamed Butt, executive director of the Hong Kong government's productivity council, which helped design Nirotech's plant.

The city's rapid transition from a manufacturing to a services-oriented economy was accompanied by state-backed efforts to boost education levels and retrain workers, which helped avoid mass unemployment. But even though Hong Kong's universities rank among Asia's best, their research output hasn't supported high-tech manufacturing. Changing that is key to reviving the sector.

Nanoshield, a subsidiary of a Hong Kong maker of kitchenware that outsourced its manufacturing to the mainland in the 1990s, is working with local university researchers who developed a chemical that can be spun into a kind of fiber for use in water filters and face masks. In 2019, Nanoshield undertook its first local manufacturing project in decades, installing a HK$20 million machine about half the size of a tennis court capable of electrifying the liquid to turn it into enough fiber for 2 million water filters a year—work that was interrupted at several points by pro-democracy protests. The company plans to add three other machines and eventually employ 50 people on the project.

The government will cover almost HK$50 million of Nanoshield's planned HK$150 million investment, says Adrian Wong, the company's manager of research and development. Hong Kong's stronger intellectual property protections are a key reason for producing locally rather than on the mainland, he says. Losing the IP "would do irreversible damage to our business."

Hong Kong sees the reindustrialization drive as key to meeting its goal of increasing spending on R&D for new products to 1.5% of GDP by 2022. The centerpiece of that effort is the Advanced Manufacturing Centre, a 1.1 million-square-foot facility scheduled to open next year and meant to relieve a chronic shortage of space for startup companies. "Now there's a chance you can manufacture in Hong Kong first before you scale up in other regions," says H.L. Yiu, head of reindustrialization at Hong Kong Science and Technology Park, the state-owned body overseeing the HK$6.65 billion project.

▲ Nanoshield's Hong Kong plant

Tang, the Hong Kong University economist, says authorities should be even more aggressive, setting a target of expanding manufacturing's contribution to GDP to 10% within a decade and making Hong Kong's chief executive, currently Carrie Lam, directly responsible for hitting that goal. "It's about coordination and having a 5- to 10-year plan," he says. —*Tom Hancock*

THE BOTTOM LINE Hong Kong's government seeks to revive a stagnant economy and create higher-paying jobs via a plan to lure more manufacturing to the territory.

Reincarnation And Realpolitik

China, India, and the U.S. are vying to influence the selection of the next Dalai Lama

Edited by Amanda Kolson Hurley

Tenzin Gyatso, the 14th Dalai Lama—the spiritual leader of Tibetans, who lives in exile in India—turns 86 in July. The choice of his successor is shaping up to be a struggle between India and the U.S. on the one hand and China on the other.

The Dalai Lama is believed to be a living Buddha who is reincarnated after his death. Traditionally a search for a child reincarnation is conducted, and once a boy is confirmed, he studies to prepare for his role. The current Dalai Lama was identified at the age of 2. There's no single method of choosing a Dalai Lama, and the process can be long and complicated.

Senior security officials in India, including in the prime minister's office, have been involved in discussions about how New Delhi can influence the choice of the next Dalai Lama, two officials with direct knowledge of the matter said, asking not to be identified given the sensitive nature of the matter. India hosts the Tibetan government-in-exile in the city of Dharamsala and only recognized Tibet as part of China in 2003. The prime minister's office didn't respond to a request for comment.

From January through March, along its Himalayan border with China, India convened five separate assemblies of senior monks from various sects and schools in the region—the first time such gatherings have taken place in more than 2,000 years. The government hopes that this group will grant international legitimacy to the current Dalai Lama's successor and help fill a power vacuum, as it could take two decades or longer for a reincarnation to be identified and to come of age.

In 1959, U.S. intelligence agents helped smuggle Tenzin Gyatso out of Tibet and into northern India to avoid being captured by Chinese security forces. He hasn't laid out a clear succession plan. A decade ago, he issued a statement saying he'd consult with other Tibetan Buddhist leaders when he's about 90 on whether the more than 600-year-old institution of the Dalai Lama should continue after he dies.

Samdhong Rinpoche, who is part of the Dalai Lama's personal office, the Gaden Phodrang, which will help decide the succession, says that if Tibet "remains occupied" by China, "His Holiness the Dalai Lama has said he will be reincarnated outside Tibet and most likely in India." China may appoint its own Dalai Lama, but its choice "will have no legitimacy."

Until last year, Rinpoche says, there was "semi-official communication" between the Chinese government and the Dalai Lama, with the government trying to persuade the Dalai Lama to return to Tibet. His return wouldn't be possible under the current political situation, Rinpoche says.

◀ Tenzin Gyatso, the 14th Dalai Lama, in Lhasa in 1959

In 2007, China issued an order that requires authorities in Beijing to oversee the next Dalai Lama's selection without the interference "of any foreign organization or individual." It calls for potential successors to be chosen by picking lots from the golden urn in Jokhang Temple in Lhasa, Tibet's capital. When installed, the Dalai Lama must then get a "living Buddha permit" from the Chinese government. Chinese officials say there's precedent for Beijing to be involved in picking the Dalai Lama, as the current one ascended to the position in 1939 after being approved by Chiang Kai-shek, who was president of the Republic of China before the Communist Party took power in 1949.

The Dalai Lama has called that a "lie" and says the golden urn method was used to pick only two of the 14 Dalai Lamas since the first one was born in 1391. (The Dalai Lama said a different procedure, the "dough-ball method," could be used if there were multiple candidates; this entails writing the names on a piece of paper, encasing them in dough balls, placing these in a bowl before a sacred object for three weeks, and then publicly rolling them around in the bowl until one falls out.)

The struggle over the Dalai Lama comes as the Biden administration works more closely with partners in Asia to sanction Beijing over human-rights abuses, restrict exports of key technology to China, and push back against the country's territorial claims, including over Taiwan. Beijing has responded by lashing out at the U.S. and its allies, insisting they have no say in Tibet, Xinjiang, or other "internal" matters.

Last year, former President Donald Trump signed the Tibetan Policy and Support Act, which reiterates the U.S. stand that the current Dalai Lama is the final authority on his reincarnation, and in November 2020, the head of Tibet's exiled government visited the White House for the first time. The Biden administration is maintaining Trump's policy: "We believe that the Chinese government should have no role in the succession process of ▶

"China has been using Tibetan Buddhism as a soft-power tool"

DAVID MCNEW/GETTY IMAGES; HULTON ARCHIVE/GETTY IMAGES

◀ the Dalai Lama," State Department spokesman Ned Price told reporters in March. Rinpoche says the U.S. policy is well-intentioned, but "the reincarnation of the Dalai Lama is entirely a spiritual matter for the people of Tibet."

Majority-Hindu India was the birthplace of Buddhism and is reasserting its role as a protector of the religion. In previous decades, leaders in New Delhi saw the Dalai Lama's presence in the country as a "Tibet card" they could use to pressure authorities in Beijing by holding out the threat of recognizing Tibet as an independent country. More recently, their view of the Tibetan exile community has shifted depending on relations with China. As tensions heated up last year with the deadliest clash in decades along the India-China Himalayan border, India last September openly acknowledged for the first time a secret military unit with Tibetan soldiers.

China, too, sees value in using Buddhism to exercise power in Tibet and more broadly throughout Asia. "China has been using Tibetan Buddhism as a soft-power tool," says Sana Hashmi, a visiting fellow at the Taiwan-Asia Exchange Foundation.

While the current Dalai Lama has advocated only autonomy for Tibet, not independence, Beijing still sees that as a threat. Wu Yingjie, the Communist Party's top official overseeing Tibet, wrote in an official publication last October that China should "go deep in exposing the counterrevolutionary nature of Dalai Lama and the Dalai Clique" and guide the Tibetan people to "take a rational approach to religion."

A similar power struggle played out with the Panchen Lama, the second-most prominent figure in Tibetan Buddhism. After the death of the 10th Panchen Lama in 1989, both the Chinese government and the Dalai Lama identified reincarnations. The man selected by Beijing is now a senior adviser to China's parliament. The Dalai Lama's choice hasn't been seen in two decades, and his followers say he was abducted at the age of 6.

"The reincarnation of Dalai and Panchen is rightly China's internal affair" and "allows no interference of external forces," China's Foreign Ministry said in a statement. "We urge the relevant parties to recognize the anti-China separatist nature of the 14th Dalai and the so-called Tibetan government-in-exile, be careful in their words and deeds, and stop using Tibet-related issues to interfere in China's internal affairs." —*Sudhi Ranjan Sen, with Jing Li*

THE BOTTOM LINE Maneuvering over the next Dalai Lama has already begun, with India and the U.S. countering China's attempts, which the current Dalai Lama opposes, to control the process.

Support Whose Troops?

● Trust in the U.S. military is down as attitudes toward it become more partisan

Super Bowl flyovers, TV commercials celebrating veterans, yellow-ribbon bumper stickers: It's long been reflexive for Americans of all political persuasions to "support our troops." Following Sept. 11 and the deployment of troops to Afghanistan and Iraq, pride in the U.S. military and gratitude for troops' service ran high, even among people opposed to those conflicts. In the years since 2000, multiple surveys have shown the public trusts the U.S. military more than any other public institution–more than organized religion and the Supreme Court, and vastly more than Congress.

But the increasing politicization of the military, a string of sexual assault scandals, the role of dozens of enlisted troops and veterans in the Jan. 6 Capitol insurrection, and other factors have shaken that trust. According to a Reagan Institute survey conducted in February, confidence in the military has fallen by 14 percentage points since 2018–from 70% to 56%. The drop was significant regardless of age, gender, or party affiliation, and is in line with trends other researchers have observed.

Criticism of the military on Capitol Hill has intensified. Democrats say the Pentagon must do more to stamp out extremist ideology in the ranks

ILLUSTRATION BY JONATHAN DJOB NKONDO. DATA: RONALD REAGAN PRESIDENTIAL FOUNDATION & INSTITUTE following Jan. 6. "The news is full of examples of service members who have extremist beliefs," Representative Adam Smith, the Washington Democrat who leads the House Armed Services Committee, said at a March 24 hearing on the issue. "It is also obvious that our military leaders are untrained in the symbols and language of these hate groups."

Conservatives are lambasting military policies they regard as "woke." Fox News host Tucker Carlson last month called maternity flight suits for women troops a "mockery" and a distraction from combating China and other threats. When military leaders rebuked Carlson, Senator Ted Cruz, the Texas Republican, took his side, claiming that the officers were stifling public dissent. He asked for a meeting with the commandant of the Marine Corps over the issue.

Jim Golby, who studies civil-military relations at the Center for a New American Security, says he can't remember a time when perceptions of the military have been so polarized. "Different parts of the public are looking at the military and creating narratives that they don't like," he says.

Former President Donald Trump had a large role in driving this politicization. At the beginning of his presidency, Trump with great fanfare named retired generals to leading positions, including former Marines Jim Mattis as defense secretary and John Kelly as White House chief of staff. Almost as quickly as he claimed them as "my generals," he turned on them. Trump also drew the military deeper into the culture wars, banning transgender people from serving (a policy undone by President Joe Biden) and opposing the Pentagon when it began a process to remove the names of Confederate leaders from military bases.

Last June, during a summer of nationwide protests against police violence, General Mark Milley, the chairman of the Joint Chiefs of Staff, marched across Washington, D.C.'s Lafayette Square with Trump for a photo op outside St. John's Church. Law enforcement officers used chemical irritants to clear the park of peaceful protesters just prior to the event. Critics including prominent Democrats and former high-ranking officers said Milley's presence lent the military's imprimatur to a political event that undercut freedom of speech and assembly. Milley, who wore battle fatigues that day, later apologized for his role.

"President Trump's rhetoric, particularly against senior officers toward the end of his term, probably helped open some of the gates" to distrust of the military among Republicans, says Golby. "The response to Lafayette Square helped open the floodgates on the Democratic side."

Criticism over Lafayette Square may have contributed to the National Guard's slow mobilization to help the U.S. Capitol Police on Jan. 6. The commanding officer of the D.C. National Guard said a senior Army officer expressed concern about the "optics" of sending troops.

Meanwhile, reports of sexual assault in the ranks have been rising. The killing of 20-year-old Army Specialist Vanessa Guillen at Fort Hood in Texas last year sparked outrage. Guillen's family said she was harassed before being murdered (a soldier suspected in her death killed himself). The Army went on to fire or suspend 14 base leaders over a culture that it said fostered harassment and sexual assault.

"With the racial issues, with the sex assault issues, with the misogyny issues, the average American is saying, 'Maybe the military isn't the leader in all these areas,'" says Don Christensen, president of Protect Our Defenders, a group that works to end sexual violence in the military.

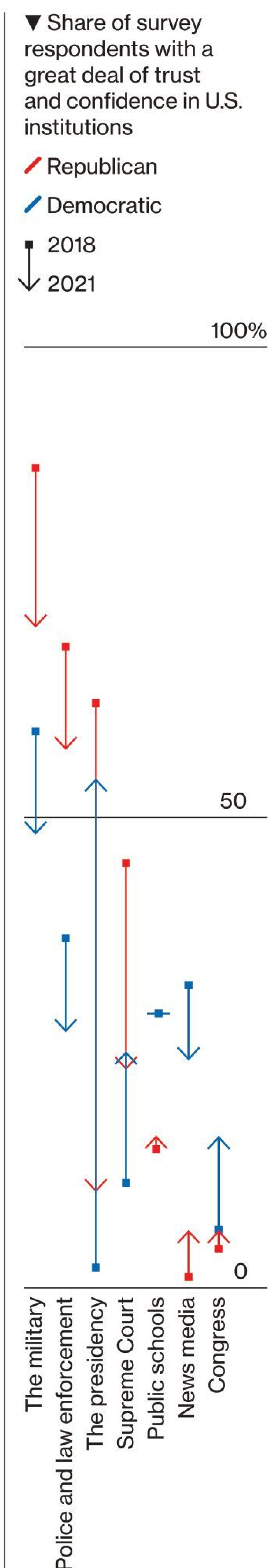
The Pentagon's inability to curb rape in the ranks has led lawmakers to push for legislation that would move handling of sexual assault cases outside the chain of command, something the department has resisted. Secretary of Defense Lloyd Austin has ordered a review of all the actions that have been taken on the issue to date. And on April 9, after a mandated period for all units to discuss the problem of extremism, the Pentagon announced plans to crack down on it with new regulations, screening, and training.

The military still enjoys more support than most institutions in American life. In polls, clear majorities of respondents consistently say they have confidence in the military, a rarity for any public institution, according to Jeff Jones at Gallup. But opinion has been so high for so long that even a slight change is cause for concern among people who follow the issue closely. It's possible, Golby worries, that the military could become like the Supreme Court, with Republicans and Democrats alike viewing some high-ranking officers as "theirs" and others as political opponents.

"If the military becomes politicized, it becomes more and more likely that the military could intervene in politics," says Elliot Ackerman, an author and former Marine who served five tours of duty in Iraq and Afghanistan. "And a military intervention in politics concerns me the most, whatever shape it would take." *—Daniel Flatley and Roxana Tiron*

THE BOTTOM LINE Rising politicization of the military, a sexual assault crisis on bases, and the Jan. 6 Capitol attack have lowered public trust in the institution, a trend that worries experts.

▼ Share of survey respondents with a great deal of trust and confidence in U.S. institutions



Small Business

Pandemic Resistant

New retail businesses in Seattle's Capitol Hill and other commercial drags show cities aren't dead

Big Little News opened its doors on East Pike Street in Seattle in early March. The postcard-size space is outfitted with wood shelves displaying more than 250 magazine titles. There's also a case for cold drinks and a carefully chosen selection of puzzles, coffee-table books, snacks, and alcohol. "We wanted to be a place where you could walk in and have the high and the low," says co-owner Joey Burgess. Customers might buy "an import fashion magazine," he imagines, "and also grab a can of Yoo Hoo."

The real novelty of the place, though, is that it opened in the middle of a pandemic. After a year in which retailers, restaurants, and bars in this ever-changing corner of Seattle struggled to survive, any new business can feel like a much-needed injection of confidence. That this one is effectively a bet on selling print media seems especially gutsy.

April 19, 2021

Edited by
Cristina Lindblad and
David Rocks

PHOTOGRAPHS BY MERON MENGHISTAB FOR BLOOMBERG BUSINESSWEEK

Central business districts across the U.S. are still ghost towns, with white-collar workers staying away from offices. But the broader doomsday predictions about urban neighborhoods never came to pass. Trillions of dollars of federal stimulus, bank forbearance, and rental assistance from landlords have propped up establishments that might have otherwise gone under. And then there's the support from loyal patrons who've gone out of their way over the past year to order takeout from favored restaurants and bars. Research by the Urban Institute shows that cities including Seattle, Chicago, Houston, and Washington haven't seen sharp increases in delinquencies on debt owed by small businesses.

At the same time, new business formation has surged nationwide, according to data compiled by the U.S. Census Bureau. Some of this is what happens in any recession: Out-of-work people go into business for themselves. But low interest rates and the relative ease of raising capital right now have emboldened entrepreneurs to do something that seems especially daring in this digital age, which is to open brick-and-mortar establishments. For instance, restaurant and food business openings have climbed back to levels just below where they were before the pandemic, according to Yelp.

Owners of new restaurants, cafes, and Amazon.com-proof concepts such as the one Burgess is testing have also been able to capitalize on the uptick in retail vacancies by snapping up locations that would have been unavailable or unaffordable a year ago.

"I have been pleasantly surprised—and in some cases awed—by the resilience" of neighborhood business districts, says Michael Berne, president of MJB Consulting, a retail planning and real estate consulting company. "In a year's time, I would expect urban Main Streets to have regained a footing, if not yet their swagger."

Few neighborhoods felt the shock of the past year as deeply as Seattle's Capitol Hill, where Burgess opened his newsstand. One of the densest areas of the city, it had a vibrant restaurant and nightlife scene that the pandemic all but shut down. After George Floyd was killed in

Tracy Taylor, a co-owner of Big Little News

Rey Amargo's cafe on Pike Street is the company's first U.S. location

Minneapolis in May, protests engulfed the neighborhood. Apartment rents fell as the normal influx of young knowledge workers, who used to fill Amazon's urban campus a mile away, slowed to a trickle.

Commercial real estate in Capitol Hill also took a hit. After years of strong growth, retail rents slipped 0.3% over the past year, to about $35 a square foot, according to CoStar data covering the neighborhood and the adjacent Central District. Behind the scenes, landlords were giving lots of breaks to tenants simply to keep their spaces filled. Even so, vacancies rose to 3.2%, four times what they were a year ago.

Property owners have shown some flexibility to entice businesses, says Damian Sevilla, a retail real estate broker at Kidder Mathews. A new restaurant in Capitol Hill might have its rent set at a small percentage of its revenue for the first two years, so it gets a break if business is slow to take off, he says. In general, Sevilla says, landlords "are circling 2023 for a return to normalcy."

Business license data from the city show several new arrivals to the neighborhood, including an Indian takeout restaurant and a cafe specializing in Mexican chocolate. More are on the way. By March the marquee of a sports bar that went out early in the pandemic had been replaced by a sign for a Korean fried chicken chain. Underneath, a banner read, "Coming soon," along with an email address for anyone interested in applying to be the general manager.

Around the corner, a third-generation Mexican ▶

◀ chocolate maker, Rey Amargo, opened its first U.S. cafe in January after months of pandemic-related delays. A 50% break on the rent last year from the landlord helped it move forward. On the plus side, staffing up was easy with so many out of work. “When we put out the sign that we were hiring, we received a lot of résumés,” says Carlos Rios, whose grandparents started the company.

Betting on Capitol Hill’s rebound came naturally for Burgess, who owns a few bars in the neighborhood and part of a local cupcake chain. When a small vintage shop decided to close last year, he and his friend Tracy Taylor, a longtime manager at an independent bookstore in the neighborhood, jumped at the chance to lease the space. “It was that magic moment,” Burgess says. “The size of the store, the cost per square foot, created an opportunity for us to do something that is a risky business model in a lot of people’s eyes.”

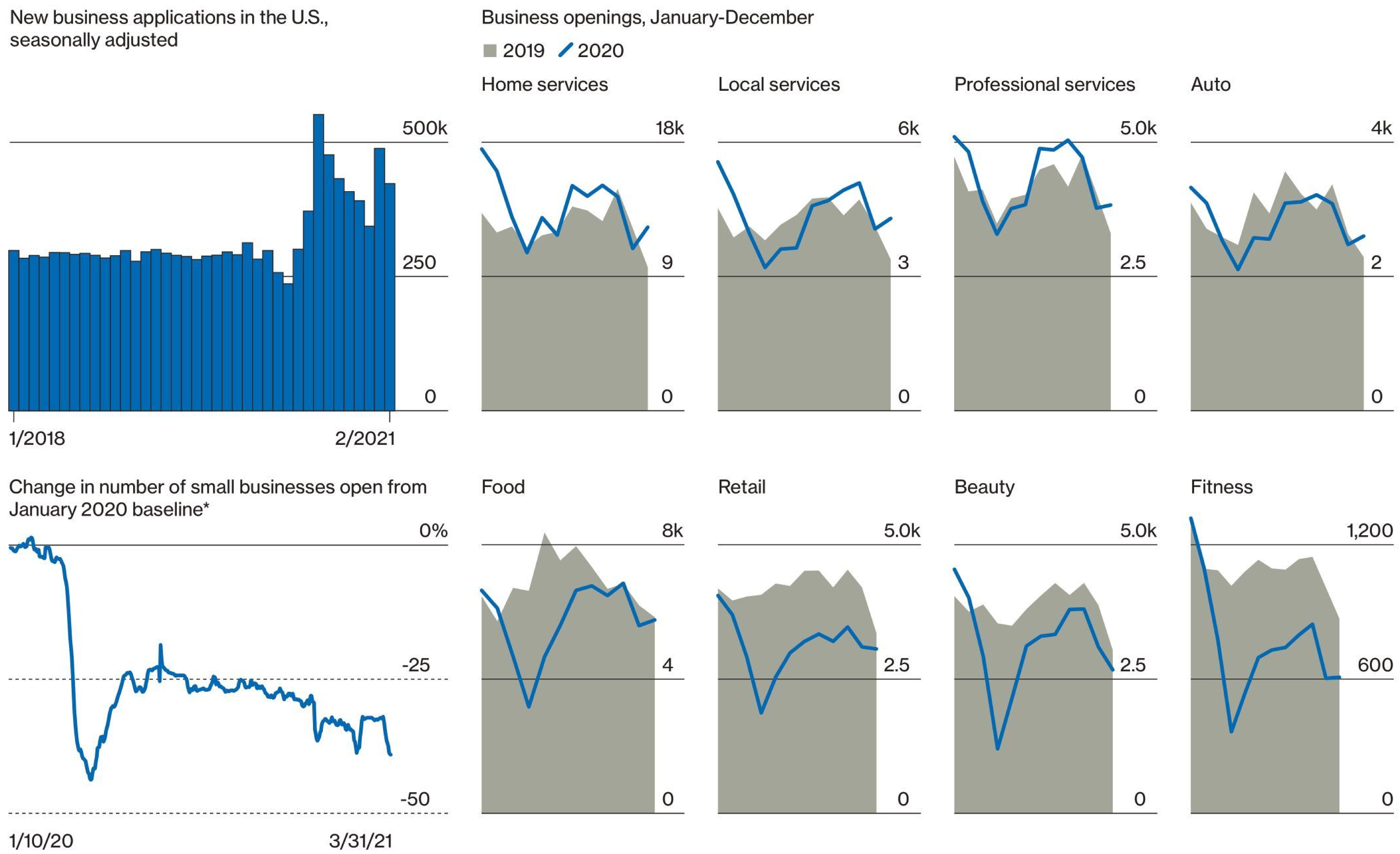
Burgess says he’s heartened that so many of the other local small businesses have made it through a year of the pandemic—a sign that the neighborhood’s unique character will endure. He’d expected the newsstand to have a slow start, but sales the first week of operations ran well ahead of projections. “People were really loving it,” he says. “They were happy to have something new.” —*Noah Buhayar*

THE BOTTOM LINE An uptick in retail vacancies and access to low-cost financing are helping seed new businesses in Seattle’s Capitol Hill and other urban neighborhoods.

Pulse

Main Street’s Uneven Recovery

How are the 30 million small businesses in the U.S. faring a year into the Covid-19 pandemic? Depends on who you ask. Since last April the federal government has approved more than $755 billion in Paycheck Protection Program forgivable loans. Still, hundreds of thousands of businesses have failed. Many others are hanging on by a thread. Some—those that don’t depend on people spending time in their space—have flourished. New business formation has accelerated, too. —*Nick Leiber*



*SEASONALLY ADJUSTED SEVEN-DAY MOVING AVERAGE. DATA: U.S. CENSUS BUREAU; OPPORTUNITY INSIGHTS; YELP

COURTESY BAT SHLOMO VINEYARDS

A Boutique Winery's Covid Boom

A quick pivot online helped Israeli vineyard Bat Shlomo avoid ruin in the lockdowns

At first, wine shops stopped placing orders. Then hotels and restaurants began calling Bat Shlomo Vineyards to take back its bottles. With Israel heading into lockdown in March 2020, no one knew when things might open up again, and they didn't want to be stuck with an ocean of wine they couldn't sell.

For Bat Shlomo's owner, Elie Wurtman, the timing could hardly have been worse: only four weeks before Passover, which—along with the autumn high holidays—is the biggest period for wine sales in Israel. About two-thirds of the winery's $1 million annual revenue came from the country's hotels, restaurants, and wine shops, and Bat Shlomo's sales plummeted 75% last April as those businesses shut their doors. "The world came crumbling down pretty quickly," says Wurtman, a venture capital investor who in 2010 co-founded the winery in Bat Shlomo, a bucolic hillside town an hour's drive north of Tel Aviv.

So he pivoted away from sales via third parties to more direct contact with consumers—and his business thrived, with sales growing 20% last year despite two more lockdowns. Of course, Bat Shlomo benefited as people in Israel, like those around the world, increased their drinking. And many sought out domestic varieties from the country's growing roster of wineries, which have jumped from a handful in the 1980s to hundreds today. At Bat Shlomo, customers who used to order only a few bottles began buying two or three cases.

Before Covid-19, Wurtman's website was a simple compendium of information about the winery—descriptions of the vintages, the history of the town, and directions for those who wanted to stop in for a tasting. But it lacked any way for fans to buy its grenaches, semillons, and syrahs, or even a mailing list where buyers could sign up for events and discounts. "It was all old-school," says Wurtman, whose fund has invested in about 20 startups, including a $5.5 billion online used-car dealer and a cloud services outfit that was sold for $450 million last summer. "I'm this high-tech guy," he says, "but I'd never done this for my business."

Wurtman hired a designer to upgrade the website, allowing online orders for bottles that can fetch more than $250 apiece. And with visits no longer possible because of the pandemic, Bat Shlomo decided to go to its customers. "There were no movies, no beaches, no nothing," Wurtman says. "Drinking wine was one of the few things you could do to elevate your quality of life."

He sold "stay-at-home" packs of Bat Shlomo reds, whites, and rosés that companies gave to their employees. And he started hosting online tastings, where customers get bottles that they open at home and sample while chatting on a videoconference. The online events were "somewhat estranged" with everyone having to wait their turn to speak, "but it was the closest thing to reality we had right then," says Avital Lemberski, a cybersecurity consultant who participated in a virtual tasting. The guidance was good, and he immediately bought a case of sauvignon blanc, then two more a couple of days later—"without a discount," he adds with a laugh.

Wurtman (second from right) with Bat Shlomo's management team

Today, with Israel's rapid pace of vaccinations, most of the economy has reopened. And even though foreign visitors haven't yet come back, restaurants and hotels are open and filling up again. Bat Shlomo's growing sales to consumers spurred some retailers—resenting the competition—to pull its wines from their stores, but, Wurtman says "the phone has been ringing off the hook" lately with orders from restaurants and wine shops eager to meet pent-up demand. And the winery has seen growing numbers of visitors wanting to sample the latest vintages and see how they're made. "People are dying to get out and are lining up for the tasting room," he says. Although direct sales to consumers have accounted for a smaller share of revenue since the economy was unshackled again, Wurtman will continue to focus on that business because it offers better margins and lets him deepen his ties to customers. Last year "we had increased wine consumption, and now we have increased life consumption," he says. "We're better than we were before." —*Yaacov Benmeleh*

THE BOTTOM LINE A revamped website, closer contact with buyers, "stay-at-home" packs that companies give to employees, and online tastings helped Wurtman's business emerge from the pandemic stronger than ever.

Indeed
I tend to side with Diderot - "Mankind will not be free until the last king is hung with the guts of the last priest."
Anonymous 07/28/19 (Sun) 08:48:41 ID: a2a2b0 (9) No.7227812
>>7227765
Nice... I like this "Diderot". Never heard of him, but I'll look him up.
NOTHING WILL STOP US NOTHING
TRUMP

THE MAN WHO KEEPS THE FAR RIGHT ONLINE

While Amazon and its peers have stopped supporting certain prominent White supremacists and conspiracy theorists, Nick Lim has stepped in

–

By William Turton and Joshua Brustein
Illustration by Chris Burnett

Two and a half months before extremists invaded the U.S. Capitol, the far-right wing of the internet suffered a brief collapse. All at once, in the final weeks of the country's presidential campaign, a handful of prominent sites catering to White supremacists and adherents of the QAnon conspiracy movement stopped functioning. To many of the forums' most devoted participants, the outage seemed to prove the American political struggle was approaching its apocalyptic endgame. "Dems are making a concerted move across all platforms," read one characteristic tweet. "The burning of the land foreshadows a massive imperial strike back in the next few days."

In fact, there'd been no conspiracy to take down the sites; they'd crashed because of a technical glitch with VanwaTech, a tiny company in Vancouver, Wash., that they rely on for various kinds of network infrastructure. They went back online with a simple server reset about an hour later, after the proprietor, 23-year-old Nick Lim, woke up from a nap at his mom's condo.

Lim founded VanwaTech in late 2019. He hosts some websites directly and provides others with technical services including protection against certain cyberattacks; his annual revenue, he says, is in the hundreds of thousands of dollars. Although small, the operation serves clients including the *Daily Stormer*, one of America's most notorious online destinations for overt neo-Nazis, and 8kun, the message board at the center of the QAnon movement, whose adherents were heavily involved in the violence at the Capitol on Jan. 6.

Lim exists in a singularly odd corner of the business world. He says he's not an extremist, just an entrepreneur with a maximalist view of free speech. "There needs to be a me, right?" he says, while eating pho at a Vietnamese restaurant near his headquarters. "Once you get to the point where you look at whether content is safe or unsafe, as soon as you do that, you've opened a can of worms." At best, his apolitical framing comes across as naive; at worst, as preposterous gaslighting. In interviews with *Bloomberg Businessweek* early in 2020, Lim said he didn't really know what QAnon was and had no opinion about Donald Trump.

What's undeniable is the niche Lim is filling. His blip of a company is providing essential tech support for the kinds of violence-prone hate groups and conspiracists that tend to get

Lim in October by the crypto-mining shed in his backyard

PREVIOUS SPREAD: PHOTOS: BLOOMBERG (4); GETTY IMAGES (7). THIS PAGE: PHOTOGRAPH BY BRENDON BURTON FOR BLOOMBERG BUSINESSWEEK banned by mainstream providers such as Amazon Web Services.

It’s almost impossible to run a real website without the support of invisible services such as web hosting, domain name registration, and protection against distributed denial of service (DDoS) attacks, which involve crashing a site by bombarding it with junk traffic. Getting banned by AWS, Cloudflare, or other infrastructure providers, as the *Daily Stormer* and 8kun have been, is a step beyond a ban from Facebook or Twitter. It puts the American far right on a short list that includes child pornographers and terrorist organizations such as Islamic State—groups that promote and incite violence and basically aren’t allowed to have websites. “Every time I see an article attacking social media companies—and they deserve it—I think it’s more important to go after the companies that are hosting terrorist material,” says Rita Katz, founder of SITE Intelligence Group, a nonprofit that tracks terrorist activity online. “There’s already a good recipe that was used for ISIS. Why don’t you use it on the far right?”

It’s tougher to keep a site such as the *Daily Stormer* offline as long as somebody like Lim is willing to support it. U.S. laws governing domestic extremism are less expansive than those focused on international terrorism, partly to protect the rights of U.S. citizens with unpopular political views. And even the big web-hosting companies have struggled to set consistent standards. While Cloudflare has refused to work with the *Daily Stormer*, it supports other sites peddling racism, including those for Stormfront and the Committee for Open Debate on the Holocaust. The overlap between Republican Party officials and the belief systems that sparked the Capitol attack, which started out as a Trump rally, can make it all the tougher to draw clear lines.

Voices from across the U.S. political spectrum have registered concerns about companies setting up litmus tests to ban groups from the internet. That said, the voices Lim supports tend to come from the same general neighborhood. He sought out Andrew Anglin, who runs the *Daily Stormer*, to offer the neo-Nazi free tech support. He says his largest customer is 8kun, and he has a personal relationship with Ron Watkins, the site’s former administrator and one of its key leaders since its inception.

Lim argues that the real political crisis facing the U.S. is not extremist violence but erosion of the First Amendment. He says that restrictions on online speech have already brought the U.S. to the verge of communist tyranny, that “we are one foot away from *1984*.” After a moment, though, he offers a sizable qualifier: “I never actually read the book, so I don’t know all the themes of the book. But I have heard the concepts, and I’ve seen some things, and I thought, ‘Whoa! That’s sketchy as f---.’”

VanwaTech’s headquarters is a squat, one-story house in a sidewalkless subdivision that’s just over the state line from Portland, Ore. Lim inherited the place from his grandparents, according to state records. While he regularly talks about VanwaTech as a growing enterprise with a dedicated staff, he seems to be the only one around who’s working at the company. He rents rooms on the cheap to friends from high school who help keep the party going. The crew has nicknamed the house Vansterdam.

When Lim greets visitors, the front door swings open to a view of a coffee table covered in cold McDonald’s fries and a collection of half-smoked joints. The backyard is littered with weightlifting equipment and bongs, along with a shed full of computer servers for mining cryptocurrencies.

Lim attributes his entrepreneurial streak to a need to “put food on the table” during an underprivileged childhood, even though classmates remember him driving other kids around in his dad’s Lamborghini and posting videos of the rides to YouTube. High school peers say Lim was obsessed with ostentatious displays of wealth and talked constantly about Bitcoin and *The Wolf of Wall Street*, the movie starring Leonardo DiCaprio as a much more glamorous version of con man Jordan Belfort.

When he’s not doing wheelies on his bicycle, Lim now gets around in an Audi A6 with a Harvard Law School license plate holder, which he calls a gag. (He didn’t go to Harvard, or to law school.)

One of his early forays into entrepreneurship was OrcaTech, a service for website owners to test how well they could withstand DDoS attacks, essentially by launching simulated attacks at them. For a certain kind of customer, the tool could also help execute attacks on others. Lim says that he never looked into whether it was used for malicious purposes, but he adds that protecting against abuse is almost impossible, comparing himself to a locksmith who can’t be sure customers are bringing him their own keys. He eventually shut down the operation out of concern that he’d be implicated in illegal activities.

Lim says he “got famous” after reaching out to Anglin. He’d read about the difficulties the *Daily Stormer* was having staying online. He wrote to Anglin on Gab, a social network popular among the rightist fringe, and offered free use of BitMitigate, his latest DDoS protection product. When asked why he wanted to do business with one of the U.S.’s most notorious White supremacists, Lim shrugs: “They were censored, so that’s what was interesting about them.” ▶

When asked why he wanted to do business with one of the U.S.’s most notorious White supremacists, Lim shrugs

◀ He then launches into a rambling justification, questioning whether the *Daily Stormer* is actually serious about the racism that defines it. "They could be joking," he says. Either way, he adds, "I just don't care. To me, it's not illegal speech."

If it's working right, infrastructure should be invisible. As with sewers and electrical grids, sturdy domain name servers and distributed hosting services allow the people who rely on them to focus on more pressing matters. It's possible to run websites in the face of hostility from the huge companies that host most sites and protect them from attack. But it's not easy, and the sites that do it tend not to work that well.

The *Daily Stormer*'s infrastructure troubles really began shortly after White supremacists rioted in Charlottesville, Va., in 2017. After the riot, Anglin posted an article mocking Heather Heyer—the counterprotester murdered by a neo-Nazi in attendance with his car—and a handful of tech companies pulled the support the site needed to stay online. This started with GoDaddy Inc., which had provided its domain name registration, the service that links the location of content on a server to a URL someone can type into a web browser. Cloudflare, which had protected the *Daily Stormer* against DDoS attacks, also banned it, as did a handful of other service providers. The

"Once a hotel invites the neo-Nazis, hosting their convention year after year, that's no longer ethical"

site began bouncing around between permissive, offshore hosting providers, leading to periodic service outages and a general deterioration of its usability.

Over the past few years, several other sites have been similarly hobbled or taken offline after their users were implicated in racist massacres. In 2018, Gab went offline after a mass murder at

SOME OF NICK LIM'S NOTABLE CONNECTIONS

Andrew Anglin
Editor, the *Daily Stormer*

Anglin runs a key forum for White supremacists that advocates ethnic cleansing and violence against women.

Rob Monster
CEO, Epik

Monster bought Lim's service BitMitigate in 2019, shortly after becoming an outspoken critic of efforts to cut off controversial sites such as Gab.

Jim Watkins
Owner, 8kun

Lim flew to Japan to celebrate with Watkins and his son when they launched 8kun, the successor to 8chan and a hotbed of QAnon conspiracies.

Ron Watkins
Former administrator, 8kun

Since stepping down, the younger Watkins has been banned from Twitter for promoting election-related conspiracy theories.

a synagogue in Pittsburgh by a person who kept a profile marked by anti-Semitism on the social network. The people who ran Gab denied they were running an extremist website, describing theirs as an open forum for anyone seeking a less censorious alternative to Facebook. When Gab lost its domain name registration, a Seattle-based company named Epik made a show of taking it on.

At that point, Epik had spent years in the mundane business of non-ideological domain registration, and Rob Monster, its awkwardly named chief executive officer, had a reputation for personally handling customer service calls and posting on arcane industry forums. But Monster had also been radicalized during the Trump years, subjecting his staff to florid conspiracy theories in staff meetings and spending more and more of his energy on politically charged work at Epik.

Around this time, Lim and Monster began collaborating. It's not clear how they met, but they quickly grew close, with Monster becoming a kind of mentor to Lim, according to Joseph Peterson, then Epik's director of operations. In 2019, the company bought BitMitigate, the Lim service that was supporting the *Daily Stormer*. As part of the deal, Lim became Epik's chief technical officer.

By the time Lim arrived, Monster's political fixation had come to dominate Epik, says Peterson, who describes himself as progressive. Peterson says he agreed with Monster's view that domain registrars shouldn't refuse clients based on their political views. He likens the business to the hospitality industry, arguing that a hotel shouldn't kick out otherwise untroublesome guests whom the proprietor overhears saying racist things. It's a different matter, he says, when a registrar becomes a beacon for racists urging violence. The blowback that followed Epik's support of Gab led Monster to prioritize working with extremist sites such as Alex Jones's InfoWars.com, according to Peterson. "Once a hotel invites the neo-Nazis, hosting their convention year after year, that's no longer ethical," he says. "That's where I feared Epik was going."

Rob Davis, Epik's senior vice president for strategy and communications, said in an email that Peterson was biased and that the idea Epik would pursue extremist clients was "categorically nuts." He said Epik cut ties with BitMitigate's previous clients, including the *Daily Stormer*, and had no direct contact with Anglin.

Peterson says he quit the company soon after Monster began a staff

SIGN: PHOTOGRAPH BY BRENDON BURTON FOR BLOOMBERG BUSINESSWEEK. TWITTER (1). YOUTUBE (3)

meeting by telling attendees to watch a video of the 2019 mosque shootings in Christchurch, New Zealand. He says the CEO claimed the video would convince his employees that the massacre had been faked.

Before killing 51 people, the perpetrator of the New Zealand massacre had posted a manifesto to 8chan, the precursor to 8kun. That August, another young man followed the same pattern, crediting the site for radicalizing him before a mass murder in El Paso. "I've only been lurking here for a year and a half, yet, what I've learned here is priceless," the shooter wrote of 8chan before killing 23 people. In the wake of the shooting, Epik declined to support the site, citing "inadequate enforcement and the elevated possibility of violent radicalization on the platform."

About the same time, Lim left Epik and announced he had started VanwaTech. The new service would prove critical to getting 8kun online and keeping it there. Lim was central enough to the effort that he flew to Japan to celebrate the site's launch with Jim and Ron Watkins, the site's owner and administrator, who are father and son. On Election Day, Ron announced that he'd stepped down as 8kun's administrator. He was later banned from Twitter for promoting election-related conspiracy theories.

In October, *Bloomberg Businessweek* emailed Monster, requesting an interview to discuss Epik's political philosophy and its relationship with Lim. Davis, the Epik executive, sent a nine-page response arguing that Epik had been demonized unfairly and had done a great job of combating extremism. Davis accused the news media of trying to destroy the lives of Epik employees and said the interview request itself was part of an attempt to manipulate the 2020 presidential election. "The long and short of it," he wrote, "is that we don't give interviews to traitors of our country that participate in attempted coups sponsored by offshore money." He cc'd close to 100 other recipients, including the Republican chair of the Federal Communications Commission, the antitrust division of the Federal Trade Commission, and Fox News host Sean Hannity.

In response to follow-up questions about Lim's connection to Epik, Davis wrote that Lim was just a short-term consultant. He described the line of questioning as a ploy to "cover the tracks of pedophiles and smash small businesses."

Along with the vagaries of Lim's napping schedule, the sites relying on VanwaTech might have to worry about its proprietor's conflicts with the likes of SITE Intelligence; Fredrick Brennan, 8chan's repentant founder, who occasionally sparred with Lim online; and Ron Guilmette, an internet researcher and activist.

For more than a decade, Guilmette has dedicated most of his time to chasing spammers and people who sell phony vitamins around the internet. He's developed a deep knowledge of the architecture of the web, and his tactics include

A sign cautions visitors to VanwaTech's headquarters

pressuring his targets' tech-support partners to stop working with them. The Californian, whose political views are a hodgepodge of mostly liberal ideas, says he chased bad actors because he thought they were crooks, not for ideological reasons—until this summer, when he found himself increasingly agitated by QAnon's influence on U.S. politics. Guilmette decided to try to take down 8kun. "I set myself the task of causing as much trouble as possible for this one particular website," he says.

Guilmette decided the best way to get to 8kun was Lim. In October, he persuaded CNServers, the Oregon company that guarded VanwaTech's 254 internet protocol addresses against DDoS attacks, to cut it off. When CNServers did so, 8kun went offline for about an hour before VanwaTech switched to another service provider. Lim now uses DDoS Guard, a Russian company less sensitive to pressure campaigns.

Web hosting for 8kun has since been spread over 11 IP addresses held by three different companies, all based in Moscow and in business with DDoS Guard, says Guilmette. Scattering the site across numerous servers appears to be a tactic designed to make it harder to take offline. "I feel like I've been chasing them, like the foxes and the hound," Guilmette says, adding that the *Daily Stormer* and 8kun are being "kept alive and breathing on the internet only because Mr. Nick Lim is keeping them."

The politics of web hosting rose to national prominence after the insurrection at the Capitol. Parler, which has replaced Gab as the buzziest right-wing social network, went offline after Amazon deprived it access to AWS. It stayed down for a month, increasing the conviction among many conservatives that the companies who run the internet are aligned against them. The site came back online in February and has been mostly stable since then.

Lim sees the rising concerns around high-tech censorship as a business opportunity. He had nothing to do with getting Parler back online, but the incident aggravated distrust in large tech companies in a way that could work to his benefit. He says he's been furiously buying extra racks of computers on EBay to keep up with the increased business. Over the course of several conversations, Lim also repeatedly suggests he's going to focus more on hosting pornographic websites, which aren't exactly digital pariahs like some of his other clients but are controversial enough to face hostility from some service providers. "A lot of people will say, 'Oh, that's an abuse of free speech to post nude pictures,'" he says. "Some people won't service a nude website. We don't care." Ⓑ

The Boring Co.'s site in the Mojave Desert

Waiting for Elon

It's not easy to compete with Miami and Austin for high-tech jobs. But Adelanto, Calif., which boasts a light regulatory environment, an enthusiastic city manager, and plenty of dirt, is giving it a shot

By Sarah McBride Photographs by Todd Midler

One night two Januaries ago, Jessie Flores made a series of frantic calls and texts to his deputies, with a request: Could they clear their schedules to get to Elon Musk's offices in Los Angeles for a meeting?

Flores is the city manager of Adelanto, Calif., a scrubby, mountain-shadowed city of 37,000 in the southwestern Mojave Desert known chiefly for its prisons. Adelanto's mayor, Gabriel Reyes, is a currency trader who works out of a ramshackle strip-mall office in nearby Hesperia. But mayor is a part-time gig here, and the city manager, who's appointed by the city council, is the full-time chief executive—in charge of finance, land use, and economic development.

Over lunch with the mayor and a county supervisor, Flores had recently learned of an unusual opportunity. Musk—whose two companies, SpaceX and Tesla Inc., had made him either the world's richest or second-richest man, depending on the day—had a sideline in rapid transit. His Boring Co. is developing a point-to-point travel system that moves passengers in 12-foot-diameter tunnels. It recently finished a tunnel below the Las Vegas Convention Center and is in talks to build one in Ontario, Calif. The county supervisor, who'd worked on the Ontario project, mentioned to Flores that Musk was looking for a place with enough room and a flexible enough regulatory environment for the Boring Co. where it could practice digging as it improves its tunneling machines. Adelanto, the supervisor suggested, might be a good fit.

Not might, Flores shot back. Definitely! He got the phone number for Boring's president, Steve Davis, and texted him. "I said, 'Steve, we're the ones you're looking for,'" he recalls. "'When can we meet?'" He suggested that Davis and his staff sit down with a team from the city who could answer questions about permits and the like. An aide to Davis proposed some dates, and Flores started planning for the meeting at SpaceX's headquarters, two hours southwest of Adelanto.

Flores, a wiry Los Angeles native who served in the U.S. Army during the first

Prisons account for one-tenth of city revenue

Gulf War and worked in security for aerospace companies before getting into local government, is not alone in his ambition. Smaller municipalities across the country have been scrambling to cater to the every need of tech billionaires and chief executive officers, especially since the pandemic fueled an exodus from high-cost cities. Musk himself recently relocated to Texas, after local groups offered Tesla at least $56 million in tax breaks to open a factory. Meanwhile, Amazon.com Inc. agreed to open a second headquarters in Northern Virginia after receiving commitments for $796 million in tax breaks and transportation improvements. A handful of Silicon Valley venture capitalists have relocated to Miami, lured by a business-friendly mayor and low state taxes.

Compared with those locations, Flores doesn't have much to work with. Adelanto has no money or political capital to spend on headline-grabbing economic incentives. "I inherited a very unstable and mismanaged city, and poorly led," says Flores, who became city manager in 2018. "If you want to quote me on that, that would be great."

For 2021, the city has been projecting a $4.72 million deficit. One-third of its residents live below the poverty line, and its recent history doesn't inspire much confidence. Three years ago, the home of former Mayor Rich Kerr was raided by the FBI as part of a corruption probe. (Kerr says he did nothing wrong. He was never charged.) Flores himself hasn't escaped scrutiny. He was placed on administrative leave in 2019 and reinstated a few weeks later. No reason was given by the city council. "Rumors, bogus allegations," says Flores, who believes other employees were upset he was disrupting the status quo at City Hall. "It's sad." And these were only the latest difficulties: In 2008 the animal control supervisor resigned after he was accused of drowning kittens, and in 2013 some moms at a local elementary school were charged with a felony for vandalizing a classroom with paint and ketchup. (The former supervisor pleaded guilty to four counts of animal cruelty and received 90 days in jail. The ketchup moms pleaded no contest and had to pay $6,901 and perform 100 hours of community service.)

Adelanto may lack reputational pizzazz, and it may not even have a local police department (it was disbanded in 2001 amid an earlier corruption probe), but it has two important assets: vacant real estate and an extremely easygoing approach to regulation. In contrast with much of California, where it can take months or longer to get real estate projects approved, permits can get same-day turnaround here. Whenever a rule offers room for interpretation, civil servants, many of whom work on contract and know their jobs are riding on helping as many businesses as possible, tend to read it in the way that provides the least friction. “They understand that it’s economic development and job creation that stimulate the economy, not government bureaucracy,” says Flores, who is registered as an independent and considers himself a libertarian. “Let’s keep California employed.”

During a recent tour, he showed off some of the companies that have opened outposts in town—including drone manufacturer General Atomics and prefabricated construction manufacturer Clark Pacific. Cannabis has been big here since 2015, when the city council approved its cultivation for medical purposes; the council later amended zoning laws to make it even easier for growers to set up shop. Prisons are big, too. Adelanto hosts several, most notoriously a U.S. Immigration and Customs Enforcement detention center run by the Geo Group, a large private prison operator. Last year, Geo applied to expand its facility, which culminated in a contentious council debate in September, ending in a deadlocked 2-2 vote at 3 a.m. The city attorney then ruled that the expansion could move ahead anyway, based on an earlier 4-1 vote. The lone planning commissioner who’d voted against the facility in that earlier vote had been fired the next day. (Flores says the dismissal was unrelated.)

Although Flores says he’d prefer to attract less controversial businesses, he appreciates what the prisons, which account for one-tenth of city revenue, contribute locally. “They stimulate the economy,” he says. “There’s guards that are employed. They have families. They have obligations.” While fighting for the expansion, he personally drove a letter of support to Sacramento and delivered it to an aide to Governor Gavin Newsom.

Local opponents point out that many guards commute from elsewhere, so the city gets only a portion of the economic benefit. “All of these companies are coming in and realizing that Adelanto is wide open,” says Diana Esmeralda Holte-Cosato, a local activist who narrowly lost a race for city council last year and continues to fight the expansion. “If they pay, they can come in and do what they want.”

The Boring Co. got its first permits to dig in 2017, when the city of Hawthorne, which is just southeast of Los Angeles International Airport and home to SpaceX and Boring, gave authorization to Musk to begin tunneling under its roads. Boring bought a house on a side street near headquarters with a plan to shovel there, too. It held a grand opening of a test tunnel in December 2018, complete with actors dressed as knights brandishing spears and fake French accents at a Monty Python-inspired tower constructed out of dirt bricks. (The tower still stands.)

Musk pitched the company’s approach as an improvement over traditional tunneling, which he said was painfully slow, comparing it unfavorably to the pace of a snail. Depending on the variety, garden snails move about 158 feet an hour—a mile in about 33 hours if the snail moves day and night. Tunnel-boring machines might cover a mile in 12 weeks or so. Musk’s goal is much more ambitious: to dig through 7 miles of dirt per day.

Digging tunnels, unsurprisingly, ▶

Flores (right) with Mayor Reyes

“We have plenty of dirt. We wouldn’t be able to tell if it’s your dirt”

◀ creates a lot of dust, and in 2019 the word among Southern California politicos was that Hawthorne was getting fed up with Boring, which was how Flores and Reyes wound up on the road for their meeting with Davis. They brought along Adelanto’s director of development services, Dave Martinez, who oversees the city’s planning and engineering. Martinez carpooled with Brian Wolfe, the city’s top engineer. An environmental consultant the city has worked with on several projects, Mark Blodgett, joined, too.

The group enjoyed a tour of SpaceX and a ride in the test tunnel—in which their cars reached more than 100 mph for a few seconds. Their pitch detailed Adelanto’s proximity to Interstate 15, which connects Las Vegas to Los Angeles, as well as its business-friendly approach to development. The Boring executives, according to Reyes, were tired of hearing complaints about the soil their tunnels were kicking up in Hawthorne. That would be no problem in Adelanto, he assured them. “We have plenty of dirt,” he said. “We wouldn’t be able to tell if it’s your dirt.”

Boring needed a property that was at least a half-mile long, Adelanto had one that fit the bill: a 20-acre plot zoned for manufacturing on the eastern fringes of town, just off U.S. Route 395. Green creosote and dried grass dot the land, and literal tumbleweeds aren’t uncommon. The closest landmark of note is Bravo Burger, a drive-thru about a mile north.

That the land had previously hosted the Adelanto Grand Prix, an annual motocross event, which was canceled last year because of Covid-19, meant extra good news for Boring. The property is considered previously disturbed, which meant less environmental red tape. Another bonus: Joshua trees, a protected species in California and common elsewhere in town, are largely absent from the site, which meant Boring wouldn’t have to go through the costly and time-consuming process of hiring an arborist to dig up and replant them. Boring and the seller, a limited partnership in Orange County, Calif., quickly agreed on a price of $495,000.

Adelanto’s team never met Musk, but in the telling of the story a year later, Flores tends to include him as an omniscient, ever-present being. A few days into escrow, according to Flores, Musk “was already rolling the boring machine on a flatbed up the 15 freeway.” Tunneling machines, like ocean liners, are generally named, and Boring’s approach is to christen them after literary figures. The rig in Adelanto is called *Prufrock*, after T.S. Eliot’s poem.

Under the California Environmental Quality Act of 1970, many projects require an initial study, where owners hire an environmental consultant to check for potential issues on the site. Adelanto didn’t ask Boring to get one, because officials saw no possibility of significant environmental impact. This is unusual but not unheard of, says Richard Zimmer, a planning professor at California State Polytechnic University at Pomona. “Where there is a gray area that allows room to interpret, cities sometimes interpret in favor of the developer,” he says. “That’s the way cities will compete.”

The full explanation for the lack of an initial study remains murky. Flores and Reyes both say that Martinez handled the day-to-day discussions, and Martinez says that since city emails get deleted after four months, he can’t show any written records of his exchanges with Boring. One factor that he says eased approval was that Boring said it planned to fill in the holes after it dug them.

Responding to a public-records request from *Bloomberg Businessweek*, the city produced permits that showed a remarkably rapid series of events. Boring applied for an annual permit for unspecified “ongoing activities” on Feb. 20. It got it the same day. Ditto a fence permit it applied for on March 4.

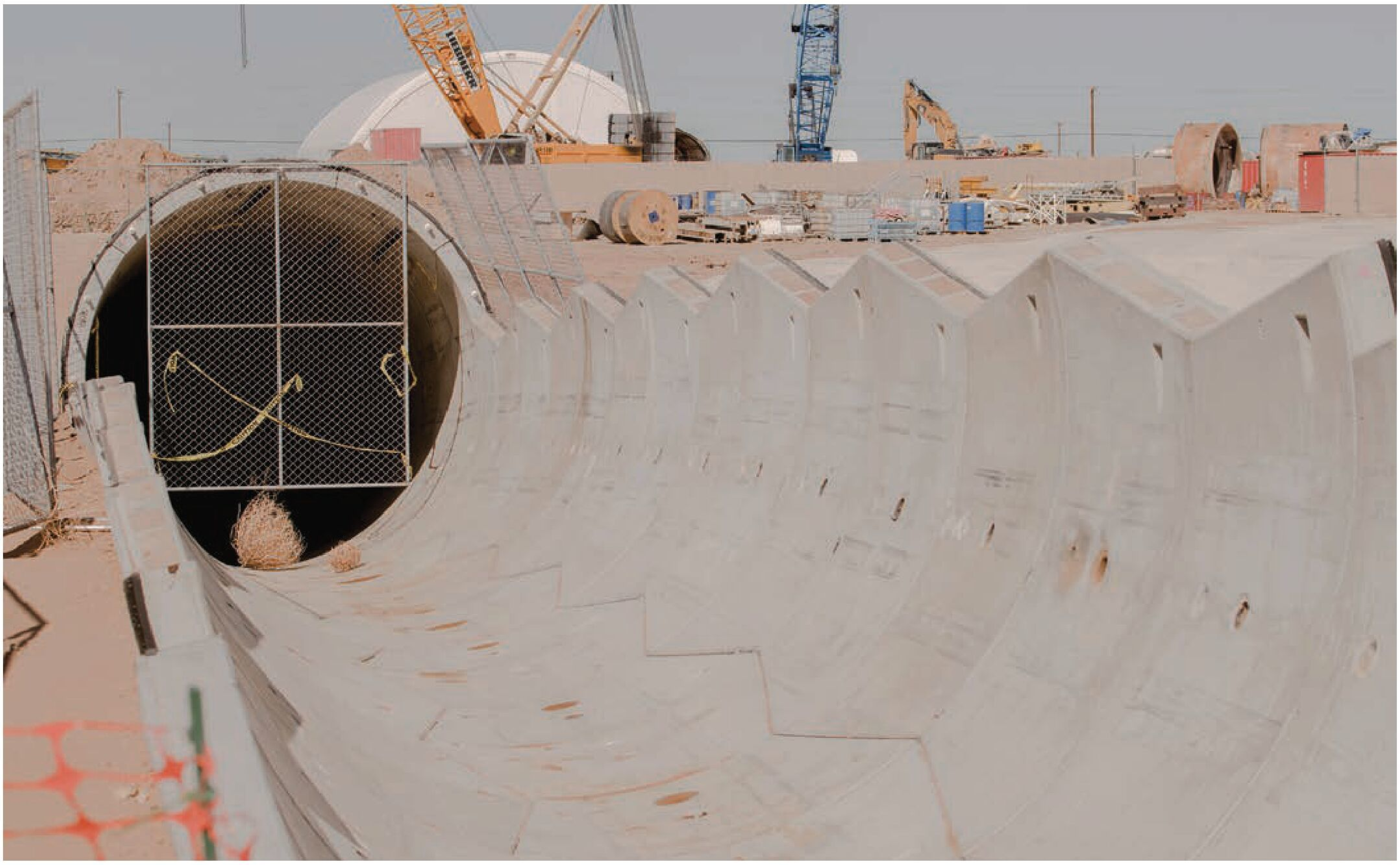
Boring’s purchase of the old motocross grounds closed on March 26, made via an entity called Jadejams Property LLC, according to the county assessor. Then, instead of applying to erect a building on-site, it went through a much simpler process of applying to put a tent on a cement foundation. The permit was dated April 15, but it was granted retroactively. Boring actually applied for it a week later, on April 22.

While all this unfolded, Musk was chafing against local officials in Fremont, Calif., across the bay from San Francisco, where Tesla’s factory had been closed because of coronavirus restrictions. He thought the closure was outrageous and wanted to reopen. “Frankly, this is the final straw,” he tweeted last May. “If we even retain Fremont manufacturing activity at all, it will be dependen[t] on how Tesla is treated in the future.” As the project in Adelanto firmed up, Musk himself was making plans to move his philanthropic foundation, Tesla’s newest factory, and ultimately himself to Texas.

Before I came to Adelanto this past January, Flores noted that although Boring wasn’t cooperating with my article, he could visit the company’s facility unannounced anytime, as allowed under California regulations, with me as his visitor. But once I arrived, Flores said Boring couldn’t accommodate guests that week, and sent Martinez, the development director, to show off the tightly secured facility from the outside.

A fence wraps around the property, which lacks any sign indicating that it hosts Boring. (The county offered one; the company declined.) Concrete quarter sections for lining tunnels, molded in Los Angeles and trucked in, sit outside the fence. Above, two cranes are visible, as well as the top of a forklift and a conveyor belt. The sounds of grinding metal ring through the air.

When the fence door slides open to let workers in, there’s a full view of the 7,000-square-foot white tent. Martinez is fuzzy on what exactly the company is up to but says that it involves experimenting with tunnel techniques, including digging the initial portion of a tunnel at an angle, rather than digging a hole and then dropping the boring machine down to the level of the tunnel.



Boring plans to make concrete tunnel sections in town

A site foreman comes to ask what we're doing but won't comment on the work. He says he ends up chasing away five or six lookie-loos a day. The interlopers have included a representative from the local carpenters' union.

Nor is it clear that the facility is creating many jobs in town. Staff at the Bravo Burger say they got an order for hundreds of patties the previous weekend, and Boring workers seem to be patronizing other businesses here and there. But many of the workers live three hours away in Las Vegas, where the company recently finished its convention center project, and so far there's been no wave of staff moving in. Boring sells nothing the town can tax, which means that so far the arrival hasn't helped the budget deficit.

Flores says he's fine with that. He's thinking further into the future and envisions a long relationship with Musk, whom he still hasn't met. "We'll take a gigafactory, and any other factory he wants to build in our city," he says, using Musk's preferred grandiose term for Tesla plants. "Let's go back to the industrial modern revolution, right? Where we're building robotics, artificial intelligence." For now, he must settle for the news that Boring will start manufacturing its concrete tunnel liners in Adelanto.

On the other hand, what Boring does offer Adelanto is a talking point for future economic development efforts. "We brag about the fact the Boring Company is in our city," Flores says. "It truly is a privilege."

He drives down a dusty road next to an airstrip, explaining that he's hoping to persuade a local businessman to repave it. If that happens, the runway and accompanying air park could hold lots of potential for the private-plane set, he predicts.

As the sun drops low on the horizon and the sky turns pink, he crosses the city limits into neighboring Victorville, home to the old George Air Force Base. Now known as the Southern California Logistics Airport, it holds an eerie parking lot for hundreds of airliners grounded during the pandemic. It also accommodates cargo flights, in part to service nearby distribution hubs for retailers. Flores would like to see retail giants such as Big Lots Inc. and Target Corp. open hubs like that in Adelanto.

Lately, the city manager says, he's been talking with a door and window maker based in Los Angeles and some property developers. A nursing-home director scouting for a new facility told him the sweeping desert views would benefit those nearing the end of their lives. Flores says he held an introductory meeting with Amazon to pitch a logistics center. And he thinks Boring's presence got companies with existing projects in the works to speed up their timetables, like Best Western, which has a hotel slated to go up just north of City Hall.

His latest victory: The California Department of Transportation approved a traffic light on Route 395. Which, all else being equal, improves the chances that a motorist might stop in town rather than roll right through en route to someplace else. In time, Flores says, he'll make his case for the gigafactory to Musk in person. "He's amazing," he says. "At the right time, we will meet with him." Ⓑ

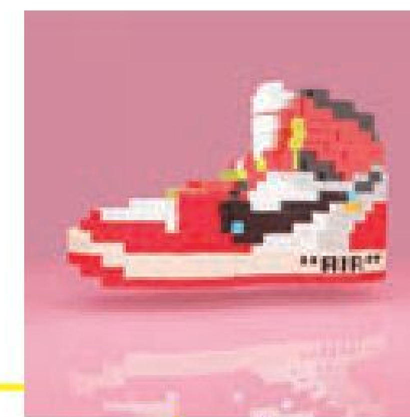
The Guggenheims Of NFTs

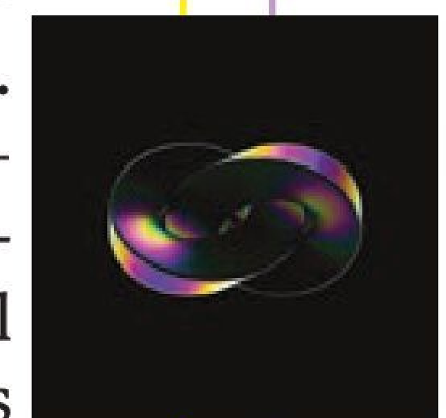
This Isn't Even Art (2020), by Max Osiris

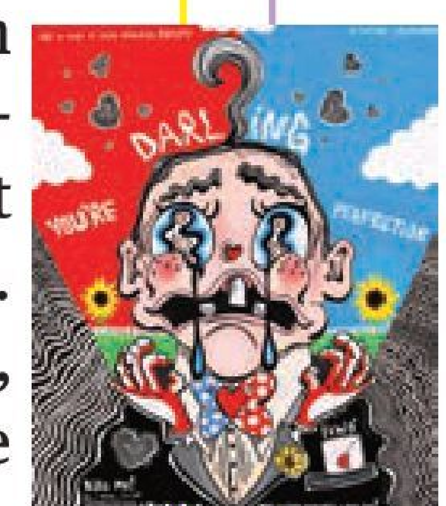
Perhaps you've heard of nonfungible tokens? These collectors already have millions of dollars' worth

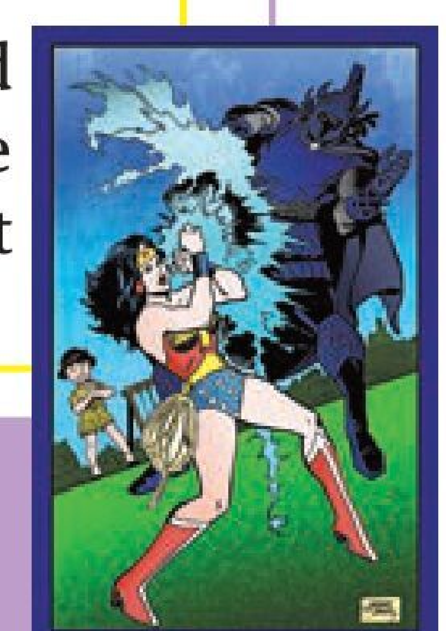
By James Tarmy and Olga Kharif

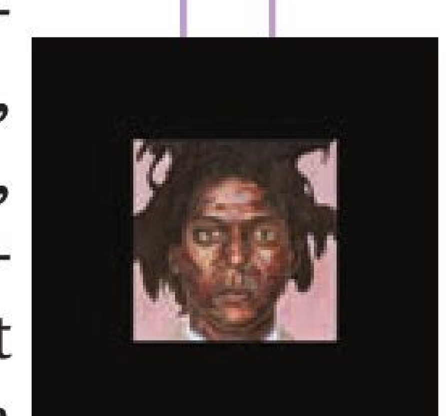
Artworks from the collection of Eric Young











A few months before nonfungible tokens exploded into the public consciousness, the field was already pretty big, with some 75,000 buyers in 2020, according to a report by market researcher NonFungible and L'Atelier BNP Paribas. But it was also still sleepy.

The term "NFT" is often used as a shorthand for a certain kind of blockchain-linked artwork, but it really refers to the digital certificate of authenticity to which these artworks are attached. The first ones were conceived as early as 2012, as digital coins that represented coupons, subscriptions, or company shares. An NFT can be created for anything, whether a century-old painting or a tweet, attesting to the blockchain's guarantee that it's the original, no matter how many free JPEG replicas you can dig up on Google Images. Half of the NFT sales made in 2020, according to the NonFungible report, were related to video games; 8% were connected to metaverses, virtual "worlds" where participants can buy land and virtual goods. Artworks made up only 5% of NFTs' total market distribution, and most sold for under $100.

In March, though, NFT art began seizing headlines. Christie's auctioned a collage of images by the creator known as Beeple (real name Mike Winkelmann, a graphic designer in Charleston, S.C.) to a Singapore-based crypto investor who paid $69.3 million worth of Ether, more than 10 times the record value of any other known NFT sale. Images by other artists, such as Pak, Mad Dog Jones, and Micah Johnson, started routinely selling for tens of thousands of dollars on digital marketplaces such as OpenSea and Nifty Gateway. As curiosity spiked, everything from (real) houses to Taco Bell-licensed pictures of Mexican food to LeBron James dunk highlights began to come with an NFT. Charmin released images they of course called NFTPs.

The frenzy has subsided some, with the average price of an NFT sinking since February from $4,000 to about $1,500, according to NonFungible, and the average daily sales volume of NFTs falling from $19.3 million in mid-March to $3.03 million by April. But the people who got in early—those who were lucky, true blockchain believers, or both—have still done supremely well. Collectors who bought hundreds or even thousands of NFTs are now, suddenly, multimillionaires, at least on paper (or rather, on-screen). Still others have begun selling, joining the growing ranks of the crypto rich.

Who are these people? And what are their motivations? The following are some of the biggest and most active collectors.

ONLINE ID: etyoung
ACTUAL ID: Eric Young

Young graduated from business school in 2009 and started out at Bank of America Merrill Lynch, putting in "a few years of torture" before going into fintech. "That helped me better understand the payment landscape, and how money moves around, and how the financial infrastructure works," he says. He bought his first Bitcoin in 2015, traded "a six-figure amount" in 2017, and then started accumulating "several hundred thousand dollars' worth at bear market lows in 2018."

He's continued to buy. "Bitcoin is a finished product. It's a savings technology," he says. "That's why I dumped most of my wife's and my net wealth into it—because I had a lot of conviction in it."

Young, who lives in the Bay Area, first encountered NFTs when he saw a *Guernica*-inspired animation called *Picasso's Bull* by the digital artist Trevor Jones. He remembers hearing about Nifty Gateway and "poking around and thinking, 'Let me see who would be interesting to buy, let me just experience it.'"

Investing in digital-art NFTs, Young says, made intuitive sense. "I understand how this ascribes provenance to a piece on a public ledger, and there's nothing else I need to understand," he says. "Whereas when you're investing in a cryptocurrency, you need to think about governance, who the founders are, and there's higher risk."

Young says he's since invested more than $1 million, on 350 or so NFTs, and has sold only three works he considers "notable." Two were by Mad Dog Jones, with Young paying $700 for both and later selling them for $240,000. "One of the things, if you're part of the crypto economy, is that things become ... I don't want to say cheaper," Young says, "but when you're pricing things in Bitcoin terms or Ether terms, and not the U.S. dollar, it looks very different." Indeed, if you have 100 Ether to spend on art, and Ether's value is skyrocketing, pieces priced in dollars can quickly become bargains.

Young has spent more than $1 million on NFTs, selling only three he considers "notable"

Young typically displays one of his NFTs on an Infinite Objects frame "which is small—I can have it on my desktop." A lot of his NFT art also came with physical components, ▶

◀ such as prints, sculptures, and plaques, giving his collection a hint of last-millennium charm. "I have a lot of stuff I need to frame," he says.

ONLINE ID: WhaleShark
ACTUAL ID: Not disclosed

Ask around in the relatively tight world of major NFT collectors and the name WhaleShark inevitably comes up. The British, Hong Kong-based collector began putting at least half his salary into Bitcoin as early as 2012, then in 2015 switched to Ether. As these currencies rose in value, he began looking for ways to spend them.

In 2019 he started buying NFTs, and he now holds about 210,000. A digital repository he started called the $Whale Vault contains one of the largest assemblages of NBA Top Shots "moments," video clips that are also certified NFTs. Top Shots are licensed by the NBA, making the clips, which can be released in editions of anywhere from 1 to more than 10,000, effectively digital trading cards. WhaleShark estimates that he's spent about $150,000 on Top Shots and that this collection alone is now worth as much as $53 million, though the only way to know for sure would be to sell it.

"I think the main reason why NFTs started to blow up is that people started to realize it's just a natural evolution," he says. "Our life is slowly turning from physical to digital. When you look at the younger generation, they are very accustomed to holding digital collectibles as a store of value."

WhaleShark says he hasn't sold anything he's bought and plans to donate his collection someday. But he still managed to monetize his holdings recently, by creating a blockchain-based currency, $Whale, that's backed by the NFTs in the Whale Vault. The coins can be used to rent and sometimes purchase NFTs from the vault, as well as to participate in Whale-related decisions. And of course they can be traded like other cryptocurrencies. "Back then they were worth $500,000," WhaleShark says of the currency's early value. Today the fully diluted market cap (the coins' price multiplied by their maximum supply) is roughly $260 million, though the price can fluctuate dramatically. He still holds about 40% of the currency.

WhaleShark sees plenty of room for the NFT field to grow. "If we look at the percentage of the mass-market population that are dealing with NFTs today, you might be looking at 0.01%," he says. The remainder "provides a significant amount of headroom. We have tons of big names coming into this space: Nike, BBC, Paramount. All these big names are going to drive user adoption."

Even so, he points out, not all NFTs are made equal. "I do believe that 99.9% of projects out today won't hold value," he says. "You had so many independent projects that were leveraging NFTs in a very exploratory manner. What we're looking to in the future is projects that have that mainstream polish."

ONLINE IDs: Seedphrase, Danny
ACTUAL ID: Daniel Maegaard

Maegaard was born in New Zealand and lives in Australia. He made his first $1 million on cryptocurrency at age 26, he says, then asked himself, "Do I continue doing my law degree, or do I pursue this full time?" To clear his mind, he booked a one-way trip to Europe, hung around for three months, then returned to Australia in 2017 determined to become a full-time crypto investor.

In late 2018 he discovered NFTs connected to land sales in the blockchain-based game *Axie Infinity*. From there, he says, "I just fell in love with the community." The group of tight-knit collaborators he found reminded him of when he'd discovered Bitcoin. As he began to collect NFTs, he sold almost as often as he bought, allocating a portion of his crypto portfolio to the pieces "with the plan to basically flip them." In May 2020 he spent the equivalent of $20,000 on *Punk #6487*, a "zero trait punk" depicting a pixelated face on a blue-gray background, from an NFT series known as CryptoPunks. He says his peers derided the purchase as "absolutely silly." In February he sold it for 550 Ether, worth about $1 million at the time.

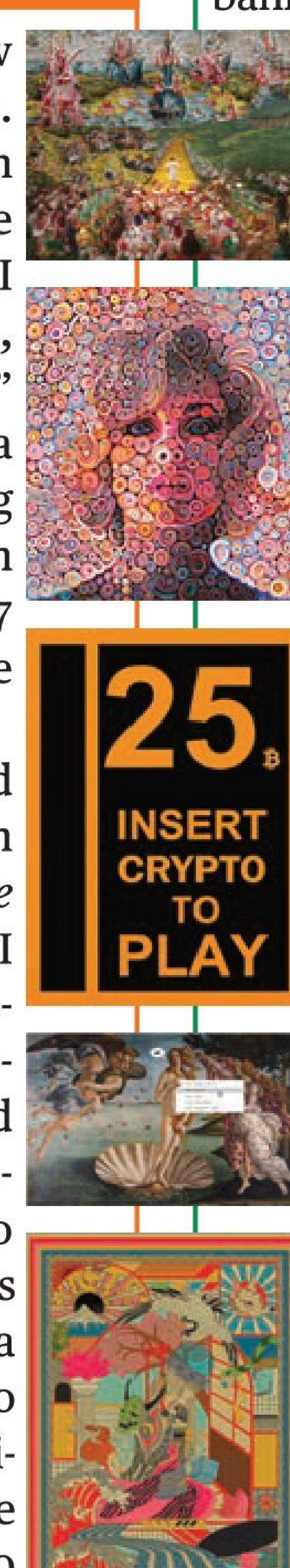
As his portfolio has increased, he's become more inclined to buy and hold. Maegaard now has hundreds of NFTs, whose value he places at about $13 million, representing two-thirds of his net worth. He's bought a few real-world objects with the proceeds from his crypto sales, including a BMW, a Rolex, two residential properties, and a seven-unit commercial building. But since that last outlay, he says, "my biggest purchases have all been digital."

ONLINE ID: Museum of Crypto Art
ACTUAL ID: Colborn Bell

After graduating from Columbia, Bell spent six months in investment banking. "I quickly realized I despised the work," he says. From there he had a few other jobs, including as a trader for a wealth management company founded by vegan Buddhists. In 2017, still working in traditional finance, he bought his first Ether.

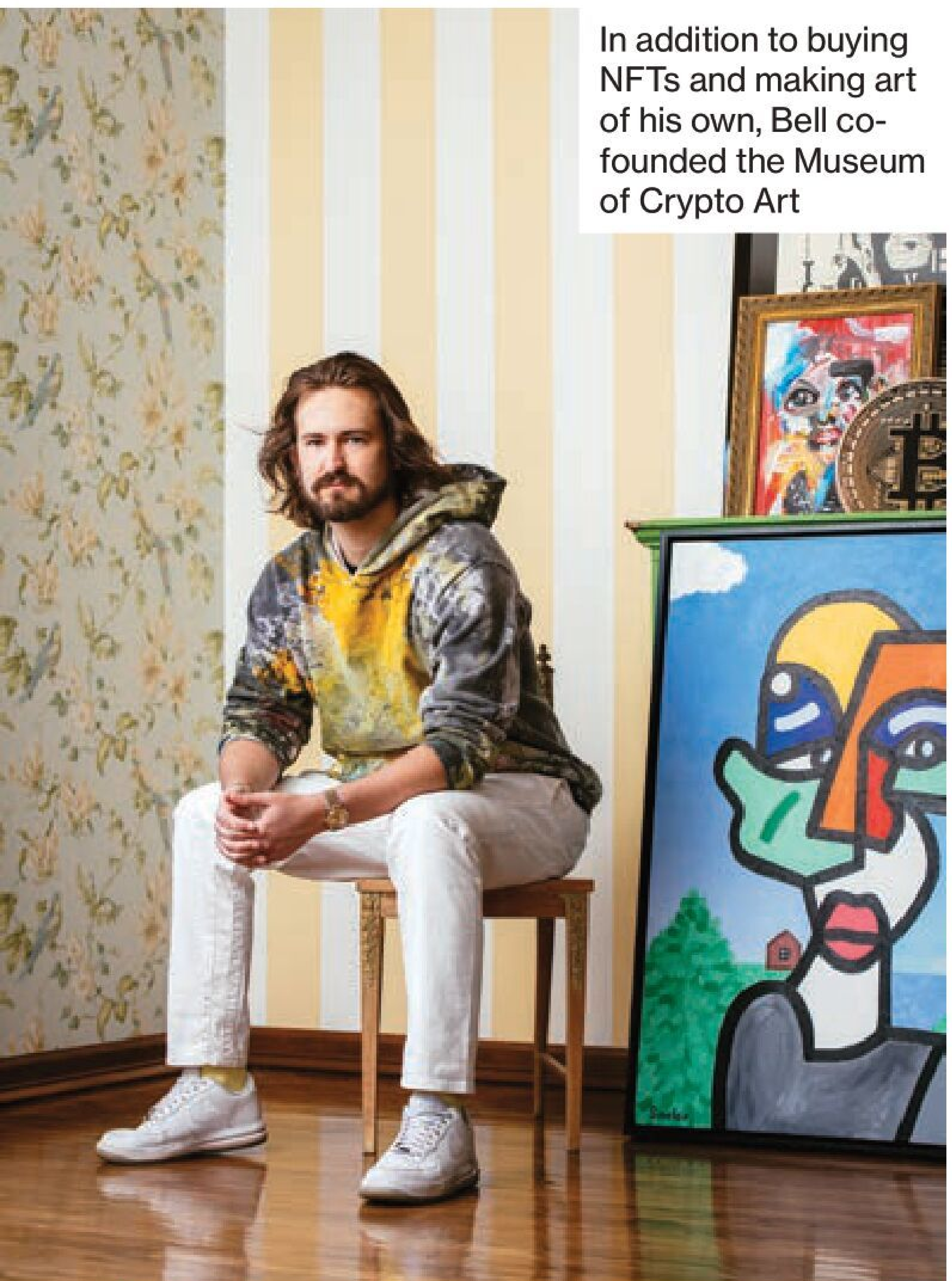
Last year he began to buy digital-art NFTs, working with Pablo Rodriguez-Fraile to build up a shared collection. He was later to the party than many cryptocurrency traders, but he made up for lost time. "I really aggressively started to collect," he says. Bell estimates he's now spent about $400,000, on almost 2,000 NFTs.

"There is a gallery component to what I do," Bell says. "My collection belongs in a museum." There's no NFT Guggenheim (yet), so he and Rodriguez-Fraile decided to build one, establishing the Museum of Crypto Art in the virtual-reality



Artworks from the collection of Colborn Bell

BELL: GABRIELA HERMAN FOR BLOOMBERG BUSINESSWEEK. RODRIGUEZ-FRAILE: MELANIE METZ FOR BLOOMBERG BUSINESSWEEK. ARTWORK COURTESY COLLECTORS



In addition to buying NFTs and making art of his own, Bell co-founded the Museum of Crypto Art

world Somnium Space before their partnership ended. (There will also be a website, for the less adventurous.) “The idea for a museum came from an experience I had in central Brazil, when I went to Inhotim,” he says, referring to the sculpture park built by the mining magnate Bernardo Paz. “That sense of stepping into the world of wonder and art is the vision I wanted to bring into the metaverse.”

One of his favorite NFTs is the work *One True Path*, by the artist known as Rhyolight. “This piece is incredibly special to me,” Bell says, “because Rhyolight was the first artist who we did the solo exhibition with at the museum. When I saw this piece…I’ve never seen anything like it.” Since then Bell has installed 23 permanent exhibitions.

Bell also makes art himself. “It’s a project I began in 2015, where I would use water marbling, a Japanese technique,” he says. “I water and dye dollar bills and give them to friends and people I’ve met along my life path.”

ONLINE ID: PABLO
ACTUAL ID: Pablo Rodriguez-Fraile

Rodriguez-Fraile began purchasing NFTs in 2017, but it was only last year that he started to buy art-related ones. His and Bell’s burgeoning collection rapidly gained notice. “Little by little, we were the ones breaking every record,” he says. “I remember we purchased a piece by Pak for $7,000, and it made some big news in the space.” The work, *Red*, consists of a simple red square, a minimalist counterpoint to the more-graphic NFTs in circulation.

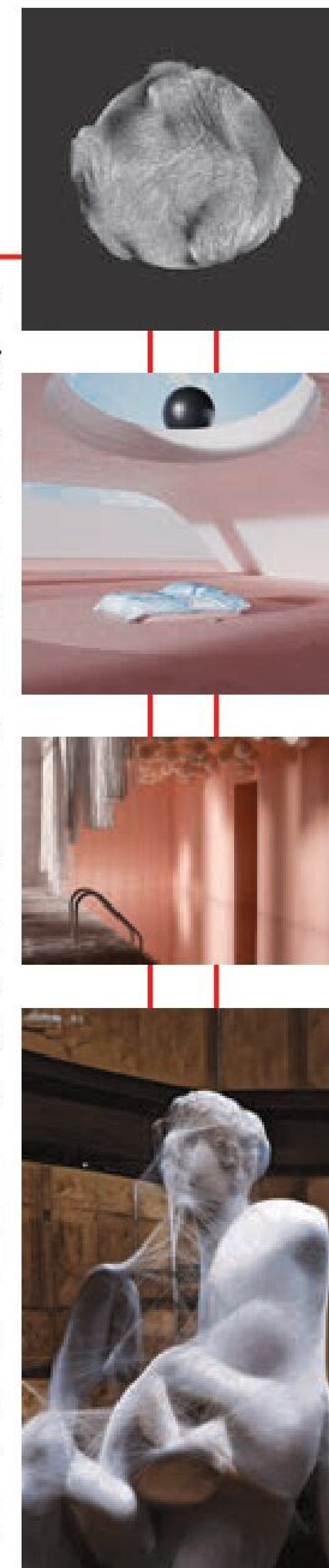
Since Rodriguez-Fraile began collecting, “the landscape has really changed,” he says. “You were able to grab a few pieces for a few hundred dollars. There were a lot less artists, and a lot fewer works going around.” He made headlines again in February when a short Beeple video, an animation depicting Donald Trump naked and passed out on a trash-strewn lawn, sold for $6.6 million. He’d purchased it four months prior for about $67,000.

After parting ways with Bell, Rodriguez-Fraile went on to found the Lot 555 Collection, which he believes is “the deepest, most important collection in the world by far.” Nearly all of the pieces it contains belong solely to him.

He guesses that his personal collection numbers as many as 2,000 NFTs, some of which are displayed on his Nifty Gateway profile. The core of his holdings consists of 300 to 400 pieces featuring “the top of the top creators.” He has about 20 works by Beeple and what he calls “the deepest Pak collection,” numbering around 70 pieces.

The biggest change in the NFT space occurred, Rodriguez-Fraile says, “when creators realized that this wasn’t only about the artist and selling, but that there was another side, with the collectors who do the buying.” Artists who can “foster good relationships and put their careers together in a professional and thoughtful manner were able to attract, let’s say, a bit more serious collectors.”

Take Pak. “We’ve had thousands and thousands of texts over the last year,” Rodriguez-Fraile says. “I’ve talked to them more than my wife.” That kind of engagement, he says, helps to ensure that “they have an incredible collector base. Every major collector is behind Pak, and I think Pak is going to be one of the most important creators in this generation.” Ⓑ



Artworks from the collection of Pablo Rodriguez-Fraile

Rodriguez-Fraile bought a short Beeple video for $67,000 and sold it four months later for $6.6 million

Clockwise from top: Bremont's S302, Supermarine chrono black, Argonaut Azure, and Jaguar E-Type 60th anniversary watch

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Edited by
Chris Rovzar

Businessweek.com

THE WATCH SPECIAL

British Watches Take Off

Bremont is bringing big watchmaking back to England

By Kristen Shirley

Photograph by Christina Poku

Although Switzerland reigns supreme in watchmaking, that hasn't always been the case. "In the 17th and 18th centuries, pretty much every concept that you find in a modern Swiss watch was developed primarily in England," says watchmaker Robert Loomes, chairman of the British Horological Institute. Even the Swiss lever escapement—which makes the ticking sound in mechanical watches and clocks—isn't Swiss: It was created in London around 1750 by Thomas Mudge.

"There were some extraordinary watchmakers who rivaled the likes of Patek Philippe," Loomes says. "Firms like Players of Coventry made the most extraordinary, complicated, beautiful, and expensive watches." So what happened to British watchmaking? World War I and II. Timepiece makers joined the army, and many studios were bombed during the Blitz. "When those workshops were destroyed in the Second World War, very few people thought of carrying on," Loomes says.

The last British watch company that made high-quality mechanical timepieces on an industrial scale was Smith Industries, which closed in the 1970s. Until recently, British companies mainly manufactured inexpensive watches overseas or made a small number of exquisite, six-figure timepieces completely by hand in small workshops such as Roger W. Smith or Loomes & Co. (helmed by Loomes himself).

Now the art is returning to British shores with a big footprint, thanks to Nick and Giles English. Last month the two founders of Bremont Watch Co. opened the Wing, a 35,000-square-foot state-of-the-art facility, where it machines cases and movement components and assembles its timepieces. Formally known as the Bremont Manufacturing & Technology Centre, the Wing marks the first time in more than 50 years that industrial-scale watchmaking has operated in the U.K.

The English brothers grew up in Cambridge in the '70s sharing a fascination with clocks, cars, and planes. Their father, Euan, who had a Ph.D. in aeronautical engineering from the University of Cambridge, was a Royal Air Force pilot and restored vintage planes for fun. "We had an amazing childhood where we were in the workshop with our father," Nick says. "Our mother would give us clocks she would buy in a boot [rummage] sale, and we would take them apart. We never managed to put them back together, but we had an awful lot of fun."

Nick and Giles followed in Dad's aviation footsteps, getting their pilot licenses at 17 and flying in the RAF reserves as undergraduates. They later began careers in corporate finance in the City of London and might still be there if it weren't for a tragedy during practice for an RAF air show involving Nick and Euan in 1995. The crash killed their father and left Nick gravely injured. The brothers left the City and followed their passion for mechanics by purchasing North Weald Flying Services Ltd., which restores historic aircraft.

Eventually their focus turned from aviation and motoring to watchmaking. The brothers didn't care for the styles popular in the early 2000s, which Nick describes as "quite bling and oversized." They wanted to create classic timepieces with military-inspired designs that could handle extreme conditions.

Using money they earned by selling a livestreaming and data protection platform they'd founded in 1999, they started Bremont in 2002. Making watches in the U.K. was part of their mission statement, but since there were no suppliers in country, they had to start by using workers and producers in Switzerland.

After years of research and development, they brought out their first timepieces in 2007—a dozen chronometer-rated units with an entry-level price point at about $3,400. A splashy marketing campaign featuring actors Ewan McGregor and Charley Boorman, who wore the watches as they traveled 13,000 miles by motorcycle around Central and South America, helped win fans.

Watch dials and bezels at the Wing

COURTESY BREMONT

The company puts its watches through brutal paces: It started a partnership with Martin-Baker Aircraft Co., a British manufacturer of fighter jet ejection seats for air forces around the world, to test select watches as it tested seats. (Bremont's MB1 is exclusively offered to pilots who've had to eject from a plane using a Martin-Baker seat, but other models are available to the public.)

The designs skew traditional. Some come on vintage leather straps, and for some of its glow-in-the-dark numerals, Bremont even uses a cream-colored Super-LumiNova to add an historical feel. (As bright-white Super-LumiNova ages, it develops a beige-toned patina.) Bremont uses its military relationships to create bespoke watches for the British Ministry of Defence and other forces around the world.

Machinery polishes a watch case

Many people think of watchmaking as a delicate métier, with rows of lab-coated people painstakingly assembling timepieces. That's accurate, but Bremont also has an enormous manufacturing division that uses massive machines to make cases and movement components. The process requires significant capital from the company and its investors—Nick estimates the Wing and its machines cost more than £25 million ($34 million)—as well as trained people to run the machines, finish the components, and assemble the parts.

It took 20 years, but Bremont has steadily brought elements of manufacturing and watchmaking back to the U.K. First came assembling all of the components into the final "movement," or timekeeping mechanism. Then came case manufacturing, which entailed buying and programming computer-controlled cutting machines to produce thousands of case parts a year. Finally, Nick and Giles arranged for components to be finished by hand on-site, ensuring each piece is perfectly polished.

Even brands such as Patek Philippe don't make every component on their own. What the English brothers want to do is create a U.K.-based supply chain for much of the watchmaking, a project they call Operation Bulldog. They make partnerships with local suppliers whenever possible, including for packaging, screws, sapphire glass, and straps. "I'm hoping people will be inspired by what we are doing," Nick says. He would love to see more component manufacturers or new dial fabricators open in the U.K. to supply companies around the world.

The Wing is located on the outskirts of Henley-on-Thames, a quintessential English country town. The shape of the curved, futuristic building designed by Spratley & Partners was inspired by a vintage biplane. Floor-to-ceiling windows span one side, flooding the space with light and showcasing the surrounding fields of the Black Bears Polo Club.

Inside is a quirky mix of heavy machinery, a Soho House-style bar, and lounges that would look at home in a tech startup. The space is designed for tours, which Bremont will offer as soon as the pandemic permits. Model aircraft are scattered about, and the hood of a vintage Jaguar is mounted on one wall. A Williams Racing Formula One race car, a new Bremont partner, is parked in the boutique. "It's highly clinical where it needs to be clinical," Nick says. "But what we've done is brought a bit of Bremont's personality in there as well."

The duo celebrated the opening with new watches. From the brand's Supermarine collection come its first diver's chronograph (from $6,795) and the vintage-inspired S302 (from $4,195). The Argonaut Azure (from $3,695), from its military division, has a blue dial and bright-orange strap.

But the most special piece is a limited-edition box set ($14,495) produced in partnership with Jaguar that includes a watch made in honor of the E-Type's 60th anniversary, a dashboard rally timer, and a driving experience with Jaguar's Classic car division. Collectors will get to test three vintage E-Type cars at the company's track in Fen End. Does it get more British than that? B

Dressed to a G

The beloved, rugged G-Shock gets ready for the boardroom

By David Graver
Photograph by Stephen Lewis

An emblem of durability, Casio's G-Shock watches have survived hockey-stick slaps, oceanic pressure at 200 meters, and the weight of a 24.97-ton truck. For this resilience, the rugged alternative to a fragile dress watch has been coveted by athletes, explorers, and military personnel since the first model was released in April 1983. Fans—who include Justin Bieber, Rihanna, Spike Lee, and Pharrell—are known to hoard them, and fitness fanatics buy new G-Shocks every year as different styles are released. Now, after more than 35 years and 100 million of them shipped, the Japanese electronics manufacturer has dressed it in upscale armor.

G-Shock's designers have long experimented with case materials beyond the brand's signature shock-resistant resin. The father of the G-Shock, Kikuo Ibe, Casio's research and development chief engineer, always wanted metal versions that delivered the same protection. A titanium G-Shock was introduced in 1995.

In 2015, Casio began offering the dressier, rounded G-Steel in stainless steel with urethane accents. But it was 2018's G-Shock GMW-B5000TFG-9 Full Metal that marked a commitment to luxury finishing. In yellow-gold-colored ion-plated stainless steel, the big, bold digital watch glowed with a mirror-like sheen from its case, bezel, and bracelet.

The Full Metal "came about in part due to Kikuo Ibe's dream project—his desire to create a solid-gold G-Shock," says Junichi Izumi, a timepiece product manager in Casio's R&D division. This ambition would come to fruition in 2019 as the G-Shock Dream Project "Pure Gold" G-D5000-9JR, a solid 18-karat yellow gold release limited to 35 watches. They retailed for about $69,500.

"We knew that by creating a full-metal version of the original DW-5000C, it would refine the watch into a dressier variation," Izumi says. "We are pleased that Ibe's dream has enabled us to produce a refined G-Shock in greater quantity while maintaining the core DNA of G-Shock that was introduced in 1983."

This year, Casio dipped into the rose gold binge seen in jewelry—and watches—to make the G-Shock GMW-B5000GD-4. "Rose gold has been trending up for a while for several reasons," says New York-based jewelry designer Juan Pablo Valencia. "It's different, conceptually speaking, than regular 'yellow' gold, which is so common and somewhat for the masses."

The bright pink of the rose gold Full Metal represents an engineering advancement for the ion-plating (IP) process, which is, more or less, a type of physical vapor deposition (PVD) coating—in which a metal is vaporized in a vacuum and then applied as a thin film. This outer layer protects the stainless steel beneath it.

The original Casio G-Shock, the DW-5000C-1A

Izumi says the "rose gold IP finish has been refined to create a highly polished look, and the dial color for the watch was also taken into consideration for the overall luxurious look." To create the full-metal aesthetic, the finish was also applied to a metal inner case to ensure that the watch shines almost everywhere.

In addition to being pretty in pink, the rose gold Full Metal offers the same superior shock resistance of the brand's typical models—thanks to a thin hidden layer of resin between the bezel and the case. But, at $600, watches in the Full Metal series are pricier than their plasticlike siblings, which hover around $100.

Russell Kelly, chief commercial officer of Hodinkee Inc., an authorized retailer of G-Shock that sells the yellow gold Full Metal, says the market is ready. "I think this metal colorway will be a great fit into G-Shock's current roster of watches," he says. "It makes for a compelling value proposition and further diversifies the brand's offering without moving too far away from its core characteristics."

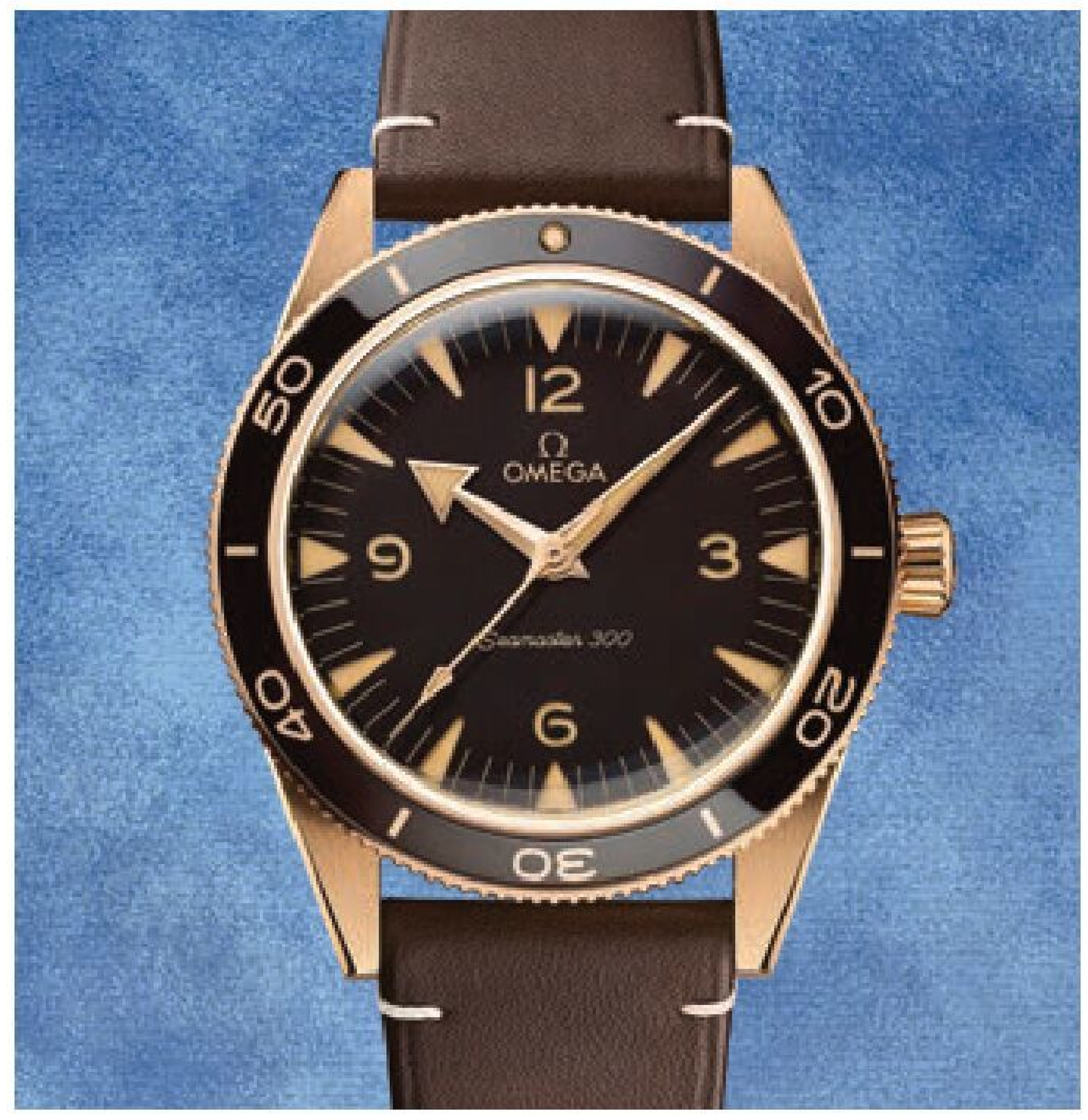
This isn't the only use of a rose gold finish on G-Shock's roster. The color reference made its debut in 2020 through the brand's partnership with streetwear retailer and fashion collaborator Kith. This year, G-Shock took that collaboration further, adorning its nostalgic 6900 model with an iridescent rainbow finish. It's another step for Casio toward dressing its watches up for nontraditional G-Shock scenarios, like the office or a fashion runway. Ⓑ

THIS PAGE: COURTESY CASIO G-SHOCK

The new rainbow-finished and rose gold ion-plated G-Shocks

Most Likely to Succeed

Patek Philippe Nautilus Ref. 5711/1A-014 When it canceled one of its most coveted models ever, the Ref. 5711 blue-dial Nautilus, Patek promised a new version. It delivered: The 5711/1A-014 has a green dial, a trend solidly entrenched as the color of choice in 2021. There are also Nautiluses with diamonds and a rose gold chronograph. *$34,893*



Most Athletic

Omega Seamaster 300 Bronze Gold Bronze has become the standard in modern dive watches because of its resistance to salt water. Omega takes it up a notch by adding gold to the bronze (along with a generous dash of copper and other secret ingredients), which means the metal will still develop a nice patina, but it won't turn your skin green. *$11,200*

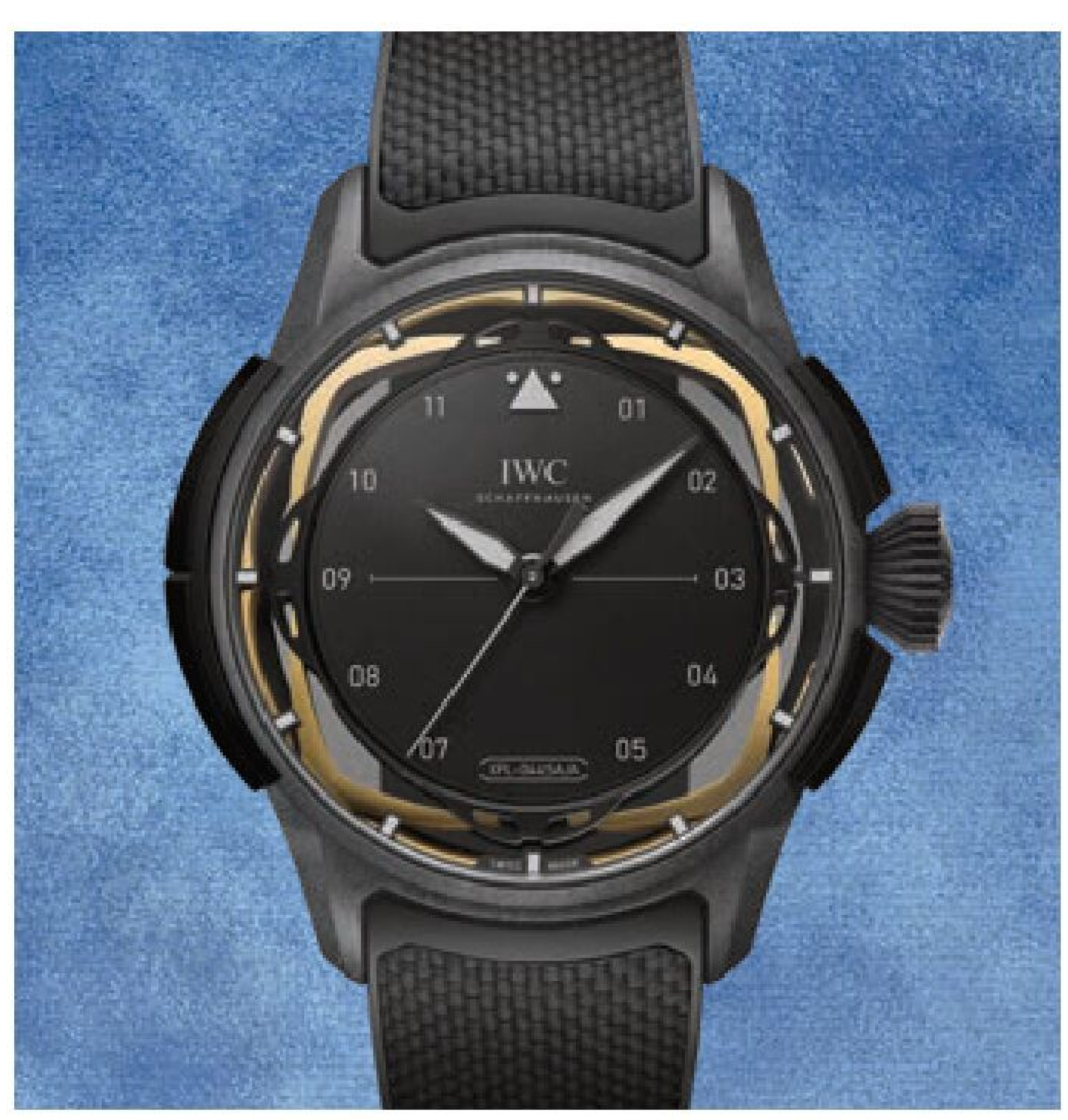
Least Likely to Clog the Suez Canal

Bulgari Octo Finissimo Perpetual Calendar Platinum Because one world record is never enough, Bulgari has added a seventh to its roster of the world's thinnest watches. This perpetual-calendar watch is 40mm wide by 5.8mm thick, slimmer than a Chiclet. *$89,000 in platinum*; *$59,000 in titanium*

The Class of 2021

Most Glamorous

Chopard Haute Joaillerie Co-president Caroline Scheufele knows where to source the best gemstones for Chopard & Cie. and what to do with them. These watches are set with a choice of marquise-cut pink sapphires, blue sapphires, or diamonds, along with five "happy diamonds" left free to roll around the dial. *Price upon request*



Most Likely to Jump Out of a Plane

IWC Big Pilot's Shock Absorber XPL The movement is suspended on a cantilevered spring to protect it from intense shocks, something we could all use after the year we've had. The case is black ceratanium, a titanium alloy that makes the watch look as tough as it is. Limited edition of 10 pieces. *$83,600*

Most Enlightened

Bell & Ross BR V2-94 Full Lum This chronograph features the brightest grade of phosphorescent Super-LumiNova available, not only on its hands, numerals, and markers but also on the entire dial. The C3 grade luminescent material has a brightness strength of 100%, compared with industry standard C1, with a 31% brightness rating. 250 pieces. *$5,100*

Most Ambitious

Frederique Constant Slimline Monolithic Manufacture The movement oscillates at 288,000 vibrations per hour, 10 times faster than the standard. In a normal watch that would blow the engine, but here there's a one-piece oscillator that does the usual job of 26 components. It creates zero friction, thus conserving energy. *$4,795 in steel; $15,995 in gold*

Destined to Save Earth

Panerai Submersible ELab-ID The only reason this watch is made of 98% recycled materials and not 100% is that it would take more energy to recycle some tiny components than to make them from scratch. The titanium case, crystal, strap, most of the movement, and even the glow-in-the-dark Super-LumiNova are reused. Limited edition of 30 pieces. *€60,000*

Most Likely to Be Copied

Audemars Piguet Royal Oak Offshore Chronograph This beloved watch is slightly smaller than previous iterations (43mm, not 44mm), with rearranged subdials and date window, a newly detachable bracelet, and a new timekeeping mechanism (AP's first with a chronograph integrated directly into it). 100 pieces in titanium, as shown. *$36,200*

After a year of rocky rollouts, luxury watchmakers are back, releasing most of their new wares by the end of April's Watches & Wonders showcase in Geneva. Meet the next generation of overachievers. *By Carol Besler*

Life of the Party

Zenith Defy 21 Spectrum You'd expect a chronograph that oscillates at the breakneck speed of 360,000 vph (the average is 28,000) to look something like a Formula One race car, but this looks more like it's ready for the Met Gala. As the world's highest-frequency chronograph in regular production, it will get you to the party (fashionably) on time. *$35,900*

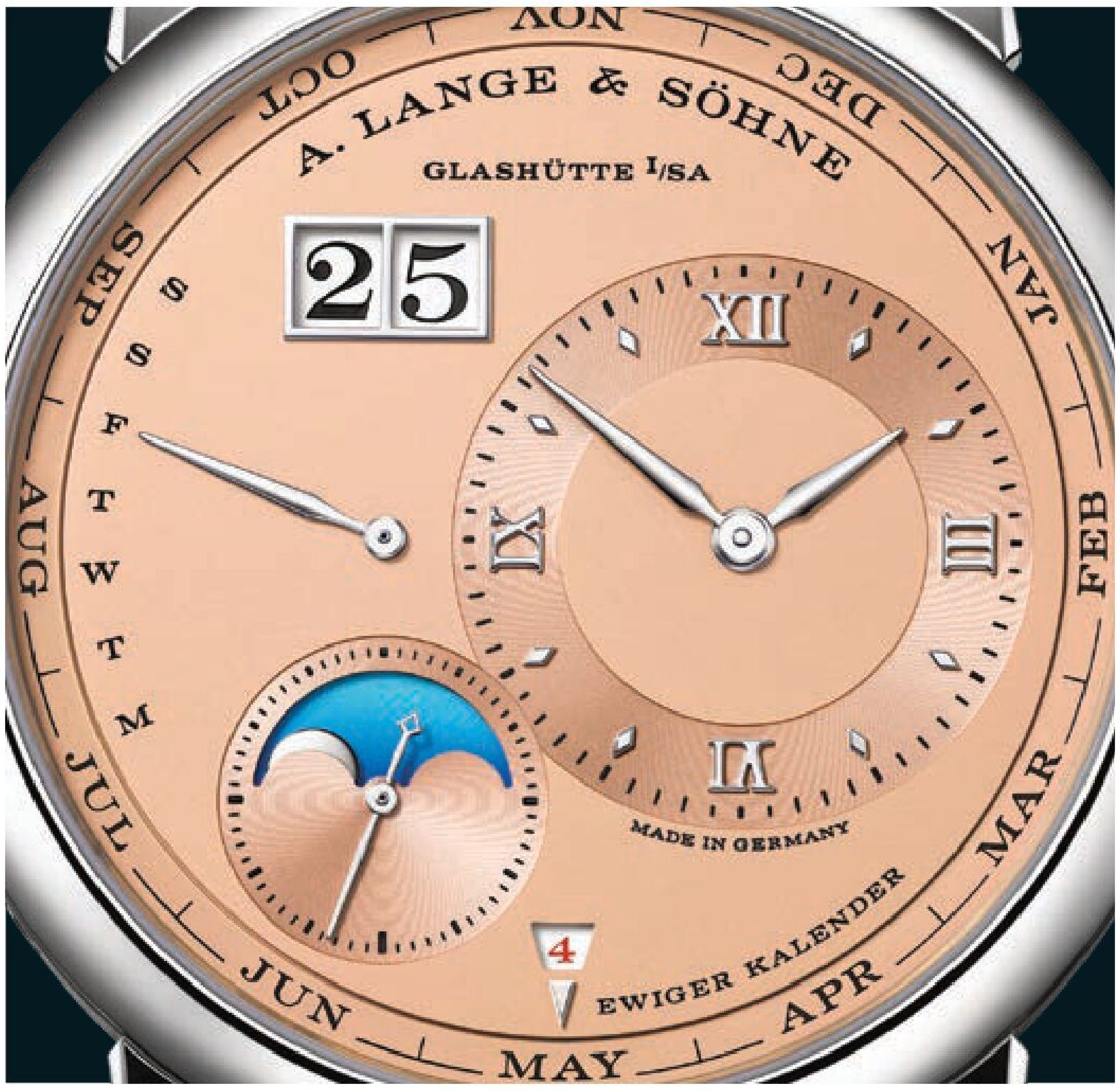
Most Likely to Be Abducted by Aliens

Rolex Cosmograph Daytona Meteorite This 18k white gold watch is the same size and has the same movement, same ceramic bezel, and same Oysterflex bracelet as the regular white gold Rolex Daytona—with one major difference: It has a dial made from an out-of-this-world slice of meteorite. *$34,050*

Most Transparent

Hublot Big Bang Integral Tourbillon Full Sapphire Having mastered the all-sapphire case—a Lego-like construction of some 37 components—Hublot adds an integrated sapphire-link bracelet. The tourbillon bridge, dial plate, and other bridges that hold together the watch's moving parts are also made of sapphire to provide a clear view. *$422,000*

PHOTO ILLUSTRATION BY 731; WATCHES: COURTESY COMPANIES; BACKGROUND: GETTY IMAGES



Perpetual Evolution

The latest supercomplex watch from A. Lange & Söhne is startlingly spare

By Hyla Bauer

Perpetual calendar watches are perennial favorites among aficionados, but they're also useful for those who, during the pandemic, have adopted the term "Blursday" to describe the monotony of each day bleeding into the next. Thanks to a handy indicator on the dial, a quick glance can remind you (again) exactly what day of the week it is.

Crafting a perpetual calendar watch is a formidable feat for any watchmaker. It's classified as a "grand complication," and with good reason: It keeps track of the time, day, date, month, and leap year, in perpetuity, with the exception of one day every 100 years. (Feb. 29 is omitted in one leap year every century, in accordance with the Gregorian calendar.)

This year the Glashütte, Germany-based A. Lange & Söhne is releasing a new in-house movement, its 67th, for its Lange 1 perpetual calendar. The caliber L021.3 movement (or watch mechanism) is an evolution of the 2012 Lange 1 Tourbillon perpetual calendar and has a power reserve of 50 hours. The brand has produced eight perpetual calendars before this over the past 20 years, all with movements fully built in-house.

Like every Lange watch, the movement is hand-finished and assembled twice: Its parts, all 621 of them, are put together for intricate timing adjustments, then taken apart, cleaned, and reconstructed.

Lange's sales during the pandemic have remained strong, with the exception of during the initial lockdown. "For the first few months, virtually all of our points of sale were closed," says Chief Executive Officer Wilhelm Schmid. "But the way we produce watches has not and will not ever change." The brand produces only a few thousand every year, so collectors will snap up these pricey timepieces, regardless of Blursday blues.

Fifteen months ago, Schmid wouldn't have thought his clients would buy remotely. "The physical interaction, where you take the watch, you hold it in your hand, and someone explains it to you," was how sales took place. Now, "not only have we changed, but our clients have also changed," he says. "I have between five and eight Zoom calls with clients a week. That never happened before."

This year the brand is also releasing a Little Lange moon phase in white gold with a sparkly dark-blue "gold flux" dial, a look that's achieved with tiny copper flecks to evoke a starlit sky. (It was previously available only in either a guilloché carved or silver *argenté* dial.) A new version of the groundbreaking Triple Split chronograph will be introduced with a pink gold case and a blue dial in a limited edition of 100 pieces.

The Lange 1 perpetual calendar, however, is the jewel in Lange's crown for 2021. It's available in two versions, one in pink gold with a gray silver dial ($104,500) and one in white gold with a solid pink gold dial ($116,000; pictured) in an edition of 150. Schmid says that in the past they've limited their more exclusive releases to 100 pieces but always had too many unhappy customers who couldn't buy the watch. "We thought we'd soften it a little bit with 150," he says. "It's still probably a drop of water on a hot stone, but at least it's a little bit better."

The sheer amount of information that a perpetual calendar watch provides is a point of pride for manufacturers and collectors alike. But all of that information makes for a dial that's jam-packed, sometimes so much so that the time is hard to spot at a glance.

In this newest iteration, time stands alone in the largest subdial, which is off-center and next to the prominent outsize date, a signature Lange 1 design feature. "It's a very different setup than a traditional perpetual calendar because you have decentralized dials," Schmid says. "All perpetual calendars operate with a 48-month wheel at the center. But because our watch doesn't have a center, the 48-month wheel became a 48-month ring" at the edge of the dial.

Combining a moon phase with a day and night indicator also has a decluttering effect, which makes the watch easier to read. For Schmid, the time and date information are foremost. "That's probably the German in us," he says. "A watch serves a purpose, and the purpose is to see the time. I always say, if you don't know what month and year you are in, you have bigger problems than just the time." Ⓑ

Double Time

De Bethune's reversible watch lets you show two sides of your personality

Photograph by Roxane Schneider

Throughout the 500-year history of watches, their makers have tried to squeeze in as much information as possible onto tiny dials. In the 19th century, dual-sided pocket watches were a popular way to include more indications and complications—or to feature an artistic motif on one side. Dual-sided watches fell out of fashion in the 20th century, and most houses stopped creating them. Today some watchmakers will use the back of a case to display overflow information such as the power reserve, but watches that can flip over and display time on both sides are truly rare. De Bethune, an independent Swiss manufacturer, is known for its *Star Trek*-ian aesthetic and dedication to traditional horology. But despite the company's fine finishing work and its interesting mechanics, not everyone is willing to pay six figures for a watch with such a quirky, space-age look. The new $250,000 DB Kind of Two tourbillon watch solves this problem by adding a second dial that has a classic design.

THE CASE
The primary dial of the DB Kind of Two tourbillon showcases De Bethune's contemporary style. It has a deltoid-shaped bridge in the center, plus a 30-second titanium tourbillon at 6 o'clock. (A tourbillon compensates for the effects of gravity on timekeeping, helping ensure precision.) The watch flips on a horizontal axis to reveal its second dial, moving the crown from 12 o'clock (the top) to 6 o'clock (the bottom). The second dial shows three concentric rings: an exterior minutes track, an hours ring with blue Arabic numerals, and a hand-guilloché center. It's a lot of watch, and yet it still only measures 42.8 millimeters wide by 9.5mm thick. *$250,000; debethune.ch*

THE COMPETITION
• The €1.35 million ($1.61 million) Reverso Hybris Mechanica Calibre 185 from Jaeger-LeCoultre has an astonishing four dials and 11 complications including a perpetual calendar, a flying tourbillon, and a minute repeater. It's the first watch to have four faces.
• Ulysse Nardin's Freak X ($23,700) has an avant-garde dial design that's similar to De Bethune's, but the triangle-shaped bridge rotates and tells the time by pointing to the minutes.
• Hamilton's dual watch, the Jazzmaster Face 2 Face ($6,195), has two movements in one case: a futuristic chronograph on one side and a simple time-only dial on the other.

All Aboard for the Last Big Railroad Merger

By Brooke Sutherland

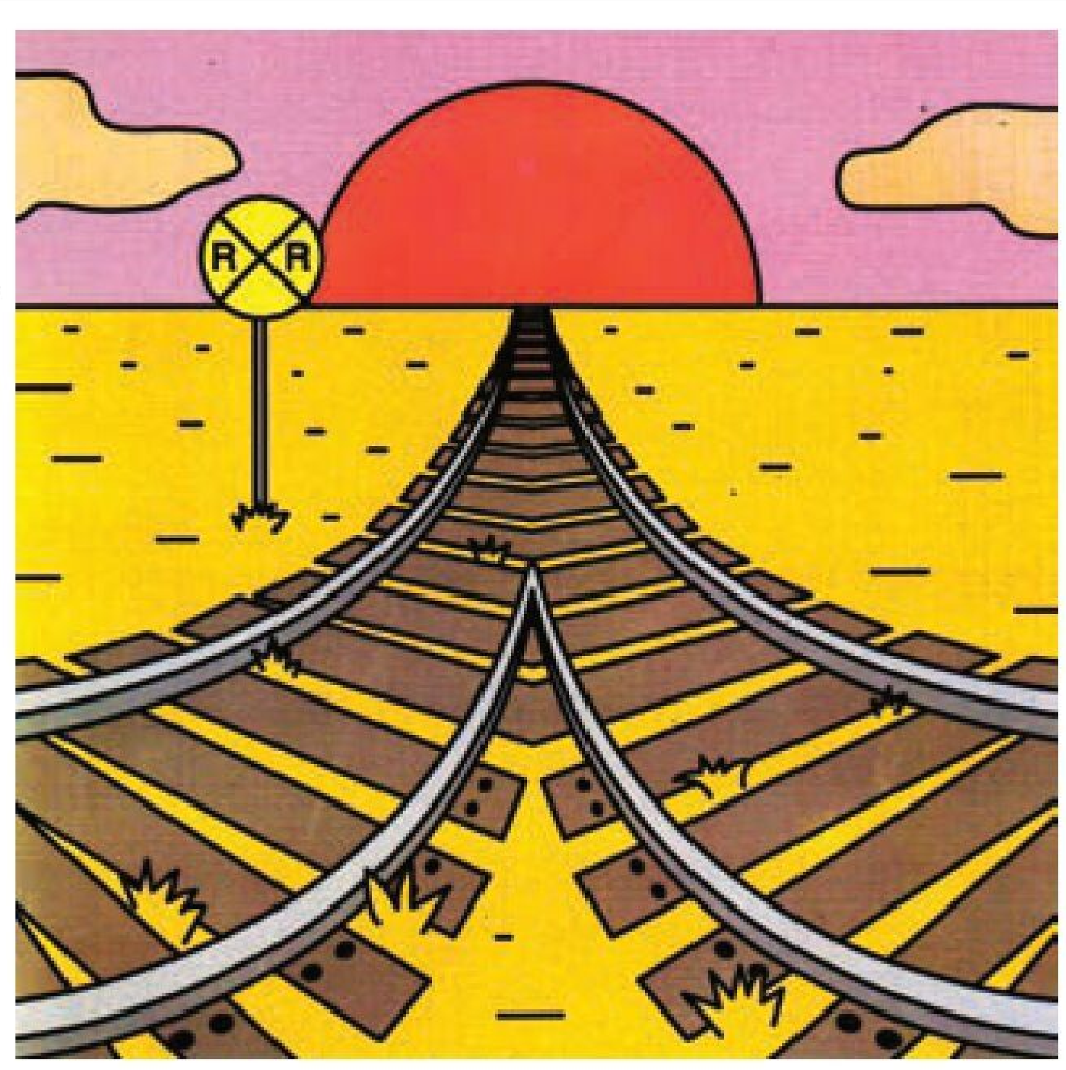


ILLUSTRATION BY GEORGE WYLESOL

Canadian Pacific Railway Ltd. has finally found the right target to realize its vision for railroad consolidation. The company agreed in March to acquire Kansas City Southern for $275 a share, or about $29 billion including debt. If completed, the merger would be the largest between two major North American railroads and the first successful one since the 1990s. Canadian Pacific's failed attempts in recent years to acquire first CSX Corp. and then Norfolk Southern Corp. underscore why consummation of the Kansas City Southern acquisition is far from a fait accompli. But of all the possible railroad combinations, this is both the most strategically logical and the most likely to receive the blessing of regulators.

The combined tracks will form a "T" that stretches from Kansas City Southern's routes deep inside Mexico, up through the U.S. Midwest, and along the Canadian border from the Pacific to the Atlantic. It's a bet that the recently renegotiated U.S.-Mexico-Canada free-trade agreement and the supply chain snarls of the pandemic will bolster the appeal of manufacturing products closer to home—which in turn will create fresh revenue opportunities for the only rail network capable of ferrying goods seamlessly between the three countries. The efficiencies offered by the combined railroad could also help lure freight traffic away from trucks, which emit significantly more pollutants as an industry.

There's no overlap between the railroads, meaning customers should only gain options from the combination. Canadian Pacific's pursuit of Norfolk Southern drew high-profile pushback from shippers including FedEx Corp. and automaker trade groups concerned about higher prices and less service. This go-round, though certain key past objectors have yet to weigh in, more than 300 entities—including Conagra Brands Inc. and Kraft Heinz Co.—have written to the Surface Transportation Board (railroads' primary regulator) to support the deal.

Even after the transaction, the combined Canadian Pacific-Kansas City Southern would be the smallest of the major North American railroads by revenue. Because of Kansas City Southern's smaller size, regulators granted it an exemption from tougher rules adopted in 2001 that require railroads to prove a merger is in the public interest. But rivals and some large shipping groups have asked that the exemption be revoked, arguing the sheer scale of the tieup and the growth of Kansas City Southern's operations in the past two decades warrant closer scrutiny.

Canadian Pacific and Kansas City Southern executives have been talking up the customer and environmental benefits of the deal, and they have a decent argument, even if the more rigorous public interest standard is applied. Any other tieup among the major North American railroads would raise much thornier issues. Further dealmaking can never be ruled out, but absent a broad rethink of the regulatory landscape, this may just be the last rail megamerger. Ⓑ

—Sutherland is a columnist for Bloomberg Opinion

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