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FEATURES

TREATED TO DEATH

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Illustration by Berya 113/Getty



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A Quantum Leap

The U.S. and China are spending billions to develop powerful technology that could transform computing and the world. Who will get there first?

BY FRED GUTERL

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Overtreated & Overbilled

The \$1 trillion problem jacking up American's medical costs. An exclusive excerpt from the new book *Get What's Yours for Health Care*.

BY PHILLIP MOELLER



UNCERTAIN "We didn't know what was going to happen. We didn't know if our customers were going to go away."

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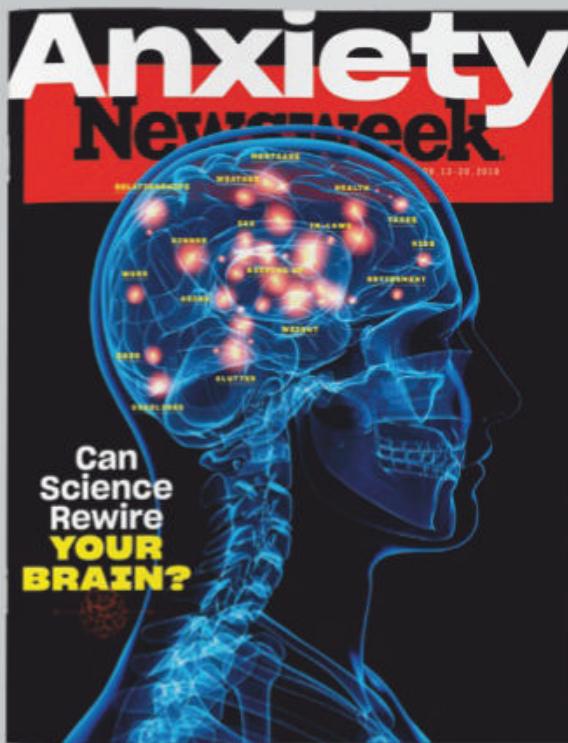
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“Journalism I don’t see elsewhere until later, if at all.”

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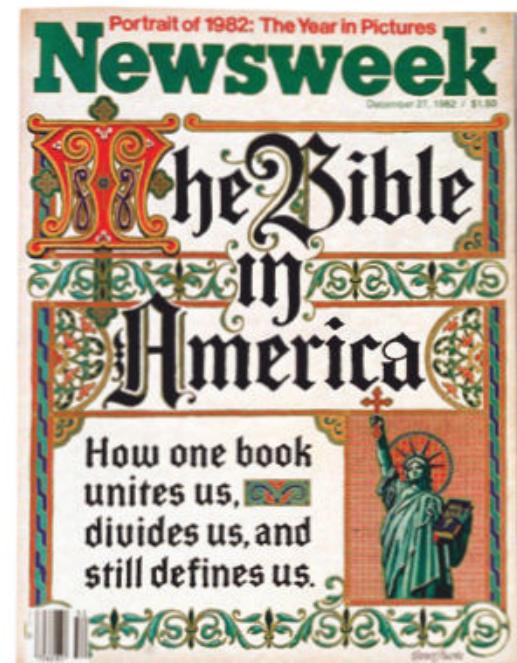
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The Archives

1942

Newsweek reported on Christmas-time advances in Allied war efforts, such as the American and Filipino victory at Guadalcanal in the Solomon Islands, which marked the “first significant defeat for the Japanese.” In North Africa, the British also made significant gains thanks to a “brilliant stratagem” by Eighth Army commander General Bernard Montgomery at El Alamein. This year, U.S. and U.K. leaders are bringing troops home from Afghanistan in hopes of ending the nearly 20-year-long war there. President Donald Trump has vowed to reduce troops in Afghanistan to 2,500 by January.



1982

“Often more revered than read, the Good Book retains a powerful grip on the American psyche and remains the subject of national controversy,” said Newsweek. Between 2011 and 2019, the percentage of Americans who had never read the Bible grew from 25 to 35 percent, according to the Barna Group.



1994

“If you don’t know who Newt Gingrich is yet, the safest bet in politics is: you will,” Newsweek wrote after he and other newly elected Republicans—“authors of a historic electoral triumph”—helped the GOP gain control of the House and Senate for the first time since 1952. Republicans have held a majority in both houses for 14 of the past 25 years. ■

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A photograph capturing a moment of celebration in a hospital hallway. In the foreground, a patient with short, curly dark hair, wearing a white hospital gown, is seated in a wheelchair. They are looking towards the right side of the frame. Behind them, several healthcare workers in blue scrubs and face masks are clapping their hands. One worker in a maroon scrub top and glasses is prominent on the left, while others are visible in the background. The setting is a clinical hallway with doors and a sign that reads "NURSE CALL".

COVENTRY, ENGLAND

First Timer

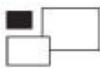
Ninety-year-old Margaret Keenan (in wheelchair) is applauded by staff, on December 8, as she returns to her ward after becoming the first person to receive the Pfizer-BioNTech COVID-19 vaccine at University Hospital in England. Meanwhile, in the United States, the federal Food and Drug Administration approved the same vaccine—as did Canada a few days earlier—for use immediately.

PHOTO BY JACOB KING

In Focus



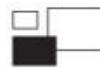
CLOCKWISE FROM BOTTOM LEFT: EMILIANO LASALVIA/AFP/Getty; WOJTEK RADWANSKI/AFP/Getty; NATHAN HOWARD/Getty



WARSAW, POLAND

Mono-Mania

On December 10 on the riverbank of the Vistula, in the Polish capital, a woman checks out a 10-foot-tall monolith, the latest in a string of objects/art installations that have popped-up throughout Europe and the United States—including a golden one in Columbia and a hollow one in El Paso, Texas. Do they come in peace?



BUENOS AIRES, ARGENTINA

Fighting for Rights

On December 10, demonstrators display green headscarfs, the symbol of abortion-rights activists, outside the Argentine Congress as legislators debate a bill to legalize abortion. Argentine lawmakers began discussions on a new bill to legalize abortion, reopening a debate that has bitterly divided the traditionally Catholic South American nation.

→ WOJTEK RADWANSKI

→ EMILIANO LASALVIA



PORTLAND, OREGON

Couch Protesters

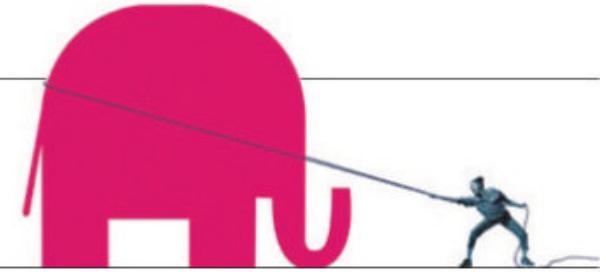
Two protesters, in black, sit within an eviction blockade last Tuesday during clashes with police during an attempted eviction. The protesters established a barricade around the Red House. According to the Associated Press, the “gentrification protest... blockaded several city blocks” and continued into Thursday.

→ NATHAN HOWARD



THE LONG HAUL

Herjavec: "Have a long-term vision, but expect short-term performance. There is no excuse, especially during COVID or even post-COVID, for lack of performance."



BUSINESS

Advice from a Shark

Shark Tank star Robert Herjavec on running—and building—a business in the age of COVID

THE COVID-19 PANDEMIC HAS OBVIOUSLY HIT A lot of businesses hard. But arguably no one more so than the owners of small businesses. To get some thoughts—and some help—I turned to Robert Herjavec, author, entrepreneur and one of the stars of ABC's *Shark Tank*, which is now in its 12th season.

The recent interview with Herjavec is part of *Better*, Newsweek's series on LinkedIn Live (Thursdays, 9 a.m. ET/noon PT), where I talk with authors, business leaders and other thinkers to help us learn how to become a little bit better at what we do. And there's no one better than Herjavec, founder and CEO of Herjavec Group, a global cybersecurity firm, and writer of *You Don't Have to Be a Shark*, to help us get through these troubled times—and beyond.

Here are some insights and advice from Herjavec about how small business owners can survive the pandemic (excerpts have been edited for clarity):

Have a Clear Sense of Reality

"WHEN COVID FIRST HIT, THERE WAS A lot of, 'Oh, we're going to get through this. Don't lay anybody off. Don't cut costs,' blah, blah, blah. I think that's dangerous. You've got to assess your personal situation in your business."

I know even for us, we didn't know what was going to happen. We didn't know if our customers were going to go away, how things were going to be affected. So I actually had my CFO make a black swan forecast, which was no new customers, none of our existing customers paying us, how long could we survive? And once I had that, I was able to come back from the edge.

But I think there's no time to have a false sense of optimism. I mean, it also doesn't mean be super negative, just be realistic."

Talk Your Employees Off the Ledge

"MY EMPLOYEES WERE ALL SCARED, LIKE EVERYBODY ELSE. And they all called. We had a big hands-on call with everybody and they said, 'What should we do first?'

The first piece of advice I gave our whole company was, I want you to get off this call, I want you to pick up the phone and call a customer, because those people are scared. I know you're scared, but those people are scared. Just reach out.

Even though we're all virtual these days, I think that human contact is actually at a premium. I think if we've learned anything during COVID, it is that we are highly interconnected

BY

DORIE CLARK

@dorieclark

social creatures, and you've got to continue to do that."

Keep Your Eye on the Short and Long Term

"YOU'VE GOT TO HAVE A LONG-TERM vision and you have to try to build something sustainable for the long-term. Most people though, when I tell them that, don't understand.

What they think that means is use the long-term as an excuse for short-term failure. And I'm like, no, no, no, no, no, no, no, no, no. Just because you have a long-term vision doesn't excuse you from having a monthly target and a quarterly target and an annual target. So have a long-term vision, but expect short-term performance. There is no excuse, especially during COVID or even post-COVID, for lack of performance.

When I'm buying a business and I sit down with the owner, one of the questions I ask is, 'Tell me about your goals.' And they usually go into these really long-term goals. And then I pivot and I say, 'Well, tell me your target for next year.' What I want to hear is a very specific number with very specific tangible targets. What I don't want to hear is, 'Well, we'll just do the best we can. You know what, we'll do the best we can.' And in my mind, I'm like, 'Oh yeah, ix-nay. That person is not a realist.'

Know When to Give Up

"WHEN YOU RUN OUT OF MONEY, [IT MAY] be time to close the business.] It really depends on your personal situation. The reality of life is you don't have unlimited time. Performance is not measured over unlimited amounts of time. A football game has quarters.

If you have unlimited funds and your parents are super wealthy and they're going to keep writing checks and you want to be the best sushi

restaurant in California and you've been in business for five years and you have no sales, hallelujah, keep going if you're passionate about it. But I think you've got to measure it against reality.

For me, every business I started, I always kind of had this timeframe: How long can I go until it really begins to impact my family and becomes dangerous? Because I love my business, but I love my family more."

Understand the New Normal

SOME THINGS WILL GO BACK TO AS they've always been, but some things, have changed forever.

The first thing that changed forever is business travel. The idea of going to see a customer I've never met to pitch them on me or my product for the first time is gone. This concept of, well, hey, I happen to be in Chicago. Let me pop in and tell you about our company. That's gone. Think about the time waste for me to go and pitch you my business when I could have done it over Zoom. So that's gone.

The idea of going out to take an existing customer for dinner or lunch to build those relationships, I think that continues because we're social beings and we want to continue to do that.

The speed of business has accelerated forever. Things move fast. People are not patient. You know why we're not patient? Because we're all in front of a computer all day. If I email somebody at four o'clock, I expect them to answer me by 4:01. If they answer me

at, like, 5:00, I'm like, 'Were you not home? Where were you? You have nowhere to go. Answer my email.' I think that changes.

But the big change is the digital acceleration. In the past, it was like, 'We have a retail strategy and we have a digital strategy.' There is no retail strategy. The retail strategy is simply there to support your digital strategy, as opposed to vice versa. So the acceleration of digital, and then obviously everything that goes around that, remote access, cybersecurity, all those kind of things."

Always Invest in the Entrepreneur

ON SHARK TANK, "THE AVERAGE PITCH is over an hour and it gets edited into seven minutes that people see at home. Here's the funny thing: 50 percent of the time we've made up our mind in the first couple of minutes.

This is the thing that people who haven't started a business don't realize. They spend years trying to find and perfect the perfect product, but in business it's about execution. What you start doing often in business isn't what you end up doing. Your business changes. There's ebb, there's flow, and you want an entrepreneur that can adapt and pivot and bring on a great team to support them.

After we learn about the business, it's knowing your numbers. Numbers are the language of business. If you can't speak business, you're going to really struggle. [On *Shark Tank*, we'll ask], 'What are your cost of goods? What's your margin on that product?' And people are like, 'Oh, I don't know that, but I'm going to hire somebody to help me with that.' And we're like, 'Yeah, stay away from that person with a 10-foot pole.'

You can't outsource responsibility when you're starting out. Yes, you can

"I always kind of had this timeframe: How long can I go until it really begins to impact my family?"



BETTER

A LinkedIn Live series
with Dorie Clark
Thursdays at 12 p.m. ET
at newsweek.com/
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hire a CFO when you get really big, but when you're starting out, man, you've got to know that, to the last dollar."

You Don't Have to Like Who You Hire

"ONE OF MY OLD BOSSSES GAVE ME THIS horrible piece of advice. He said, 'Never hire somebody you wouldn't want to sit next to on an intercontinental flight.' For some reason, that was in my head. So I'd be interviewing somebody and I'd say, 'Do I like that person? Can I hang out with them?'

Now, I've realized it doesn't matter. A team is not a group of people that necessarily like each other. A high performing team is a group of people that respect each other. I don't need to like you. We don't need to go out for dinner. I don't need to meet your family. I don't need to meet your dog. I have to respect you.

So the first thing I look for is, do you fit in our culture? In our company, we're a highly competitive,

highly motivated, highly driven culture. So if you don't want to wake up every day and do a little bit better than the day before, and if our growth doesn't motivate you, you're probably not going to fit with us because our 350 people are deeply passionate about cybersecurity. We look for the cultural fit above everything."

Desperation Is a Powerful Motivator—At First

"YOU KNOW WHAT DROVE ME WHEN I started my business? Paying my mortgage, that's what drove me. And sometimes these entrepreneurs come in and they say, 'I started my business. I had this real vision and we were going to do this and I was deeply passionate about it,' and I'm sure there are people like that, but I've got to tell you, most people that start a business, it's fear and *need*.

My need was somebody fired me. I couldn't get a job in time to make my next mortgage payment. So when I

GIVING UP "For me, says Herjavec, 'I always kind of had this timeframe. How long can I go until it really begins to impact my family and becomes dangerous?'"

woke up every day, I'm like, "If I don't sell something today, I can't pay my mortgage." So that was a very clear cause and effect. But having said that, that only takes you so far. If you start a business to make a buck, you'll only make a few bucks. If you start a business to make a buck, but you find your greatness and your purpose, you'll make far more bucks along the way.

The funny thing is when COVID started, I was so afraid. All that uncertainty. I went right back to, if I don't wake up today, people are going to know I'm scared. They're going to get scared and our business could fail. And I think failure is a really big motivator."

Make Time for Reflection

"ONE OF THE GREAT THINGS ABOUT being an entrepreneur is not that you work less. That's another thing all my friends who've never started a business always say, 'Oh, I wish I could start my own business so I could work on my own schedule.' And I'm like, 'That's such crap.' You work at your customer's schedule.

But one of the things that people don't do enough is spend the time to think. Business is a contact sport, and when the game starts, it's on. So what I've had to do is find those moments of stillness in my day in order to be able to do that. And for me, it's waking up early. So I wake up every day at 4:30 a.m. The first half hour is a cup of coffee and just thinking. I have a pad of paper in front of me and for that first half hour, I just write down the things I need to accomplish today. Because I've learned that once the day begins and the fight starts, I'm not thinking about what I'm going to accomplish. I'm just reacting." ■



Has Trump Altered the Course of American Conservatism?

Republicans disagree on how much the outgoing president reshaped their movement



NATIONALISM AND POPULISM ARE THE GOP'S FUTURE

by R.R. Reno

IT'S LONG PAST TIME FOR AMERICAN conservatism to change course. We face a crisis of solidarity. Our political programs need to re-tie strands of society that have come undone.

For conservatives, that means adopting a nationalist-populist platform. Nationalism does not mean nationalization. It is not an assault on our free market tradition. Instead, nationalism requires rebalancing policy priorities away from greater globalization and toward the restoration of an integral domestic economy.

Economic growth should be more widely spread around the country, rather than clustered in

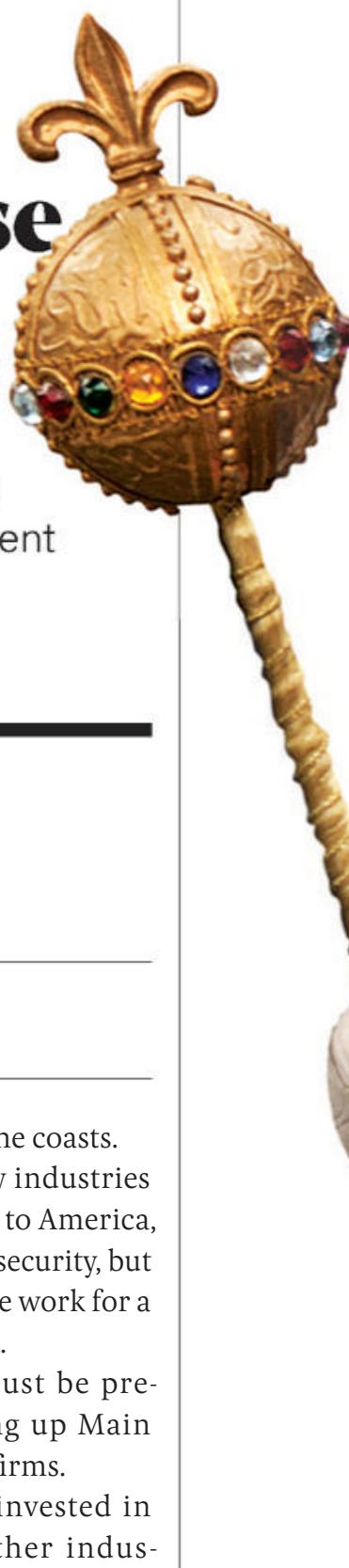
super-wealthy cities on the coasts.

Supply chains and key industries need to be brought back to America, not merely to ensure our security, but also to provide productive work for a wide range of Americans.

Super-sized firms must be prevented from swallowing up Main Street retail and service firms.

Capital needs to be invested in manufacturing and other industries in order to increase worker productivity, which is necessary for increased wages.

Government funding needs to be directed away from higher education, which subsidizes the top third of society, and moved toward



GETTY



vocational education, which helps ordinary Americans get good jobs.

Trade and tax policy need to be recalibrated to align with these goals. It is dishonest to say that doing so violates “free market principles.” Our current globalized economy depends upon key policy decisions, including the establishment of transnational institutions such as the World Trade Organization. Those decisions were political, and rightly so.

But times have changed. When Ronald Reagan was elected in 1980, the American people had suffered a decade of economic stagnation. Tax cuts and de-regulation unleashed the creative energies of the Baby Boomer generation. Unlike earlier post-war booms, the rising tide of GDP since the 1990s has lifted fewer and fewer boats. Wages have

“Our economy is great for those in the upper 20 percent and increasingly lousy for the rest.”

stagnated for the working class, while those at the top have seen extraordinary gains in wealth.

Our economy is great for those in the upper 20 percent and increasingly lousy for the rest. After the 2008 financial crisis, investors ended up even richer. The same trend is unfolding during the COVID-19 crisis.

I don’t care whether one explains the stagnation of working class wages and accelerating wealth of the top end as an “inevitable” consequence of “capitalism,” or ascribes it to misguided “government meddling” in “free markets.” The growing gap between winners and losers has become the preeminent problem

afflicting our country. An American conservative with nationalist priorities is a populist because he insists on standing up for the losers, not kowtowing to the winners.

No political party deserves to govern in the 2020s unless it has a plan for restoring middle class prosperity to the median-skilled, median-educated American.

The Left favors redistribution. The Republican Party needs to take a more appealing tack—that of providing productive work and high wages. Americans wish to provide for themselves. But they will vote for the government dole if the Republican Party gives them no alternative.

Nationalism also requires restoring clarity to foreign policy: It needs to serve American interests. The United States led the way in constructing the global system after the end of the Cold War. For too long, our global strategy has been justified as necessary in order to defend the “rules-based international order.”

Yes, America has an interest in that order. But the “rules-based international order” is not the same as America’s interests. A conservative with nationalist inclinations is a populist because he resists the efforts of the richest Americans to define the nation’s interests in terms of *their* own interests.

Nationalism does not mean xenophobia. It is neither insular nor aggressive. Instead, nationalism aims to unify the country around a shared American identity. If the Republican Party wishes to have any right to govern our country, it must ally itself with patriotic ardor and cultural renewal.

→ R.R. Reno is editor of First Things. The views expressed in this article are the writer’s own.



A DEFENSE OF ZOMBIE CONSERVATISM

by Charles C.W. Cooke

IN SO FAR AS IT REPRESENTS ANYTHING more than a post hoc rationalization for President Donald Trump’s caprice, the postmortem for the pre-2015 Republican Party reads as follows. By the 1980s, a set of serious problems had arrived in the United States. Thankfully, President Ronald Reagan and his fellow travelers had good answers to these problems and, by and large, they managed to solve them. But, having done so, the Republican Party and its friends within the institutionalized conservative movement failed to move on. Instead, they decided that the platform of 1980 was applicable to all places and all times. And so, in 2015, the party rebelled and nominated a politician who saw things differently. That politician, Donald Trump, managed to win the nomination, ascend to the

presidency and recast the movement in his image. These changes are likely to be permanent.

It is certainly true that the Republican Party sometimes falls back on gauzy nostalgia. It is true, too, that there seems to be no problem with which the United States can be confronted that does not lead to prominent figures within the GOP calling for a tax cut. But I see no evidence that these habits are on their way out, or that Donald Trump’s election did anything much to limit them.

It would be bizarre to point to Donald Trump as evidence that the GOP has changed meaningfully on policy, given that the standout achievements of his presidency—the ones to which Trump and his defenders themselves point with pride—are a massive tax cut inspired by former House Speaker





Paul Ryan (R-WI); the stocking of the federal judiciary with originalist judges, selected with the counsel of the Federalist Society; an attempt to repeal Obamacare that was ultimately killed not by the president, but by the late Senator John McCain (R-AZ); an all-of-the-above pro-life agenda; widespread, executive-led regulatory relief; the moving of the Israeli embassy from Tel Aviv to Jerusalem; the tearing up of the Iran nuclear deal; and a criminal justice reform bill that, while laudable, flew directly in the face of almost everything Trump has ever said on the matter and was opposed by almost everybody who is currently touting a new approach to conservatism.

Certainly, the Republicans under Trump failed to take federal spending seriously, or to do anything of consequence to deal with our out-of-control entitlement spending. But how, exactly, did that differ from last time they controlled Washington? And how did it differ from the Reagan administration? This is what Republicans do: They talk a great deal about the debt when a Democrat is in the White House, and they ignore it when their own guy is president. The one area in which President Trump differed from most other Republicans was in the area of trade. But, even there, Trump's actions were haphazard, half-hearted and, because they were not put before Congress, unable to survive contact with the next president who happens to disagree.

What is worth engaging with is the attendant charge that, irrespective of its merits, the traditional conservative offering has ceased to reflect the concerns of a majority—and, in a democracy, that itself matters. Here, the reformers do have a point, although it is not an especially strong one, all things considered. It is true, of course, that since 1988 the

WHAT WOULD THE GIPPER SAY?
Trump had none of Ronald Reagan's personal charm, not to mention his conservative or anti-communist bona fides. But it's not clear how much—if at all—Trump has rewritten the Republican political playbook.

Republican Party has won the "popular vote" in a presidential election only once—and that, even when it did win, in 2004, it did so narrowly. But it is not at all clear that this is the only, or even the best, way of judging the popularity of the fusionist cause. The most obvious problem, of course, is that this argument focuses on the presidency at the expense of everything else, and, in so doing, misses the remarkable success that traditional Republicans have had at literally every other level—success, it must be said, that has been spearheaded by a cast of "generic Republican" candidates who have talked incessantly about exactly the sort of things that are supposedly no longer of interest to the masses.

Since they took the House of Representatives in 1994, Republicans

have controlled it for all but six years. Since they took the Senate in the same year, they have controlled it for all but nine. And, since 2006, 45 states have elected a Republican governor to at least one term. Not bad for an out-of-touch party that nobody likes! Look at the two most impressive and sustained models of "red state" governance in the nation—Texas and Florida—and you will see that they are the result of the same policy priorities that have animated Republicans for decades: low taxes; responsible spending; suspicion of entitlements and unfunded liabilities; a healthy business environment; opposition to gun control; support for charter schools; a preference for originalist and textualist judges; disdain for socialism; and the assimilation rather than rejection of legal immigrants. Even the "Tea Party" movement, a populist uprising of 2009 and 2010, was traditional in nature. In tone, the Tea Party movement was anti-elite, yes. But what did its adherents want? And how did it differ from what, say, the Chamber of Commerce wanted?

The truth is that the fusionist project is alive and well, and it will likely remain so for the foreseeable future. The center of gravity within the Republican coalition will shift around, as different issues drive attention and different political figures come and go.

But, as a general matter, there has been no great overhaul of American conservatism with which we must contend. That a figure as mercurial as Donald Trump was pushed so quickly into the longstanding policy mold should provide as good a piece of evidence for this as we are likely to come by in this life or the next. ■

"There seems to be no problem with which the United States can be confronted that does not lead to prominent figures within the GOP calling for a tax cut."

→ **Charles C.W. Cooke** is editor of *National Review Online*. The views expressed in this article are the writer's own.

NEWSMAKERS

Talking Points

sky news

"Hopefully it'll help other people come along and do as I did."

—MARGARET KEENAN, THE FIRST PERSON TO GET THE PFIZER-BIONTECH VACCINE OUTSIDE OF A CLINICAL TRIAL

THE WALL STREET JOURNAL

"I THINK WE'LL SEE SOME REDUCTION IN THE INFLUENCE OF SILICON VALLEY."

—ELON MUSK ON HIS MOVE TO TEXAS

ELON MUSK

Los Angeles Times

"We have kids all over the country that need to save themselves and don't know how. If I speak out, then maybe someone else with something wrong will have the courage to speak out, too."

—HALEY HODSON, RETIRED VOLLEYBALL STAR, ON HER CONCUSSION LAWSUIT AGAINST STANFORD AND THE NCAA

"If we have too many contacts now before Christmas, and that ends up making it the last Christmas with the grandparents, then we will have failed."

—GERMAN CHANCELLOR ANGELA MERKEL

"I SUSPECT, AT SOME POINT IN TIME, HE WILL STEP DOWN AND ALLOW THE VICE PRESIDENT TO PARDON HIM."

—New York Attorney General Letitia James

THE VIEW



LETITIA JAMES

Twitter

"The Thanksgiving surge has arrived."

—MISSISSIPPI STATE HEALTH OFFICER DR. THOMAS DOBBS

Twitter

"EVEN TRUMP APPOINTEES & REPUBLICANS SAW THIS FOR WHAT IT WAS: A CHARADE."

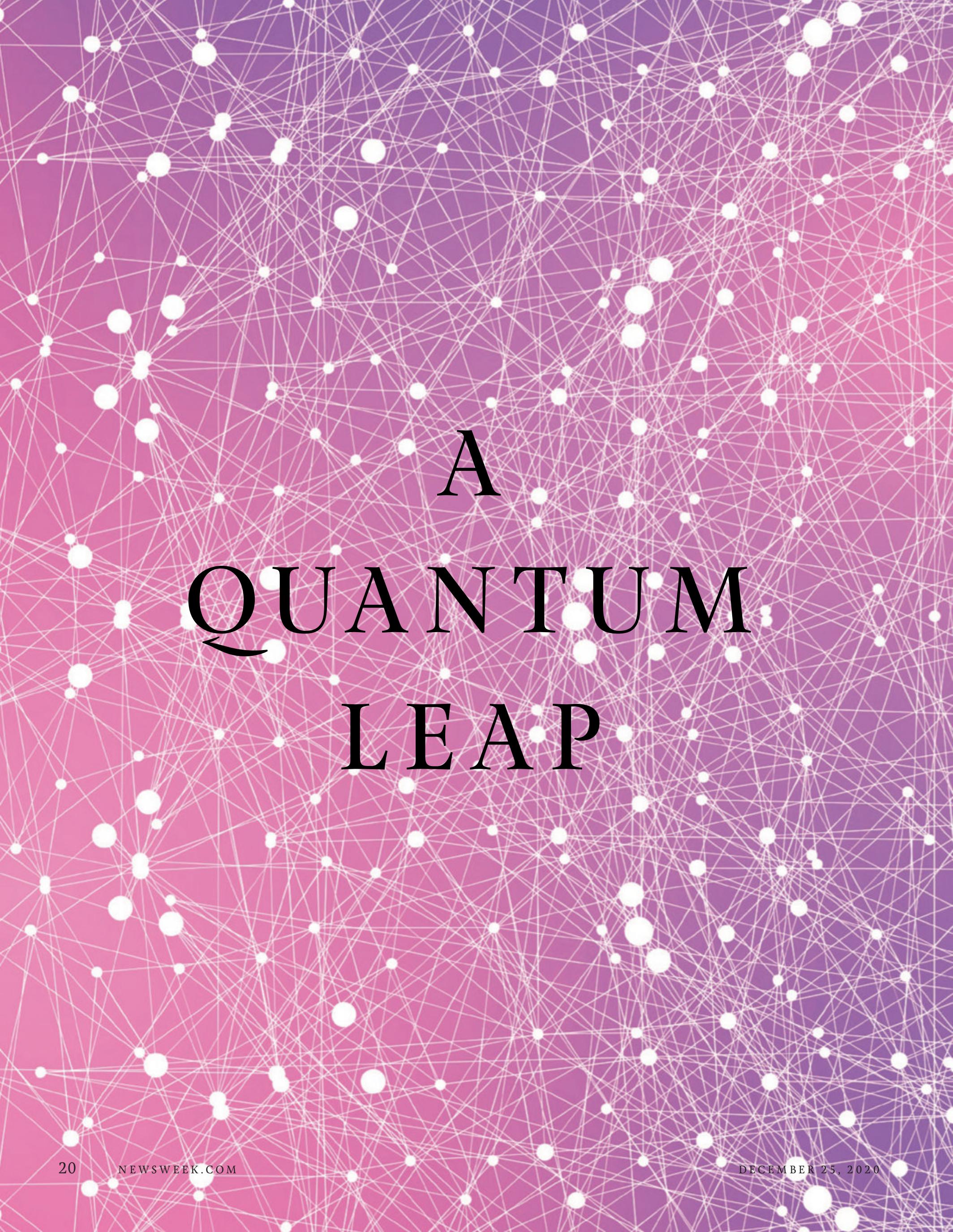
—Democratic Representative Conor Lamb of Pennsylvania on the effort to block the certification of election results

ANGELA MERKEL

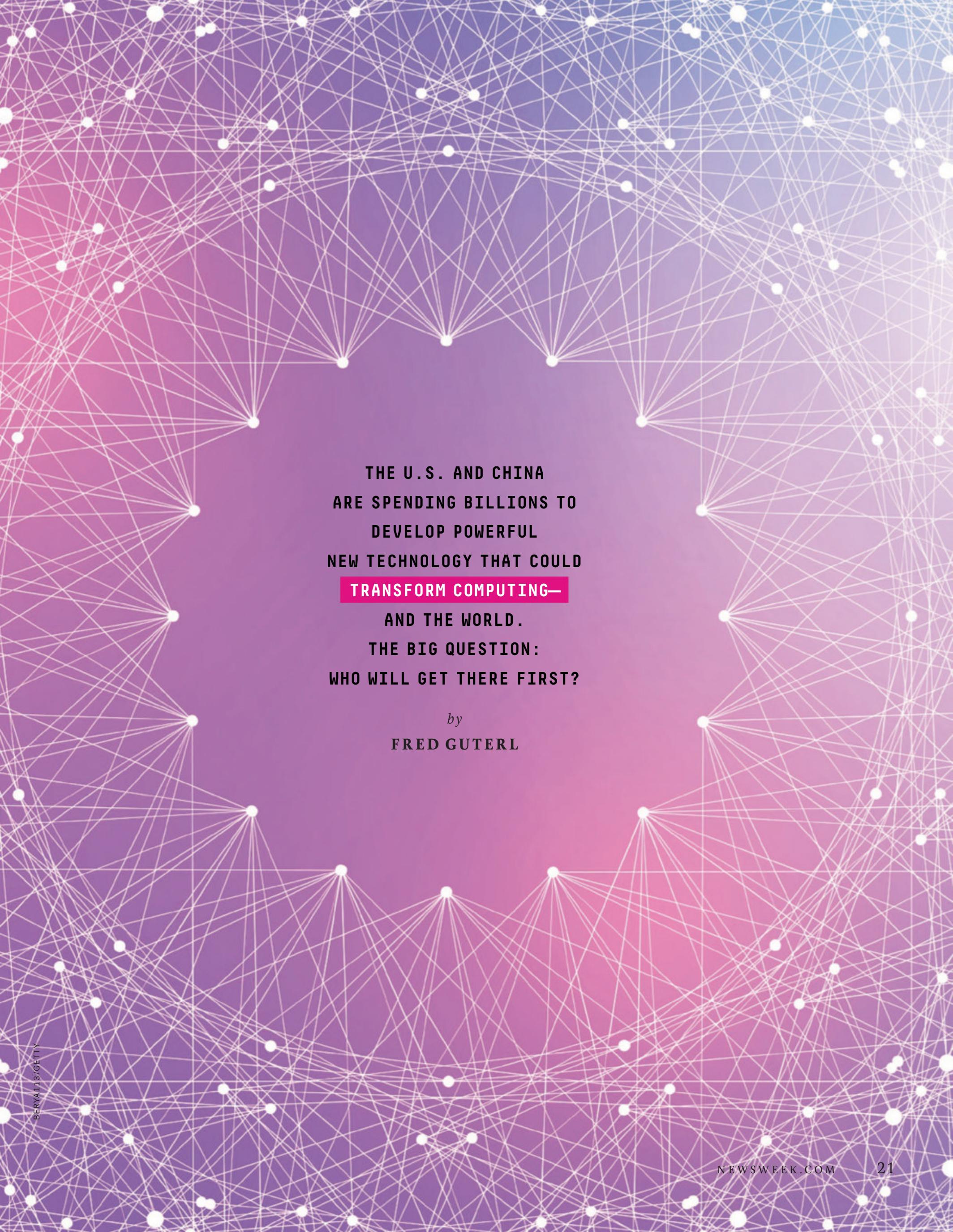


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A QUANTUM: LEAP



THE U.S. AND CHINA
ARE SPENDING BILLIONS TO
DEVELOP POWERFUL
NEW TECHNOLOGY THAT COULD
TRANSFORM COMPUTING—
AND THE WORLD.
THE BIG QUESTION:
WHO WILL GET THERE FIRST?

by

FRED GUTERL

BACK IN 1994, WHEN QUANTUM COMPUTERS existed only as so much chalk on a blackboard, mathematician Peter Shor invented what may soon prove to be their killer app.

Shor trained his efforts on a calculation called “factoring,” which ordinarily nobody but a mathematician would care about, except it just happens to be an Achilles heel of the internet. If someone were to invent a computer that could perform this operation quickly, messages now hidden from hackers, terrorists, military adversaries, governments and competitors would be as easy to read as a Stephen King novel.

Shor, of course, didn’t have such a computer. He was writing an algorithm, or program, for a hypothetical machine that might one day exploit the weird properties of atoms and subatomic particles, as described by the theory of quantum mechanics, to perform calculations that conventional computers could only solve in years—maybe hundreds of years, or millions, or more time than the universe is expected to last. Too long, at any rate, to be useful in cracking open an email. Shor’s algorithm was a theoretical exercise. “The question of whether using quantum mechanics in a computer allows one to obtain more computational power,” he wrote in his 1994 paper, “has not yet been satisfactorily answered.”

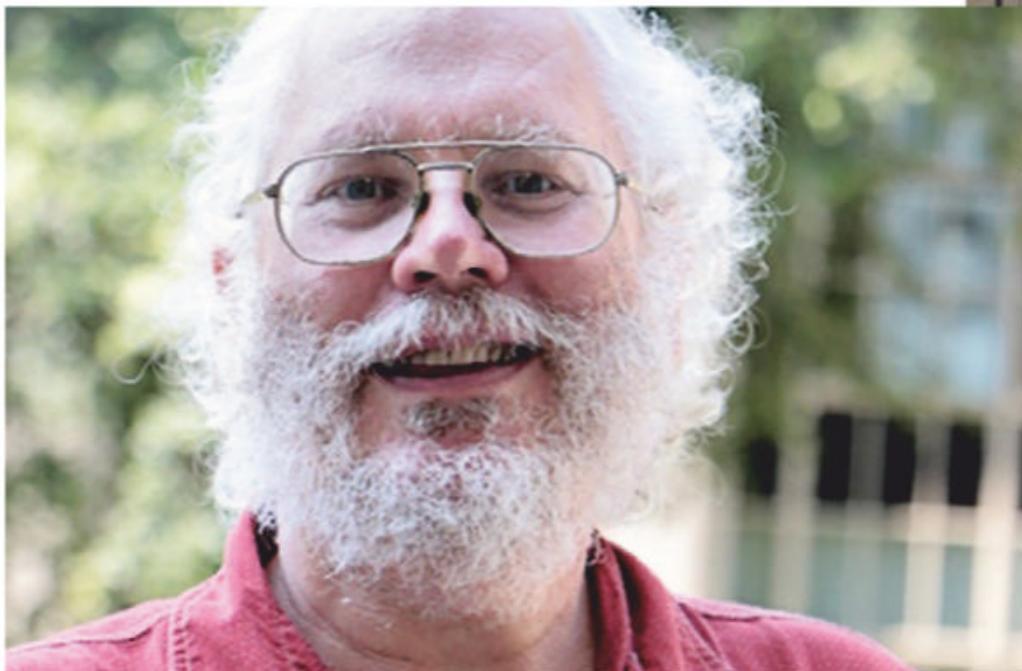
The answers are now coming in.

Last year a team from Google achieved what it called “quantum supremacy” when its quantum computer performed a calculation faster than a conventional computer could. “Our machine performed the target computation in 200 seconds, and from measurements in our experiment we determined that it would take the world’s fastest supercomputer 10,000 years to produce a similar output,” wrote Google’s John Martinis and Sergio Boixo in a blog post. And earlier this month, a team under the direction of Pan Jianwei at the University of Science and Technology in China (USTC), in the journal *Science*, said its quantum computer succeeded in performing a calculation 100 trillion times faster than a conventional computer could—surpassing Google’s achievement by a factor of 10 billion, according to the Xinhua, China’s state-run news agency.

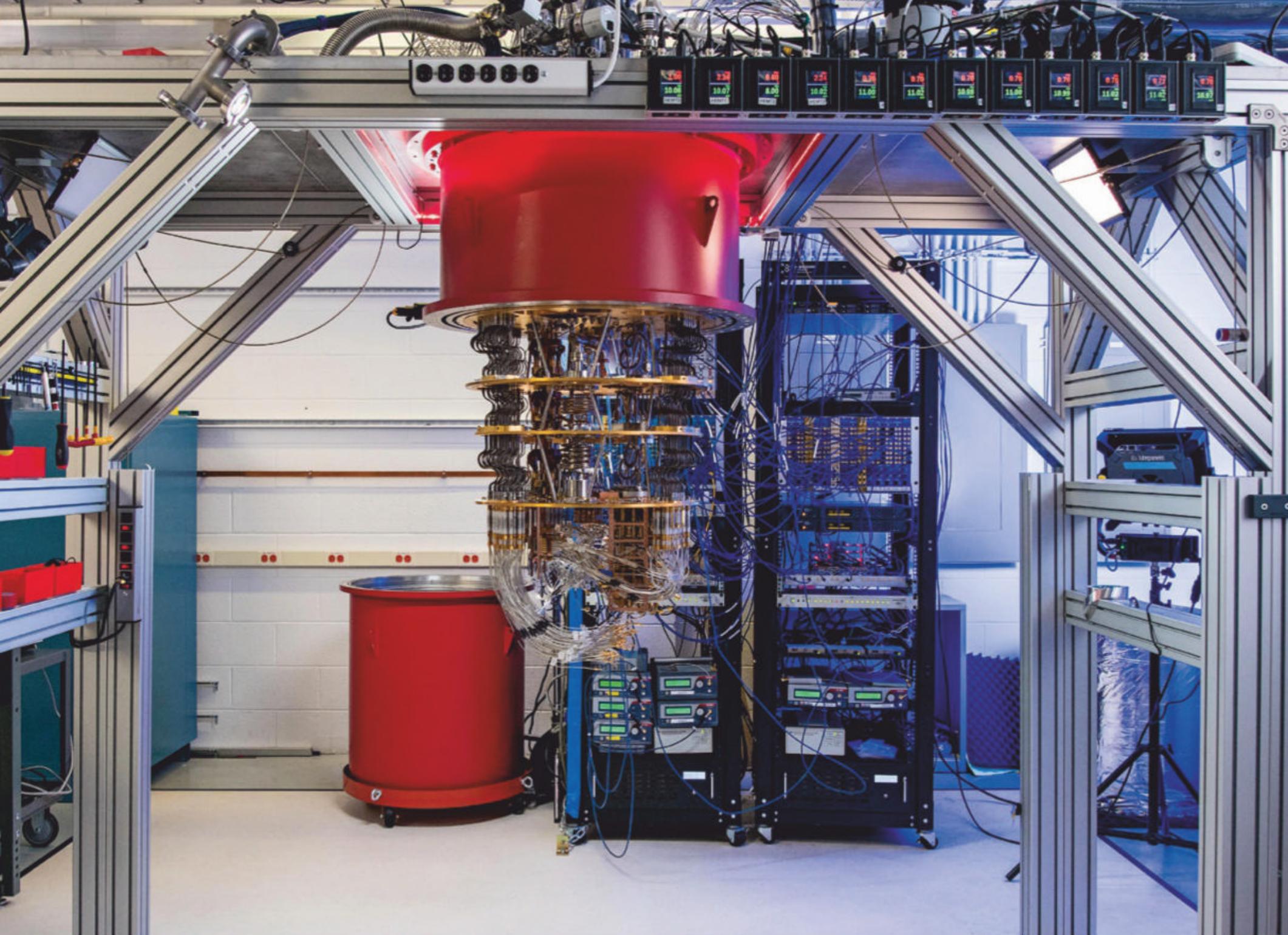
These two announcements were mere demonstrations, using prototype machines in the lab to

perform calculations that are not useful in any practical sense. Nobody is ready to put Shor’s algorithm into practice. But tens of billions of dollars are being invested in a broad-scale effort to make it possible. Dozens of engineering teams, from big companies like Google, IBM and Amazon to universities and startups, are racing to build a full-scale working quantum computer. China is reportedly spending \$10 billion on the effort, building a center devoted to quantum computing and artificial intelligence; the U.S. government has committed \$1 billion; and corporate and military budgets likely hold many millions more—for instance, Google and IBM are each thought to have spent in excess of \$100 million.

These groups are in pursuit not merely of faster computers but a fundamentally different approach to computing, which would open up new vistas in technology and society. Quantum computers could be as transformational as the microchip, which ushered in the internet age and all the attendant effects on the economy and politics. For instance,



CLOCKWISE FROM BOTTOM LEFT: DICKSON LEE/SOUTH CHINA MORNING POST/GETTY; ROSALIE ZAMMUTO/MIT; HANNAH BENET/GOOGLE



"THE FEDERAL GOVERNMENT HAS TAKEN ITS FOOT OFF OF THE GAS PEDAL IN TERMS OF INNOVATION. WHILE WE'RE DOING SO, OTHER NATIONS LIKE CHINA CAUGHT UP."

QUANTUM THEORY
Mathematician Peter Shor wrote an algorithm that a quantum computer could use to break the encryption codes now widely found on the internet. Organizations in the U.S., China and elsewhere are now testing the machines. Top to bottom: A quantum computer in Google's Santa Barbara lab; Shor; Pan Jianwei.

the vast computational possibilities of quantum technology would turbo-charge artificial intelligence in ways that are difficult to fathom. It's no accident that China's new technology center will combine the two fields.

China's ambition in quantum technology has caused something of a Sputnik moment in the U.S., nearly as ominous as the Russian satellite in 1957 that kicked off the race to the moon. It wasn't long ago that Chinese engineers were perceived as copycats. That is no longer the case. China launched a satellite in 2016 that demonstrated the use of quantum cryptography—not computing per se, but involving the same kinds of advanced technology.

The long-term worry is that the U.S. loses its technological edge to China. While China embraces ambitious technology programs, the U.S. has in recent years retreated into a reactive mode, with diminishing budgets for science. Back in the 1960s, the federal government accounted for about two-thirds of R&D spending in the U.S., the rest coming mainly from the private sector. But its role has diminished, says Paul Scharre, director of technology and national security at the Center for a New American Security (CNAS) and author of *Army of None: Autonomous Weapons and the Future of War*. "Basically the federal government has taken its foot off of the gas pedal in terms of innovation in the U.S.," he says. "While

we're doing so, other nations like China caught up."

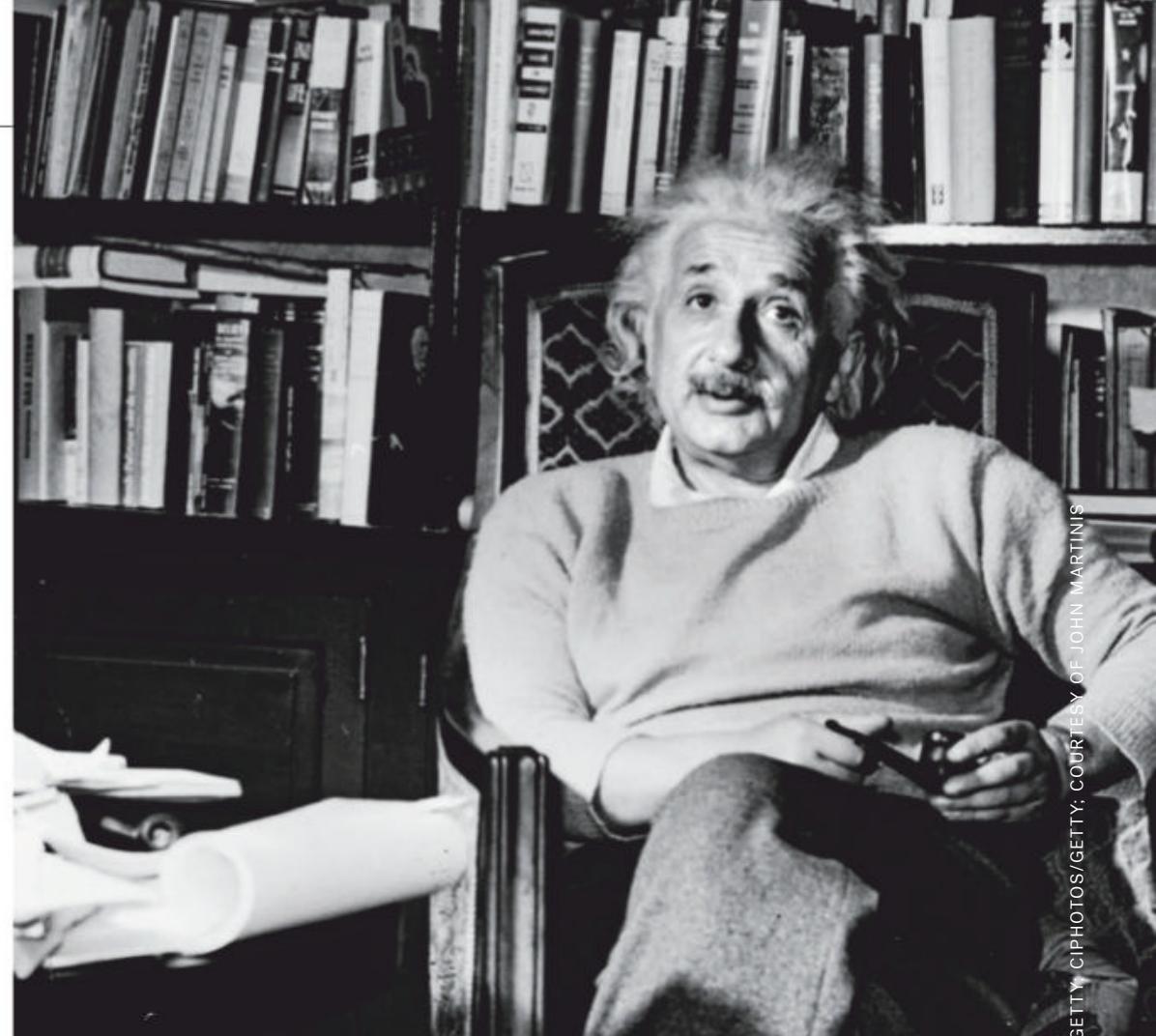
What tends to focus the mind are the security implications in the near term. When quantum computers go live, what will happen to all our secrets? Will we wake up one day and find that China has been reading our mail? Shor's algorithm, once a fanciful conjecture, is beginning to look like a threat. The question is, is the threat imminent?

The Meaning of "Quantum Supremacy"

JOHN MARTINIS GOT INVOLVED IN QUANTUM COMPUTERS back in the 1980s, "before the word 'qubit' was even invented," he says.

A qubit is the fundamental unit of information in a quantum computer—the analogue to a "bit" in conventional computers, but with some important differences. A bit can be either a zero or a one; a qubit can be both numbers at once, and everything in between—a property known as superposition. A bit exists as a tiny pocket of electrical charge in a silicon chip, which classical computers shuffle around like checkers to perform mathematical operations; a qubit is a single atom or subatomic particle, which stores information in a peculiar statistical fashion according to laws of quantum mechanics that are wholly beyond our experience in the macroscopic world. A bit is a discrete unit of information; a qubit is part of a collective, "entangled" with other qubits by a phenomenon that Albert Einstein described as "spooky action at a distance."

In his early work at the University of California at Santa Barbara, Martinis began by asking basic questions about how to get information out of things as small as atoms and photons, or particles of light. But dealing with single atoms and particles pushes engineering to extreme levels of precision, as Martinis found early on. How do you protect these tiny



FROM TOP: LUCIEN AIGNER/THREE LIONS/HULTON ARCHIVE/GETTY; CIPHOOTOS/GETTY; COURTESY OF JOHN MARTINIS

particles but also allow them to interact with others in such a way that the computer can perform a useful calculation? In other words, how do you harness the qualities of superposition and entanglement to perform a task, such as factoring a large number for the purpose of reading an encrypted message? "You have to isolate qubits to keep them coherent," he says, "but if you isolate them super well, they can't talk to other qubits to do computation."

Martinis spent years trying to strike this balance, experimenting with different materials and setups, then turned to the task of getting qubits to work together in a computer. Eventually he found his way to Google, where he began work on what became Sycamore, the quantum computer used in last year's demonstration. Sycamore's 54 qubits are kept in a chamber at Google's lab in Goleta, California cooled to within one degree of absolute zero, the lowest temperature possible—more than 500 degrees Fahrenheit below zero. The machine is "programmed" by beaming faint microwaves into the chamber, which stimulate the qubits.

A big issue that Martinis and every other quantum engineer struggles with is how to keep the qubits intact long enough to perform a calculation. Superposition—the ability of qubits to be both a zero and a one at the same time—is an essential part of the machine's operation. The slightest

"CURRENT INTERNET SECURITY MEASURES AND THE CRYPTOGRAPHY BEHIND THEM WILL NOT WITHSTAND THE NEW COMPUTATIONAL CAPABILITIES THAT QUANTUM COMPUTERS WILL BRING."

THE GURU

John Martinis started making qubits in the 1980s. At Google, he developed Sycamore, the quantum computer used in last year's demonstration. Top to bottom: Albert Einstein; a rendering of qubits and quantum superposition; Martinis.



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disturbance, however, can cause a qubit to collapse into a one or a zero, bringing down the whole delicate entangled constellation of qubits with it. Even cooled at extreme temperatures, the qubits have an annoying tendency to dissipate so quickly that many calculations result in errors. Making a quantum computer is difficult enough; making one that is not riddled with errors has so far proved beyond the reach of the engineers.

"You would like qubits to maintain their superposition of a zero and a one and maintain entangled states even while you're doing operations on them," says Scott Aaronson, a computer science professor

read the message, you know your computer works. But Shor's algorithm was too difficult for the baby quantum computers of the day to handle.

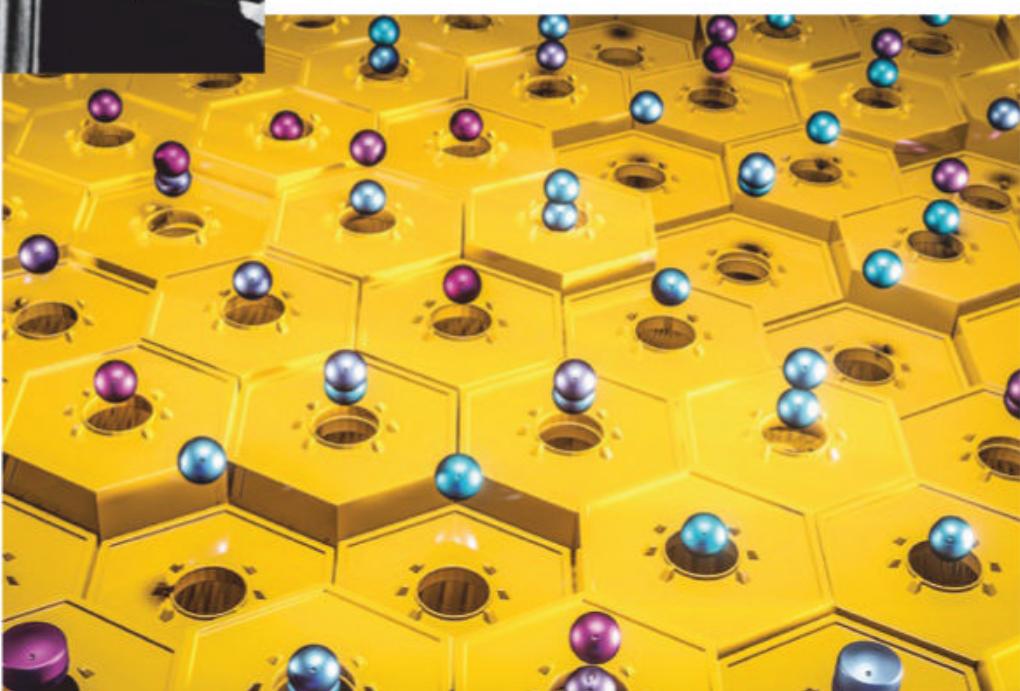
Back in 2011, Aaronson and his graduate students came up with the idea of "boson sampling," which involves predicting how particles like photons will behave when they bounce around obstacles. It's a tough problem for classical computers because it involves lots of calculations about quantum mechanics; but since quantum computers live in that realm, the calculation should be a doddle. Aaronson not only came up with the experiment but also, crucially, with a way of checking the results statistically without having to solve the problems with a classical computer—which, of course, by the definition of "quantum supremacy," should be impossible.

Both Google and USTC wound up adapting Aaronson's approach to their specific machines. Pan Jianwei and his colleagues at USTC, in fact, built Jiuzhang literally as a machine for boson sampling—using photons, a type of boson, as qubits. They sent photons, in the form of laser beams, pinging and ponging through a course of mirrors and other obstacles. The setup wasn't meant to be a general-purpose computer that could be programmed to perform different tasks but to do one thing only: demonstrate that a machine made of photons could perform a calculation of how photons behave when they move through an obstacle course.

The USTC experiment accomplished more than this tautological description captures, of course. It demonstrated that photons could be controlled and used to produce a computational result. Still, engineers have critiqued Jiuzhang on the grounds that it was built for such a narrow purpose. They've also tried to show that a classical computer could achieve the same result in a reasonable amount of time, a task known in vernacular as "spoofing."

"The situation is evolving rapidly, from day to day, as people try to knock down the new result by showing how to spoof the outputs classically," said Aaronson in an email. "We don't know yet how well they're going to succeed. Debates about whether, and in what sense, the USTC group achieved quantum supremacy are likely to continue for quite some time."

Google's Sycamore test also made big headlines, and it also caught some flak in technical circles. IBM engineers, who are working on their own quantum computer, insisted that it's possible in theory to



at the University of Texas at Austin who collaborates with Google and other quantum engineers. "The problem is they're inherently very fragile. As soon as information leaks into the environment about whether a qubit is a zero or a one, the whole thing collapses. This 'noisiness' is the fundamental problem in building a quantum computer. This is what makes it hard."

Coming up with a way to test Google's and USTC's machines was a difficult problem in itself. To do so required overcoming a conundrum: If you ask your quantum computer to solve a problem that no conventional computer can accomplish in a reasonable amount of time, how do you check the results? The simplest way would be to use Shor's algorithm on an encrypted message; if you can





"WE SHOULD BE INVESTING A LOT IN BASIC RESEARCH,
TRYING TO FUND NEW PROGRAMS AND BUILD UP THE PIPELINE OF TALENT."

MISHA FRIEDMAN/GETTY



WORK IN PROGRESS
Quantum computers are still a long way from doing anything remotely useful. "I don't think that quantum supremacy is completely a done deal," says Scott Aaronson.
Left: Dario Gil, Director of IBM Research, stands in front of IBM's quantum computer.

spoof Sycamore with a supercomputer, provided it were equipped with tremendous amounts of memory. "They said, 'it only took us two seconds, but it would take a crippled supercomputer 10,000 years,'" said Robert Sutor, a mathematician and vice president at IBM Research. "Why are you crippling it? Why would you remove part of its functionality and then say how wonderful you are?"

Many engineers look at the quantum supremacy demonstration more as milestones than a significant developments in their own right. Both Sycamore and Jiuzhang were impressive accomplishments; both are a long way from doing anything remotely useful, claims of "supremacy" to the contrary. "I don't think that quantum supremacy is completely a done deal," says Aaronson. "I would like to see quantum supremacy for some problem where we can actually easily recognize the answer."

To get a quantum computer capable of doing interesting things, engineers will need to figure out how to correct the errors and scale the machines up to thousands of qubits, and perhaps millions. The first practical applications are likely to be in simulating things that involve quantum mechanics, like chemistry, which could have an impact in drug development.

"Shor's algorithm, breaking cryptographic codes, is one of those things that will happen in the evolution of quantum computers," says Aaronson. "But by the time you can do that, you can pretty much do any quantum computation. It would surprise me a lot if it was in the next decade."

So Why Worry?

AFTER THE SYCAMORE DEMONSTRATION IN 2019, Martinis and Google had a parting of ways. "It was time for me to leave," he says. In the fall, Martinis joined Michelle Simmons, an old acquaintance who had formed Silicon Quantum Computing, a start-up in Sydney, Australia. Simmons' company is making qubits out of phosphorous and silicon, which tend to be more stable than other materials, she says, and that means they may not require so much error-correcting. They also work at higher temperatures, without the cryogenic equipment IBM and Google's machines require.

"Working at Google was great because we had the resources to solve tough problems," says Martinis. "On the other hand, what's great right now is there's



CHINA HAS COMMITTED \$10 BILLION TO QUANTUM RESEARCH; THE U.S., \$1 BILLION, PLUS

an ecosystem where you have the companies, the startups and university groups where people can solve problems. I think that's better in the end."

Martinis, though, is under no illusion that a thousand quantum flowers will bloom. The field is crowded now, but that won't last forever. "All these people have a lot of optimism, but when they go to do the systems engineering, they're going to find that their ideas might not work so well." Out of the dozen or so projects underway now, Martinis says, "it's a question whether one or two could work. Building a quantum computer is really hard, harder than you think."

The resources required to pull off a quantum computer would seem to favor the Googles and the IBMs of the world—and China. Google's Hartmut Neven, head of its quantum computing effort, told a gathering of the Center for Strategic and International Studies earlier this year that building an error correcting quantum computer would cost

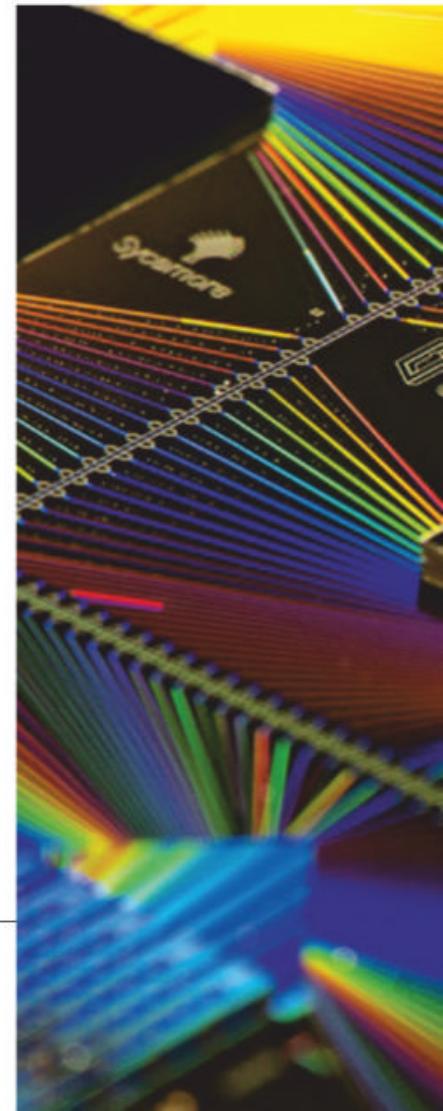
more than \$3 billion.

Google is currently committed to seeing the project through and has the cash to do so, but a change in corporate priorities could put such a long-term effort at risk. "What would really secure American leadership," said Neven, "is if the government would use its enormous purchasing power to reward early risk takers."

Regardless of whatever shortcomings Jiazhang may have, it clearly demonstrates that China is a formidable innovator. Neven issued a grim warning about the danger of the U.S. being beaten in the race to develop a quantum computer.

"We are indeed most worried [about] an as of yet unknown competitor [from] China [who will] beat us to the race to an error-correcting machine, because China has the ability to steer enormous resources in a direction that's deemed strategically important."

While China's ambitions have grown, the



PULLING AHEAD

China's ambitions have grown, but the U.S. has gotten complacent. "Even if China was doing nothing in quantum science, we should be investing a lot in the basic research, trying to fund some of these new programs, and trying to build up the pipeline of talent," says Elsa Kania. Left: China launched the first quantum-communications satellite in 2016. Below: The chips at the heart of Sycamore, Google's quantum computer.

technology aims of the U.S. seem diminished. "There is a mentality of complacency," says Elsa Kania, a china expert at CNAS. "There's a sense and an ideological commitment to the notion that the market can do it all, that there's no role for government, and a backlash against investments in science and education. Even if China was doing nothing in quantum science, we should be investing a lot in the basic research, trying to fund some of these new programs, and trying to build up the pipeline of talent."

How much the U.S. is spending on quantum computing research is difficult to say. Although the government's share of total R&D spending is lower than it used to be, "when you include U.S. private companies, we still outpace pretty much everyone in the world," says Todd Harrison, director of defense budget analysis at the Center for Strategic and International Studies.

Corporate research doesn't include much basic R&D, which is what typically yields the biggest long-term payoffs. The military, which in the past has sowed world-changing technologies like the internet, could wind up playing a crucial role in quantum computing. Funding for unclassified military R&D

has in general remained steady, according to Harrison. The Pentagon is probably also funding classified quantum computer research. Documents from the Edward Snowden cache revealed that the National Security Agency was spending about \$80 million on a "cryptographically useful quantum computer," the Washington Post reported, all of it classified.

Getting Ready

EVEN THOUGH THE QUANTUM COMPUTERS THEMSELVES seem far off, it's not too soon to start worrying about keeping secrets from prying eyes. The prospect of a code-breaking machine emerging sometime in the next decade is already setting off alarm bells in some quarters.

The National Security Agency and other intelligence organizations are thought to be scooping up reams of encrypted information in anticipation of a day in the not-too-distant future when they can decode them with a quantum computer. And they are also beginning to worry about the day when their adversaries can decipher their collected secrets, We too. In the U.S., plans are afoot to introduce new encryption methods that cannot be broken even by a quantum computer. The NSA announced in 2015 that it intended to switch eventually to an alternative, quantum-resistant scheme, as yet undetermined. "It is now clear that the current Internet security measures and the cryptography behind them will not withstand the new computational capabilities that quantum computers will bring," an NSA spokesperson told Quanta's Natalie Wolchover.

A year later, the National Institutes of Standards and Technology announced a technical competition for standards of quantum-resistant encryption. This fall, NIST narrowed a field of 69 contenders to 15. The most popular scheme, it turns out, is "lattice-based encryption," which would require a computer to find a specific route through grids of billions of numbers—an entirely different mathematical basis than that of current public-key encryption schemes, which rely on factoring large numbers.

Persuading government agencies and other organizations to migrate from the current public-key encryption schemes to new ones won't be easy. If the threat is not clear and present, complacency can set in. "People are still using web browsers with encryption that was broken in the nineties," says Aaronson. "It's sad." ■

MILLIONS MORE FROM THE MILITARY AND CORPORATIONS .

Overtreated



THE \$1 TRILLION **HEALTH CARE PROBLEM** THAT'S JACKING UP

GETTY



and Overbilled

BY
**PHILIP
MOELLER**

▼
ART BY
C.J. BURTON

AMERICANS' MEDICAL BILLS—AND **HOW YOU CAN FIGHT IT**

Best-selling author Philip Moeller takes on health care in his new book, GET WHAT'S YOURS FOR HEALTH CARE (Simon & Schuster, January), which explains how to make intelligent health care decisions, talk to your doctor and receive the best possible care. In this excerpt, Moeller discusses how too many tests and procedures can lead to unneeded care and bad outcomes, as well as the costs of misdiagnoses from too little care—and what steps you can take to get just the right level of care.

» AMERICANS GET TOO MUCH CARE THEY DON'T NEED AND TOO little care they do need. These twin problems—unneeded and misdiagnosed care—plagued medicine long before Hippocrates asked an Athenian to say "Aah" more than 2,500 years ago. They are fueled by doctors with the best of intentions and those who are not well informed or paying more attention to their wallets than their patients' needs.

Whatever the causes, Americans consume too much health care, boosting the nation's annual medical bills by \$750 billion to \$1 trillion. This waste is driven by health providers who encourage it and consumers who demand too much care, often because they don't know the true cost of that care.

At the same time, millions and millions of Americans receive the wrong medical diagnosis. Their doctors either treat them for the wrong maladies or don't uncover their true health needs and thus fail to treat them at all. Patients can be complicit here, failing to communicate effectively with their physicians. Whatever the causes, misdiagnoses are a huge, largely invisible medical problem.



BE INFORMED

Unneeded tests are often ordered for back pain—and are potentially counterproductive. The Choosing Wisely site discusses factors for consideration regarding imaging: it will not help you get better faster, there are risks involved and the tests are expensive. It also addresses symptoms that might be reasons for imaging.



The Cheapest Care Is the Care You Don't Need

THE GOOD NEWS ABOUT UNNECESSARY CARE, OFTEN CALLED wasted care or low-value care, is that this problem has been solved—on paper. Beginning in 2012, the American Board of Internal Medicine (ABIM) began assembling recommendations from leading clinical groups and medical societies about low-value treatments. Today, its Choosing Wisely initiative has grown to encompass roughly 600 sets of low-value treatment guidelines from nearly 90 medical societies and other clinical experts. There is a smartphone app (search for “Choosing Wisely”) that lets people choose from 115 or so sets of common, low-value medical treatment situations that are explained in plain English. Unneeded tests and treatments for lower back pain are one good example of this.

FROM TOP: TETRA IMAGES/GETTY; APOMARES/GETTY

Other partners, including state health groups, have been using real-world health insurance claims experience to help determine the incidence of unneeded care. Milliman, the actuarial consulting firm, developed the MedInsight Waste Calculator to help researchers identify promising areas to reduce wasteful medical spending.

In the real world, unfortunately, progress to reduce unneeded medical care has been slow. It can take years for new clinical guidelines and treatment protocols to become widely accepted by doctors, let alone understood by patients. Further, there are strong incentives for ordering tests and procedures. They are covered by health insurance, often demanded by patients and are perceived by many clinicians as a defense against malpractice claims.

We have been given little reason to question how much unneeded care we get or how to avoid it. It usually takes a wave of high-visibility media attention to change public perception. The national plague of opioid addiction, fueled by massive overprescription, is a sobering example.

A 2017 study reviewed the substantial research done since 2012 on the impact of Choosing Wisely’s efforts. It found three compelling reasons for low patient engagement with efforts to reduce unneeded care:

- “Most Americans remain poorly informed about the costs and benefits of particular treatments.”
- “Many patients still seek tests or treatment even when informed that they are unlikely to yield much benefit, because they have been conditioned to fear rare, life threatening events.”
- “Many patients proceed with low-value treatment either because they distrust the evidence of its low value presented to them or because they suspect that the resources saved will only bolster an insurer’s or provider’s profit margins rather than benefit the public.”

“There’s a whole culture [change] that’s going to have to happen on the consumer side, of moving away from ‘more is always better,’” said Beth Bortz, head of the Virginia Center on Health Innovation. The center has researched low-value care using the Milliman tool.

“A lot of Americans think that more imaging, more testing, is always worth it,” Bortz said. “I think a lot of times consumers don’t understand the risks of unnecessary imaging, long term. You don’t want more CT scans than you have to have.”

Beyond the cost of an unnecessary test, she said, there is possible physical harm and longer-term cost and emotional impacts keyed to the results of that first unneeded test. Such “cascade” effects can occur when test results delay treatment, lead to other tests or reveal other possible health issues, setting off yet another round of tests.

A research study of internists found that nearly all of them had experienced cascade effects from incidental test findings and that twice as many patient encounters produced no clinical significance versus those with meaningful medical implications

requiring further treatment. About a third of the tests might have been unneeded, the doctors told researchers.

"Most physicians reported that cascades had caused their patients harm (86.7 percent), including psychological harm (68.4 percent), treatment burden (65.4 percent), financial burden (57.5 percent), dissatisfaction with care (27.6 percent), physical harm (15.6 percent), disrupted social relationships (8.7 percent), and death (0.2 percent)," the study found.

Several states have used Milliman's MedInsight tool to look at the percentages of specific medical procedures found to be unnecessary. Virginia and Washington studies looked at nearly 50 procedures and analyzed use patterns by examining millions of private health insurance claims filed by state residents.

"The two best health care tests in America are PSA [prostate specific antigen] and pap smears," MedInsight product manager Marcos Dachary told me. "Then, with a straight face, you can say the two worst tests in America are the PSA and pap smears." Interpretation matters here.

"Understanding the patient, the patient's age, the patient's prior condition—all of that nuance or context allows us to weigh in appropriateness" to help determine if a procedure was warranted or unnecessary. The procedures used in the Virginia and Washington studies, he explained, were those where the clinical nuances had the least amount of wiggle room for interpretation by providers.

The Virginia Center on Health Innovation study used six procedure categories and found that between 20 and 100 percent in each were unnecessary. The Washington Health Alliance has gotten similar results in its studies.

Unnecessary and expensive MRIs for routine health concerns top the list, accompanied by annual tests and screening procedures that produce little benefit, along with prescriptions of opioids and other powerful drugs for lower back pain, headaches and other normal aches and pains.

The incidence of low-value care is also widespread in Medicare, according to a 2018 analysis for Congress. "In 2014, there were between 34 and 72 instances of low-value care per 100 beneficiaries," the report said. "Between 23 percent and 37 percent of beneficiaries received at least one low-value service."

What's a Patient to Do?

ODDS ARE YOU TRUST YOUR DOCTORS AND ARE PREDISPOSED TO follow their advice. If not, you'd probably look for new doctors. So, when your trusted health care professional says you need a medical procedure or test, you are conditioned to agree.

This can be a stressful interaction to begin with, especially if you're feeling bad and already think something may be wrong. Why would you possibly turn down an offer of care, especially one that is covered by your health insurance?

Well, you should at least take a time-out at this point. Without



IS IT NECESSARY?

Sometimes imaging is not in your best interest. These low-value procedures can lead to "cascade effects" resulting in additional rounds of tests that do not speed up the time for recovery and sometimes delay treatment that may help.

Choosing Wisely's 5 Questions to Ask Your Doctor

A CONNECTICUT COLLABORATION WITH CHOOSING WISELY LOOKED AT WAYS THAT PATIENTS CAN PROTECT THEMSELVES FROM UNNECESSARY CARE. IT CAME UP WITH FIVE QUESTIONS TO ASK YOUR DOCTOR; GROUPS IN OTHER STATES NOW USE THE LIST.

- 1. Do I need this test or procedure?**
- 2. What are the risks and side effects?**
- 3. Are there simpler, safer options?**
- 4. What happens if I don't do anything?**
- 5. How much does it cost, and will my insurance pay for it?**

FROM TOP: MASKOT/GETTY; RON LEVINE/GETTY



seeming to question your doctor's expertise, there are ways to give yourself some breathing room.

"Thanks for your guidance and suggestions," you might say. "I'd like to go home, give it some thought and talk it over with my family. If I did go ahead, when do you recommend I have this done?"

A Connecticut collaboration with Choosing Wisely looked at ways that patients can protect themselves from unnecessary care. It came up with five questions to ask your doctor; groups in other states now use the list (see sidebar). Ask those questions and consult a checklist for getting the right care. Several medical and patient safety organizations including the National Patient Safety Foundation and the Society to Improve Diagnosis in Medicine have developed widely-used patient guides and a four-page checklist to help you get the right care.

Accurate Diagnosis and Second Opinions

SUE SHERIDAN BECAME A FIRST-TIME MOTHER MORE THAN 25 years ago. Her son was born in 1995. Like many newborns, he had jaundice. Unlike only a few others, he had a more serious condition that went undiagnosed by caregivers at her community hospital in Boise, Idaho.

"My son suffered brain damage from kernicterus [a rare form of brain damage in jaundiced newborns] that was not diagnosed to treat his newborn jaundice. [Jaundice is] very, very, very common," she said when I spoke with her late in 2019. "It's the most common newborn phenomenon. There are national guidelines out there. And nobody followed them. And he ended up with brain damage."

"A lot of patients don't even think about looking up guidelines," she said. "I wish I would have....That was in 1995. He now has severe cerebral palsy."

Sheridan's exposure to the effects of a missed medical diagnosis was not over. "After my son's effort, four years later my husband died because he had a tumor in his cervical spine that was removed. We were told it was benign."

"What we didn't learn," she continued matter-of-factly, "was that 23 days later a final pathology report came out. By now, he was discharged. And it was a malignant cancer, and that document never got presented to the neurosurgeon. It got put in my husband's file—his medical records. And the neurosurgeon never saw it, so his cancer went untreated for six months. And by the time the pain came back, it was too late. And so my husband died [three years later] when he was 45."

Enduring these devastating family tragedies triggered Sheridan to switch careers from international trade financing to health care and, in particular, patient safety. Sheridan looked deeply into what was being done to protect patients. "I thought somebody was in charge of keeping us safe," she said. "I learned that no one is in charge of keeping us safe."

Sheridan looked deeply into what was being done to protect

patients. "None of the agencies [including the Food and Drug Administration (FDA), the Centers for Disease Control (CDC) and other groups] is tasked with keeping us safe," she said, lamenting the absence of a health care equivalent to the National Transportation Safety Board, which investigates accidents and identifies ways to prevent them. "We don't have that in health care."

Sheridan cofounded Consumers Advancing Patient Safety (CAPS), which eventually led to advocacy work with the World Health Organization. Since early 2018, she has been head of patient engagement at the Society to Improve Diagnosis in Medicine (SIDM).

Sheridan also fought to get a better deal for her family. She and her late husband, a physician, brought a malpractice action in 1997 related to their son and fought all the way to the Idaho Supreme Court. There the Sheridans won, triggering a substantial award to fund Cal's lifelong care.

After her husband's death, and with the knowledge learned during the grueling case involving her son, Sheridan settled out of court. "I just did not trust the system," she said in explaining her decision.

In addition to financial awards, Sheridan is proud that the actions over her son and her late husband's treatments included formal changes in hospital treatment policies. "Malpractice doesn't change the system," she said. "They wanted me to sign gag clauses and seal everything up, and I refused to do that. Diagnosis is the beginning of the journey, and the beginning of what we hope is the right treatment," Sheridan noted. "If you don't get the right diagnosis, you're getting the wrong treatment."

Bad Medicine Is a Leading Killer

I WISH THAT SUE SHERIDAN'S EXPERIENCE WAS RARE, UNUSUAL, unexpected or some other comforting word. It is not.

Each year, an estimated 40,000 to 80,000 people die due to medical diagnoses that caused them to receive the wrong medical care or no care at all. Even the lower range of this estimate is comparable to annual gun deaths. I'm hard pressed to find either epidemic more frightening than the other. There is, however, no public outrage over lethal medical mistakes.

This is likely because people don't know the scale of medical misdiagnoses. The range of death figures cited here is based on autopsy results, not guesswork. And while avoidable deaths are down slightly from estimates made 20 years ago, the death toll from bad or at least off-base medical advice remains enormous.

The incidence of bad diagnoses that do not lead to fatalities is broader still. A 2014 study found that about 5 percent of all medical diagnoses for outpatients were in error. Based on the number of people interacting with health care then, this worked out to 12 million cases a year.

Your doctor recommends additional tests. Now what?

HERE ARE SOME FOLLOW-UP QUESTIONS TO ASK FROM SIDM'S TOOLKIT:

- 1. What is my diagnosis? What else could it be? And what's the worst it could be?**
- 2. Why do you think this is my diagnosis? From test results? From my physical exam?**
- 3. Can you give me written information on my diagnosis? A pamphlet? A website?**
- 4. Can you explain the test/treatment you want me to have?**
- 5. What are the risks to the test/treatment you want me to have? What happens if I do nothing?**
- 6. When do I need to follow up with you?**
- 7. What should I do if my symptoms worsen or change, or I don't respond to treatment?**
- 8. Can you suggest a specialist who treats the condition you've diagnosed? I would like to make an appointment with them. (This one is mine, not from SIDM)**





TRUST BUT VERIFY
Be an active participant in your care. Be clear, complete, accurate and consistent when describing your symptoms to medical personnel. Research the care that is recommended and don't be afraid to ask questions. If you're not satisfied, ask what else it could be.

Get What's Yours Rx

- > Up to a third of all medical care is unneeded.
- > Use "Choosing Wisely" to spot unneeded care.
- > Learn how to spot bad medical diagnoses, which kill as many people as cars or guns.
- > Your doctors aren't perfect, so talk to them about suspect care recommendations.
- > Ask your doctors informed questions and use good checklists of things to cover.

Where to Start

VASCULAR EVENTS (STROKES, HEART ATTACKS, PULMONARY embolisms and related circulatory conditions), infections (principally sepsis) and cancer are the three leading sources of misdiagnoses. The potentially deadly consequences of these events should put you and your personal health posse on high alert.

Women and minorities need to be particularly alert to bias in their diagnoses. They have been routinely excluded from disease research studies and remain underrepresented. As a result, their symptoms may lead to erroneous diagnoses. A woman who presents in an emergency room setting with chest or back pain might be diagnosed with acid reflux or gastro esophageal reflux disease, Sheridan said. That might be true for men, but she could be having

a heart attack. Gender bias is worse for African American women, who are at higher risk for stroke. Unless your doctor tells you your condition is life threatening and requires immediate treatment, your initial response to a diagnosis involving serious conditions should include asking your provider what treatment they recommend, where it be performed and if there is a time it should begin.

When decisions don't need to be made on the spot in an emergency room, don't rush things. "Thanks for providing your thoughts," you might say. "It's a lot to take in all at once. Would it be okay if I set up a follow-up appointment to discuss this further?"

A diagnosis related to any serious medical problem should trigger an extensive and broadening circle of research among friends, medical professionals in your community, disease-specific sites, leading medical sites and social media advocacy groups.

SIDM has a patient toolkit that can help prepare you for a deeper dive with your doctor. It's an interactive form you can complete and print out that asks you questions about your medical condition, symptoms and any related personal or family medical history, plus a list of your medications. It allows you to record pain issues.

Bring a complete copy of your medical records and tell your doctor anything helpful. Lack of complete or accurate patient records is regularly cited as a contributing cause of medical misdiagnoses. Ask Choosing Wisely's 5 questions (see sidebar on previous spread), and ask some care questions from SIDM's toolkit (see sidebar).

A variant of this sequence applies when the misdiagnosis may consist of the absence of a diagnosis—a missed call of an illness or condition. Doctors face much tougher medical issues than they once did, simply because the things that medicine now can treat have expanded, as have the tools and medicines for treatment.

"The explosive growth in medical evidence and new technologies ends up being a double-edged sword," the SIDM site notes, "making diagnosis more accurate but also more complex at the same time."

If your doctor or your child's doctor feels a health condition is not serious—"She just has the flu"—you should follow up with the "what else might it be" or "what's the worst it could be" question. Your doctor needs to hear your concerns, and in thinking about how to reply, they just might change their opinion and do you and your child a lot of good.

Health reforms in Washington seem to be the only ones that get broad attention. But important reforms in the delivery of health care happen all the time, albeit at a less headline-generating pace. Evidence-based tools to spot the care you need and the care you don't are great examples of how people can make informed health decisions. In the process, they can achieve better health outcomes and often spend a lot less money on their care. ■

→ From GET WHAT'S YOURS FOR HEALTHCARE: HOW TO GET THE BEST CARE AT THE RIGHT PRICE by Philip Moeller. Copyright © 2021 by Philip Moeller. Reprinted by permission of Simon & Schuster, Inc.

Q&A: Philip Moeller

BY MEREDITH WOLF SCHIZER

This is the third "Get What's Yours" book in the best-selling series.

Why this book? Why now?

Regardless of who won the presidential election, it became clear to me that the growing pressure for health reform would collide with the reality that serious reform is not going to happen anytime soon. It took four years to implement the Affordable Care Act, and it covers only 7 percent of people with health insurance. Changing the system for the other 93 percent will take many years, even assuming we did not have a divided government. I became convinced we needed a consumer guide to the health system we will be living with for some time, and that the best time to publish such a book was after the election.

The pandemic has really advanced telemedicine.

How can patients get the most from televisits?

The hierarchy of effective telemedicine begins with your primary care doctor, who knows you and your health history and can provide remote care as part of your ongoing medical treatment. But whether you speak with your own doctor or a stranger who works for a telemedicine start-up, the burden remains on you to

make sure the clinician is properly licensed, has experience in the care you need, and knows your health history (including the meds you take) BEFORE you hop on Zoom or another platform.

When should a patient choose an in-person visit instead?

Telehealth can be especially

effective in treating visible conditions, such as dermatology needs, as well as psychological and behavioral counseling, where the privacy can make people comfortable sharing concerns they would not share in a face-to-face appointment. In-person visits are still the gold standard, however, and people need to get back into preventive health care.

What's the single most important thing a patient can do to advocate for herself or a loved one?

Never give up!

What's the best way to get the appropriate level of screening—particularly



for not-easily-categorized ailments—without consenting to (or requesting) overscreening and risking the “cascade effect” while also ensuring that something important isn’t missed?

Do your homework. Don’t accept a doctor’s recommendations without further research. As the book explains, there is extensive clinical evidence about where we get too much care and where we get too little. Use the book’s consumer guides and question checklists to determine if tests are appropriate. Most tests are not related to medical emergencies. Take the time to find out more about a test, including canvassing reliable news and medical sites and talking with friends and others you trust who have faced problems similar to yours.

Screening tests can be overused, but are some regular ones actually essential? Which ones? For example, the U.S. Preventive Services Task Force (USPSTF) recently lowered the age recommendation for beginning colonoscopy screenings to 45. What about mammograms? There are conflicting recommendations for beginning those, including starting at 40, 45, and 50.

The book includes an appendix containing the most highly recommended USPSTF tests. Where there is no universal standard for when a test should be administered, speak with your own doctors and find out when they recommend you be tested and why. In doing research for the

book, the value of a solid relationship with a primary care doctor popped up over and over again. Find a good doc you trust.

What changes can consumers expect from health care under a Biden presidency?

I expect the Affordable Care Act to be sustained in the case now before the Supreme Court. President-elect Biden can expand ACA enrollments without Congressional approval. A sharply divided government will limit large-scale changes to health care. Expanding Medicare to persons aged 60 to 65 may be the best he can do for a while. Lastly, the pandemic will generate bipartisan support for higher spending to support frontline health workers and at-risk populations, including tougher scrutiny of nursing homes. Congress also will be sympathetic to more Medicaid funding to the states. The “bad guys” in health care—drug, insurance, equipment and hospital firms—have been on their best behavior during the pandemic and have regained some standing with the public. They are well-positioned to fend off major changes to their businesses.

“Do your homework. Don’t accept a doctor’s recommendations without further research.”

It is the end of the calendar year. Is there something specific consumers can do now to maximize their health care dollars?

Most people have completely satisfied their insurance plan deductibles and out-of-pocket expenses, making care effectively free at the end of the calendar year. Refill prescriptions. Schedule those appointments you’ve been putting off. Visit a surgical center and get that elective care procedure.

How are you coping with the pandemic?

The isolation from friends and family is taking a toll, as is not being able to travel. On the bright side, our home has never been in better repair, and my wife and I are cooking a lot and eating ridiculously well. A pandemic is a wonderful time to recuperate, and I’ve had successful cataract surgery and a total knee replacement. Sad to say, and I’m not proud about this, a pandemic also is a wonderful time to research and write a book!

Do you have any favorite podcasts?

I am a Luddite and listen to only one occasionally—*Fresh Air* with Terry Gross.

What’s next for you?

I will get the vaccine as soon as possible and so will our friends. Then it’s off on trips with friends and family ASAP. Sometime in late 2021, the idea of another book will begin invading my dreams, and then it will be *deja vu* all over again. Maybe I’ll get the other knee replaced! ■

BOOKS

Wrap Up a Good Read

30 thoughtful, easy-to-find gifts for
everyone on your holiday list

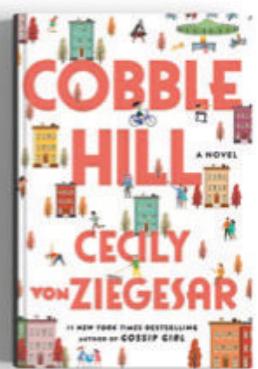
TIKTOK-ER DIXIE D'AMELIO TALKS FAME

"Don't do something you're not into or not proud of...people can see through that." » P.48



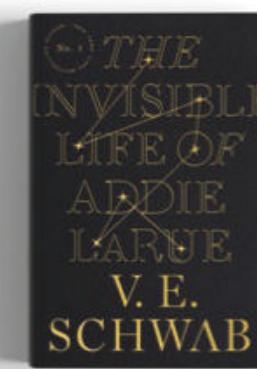
Having trouble picking out the perfect gift for everyone on your list? Did you wait till the last minute? Never fear, *Newsweek* has curated a list of book choices for you, with a selection of photo essays, biographies, novels, thrillers and more—all from 2020, each one proving that something good came out of this year after all. These great reads are available for pick up at nearby bookstores, or online for contactless purchases with shipping in time for the holiday—or even choose the e-book option. Select gift wrap at checkout and have them shipped directly to the lucky recipient. All that's left is to set up a Zoom call to discuss what everyone is reading! —*Juliana Pignataro*

For your fiction-devouring best friend:



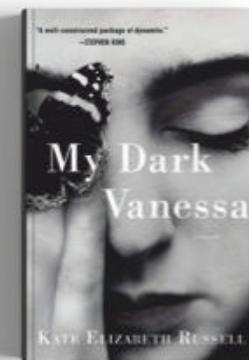
Cobble Hill
By Cecily von Ziegesar
ATRIA BOOKS | \$27.00

The author of the *Gossip Girl* series returns with a plot that's just as juicy—this time following four couples and their kids in Cobble Hill, Brooklyn.



The Invisible Life of Addie LaRue
By V. E. Schwab
TOR BOOKS | \$26.99

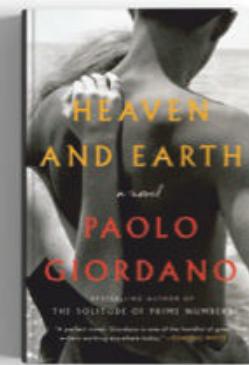
Addie LaRue makes a bargain to live forever, but is cursed to be forgotten by whomever she meets, in this magnetic and magical novel.



My Dark Vanessa
By Kate Elizabeth Russell

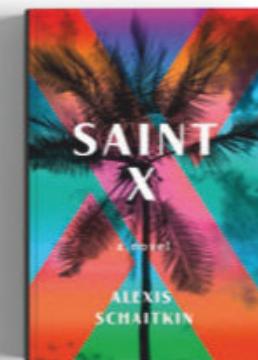
WILLIAM MORROW
\$27.99

This explosive debut flashes between a 15-year-old's relationship with her 47-year-old teacher and 17 years later, when he's accused of sexual assault.



Heaven and Earth
By Paolo Giordano
PAMELA DORMAN BOOKS | \$28

Simmering with resentment, lust and the heat of an Italian summer, *Heaven and Earth* follows four friends from the time they meet in the 1990s till 2012 as they follow a collision course while protecting a deep and cataclysmic secret.



Saint X
By Alexis Schaitkin
CELADON BOOKS
\$26.99

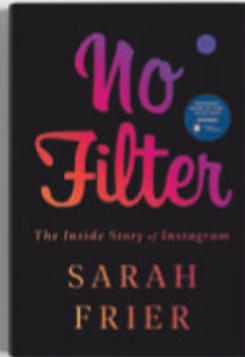
Seven-year-old Claire's life was marked irreversibly when her older sister went missing during a family vacation in the Caribbean. Years later, Claire crosses paths with the man suspected of killing her in this addictive and breathtaking debut novel.



The Death of Vivek Oji
By Akwaeke Emezi
RIVERHEAD BOOKS | \$27

One of the most highly acclaimed novels of 2020 will be unlike anything they've ever read before, beginning when a mother opens her door in Nigeria to find the body of her son.

For your social media-addicted coworker:

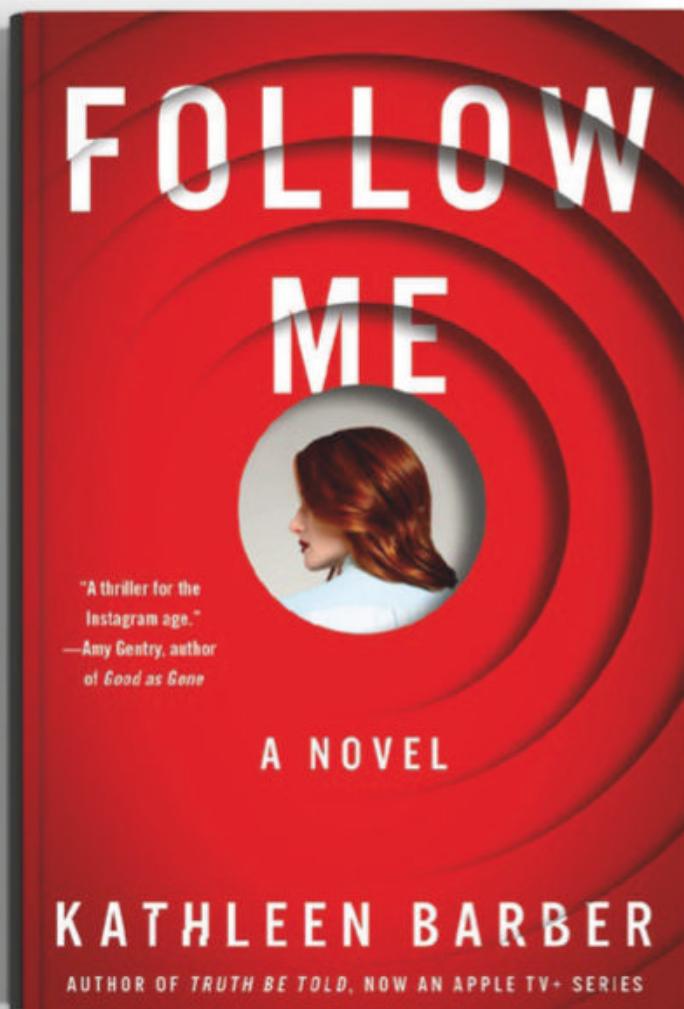


No Filter, The Inside Story of Instagram
By Sarah Frier
SIMON & SCHUSTER | \$28

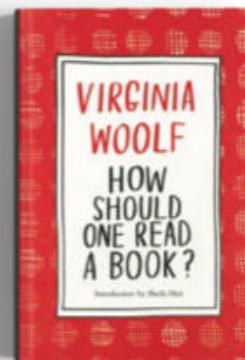
Just how did Instagram become one of the most influential and relevant platforms of the modern world? Frier's access to the central figures in the drama unravels the tangled web of the online company's unprecedented impact.

Follow Me

By Kathleen Barber | Gallery Books | \$27
Audrey Miller is a social media oversharer whose constant cataloging has earned her an unwelcome follower in this chilling tale that'll make anyone think twice before posting.



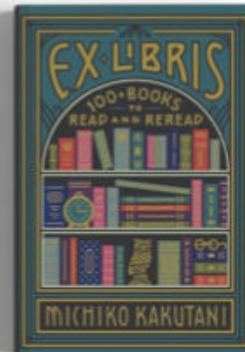
For your mom, who has already read pretty much everything:



How Should One Read a Book?

By Virginia Woolf
LAURENCE KING PUBLISHING | \$9.99

This slim and elegant volume is an update to a literary classic that stands the test of time.



Ex Libris: 100+ Books to Read and Reread

By Michiko Kakutani
CLARKSON POTTER
\$25.00

Pulitzer Prize-winning literary critic Kakutani shares must-read classics, memoirs, manifestos and more—complete with magnificent accompanying artwork.



For your cousin, who can't get enough true crime:

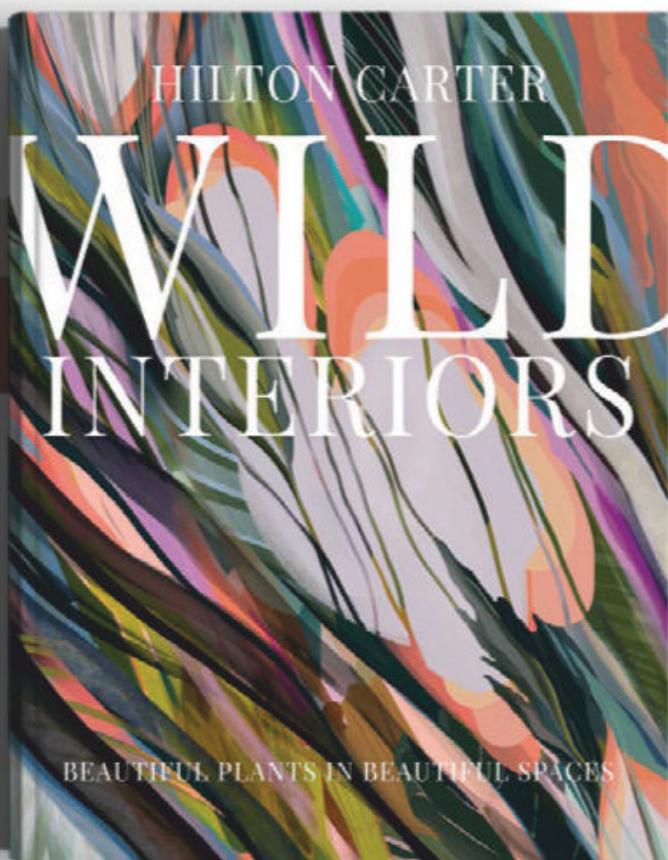


We Keep the Dead Close: A Murder at Harvard and a Half Century of Silence

By Becky Cooper
GRAND CENTRAL PUBLISHING | \$29

In 1969, Harvard anthropology graduate student Jane Britton was found killed in her home. Decades of speculation and whispers followed, until Cooper heard the story—as a student herself—and put it all together over the course of a decade in this immersive and expansive memoir.

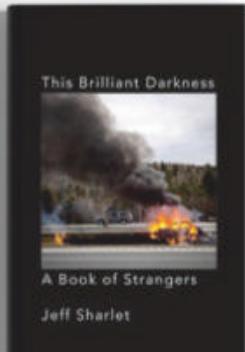
For your artsy aunt:



Wild Interiors: Beautiful Plants in Beautiful Spaces

By Hilton Carter | CICO BOOKS | \$24.99

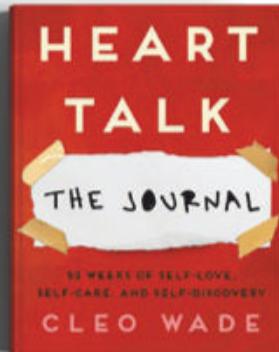
Chock full of spectacular full-color, full-page photos and advice for houseplant aficionados to help make a decor statement with greenery.



This Brilliant Darkness: A Book of Strangers

By Jeff Sharlet
W.W. NORTON & COMPANY | \$25

In breathtaking photos and short, propulsive narratives, Sharlet tells the stories of the people he has encountered while traveling the road of life.

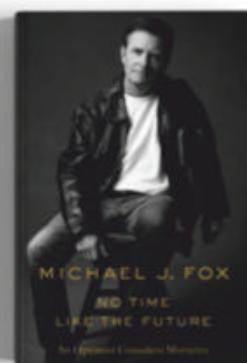


Heart Talk: The Journal: 52 Weeks of Self-Love, Self-Care, and Self-Discovery

By Cleo Wade | ATRIA BOOKS | \$17.99

Based on the best-selling book, a year-long journey through the self that's both poetry and journal.

For your sister, who could use some inspiration:



No Time Like the Future: An Optimist Considers Mortality

By Michael J. Fox

FLATIRON BOOKS

\$27.99

Fox reflects on recent challenges and shares the lessons he has learned since being diagnosed with Parkinson's at the age of 29. By turns humorous, profound, reflective and hopeful.



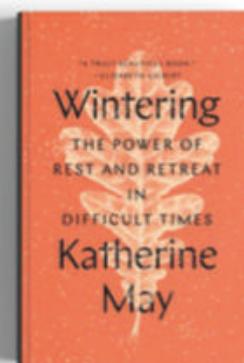
Keep Moving: Notes on Loss, Creativity, and Change

By Maggie Smith

ATRIA/ONE SIGNAL

PUBLISHERS | \$24

A perfect pick-me-up, Smith's gem is packed with luminous quotes and essays about resilience, transformation and moving forward no matter the circumstances.



Wintering

THE POWER OF REST AND RETREAT IN DIFFICULT TIMES

Katherine May

Wintering: The Power of Rest and Retreat in Difficult Times
By Katherine May
RIVERHEAD BOOKS | \$24

The book equivalent of a warm hug. May's calming meditations read like poetry.

"Heartbreaking, surprising, inspiring, and profound."

—Lori Gottlieb,

Author of *Maybe You Should Talk to Someone*

good morning, monster

A Therapist Shares Five Heroic Stories of Emotional Recovery

CATHERINE GILDINER

New York Times Bestselling Author

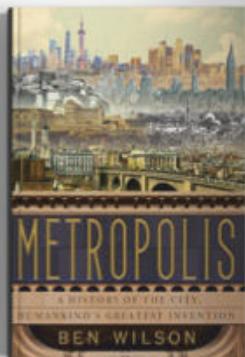
Good Morning, Monster: A Therapist Shares Five Heroic Journeys to Recovery

By Catherine Gildiner

ST. MARTIN'S PRESS | \$27.99

A longtime psychologist chronicles the lives of five of her most inspirational patients for a story that's both wrenching and hopeful.

For your dad, the history buff:

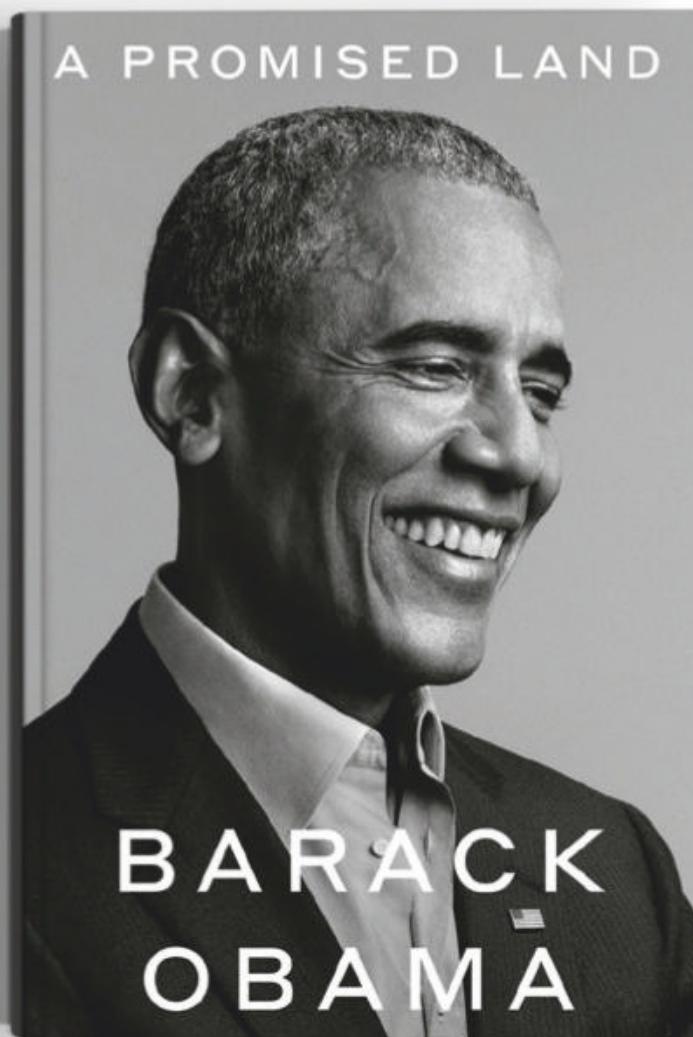


Metropolis: A History of the City, Humankind's Greatest Invention

By Ben Wilson

DOUBLEDAY | \$32.50

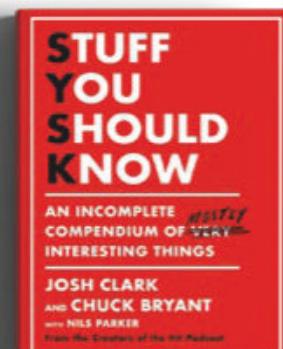
The supremely beautiful cover of *Metropolis* is outdone only by the epic narratives of the world's influential cities contained within its pages, spanning from Uruk in 4000 B.C. to Lagos in 2020.



A Promised Land

By Barack Obama | CROWN | \$45

Arguably the most-anticipated presidential memoir in modern history, and a must for any history buff's bookshelf.

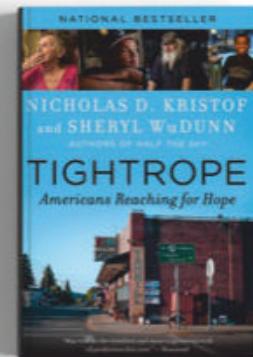


Stuff You Should Know: An Incomplete Compendium of Mostly Interesting Things

By Josh Clark and Chuck Bryant with Nils Parker

FLATIRON BOOKS | \$27.99

An addendum to the podcast of the same name, *SYSK* is as close as you'll get to being out at a bar on trivia night, jam-packed with tidbits about everything from Demolition Derbies to Dolly the cloned sheep.

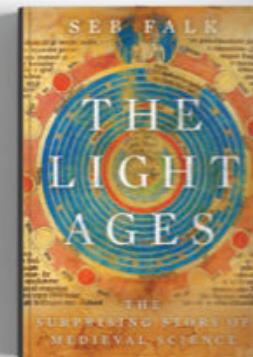


Tightrope: Americans Reaching for Hope

By Nicholas Kristof and Sheryl WuDunn

VINTAGE | \$16.95

Venturing back to Kristof's native rural Oregon, *Tightrope* explores how lives have been altered by poverty, addiction and the loss of blue collar jobs in a remarkable study of modern American life.



The Light Ages: The Surprising Story of Medieval Science

By Seb Falk

W.W. NORTON &

COMPANY | \$30

Cambridge science historian Falk journeys through the 14th century by way of a monk in order to tell the surprising and vivid story of medieval science.

For your video game-loving nephew:



Ready Player Two

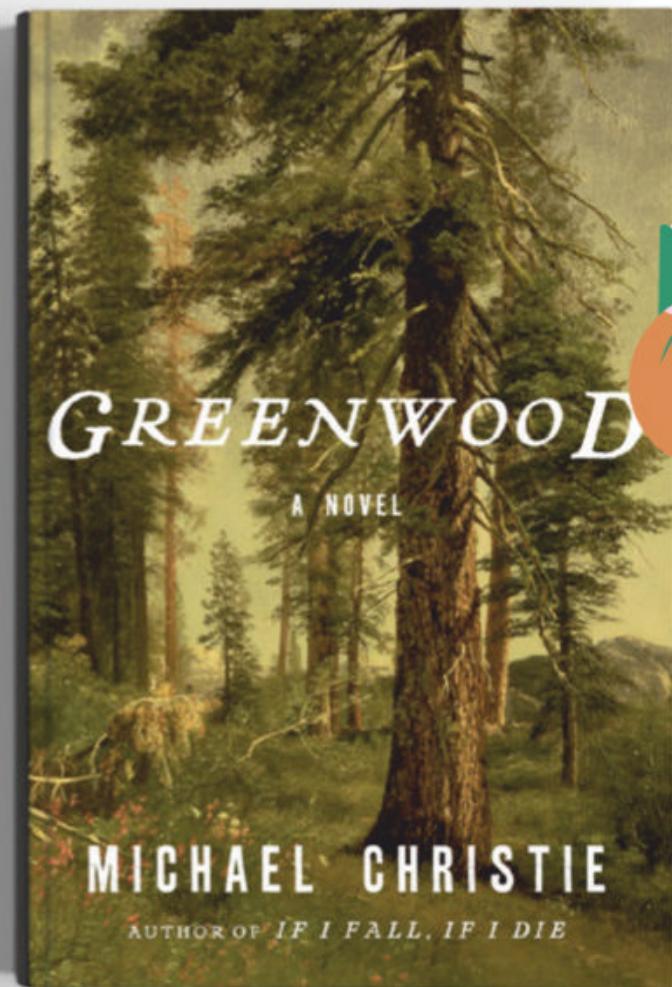
By Ernest Cline

BALLANTINE

BOOKS | \$28.99

The much-anticipated sequel to *Ready Player One* picks up days after Wade Watts wins the Oasis founder's contest, when he makes an unexpected and incendiary discovery.

For your brother, who would rather be outside exploring:



Greenwood

By Michael Christie | HOGARTH | \$28

Christie weaves what is, in our opinion, one of the best novels of the year; a story as lush and complex as the trees it revolves around.

For your niece with
the big imagination:



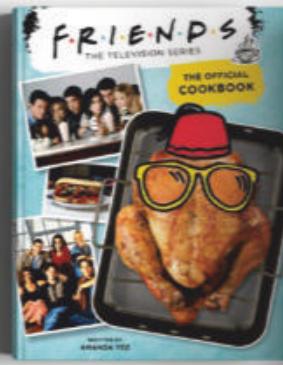
The Ickabog

By J.K. Rowling
SCHOLASTIC INC.
\$26.99

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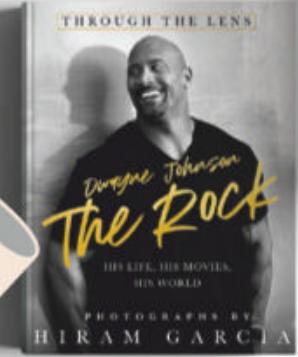
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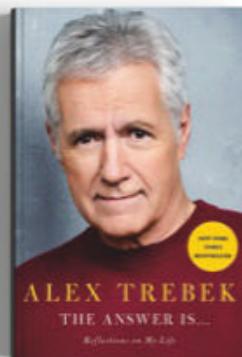
Is This Anything? Jerry Seinfeld

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Culture

01 Peep Drop

Bethlehem, Pennsylvania

Everyone knows about the big ball drop in Times Square, but this town in Pennsylvania takes the New Year's tradition to a newer, sweeter level. For 11 years running, they've hosted an alternative drop—a 400-pound marshmallow Peep chick, which descends to ring in the new year.



02 Burning Effigies

Ecuador

New Year's Eve comes with a whole set of traditions and customs to symbolically leave the previous year behind. Here, "monigotes"—figures that represent what went wrong in the last year, sometimes politicians—are then burned into the night.



03 Skating to Mass

Venezuela

Venezuelans add a unique touch to the usual Christmas mass by strapping on roller skates Christmas morning and rolling over to church. In the capital of Caracas, streets are closed until 8 a.m. to accommodate.



06 Krampus, Santa's Evil Twin

Austria

Known as a sort of "evil twin" to Santa, Krampus terrorizes children, rather than bringing them joy. During this "celebration" in early December, people dress as this devil-like figure and wander around the streets.



05 Caga Tió

Catalonia

This tradition will make any child giggle. Throughout December, children feed a log painted with a cartoon face, and then just before the holiday they are told to sing to it and beat it with a stick. Inevitably, the log "poops" out gifts and nougat candy.



04 Mari Lwyd

Wales

This eerie pagan tradition is celebrated in late December and requires the skulls of different animals. Usually a horse skull is decorated and attached to a stick draped with a white sheet. Then, these ghostly apparitions are paraded door-to-door while the petitioners ask for ale and cake at each stop by reciting rhymes and riddles.

07 Throwing of the Shoe

Czech Republic

This Christmas tradition has little to do with trimming trees or singing carols. Rather, young women step outside their homes on Christmas Eve and instead of waiting for Santa, they throw a shoe over their shoulder. How it lands is said to predict if the woman will marry in the next year.



9

09 Sauna Visit

Estonia

This is a holiday tradition most people would happily get behind. On Christmas Eve, after spending the day setting up for the following day's festivities, it is traditional to sweat it out in the sauna with your family.



07: KVLADIMIRV/GETTY; 08: ABADONIAN/GETTY; 09: RAIGO PAJULA/AFP/GETTY; 10: SCOTT EISEN/BLOOMBERG/GETTY

08 Bathtub Carp

Slovakia

Carp is a classic Christmas dinner staple in Slovakia, but to observe this tradition, you cannot simply walk into your local supermarket to pick up your fish. Instead, the carp must swim in the family's bathtub for up to two days prior to being prepared for the festive meal.



10

10 Kentucky Fried Christmas

Japan

Kentucky Fried Chicken might not be the first thing that comes to mind when you think of Christmas, but over the years, it has become quite the holiday tradition in Japan. So much so that in order to ensure you get your hands on a holiday bucket, it is suggested that you order in advance, as nearly 4 million people choose KFC as their Christmas dinner.



UNCHARTED

Wacky Ways the Holidays Are Celebrated Around the World

The holiday season is upon us and though they may feel a bit different this year—without large get togethers and more merry-making from afar—the holidays themselves are certainly not canceled. December is filled with celebrations from various religions, ending of course with New Year's which is celebrated, in one way or another, by all. Most are observed in traditional ways, but in every corner of the globe there are also unique ways of celebrating holidays in late December, from Christmas to New Year's—some more familiar than others. From a “pooping” log in Catalonia, to a KFC dinner in Japan, here are some of the most unusual ways people bring the festivities home—all around the world. —Kathleen Rellihan

PARTING SHOT

Dixie D'Amelio

FOR DIXIE D'AMELIO, TIKTOK STAR AND REGULAR VIRAL SENSATION, 2020 has been quite a year. "I graduated high school, released my first single, signed to a label, launched a podcast with my sister [Charli D'Amelio] and launched my YouTube channel." Her single released in June, "Be Happy," quickly exploded, taking in more than 55 million streams. She released a second earlier this month, "One Whole Day," but she's just beginning, with hopes of collaborating with "Billie Eilish, Lil Uzi Vert or Trippie Redd." Besides music, she has a slew of other projects in the works, too, which she's able to do alongside her popular family: she and her sister, Charli, are two of the most-followed accounts on the video sharing site TikTok, with a combined following of more than 150 million users. "When everything started, we had a rule in our family that we only do things that we *want* to do." Her recipe for social media success? "Be yourself and don't do something that you're not into or not proud of because people can see through that (especially on social media)."



"TikTok has not only changed my career, it essentially created my career."

Has TikTok changed your career?

TikTok has not only changed my career, it essentially created my career. Pre-pandemic, I planned to go immediately to college. Now I have this new path and direction, due to TikTok opening up so many incredible doors and opportunities.

You cover different areas: singer, actress, influencer, etc. What would you say your main focus is?

If I had to choose, I would definitely put my priority on my music. It's been a passion of mine since I was a little girl.

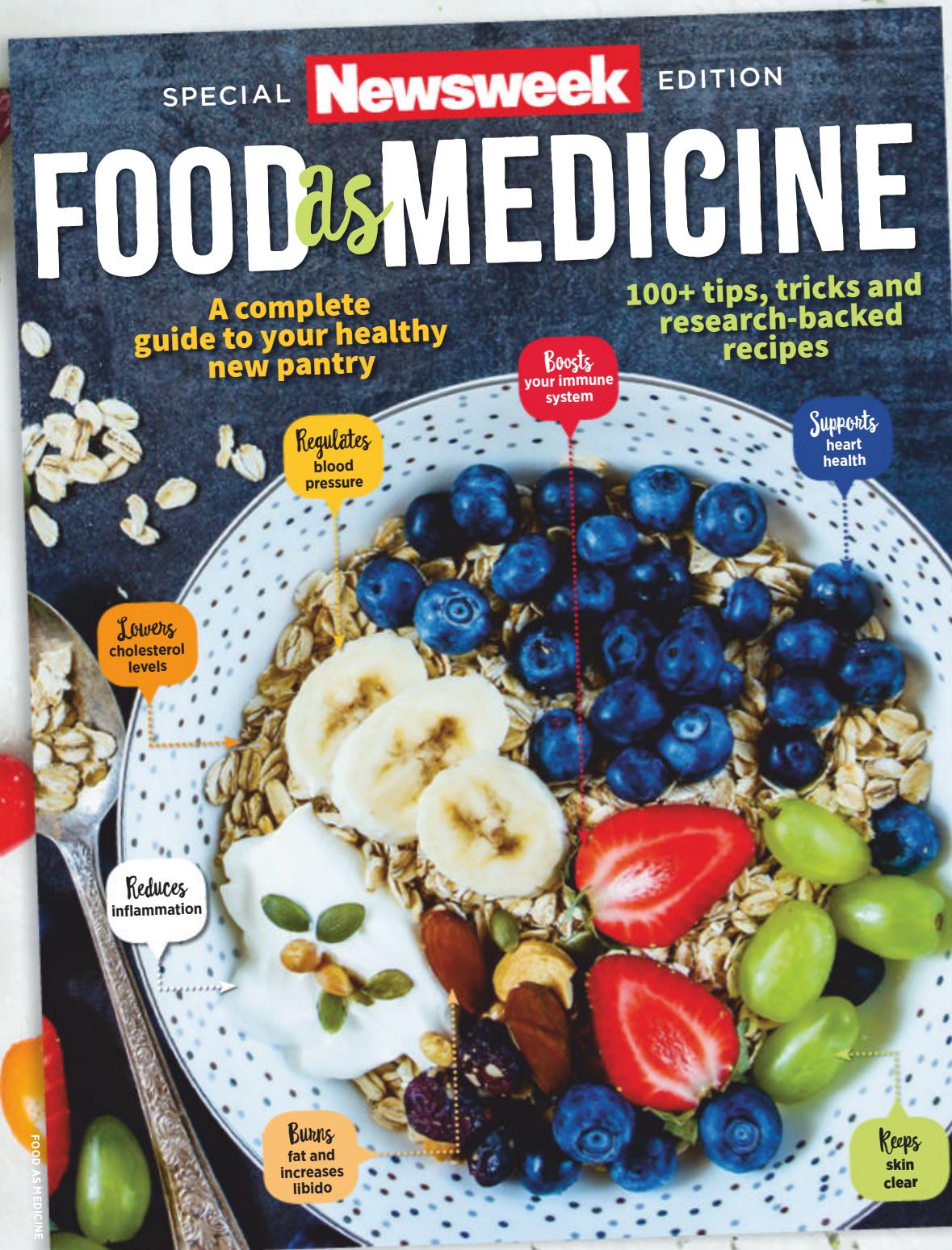
How do you balance solo work and working with your family?

The best part about my focus on my solo career, separate from my family or Charli, is that when we work together, it just feels like fun. We have a great time with the projects we do together—like our fashion and makeup partnerships with Hollister and Morphe, and our podcast 2 CHIX—but then I can go pursue the things I'm passionate about.

How have you been coping with the pandemic?

I've been able to dive more into music. It's kind of wild how much can be done virtually. I never experienced creating music before the pandemic, so for me, it's all I know. Liam Payne asked me to be on his Christmas song "Naughty List." We did everything virtually, from recording to filming the music video, but I do hope to meet him in person at some point. —H. Alan Scott

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