

PERSON *of the* YEAR

TIME

—
ELON
MUSK
—

LUCILLE & DESI: A Power Couple On-Screen and Off

It's easy to forget that many of the classic sitcom tropes and styles that modern audiences take for granted, like the three-camera set-up or writing a baby into the script when the actor gets pregnant, originated on *I Love Lucy*.

Being the Ricardos, written and directed by Aaron Sorkin and co-executive produced by Lucille Ball and Desi Arnaz's children, Lucie and Desi Arnaz Jr., takes audiences back in time and into the studio where *I Love Lucy* was originally filmed. Focusing on a single week, the film is an eye-opening window into 1950s Hollywood, as well as Ball's unique role in it. McCarthyism, gender discrimination, racial discrimination, marriage, and friendship are all present, as well as fresh details about how Ball and Arnaz were true trailblazers in the industry.

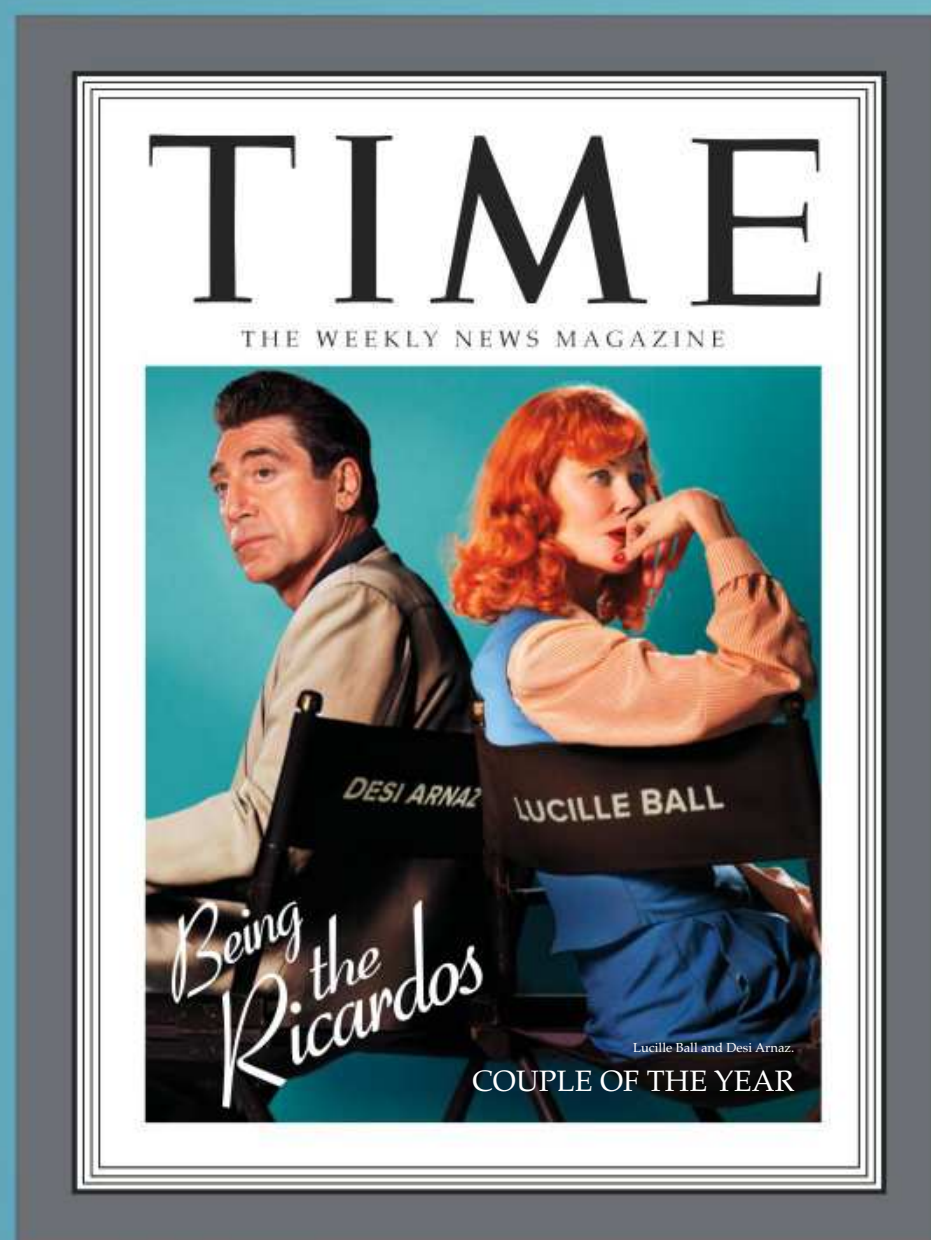
Widely regarded as one of the most influential sitcoms in history, at the time, *I Love Lucy* was unlike anything else on

television. From an audience perspective, it was unusual to see a woman as the lead actor, and it was unheard of to show an actual pregnancy on screen — though the FCC still wouldn't allow the word "pregnant" to be aired. The iconic series was

also a pioneer behind the scenes, using techniques that would later become standard for 30-minute primetime sitcoms. Most notably, the show was the first to film on three cameras simultaneously in front of a live studio audience. This approach allowed cameras to film from multiple angles at once, eliminating the need for several takes or reshoots, and allowing it to be filmed continuously, like a play. The result was more authentic audience reactions and genuine laughter that have become famous in their own right.

As emblematic of the era as it seems now, *I Love Lucy* was

also remarkably progressive for its time. Lucy, a zany and imperfect housewife with ambitions of her own, was far from the idealized homemakers depicted on contemporary sitcoms. And her marriage to Desi, a Cuban American who leaned into



ACADEMY AWARD® WINNER
Nicole KIDMAN

ACADEMY AWARD® WINNER
Javier BARDEM

WRITTEN AND DIRECTED BY
Aaron SORKIN

BEING THE RICARDOS PREMIERES IN SELECT THEATERS ON DECEMBER 10,
AND WILL BE AVAILABLE FOR STREAMING ON AMAZON PRIME VIDEO ON DECEMBER 21



his heritage, was the first time American audiences had seen an interracial couple depicted on screen. By far the most beloved program on the air at the time, *I Love Lucy* proved the value of diverse representation on screen, even in an overwhelmingly conservative era.

As the show's popularity continued to grow, so did Ball and Arnaz's production company, Desilu Productions, and *I Love Lucy*'s lasting impact on television and American culture at large. For instance, Arnaz's forward-thinking idea to shoot episodes on 35mm film and record them on a permanent medium is what made reruns and syndication possible. And when Ball bought out Arnaz's shares of Desilu Productions in 1962, she became the first woman to head a studio.

Ball may be best remembered today as the wacky, lovable, red-haired Lucy Ricardo, but she and Arnaz's real legacy transcends their TV personalities.

Being
the
Ricardos



TIME

HEROES OF THE YEAR

*Vaccine Scientists
and the Miracle
of mRNA*



Clockwise from top right:
Katalin Kariko,
Barney Graham,
Kizzmekia Corbett and
Drew Weissman

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DRIVING TODAY TRANSFORMING TOMORROW

We are at the beginning of a new era of high-class experiences. This is no longer about transport - Audi is shaping their vision of how we could see the future of premium mobility progressing.

Thanks to digitalization it's all about experiences that are immersive and entirely human-centric. The Audi grandsphere concept car is an experience device embedded in a holistic digital ecosystem, showcasing the life-changing possibilities of progressive luxury.

The heart of the Audi vision lies inside the Audi grandsphere concept car. The "sphere" is where Audi has put the driver, and their passengers, at the center of their own world. Their needs and desires shape the space, the architecture, and the functions. It's clear that at the inception of this vehicle, the focus is directed toward the interior, its design, and how the two can enhance and cultivate a very personal experience as part of the journey.



Concept vehicle shown. Not available for sale. Specification may vary.

“It’s no longer about driving.
Thanks to digitalization, it’s about experiences”

HENRIK WENDERS, SENIOR VICE PRESIDENT OF AUDI BRAND

In essence, the Audi grandsphere concept car is not just for mobility; it will change how drivers can live their lives, spend their time, and design a world of their own.

Whilst the impressive and innovative technologies that lie inside the sphere bring the world to life, the journey begins with Level 4 driving. This driving experience is reflected in future technology that could make new dimensions of freedom possible, gifting the driver the biggest luxury of all. Time.

The commodity we never seem to have enough of becomes abundant as soon as you walk towards the Audi grandsphere concept car.

Thanks to the integration of 3rd party apps, your morning routine can begin the moment you step inside. Paired with Level 4 driving, a mode that transforms the sphere by creating a luxurious space without the steering wheel, pedals and displays, you have the ability to meditate and practice self-care whilst being transported to your destination.

A dedicated workspace is no longer a static location. Your personal sphere can transform into an office, allowing for time to be used efficiently and inspiration to be seized at every moment. Conference calls suddenly have a scenic backdrop, blending the inside and outside together to create a modern workplace.

Recreation time is now more fluid, too. Drivers can reclaim lost moments and catch up on their favorite shows from the comfort of their sphere. Customized infotainment options are also available, such as seamless integration of onboard streaming customized from each passengers’ favorite music and video providers.

Immersive experiences and intuitive usability are at the core for Audi and the future of travel. Simply getting from A to B will be a notion of the past, allowing the journey to become its own destination.



Concept vehicle shown.
Not available for sale. Specification may vary.

Concept vehicle shown.
Not available for sale. Specification may vary.



“The future? We at Audi are shaping it”

HENRIK WENDERS, SENIOR VICE PRESIDENT OF AUDI BRAND

The technology available is nothing short of remarkable.

Eye-tracking redefines the idea of hands-free control, allowing the driver to launch the digital services they need for their journey by simply looking at a menu icon, then confirming their selection by touching a touch-sensitive panel.

To make adjustments, passengers merely have to look at their selection and

make their choice with a simple gesture. The Audi grandsphere concept also enables experiences that extend beyond its four doors. At the glance of an eye and the brush of a button, food can be ordered and tables can be reserved.

By proactively making dining suggestions along the route, the Audi grandsphere concept seamlessly blends the outside world with a life created within the sphere. Thanks to Audi services and

the ability to integrate digital services, the possibilities are nearly endless. The Audi grandsphere concept can design a spectacular scenic route and provide restaurant or hotel options. The vehicle also takes care of everyday tasks that go beyond the ride itself - picking up passengers with information about their current destination and independently handling parking and charging.

Concept vehicle shown.
Not available for sale. Specification may vary.



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Concept vehicle shown. Not available for sale. Specification may vary.

“We’re leveraging the technology available today to make tomorrow brighter, better, more sustainable...”

HENRIK WENDERS, SENIOR VICE PRESIDENT OF AUDI BRAND

As with all concept cars, the Audi grandsphere concept represents an outlook on the future Audi product portfolio, giving us a tantalizing glimpse into which technologies could be introduced in the next few years. At this very moment, the Audi development team is working on a wide range of interfaces to support key technological advancements - from

seamless integration of the customers’ digital ecosystems, which would allow passengers to bring their favorite apps into the car with no smartphone needed, to the concierge control knob seen in the Audi grandsphere concept.

Premium mobility is set to be a multifaceted experience with interiors that redefine luxury, services that

reinvent what concierges do, and digitalization that enables Audi owners to follow every whim, whether it’s working, relaxing, connecting, or indulging.

If we’re at the dawn of a new era in luxury mobility, Audi is the light shining on the horizon. The future is here, and Audi is leading the way.

The future is here, and Audi is leading the way. More at progress.audi

TIME

ENTERTAINER OF THE YEAR

Olivia Rodrigo



TIME

ATHLETE OF THE YEAR

Simone Biles

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TIME

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ALEJANDRO DE LA GARZA



ASSETS OR APPRECIATION?

ASK YOURSELF, WHERE NEXT?





PHOTOGRAPHS BY
MATTIA BALSAMINI
FOR TIME



PHOTOGRAPH BY
DJENEBA ADUAYOM
FOR TIME



PHOTOGRAPH BY
KELIA ANNE
FOR TIME

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HEROES OF THE YEAR

THE SCIENTISTS WHO CREATED THE
MRNA VACCINES MAY HAVE SAVED THE WORLD
FROM MORE THAN COVID-19

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TEENAGER OLIVIA RODRIGO WROTE A
CONFESSIONAL ALBUM IN HER BEDROOM THAT
BECAME THE SOUNDTRACK OF A RAW YEAR

BY LUCY FELDMAN

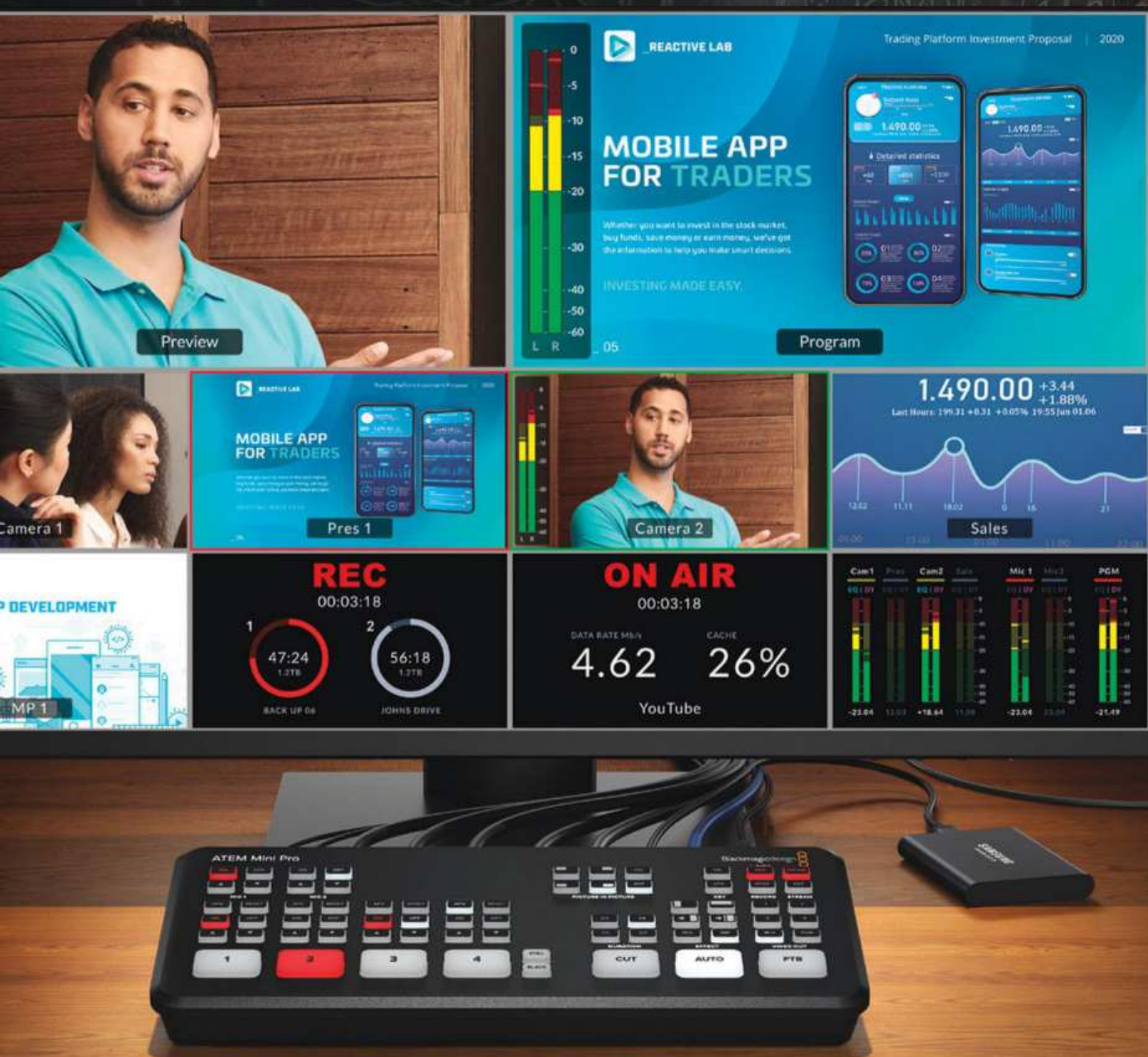
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Introducing ATEM Mini Pro

The compact television studio that lets you create presentation videos and live streams!

Blackmagic Design is a leader in video for the television industry, and now you can create your own streaming videos with ATEM Mini. Simply connect HDMI cameras, computers or even microphones. Then push the buttons on the panel to switch video sources just like a professional broadcaster! You can even add titles, picture in picture overlays and mix audio! Then live stream to Zoom, Skype or YouTube!

Create Training and Educational Videos

ATEM Mini's includes everything you need. All the buttons are positioned on the front panel so it's very easy to learn. There are 4 HDMI video inputs for connecting cameras and computers, plus a USB output that looks like a webcam so you can connect to Zoom or Skype. ATEM Software Control for Mac and PC is also included, which allows access to more advanced "broadcast" features!

Use Professional Video Effects

ATEM Mini is really a professional broadcast switcher used by television stations. This means it has professional effects such as a DVE for picture in picture effects commonly used for commentating over a computer slide show. There are titles for presenter names, wipe effects for transitioning between sources and a green screen keyer for replacing backgrounds with graphics.

Live Stream Training and Conferences

The ATEM Mini Pro model has a built in hardware streaming engine for live streaming via its ethernet connection. This means you can live stream to YouTube, Facebook and Teams in much better quality and with perfectly smooth motion. You can even connect a hard disk or flash storage to the USB connection and record your stream for upload later!

Monitor all Video Inputs!

With so many cameras, computers and effects, things can get busy fast! The ATEM Mini Pro model features a "multiview" that lets you see all cameras, titles and program, plus streaming and recording status all on a single TV or monitor. There are even tally indicators to show when a camera is on air! Only ATEM Mini is a true professional television studio in a small compact design!

ATEM Mini..... **US\$295**

ATEM Mini Pro..... **US\$495**

ATEM Mini Pro ISO..... **US\$795**





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Discover how we are catalyzing new pathways to cleaner fuels at aramco.com/poweredbbyhow

Behind The Scenes

IN HER PROFILE OF OUR 2021 ENTERTAINER of the Year Olivia Rodrigo, my colleague Lucy Feldman made an observation that jumped out at me. Rodrigo, the 18-year-old pop sensation whose music has won over audiences of all ages, “has a gift for picking the best of the past,” Lucy notes, “and finding just the right way to situate it in the present.”

It’s a theme that resonates throughout this issue. Simone Biles, the greatest gymnast of all time and our Athlete of the Year, took sports and the world forward in 2021 by using her



PHOTOGRAPH BY
MARK MAHANEY
FOR TIME

spotlight at the Tokyo Olympics to stand up for mental health, and making sure athletes are measured by more than their wins and losses. The miracle of fast and effective vaccines that saved millions of lives from COVID-19 was the work of so many scientists over so many years that we created a new category to recognize them, Heroes of the

Year. The mRNA vaccines available today are built on the pioneering insights of the past—and will become the breakthroughs of tomorrow. Even Elon Musk’s spacefaring adventures are a direct line from the very first Person of the Year (then called Man of the Year), Charles Lindbergh, whom the editors selected in 1927 to commemorate his historic first solo transatlantic airplane flight over the Atlantic.

FOR US AT TIME, it has also been a year of building on the past to forge the future. We developed, like so many of you, a new hybrid approach to work as many of us now ping back and forth between our virtual and physical offices. We continued to expand our TIME100 franchise with TIME100 Companies and a new series of TIME100 Talks. We returned to live events with a gathering in Glasgow for COP26 that brought together climate-change leaders from around the globe. We created a special project on racial justice, Visions of Equity, led



▲
TOP: ELON MUSK SITS
FOR MARK MAHANEY AT
THE SPACEX FACILITY IN
BOCA CHICA, TEXAS, ON DEC. 3;
BELOW: *TIME* EDITOR-IN-
CHIEF EDWARD FELSENTHAL
WITH MUSK

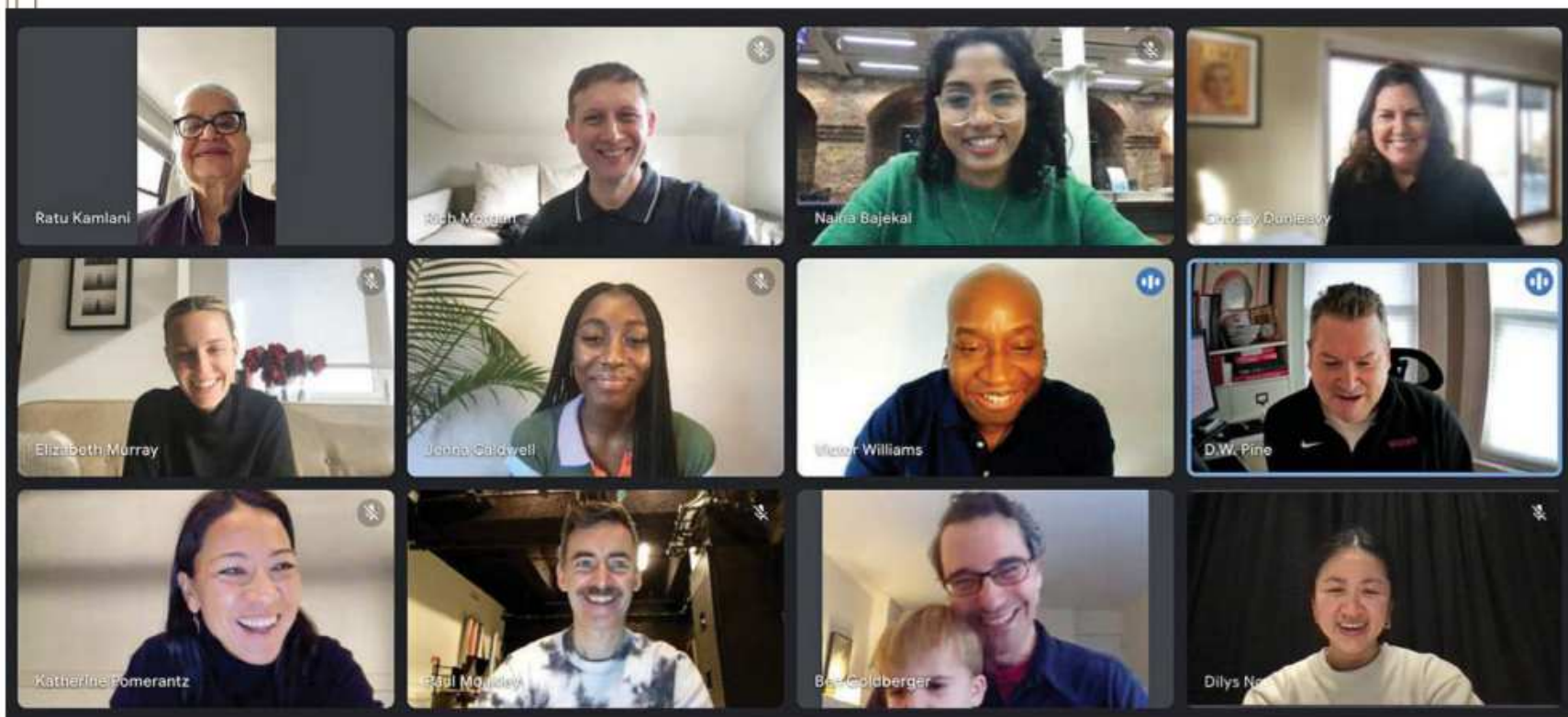
Wrong turns can turn out right



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Out There™



FROM THE EDITOR



▲
**TIME STAFF MEET
VIRTUALLY TO DISCUSS
THE PERSON OF THE
YEAR SPECIAL ISSUE**

►
**MATTIA BALSAMINI
PHOTOGRAPHS
KIZZMEKIA CORBETT
IN BOSTON ON DEC. 3**



▼
**KELIA ANNE
PHOTOGRAPHS
OLIVIA RODRIGO
IN L.A. ON NOV. 22**



by staff of color in our newsroom. We helped lead our industry into the next phase of the Internet with TIMEPieces, an NFT platform for artists. We expanded our digital offerings, with more than 100,000 of you now supporting our journalism by subscribing for full access to our site. And our two-year-old Emmy-winning TIME Studios division continued to create new homes for our journalism, with more than 20 film and television projects set to air on leading streaming services and networks.

PERSON OF THE YEAR is for us a powerful capstone to the work of the previous 12 months. The process began in early fall, as it always does, with a gathering of our global staff to debate various nominations. But this year we had an inspiring addition: we were joined at the kickoff by 2018 Person of the Year Maria Ressa, the journalist who was awarded the Nobel Peace Prize in 2021 for her fearless reporting in the Philippines.

The ambition of the franchise has grown considerably since Lindbergh graced the cover and has become an incredible staffwide effort, touched in some way by nearly everyone at TIME. The core project is the work of an editorial committee that includes Naina Bajekal, Jenna Caldwell, Elizabeth Murray and Victor Williams and led by executive editor Ben Goldberger. “We spent a lot of time thinking about the year through the lens of re-emergence and re-evaluation,” says Ben, “which made it a particularly fascinating process.”

All of us at TIME thank you for being a part of the TIME family and wish you and your loved ones the best for 2022.

Edward Felsenthal,
EDITOR-IN-CHIEF & CEO
@EFELSENTHAL



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A photograph of two men sitting at a wooden table, playing a game of chess. The man on the left, who is older with a beard and glasses, is reaching out to move a piece. The man on the right, who is younger, is looking on attentively. The scene is lit with soft, natural light from a window in the background.

The Power of Cross Generational Problem Solving

You may be forgiven for thinking that the apocryphal Chinese curse “may you live in interesting times” was coined precisely for our times. Never has it seemed so apt as it does today.

You may be forgiven for thinking that the apocryphal Chinese curse “may you live in interesting times” was coined precisely for our times. Never has it seemed so apt as it does today.

The world is facing unprecedented challenges to the natural environment, political institutions, social structures and ways of working and living.

As much of the world emerges from the relative economic hiatus and enforced social isolation of the Pandemic we are collectively confronted with the sheer enormity of the task at hand.

Truth, reason and science are under attack, living standards are eroding with permanent Pandemic-induced job loss and inflation, and the natural world and economic domains of life are under threat from runaway global warming.

The latter, in particular, is an existential threat to our very survival that if not immediately addressed promises a rather bleak future for us and the planet.

Much progress has been made of course. The 2015 Paris Agreement was an historical landmark event that conjoined almost every country on the planet to agree to stringent carbon emission targets so as to keep global warming to 1.5 degrees.

On the back of the Agreement many countries have reduced their carbon emissions. They have been switching to clean energy generation and low carbon grids, facilitating the introduction of Electric Vehicles (EVs) through policy and tax initiatives, and have regulated industrial emission quotas.

There has been a seismic shift in the response from

government, business, industry and individuals. As recently as the lead up to the Glasgow COP26 Climate Change Conference, for instance, more than 70% of the world's economy had recommitted to reducing carbon emissions even further in order that we keep global warming in sight of 1.5 degrees, or at least below 2 degrees.

But as laudable as this progress is, it's not enough to avert disaster. More needs to be done.

New thinking and undelayed concerted action needs to take place.

DRAWING ON TRADITIONS

Climate change, along with a host of other contemporary problems the world faces, requires a paradigmatic shift in how we meet and conquer the challenges they present.

At the heart of this shift lies cooperation and collaboration. These are not new by any means, having existed in business and other spheres of public and private life for as long as we can remember. COP26 is, itself, an exemplar of international cooperation.

What is new is how we might employ these concepts across demographic generations. By drawing on the full potential of human knowledge and creative problem solving, by sharing wisdom and experience, insight and inspiration across demographic generations, by banging old and young heads together in common cause, opens up a hitherto barely trodden path to resolving some of the most pressing challenges of our very 'interesting times'.

The transfer of knowledge and wisdom from older to younger

CONTENT FROM SOMPO HOLDINGS

generations is not a new concept. Traditional societies relied on it to ensure the continuation of their culture - stories, myths, skills and the treasure-trove of experience passed down from older to younger generations.

In these cases there was a shared understanding that the transfer was one way, that younger generations are there to listen, to watch, to absorb and to learn from their elders in order to ensure the survival of the community.

We see the pattern replicated in more contemporary communities from Japan to Greece where multigenerational households are the norm, and where, in contrast to most Occidental societies, aging is not equated with economic and social value loss.

Businesses will mold and evolve to the values espoused by Generation Z, creating a new generation of companies more likely to live harmoniously with the world and the communities in which they reside, and not merely for the sake of short term profit.

In Japan for instance an ethos of inclusivity and placing a high value on community by individuals and companies, has resulted in a purpose-driven economy that, rather than being solely about profit, works to the sustainable benefit of society as a whole.

RETHINKING INTERGENERATIONAL WISDOM

Both traditional and those mostly Asian and Mediterranean contemporary cultures' attitude to the elderly and intergenerational approach to knowledge transfer are admirable and arguably effective for the time and the challenges they faced.

This time it is different.

Both older and younger generations have a part to play in solving the challenges of today. Both generations bring their own ways of thinking and capacity to process and analyze information to the table.

As demonstrated through numerous studies on workplace diversity and multigenerational work spaces and cohort-dependent management styles, problem solving is maximised - the resultant solutions are more efficacious than if we relied on one over the other.

Cognitive diversity is as much a key to solving environmental and other global crises as it is to innovatively solving business problems.

Younger minds are quicker and more focused, while the older brain tends to be more methodical and holistic.

If ever there was a time to draw on the full potential of all generations it is now. Younger cohorts such as Generation Z have a way of seeing and interacting with the world which predisposes them to be more than able partners in a two-way intergenerational sharing of wisdom and approach to tackling problems.

They are, in the first instance, more concerned with, and invested in, the environmental and climate challenges facing the world. They are, by nature, more open and collaborative than previous cohorts.

They have a strong sense of community as evident through

their participation in social media both as innovators and entrepreneurs as well as their individual level of engagement in social media-led conversations.

They are more compassionate and empathetic - more likely to see giving to others as part and parcel of a well-rounded life.

And unlike previous generations, Generation Z are not prepared to sacrifice their commitment to creating a better world for a bigger pay-check.

HARMONIZING FOR SUSTAINABILITY

What gives this litany of positive attributes even greater import is that as Generation Z are more fully employed and integrated into the commercial world, they will effect internal changes to companies, per force, rendering them more sustainable, compassionate and empathetic.

Businesses will mold and evolve to the values espoused by Generation Z, creating a new generation of companies more likely to live harmoniously with the world and the communities in which they reside, and not merely for the sake of short term profit.

Finally, Generation Z is the cohort most comfortable with technology and data.

This point is critical because it is through data and technology that we will receive a much-needed leg-up in tackling the challenges of the world such as environmental and economic sustainability, and inclusivity.

It is through technology deployed and data collected across industrial and lifestyle domains from the monitoring of



pollution and the climate impact on the earth, to the gathering of health data through for example wearables that we will be able to make the decisions required to ensure a more sustainable way of living, working and playing.

Data and technology undergird new ideas, untapped wisdom and leaps of collective imagination achievable through collaboration, engagement and partnerships forged across the generations.



**SOMPO
HOLDINGS**



2021 THE YEAR IN

Covers



1. 'VALUABLE INSIGHTS FOR OUR TROUBLED WORLD.'

JANE MCKINLAY, of New Orleans, on the Feb. 1/ Feb. 8 issue announcing the launch of TIME's 2030 initiative

2. 'Our treatment of the earth is an insult to the universe ... a wholesale damning of humanity.'

JOHN WAWRZONEK, of Northborough, Mass., on the April 26/May 3 climate issue

3. 'MY BIGGEST HOPE IS THIS COVER MIGHT INSPIRE OTHER LITTLE GIRLS TO THINK, "I CAN DO THAT!"'

REESE WITHERSPOON, writing on Instagram about TIME's inaugural list of the world's most influential companies of 2021 in the May 10/ May 17 issue

4. 'As history and society continue to evolve, so should the school curricula.'

JANE TAEGER, of St. Augustine, Fla.,

on Olivia B. Waxman's July 5/July 12 cover story on the controversy over critical race theory

5. 'WORKERS THAT STRUGGLE TO PAY BILLS ARE FED UP HEARING ABOUT THE PAY OF CEOS AND ARE DEMANDING MORE.'

RITA BALLONE, of Carmichaels, Pa., on the Aug. 2/Aug. 9 "Rethinking Work" issue

6. 'I would like for Mr. Fanone to know that his experience was not in vain ... and that he is being heard.'

KAREN WARTICK, of Mesa, Ariz., on Molly Ball's Aug. 23/Aug. 30 profile of D.C. police officer Mike Fanone

7. 'Jane Goodall is one of the few who can persuade individuals to accept their own responsibilities for slowing climate change.'

STEPHEN JOSEPH SHELLSHEAR, of Brighton, Queensland, Australia, on Ciara Nugent's Oct. 11/Oct. 18 profile of the 87-year-old naturalist

8. 'WE NEED A RESET OF CORPORATE MORAL VALUES. PUBLIC GOOD MATTERS.'

CÉLINE GOUNDER, writing on Twitter about Billy Perrigo's and Roger McNamee's Oct. 25/Nov. 1 features on the most significant leak in Facebook's 17-year history

A Dell XPS 15 laptop is open on a light-colored wooden workbench. The laptop screen displays a software interface with various images and a grid. In the foreground, a long wooden ruler is placed horizontally across the workbench. To the left of the ruler, there are some fabric samples and a wooden handle. To the right, there are more fabric samples and a small white object. In the background, a person is sitting at a desk, and there are large arched windows.

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XPS 15



Dell Technologies recommends
Windows 11 Pro for business.



Quotes

‘Rude and racist are not the same.’

MEGHAN MARKLE, on the difference between the way the British media covers white members of the royal family and the coverage she received prior to leaving the U.K., to Oprah Winfrey in an interview that aired on March 7



‘FELLAS, I NEED 11,000 VOTES. GIVE ME A BREAK.’

DONALD TRUMP, in a Jan. 2 phone call with Georgia secretary of state Brad Raffensperger, during which he repeatedly pressured Raffensperger to overturn President-elect Joe Biden’s win in the state

‘Today, we are able to breathe again.’

PHILONISE FLOYD, brother of George Floyd, after former Minneapolis police officer Derek Chauvin was found guilty of murder on April 20

‘DON’T JUDGE ME, BECAUSE I AM HUMAN ... I JUST HAPPEN TO RUN A LITTLE FASTER.’

SHA’CARRI RICHARDSON, American sprinter, speaking to the *Today* show on July 2 about her suspension from the U.S. Olympic team after testing positive for THC



‘THE WORD VICTIM IS A LOADED, LOADED WORD.’

JUDGE BRUCE SCHROEDER, ruling Oct. 25 that attorneys could refer at Kyle Rittenhouse’s murder trial to people he shot as “looters” and “arsonists” but not “victims”; the teen was found not guilty on Nov. 19 after fatally shooting two protesters in Kenosha, Wis., last year

‘DIVORCE, BABE. DIVORCE.’

ADELE, in an Oct. 9 Instagram Live, on what inspired her album 30

‘We are witnessing ... an outright crime against humanity.’

ARUNDHATI ROY, author, writing in the *Guardian* on April 28 about the Modi government’s failure to handle India’s brutal second wave of COVID-19

‘Losing her has put a new lens on my eyes on the amount of hate that exists in our world.’

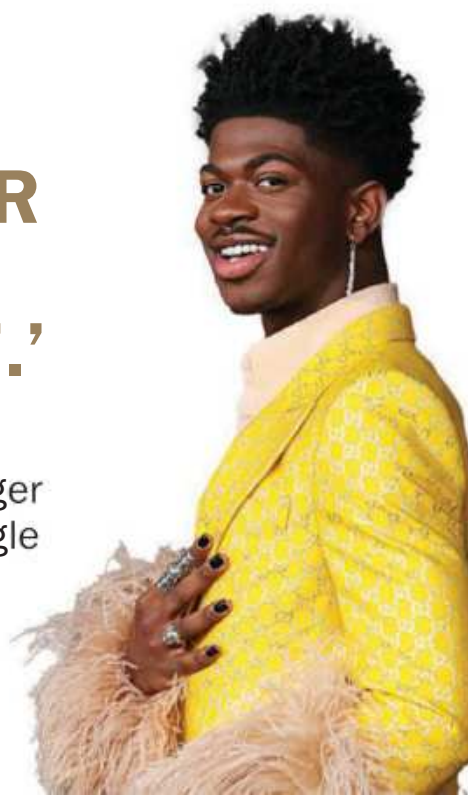
RANDY PARK, son of Hyun Jung Grant, 51, a Korean American woman who was among the eight killed in the March 16 Atlanta spa shootings, in an interview three days later

‘A code red for humanity.’

ANTÓNIO GUTERRES, U.N. Secretary-General, in an Aug. 9 statement after the release of an Intergovernmental Panel on Climate Change report, which found the opportunity to limit the impact of climate change is rapidly narrowing

‘THIS WILL OPEN DOORS FOR MANY OTHER QUEER PEOPLE TO SIMPLY EXIST.’

LIL NAS X, in a March 26 open letter to his younger self, promoting the release of his single “Montero (Call Me by Your Name)”



‘IT’S O.K. NOT TO BE O.K.’

NAOMI OSAKA, tennis player, in a July 8 essay for *TIME* about her mental health

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Working with farmers, SABIC is helping increase food yields for the world while arable land is diminishing.

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Meet one of the world's leading chemical companies at [SABIC.com/collaboration](https://www.sabic.com/collaboration)

Firsts & Lasts

Kamala Harris is sworn
in as the first female,
Black and Asian
American Vice President
of the United States



Pope Francis meets with Grand Ayatollah Ali al-Sistani in Najaf, Iraq—the first ever meeting between a Pope and a Grand Ayatollah



The first direct observation of light from behind a black hole is reported, confirming a prediction made in Einstein's theory of general relativity

Arkansas becomes the first U.S. state to impose a ban on transgender youth receiving gender-affirming health care

First Eid prayers in 87 years at the Hagia Sophia in Istanbul, after the site's conversion from museum to mosque

El Salvador
becomes the first
country in the world
to adopt Bitcoin as
an official currency



Netflix megahit
Squid Game is first
released on the
streaming platform



Mariah Carey's
"All I Want for
Christmas Is
You" announced
as the first
holiday song
certified diamond

The World Health Organization endorses the first malaria vaccine

DECEMBER

Aung San Suu Kyi's last day as leader of Myanmar, as the military seizes power in a coup

Lasts

Last day standing
for Richmond, Va.'s
131-year-old
statue of Confederate
general Robert E. Lee,
which is removed
from its plinth



The final *Keeping Up With the Kardashians* episode airs on E!, ending a 20-season run for the groundbreaking reality TV show

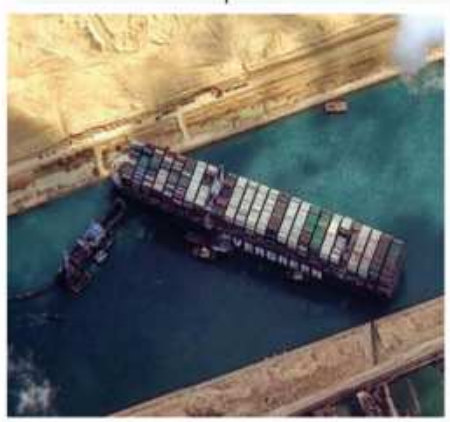
The U.N. confirms the worldwide end of leaded-gasoline use after gas stations in Algeria, believed to be the last places offering the fuel, run out


Last day that Mako Komuro—formerly Princess Mako—is considered a member of Japan’s royal family, before her wedding to commoner Kei Komuro

The end of a 13-year conservatorship under which the pop star Britney Spears had been held, following a Los Angeles judge's ruling

Former President Donald Trump posts his last tweet before being permanently banned from Twitter following the insurrection at the U.S. Capitol

The last day the
container ship
Ever Given blocks
the Suez Canal after
running aground
nearly a week earlier
and disrupting
global trade





You have been
held against your
will in a foreign
country with
no access to the
outside world,
no contact with
your family and
loved ones, no
word from your
government.

It has been
months since
you were free
to feel sunlight,
a warm embrace,
routine comforts,
hot food.

You have been
denied counsel.
You have been
beaten, tortured,
interrogated,
humiliated.

Some days your
spirit sinks,
all hope is lost,
you think the end
will never come.

At night you
dream of your
family, of living
again only to
wake to the same
solitary confines.

You feel
forgotten, alone,
abandoned by
your country.

You have one ask of
the reader of this ad:

Bring me home.



Donate to aid their return:
jamesfoleyfoundation.org/give

JAMES W. FOLEY
LEGACY FOUNDATION

Truth

Down but Not Out

BY KARL VICK

ON MAY 23, A CONTROL TOWER RADIOED a Ryanair jetliner that it had a bomb on board. A fighter jet appeared off its wing, and Flight FR4978, en route from Greece to Lithuania, was compelled to make a sharp turn and land in Belarus. But there was no bomb: only Roman Protasevich, an ashen-faced journalist who informed his fellow passengers that he was the reason the plane was diverted. After disembarking, the 26-year-old was led away for the crime of reporting on political opposition—exactly the sort of activity essential to the functioning of a democracy, should one ever occur in his benighted homeland.

When a state openly hijacks a commercial flight to abduct a journalist, the message to the rest of the world is that the impunity enjoyed by authoritarians has reached a new level. After all, even the Saudis tried to keep Jamal Khashoggi's fate a secret in 2018; along with a bone saw, they brought a body double.

"It's been a terrible year for press freedom," says Robert Mahoney of the Committee to Protect Journalists, an advocacy group based in New York City. "Governments are increasingly intolerant of criticism, of independent reporting. They either jail journalists or they prosecute them under vague and sweeping antiterrorism laws, or 'fake news' laws, and try to shut them down that way."

Yet 2021 was also a year in which the problem took the world stage. Calling free expression "a precondition for democracy and lasting peace," the Nobel Committee awarded its Peace Prize on Oct. 8 to two journalists. Dmitry Muratov of *Novaya Gazeta* dedicated the award to the six reporters murdered while working at one of the last independent news outlets in Vladimir Putin's Russia; in the Philippines, Maria Ressa, co-founder of the online news site Rappler, faced down President Rodrigo Duterte while also documenting



A Ryanair flight lands in Vilnius on May 23 after Belarus forced it down to arrest a journalist on board

how the brutal populist was enabled by social media companies, as well as other dark forces the Internet once held the promise of keeping in check. "It's a battle for facts," Ressa, who was a TIME Person of the Year in 2018, told me in October. This is why authoritarian regimes jail journalists but find social media useful. Putin's troll farms create uncertainty not only about U.S. elections but also about "the facts on the ground" in places where Russia is making military moves.

SO DID THE SCALE, over the past 12 months, began to tip toward truth? There was reason to hope. The year began with Australian lawmakers coming to the aid of news organizations by forcing Google and Facebook to pay for the news they collect ad revenues from. And 2021 ended with a growing consensus to compel social media platforms to place the public good ahead of business models that encourage political and social division. The source of the groundswell? Whistle-blower

Frances Haugen's leak of Facebook's internal documents to news organizations grounded not in "engagement" but in trust built on the verification of facts.

There remains no shortage of old-fashioned physical threats to journalists. Since the military seized control of Myanmar on Feb. 1, dozens of journalists have been arrested. The return of the Taliban put hundreds of Afghan journalists at risk. In Mexico, nine members of the press have been killed so far this year. In November, al-Shabab sent a suicide bomber to kill the head of Radio Mogadishu in the Somali capital.

Yet so much depends on the architecture of communication. This year 18 countries used a "middlebox" in China's Huawei technology to block news outlets—and 54 others could do the same. The Internet has allowed journalists to reach more people, faster than ever. "But like any technology, it's dual use," notes Mahoney. "You've seen this cheap and instant communication revolutionizing journalism and the distribution of news and information, but also being turned against the very publishers of that news and information. It's a constant battle." —With reporting by SIMMONE SHAH

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Language

CRITICAL RACE THEORY

Noun

- (1) An intellectual movement contextualizing the effects of structural racism;
(2) A buzzword in the debate over how students should be learning about race

NFT

Initialism

Nonfungible token: a digital file that cannot be copied, thus allowing certified ownership of a virtual asset



REGENCYCORE

Noun, adjective

A fashion and culture trend inspired by the look of the British Regency period—or by Netflix's hit *Bridgerton* and the series' celebration of early 19th century aristocrats and their glamorous foibles

deplatform

Verb

To ban, boycott or otherwise limit the influence of someone on a platform—usually a social media or other public forum

hot vax summer

Noun

A season of surging social action for vaccinated singles, predicted (if not realized) after a year of distancing



ECO-ANXIETY

Noun

Significant unease or fear about climate change and the current and future environmental harm it poses to the earth



cheugy

Adjective

A catchall descriptor for someone or something that is basic, trying too hard or not trendy; originating on TikTok, it's often used by Gen Z to deride millennial trends

murraya

Noun

- (1) A genus of tropical Asiatic and Australian trees and shrubs;
(2) The word with which Zaila Avant-garde in July became the first Black American winner of the Scripps National Spelling Bee, which dates to 1925

breakthrough

Adjective

Used to describe an infection, as with COVID-19, that occurs despite vaccination against the disease



hybrid

Adjective

To be composed of mixed parts, as in an employment model in which employees are expected to mix in-person and remote work

METAVEVERSE

Noun

- (1) A digital realm or collective of virtual experiences, environments and assets; (2) A vision of the future of the Internet, as promulgated by Facebook's October announcement that it was renaming itself Meta

SECOND GENTLEMAN

Title

The male partner of a U.S. Vice President (see: Doug Emhoff, husband of Kamala Harris)



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Shiny &
Energized*



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In just 28 days.

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*Take the 28-Day Challenge
at ONE28DayChallenge.com*



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Climate

A Time for Innovation

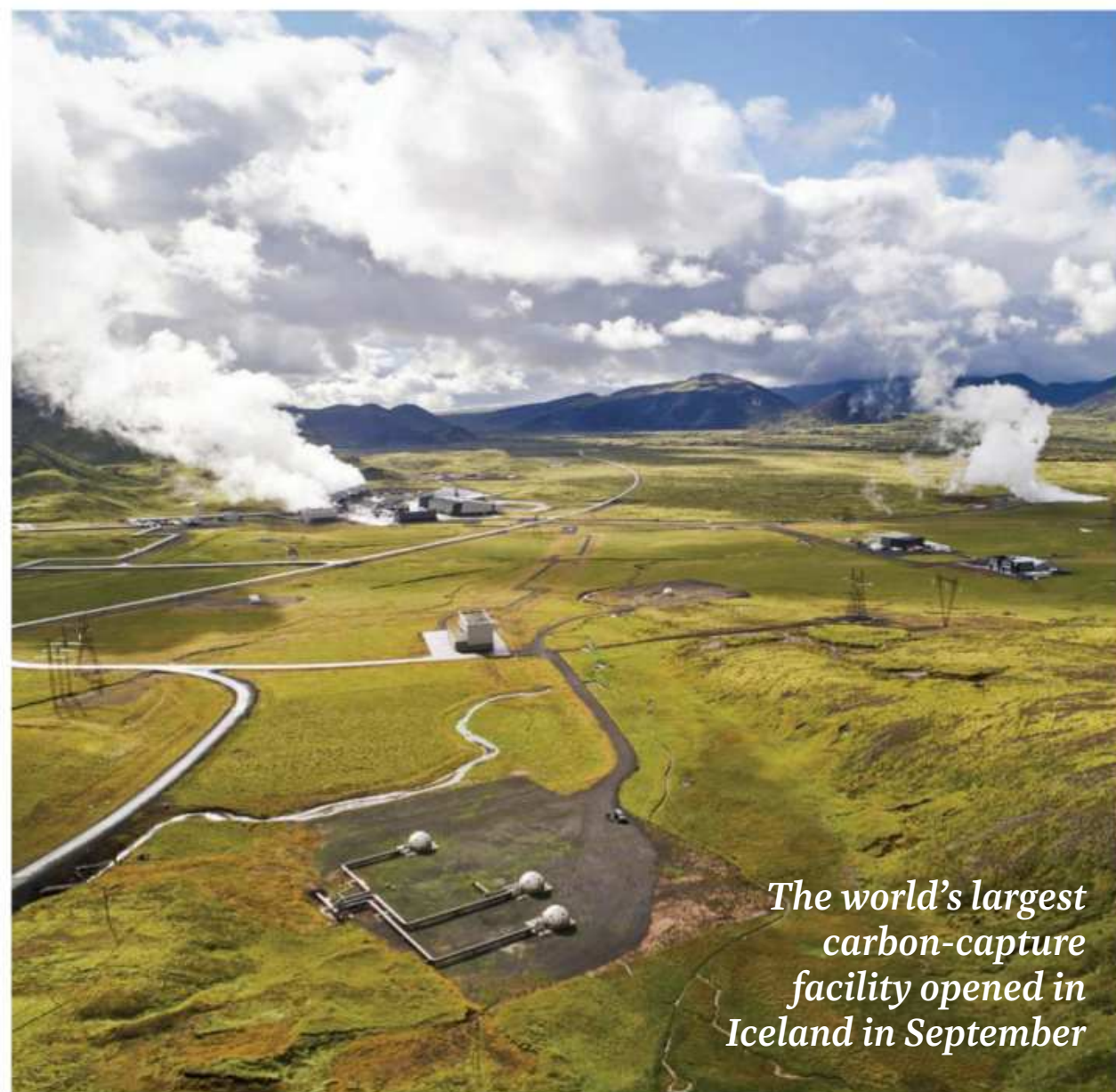
BY ALEJANDRO DE LA GARZA

AFTER A RARE PANDEMIC-related dip in 2020, global carbon emissions bounced back with a vengeance. Climate disasters seemed relentless over the summer, from flooding in Western Europe and China to wildfires in Siberia and the American West. And although world leaders made some headway at the COP26 climate summit in Glasgow, their new emission-reduction commitments aren't nearly enough to get the world back on track.

Even so, it was also a year in which individuals, organizations and governments started to come together to respond to the climate emergency. It's unclear whether that momentum will lead to the sweeping systemic changes the world needs to rapidly zero out greenhouse-gas emissions, but from international agreements to technological advances, some progress is being made. Here, some of the most important climate advances of 2021.

ELECTRIC ACCELERATION

Traditional carmakers have long been seen as an obstacle in the fight against climate change, with internal combustion engines in trucks and automobiles responsible for almost 20% of U.S. carbon emissions. But we might look back on 2021 as the year the dam broke, with carmakers from General Motors to Mercedes-Benz practically falling over one another with pledges to electrify their offerings and plow money into battery vehicles. Ford rolled



The world's largest carbon-capture facility opened in Iceland in September

out an electric version of its most popular vehicle, the F-150 pickup, while Tesla, a trailblazer in the segment, continued to charge ahead, logging record quarterly profits.

A GUST OF GREEN POWER

Offshore wind is one of the world's best decarbonization tools, especially to power densely populated coastal areas like the Eastern seaboard. But the U.S. hasn't built more than a handful of those turbines, even as gigawatts of offshore wind power began flowing in Europe and China in recent decades. This year, the U.S. approved its first large-scale offshore wind farm, Vineyard Wind, off the coast of Massachusetts, and construction began in November. Many more such projects are expected in the years ahead.

GETTING THE CARBON OUT

The largest-ever facility designed to pull carbon out of the

atmosphere and permanently store it underground began operating in Iceland in September. The plant runs on geothermal energy and is able to sequester 4,000 tons of carbon per year. To be sure, that's several orders of magnitude smaller than the billion-ton scale that would be required to make a dent in global emissions, and many environmentalists are wary of investing in such projects, saying limited resources are better used to build renewable power and storage to replace fossil fuels. But other experts argue that developing such carbon-capture tools will prove essential to balance out emissions from hard-to-decarbonize industries like shipping and air travel.

BATTERY BREAKTHROUGH

Secretive U.S. startup Form Energy entered the public eye this year, showing off its rechargeable iron-air battery to *Wall Street Journal* reporters in July. The batteries are too heavy for electric cars, but they could be a game changer for the

power grid. The new system is made with cheap and plentiful iron pellets. If it works as well as Form Energy claims, it would offer a more affordable way to store renewable electricity and release it when the sun isn't shining or the wind isn't blowing, making it more financially viable to phase out fossil-fuel power plants.

LINKING CAUSE AND EFFECT

Over the past few years, an international team of scientists has been quietly refining a system to determine the role of climate change in extreme weather events faster than ever before. This summer, that team, led by European climate scientists Geert Jan van Oldenborgh and Friederike Otto, took only nine days to prove that a deadly, record-breaking heat wave in the U.S. Pacific Northwest would have been all but impossible without the effects of human-made greenhouse-gas emissions. Work like this is crucial in helping the public grasp the urgency of the climate crisis.

A NEW DEADLINE FOR COAL

Although many observers were dissatisfied with the results of COP26, the summit did have some successes. One of the key milestones from the meeting was an agreement between more than 40 countries to phase out coal power, one of the worst contributors to global climate change. Major emitters like the U.S. and China didn't sign on to the deal, and some experts say the agreement gives individual countries too much leeway on phaseout dates, but the international pledge still marks a step toward the goal of eliminating coal power worldwide.



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Then & Now

Franklin D. Roosevelt

With the U.S. stricken by the Great Depression, TIME explained that voters “wrote their own ticket for Man of the Year” by electing Democratic legislators—a clear endorsement of FDR’s New Deal. Amid the COVID-19 pandemic, President Joe Biden, weakened by soft approval ratings, now struggles to shepherd his Build Back Better agenda through a sharply divided Congress.



1934



Haile Selassie

TIME praised Selassie’s leadership when Ethiopia was battling Italian invaders, although the emperor was later accused of violently repressing rebellion. Current Prime Minister Abiy Ahmed—a 2019 Nobel Peace Prize winner—is locked in civil war in the same region, his government accused of ethnic cleansing and forced starvation.



1935



The American Fighting-man

Six months into the Korean War, TIME lauded the dedication of U.S. soldiers, particularly those who had never expected to see active duty. Today, the U.S. reckons with the consequences of its haphazard withdrawal from Afghanistan, after 20 years of war that killed not only more than 2,400 American troops, but also tens of thousands of Afghan and Pakistani civilians.

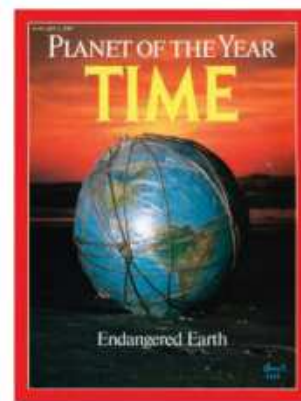


1950



The Endangered Earth

Our destruction of the world’s natural habitats will cause a crisis for biodiversity, TIME wrote of its “Planet of the Year” pick, warning that “humanity is at war with the plants and animals that share its planet.” Decades later, the current trajectory of climate change now threatens to make much of the globe uninhabitable for another species: us.



1988



The Peacemakers

Among a group of “peacemakers” TIME recognized as working to end decades of conflict were Yitzhak Rabin of Israel and Palestinian leader Yasser Arafat. Some three decades later the conflict grinds on, flaring in May when Hamas and Israeli forces traded fire that killed hundreds, mostly Palestinians. The outbreak followed moves against Palestinians inside Israel.



1993



The Whistleblowers

At Enron, WorldCom and the FBI, three women became whistle-blowers in 2002 after failing to convince internal leaders to take action and curb wrongdoing. This year, disillusioned with Facebook’s treatment of its “civic integrity” team, which was meant to fight misinformation and improve user safety from the inside, former employee Frances Haugen made damaging internal documents public.



2002



BIDEN: ALEX WONG—GETTY IMAGES; ETHIOPIA: YASUYOSHI CHIBA—AFP/GETTY IMAGES; AFGHANISTAN: JIM HUYLEBROEK—THE NEW YORK TIMES/REDUX; PALM TREE: LUKE SHARRETT—BLOOMBERG/GETTY IMAGES; GAZA CITY: MOHAMMED TALATENE—DPA/PICTURE ALLIANCE/GETTY IMAGES; HAUGEN: DREW ANGERER—GETTY IMAGES

LET'S EMBRACE DIALOGUE.

MARIAN SALZMAN

Sr. Vice President, Global Communications
Philip Morris International



“We build too many walls and not enough bridges.”

Sir Isaac Newton’s assessment of the state of humankind four centuries ago continues to ring true. Worse, division and dissent are increasingly apt to turn into hate—an emotion that blinds us to the merits of opposing arguments and stops us from finding common ground on which to build solutions.

Globally, hate is on the rise. Most respondents (70 percent) to a new international survey commissioned by Philip Morris International (PMI) reported that the level of hate and hate speech in their countries has increased in the past two years. And four in 10 respondents said they encounter hateful speech, either online or in person, at least once a week.*

While alarming, this trend should not surprise us. Our modern culture of news consumption too often cages us within echo chambers self-constructed to affirm our beliefs and push out conflicting data and perspectives. Misinformation and disinformation abound, stoking hate and aggression toward those deemed unlike us. Within a context of declining trust in institutions, it is hardly surprising that society is caught up in a vicious spiral of hate, skepticism, and division.

Beyond its destabilizing effects on individuals and communities, hate is being manifested through exclusionary practices and mindsets. And that is a problem for us all. By impeding diversity of thought and constructive dialogue, hate stalls progress at a time when the world urgently needs solutions.

As a never-smoker working in an industry that has long been reviled for its product, I experience firsthand how hate and exclusion stand in the path of change. But despite the resistance, I am fully committed to our mission: creating a future without combustible tobacco products. A future that PMI is working to achieve by developing technological solutions grounded in an uncompromising commitment to rigorous scientific research and transparency. The problem? Instead of engaging in a factual, evidence-based conversation about the role product innovation plays in delivering this future, some special interest groups are rejecting any solution coming from the industry, dismissing science and discounting measurable progress.

From the pandemic and climate change to tobacco harm reduction, the world faces threats requiring collaboration and innovation, not policies based on exclusion and age-old enmities. An overwhelming majority of our survey respondents (77 percent) believe that society’s biggest challenges will never be solved if we continue to demonize and exclude those with whom we disagree.* If we are to progress, we cannot allow bias and preconceived beliefs to overshadow opportunity. We cannot afford to retreat into long-established camps and close our minds to solutions offered by the “other side.” Our world faces potentially cataclysmic challenges on several fronts. Let’s stop fighting one another and focus instead on the advances we so desperately need. Society expects—and deserves—better.

Learn more at [PMI.com/letstalk](https://www.pmi.com/letstalk)

*Online survey commissioned by Philip Morris International through Engine Insights CARAVAN International Omnibus Survey. A total of 5,026 interviews were conducted across Brazil, France, South Africa, South Korea, and the United States between October 1 and 10, 2021.



PHILIP MORRIS
INTERNATIONAL

TIME
2021 PERSON OF THE YEAR

Elon
Musk

PHOTOGRAPH BY
MARK MAHANEY FOR TIME



By Edward Felsenthal

Despite shattering records this year with a net worth above \$300 billion, **Elon Musk** demurs at being described as the richest person in the history of the world. “Excluding sovereigns,” Musk says wryly, adding that Russia’s Vladimir Putin is likely richer than he. “I can’t invade countries and stuff.”

The differences begin to fade a bit as one drives down Texas Highway 4, between the Gulf of Mexico and the Rio Grande, toward one of the southernmost points in the U.S., where Musk is preparing to launch the world’s largest rocket. Gleaming spacecraft—some retired from duty, others still in production—rise stories above the sparse terrain. His company is gobbling up local housing and encouraging employees to move there. “Creating the city of Starbase, Texas,” Musk announced on Twitter earlier this year, to the evident surprise of the residents of Boca Chica, where his facility is located. (A county official noted that “Sending a tweet does not make it so,” and that a petition must first be filed.)

For nearly a century, TIME has named a Person of the Year—the individual or group who most shaped the previous 12 months, for better or for

worse. Person of the Year is a marker of influence, and few individuals have had more influence than Musk on life on Earth, and potentially life off Earth too. In 2021, Musk emerged not just as the world’s richest person but also as perhaps the richest example of a massive shift in our society. From Amazon’s Jeff Bezos to Facebook turned Meta’s Mark Zuckerberg, the year brought home the extent to which, at a time of rising protest over ever deepening inequality, our lives and many of the basic structures around them are now shaped by the pursuits, products and priorities of the world’s wealthiest people.

Even in that rarefied crowd, Musk is in a class of his own. He sees his mission as solving the

The

globe’s most intractable challenges, along the way disrupting multiple industries across two decades. These include what was once the core American creation, combustion-engine automobiles, and what was once the core American aspiration, spaceflight, as well as a litany of other manifestations of our present and future: infrastructure construction, artificial intelligence, neurotechnology, payment systems and increasingly money itself through his dalliances with cryptocurrencies.

As provocative as his vision is his persona, a blunt instrument that often seems to revel in division and aggressive mockery as he gives the world access to his id through social media.

MUSK’S LARGEST TERRESTRIAL IMPACT so far has been with Tesla. 2021 was the year that electric vehicles finally came into the mainstream and that Tesla became a trillion-dollar company, one of only a handful in the world. It’s a market that Musk almost single-handedly created, seeing long before others the demand for clean-energy transportation

that the world's climate crisis would eventually propel. From Detroit to Milan, announcements of EV commitments poured in all year as automakers that once fiercely resisted emissions restrictions are now scrambling to catch up.

Should we fall short with Earth, Musk's answer is space, where he envisions "a futuristic Noah's ark." His SpaceX is the global commercial leader in building and flying rockets and crews, chosen by NASA to build the ship that aims to place astronauts back on the moon for the first time in more than 50 years. Musk's rough timeline for that is three years, with two more years to land on Mars. The key, he says as matter-of-factly as the rest of us might say the time of day, is making spacefaring

rockets as reusable as airplanes.

Musk's rise coincides with broader trends of which he and his fellow technology magnates are part cause and part effect: the continuing decline of traditional institutions in favor of individuals; government dysfunction that has delivered more power and responsibility to business; and chasms of wealth and opportunity. In an earlier era, ambitions on the scale of interplanetary travel were the ultimate collective undertaking, around which Presidents rallied nations.

Today they are increasingly the province of private companies. To Musk, that is progress, steering capital allocation away from the government to those who will be good stewards of it.

Choice

He sees his mission as solving the globe's most intractable challenges, disrupting multiple industries along the way



To others, it is testament to capitalism's failings as staggeringly wealthy, mostly white men play by their own rules while much of society gets left behind.

IN DECIDING EACH DECEMBER who should be Person of the Year, we look back but also aim to look forward. Bezos was the choice in 1999 when e-commerce was just beginning to take off. Zuckerberg was selected in 2010, well before it was clear what Facebook's full effect on society and democracy would be. We don't yet know how fully Tesla, SpaceX and the ventures Musk has yet to think up will change our lives. At 50, he has plenty of time to write the future, his own and ours. Like it or not, we are now in Musk's world.

For creating solutions to an existential crisis, for embodying the possibilities and the perils of the age of tech titans, for driving society's most daring and disruptive transformations, Elon Musk is TIME's 2021 Person of the Year.

Felsenthal is the editor-in-chief and CEO of TIME

Visionary. Showman. Iconoclast. Troll. How **Elon Musk** is reshaping our world—and beyond.

By Molly Ball, Jeffrey Kluger
and Alejandro de la Garza

THE RICHEST MAN IN THE WORLD DOES NOT OWN a house and has recently been selling off his fortune. He tosses satellites into orbit and harnesses the sun; he drives a car he created that uses no gas and barely needs a driver. With a flick of his finger, the stock market soars or swoons. An army of devotees hangs on his every utterance. He dreams of Mars as he bestrides Earth, square-jawed and indomitable. Lately, Elon Musk also likes to live-tweet his poops.

“Just dropping some friends off at the pool,” the 50-year-old zillionaire informed his 66 million Twitter followers on the evening of Nov. 29, having previously advised that at least half his tweets were “made on a porcelain throne.” After an interval—21 minutes, if you must know—an update: “Splish splash.”

“Sometimes I do hit some resonant notes with respect to humor,” Musk says of his puerile expressions. It’s a warm, windy December day at Starbase, his new rocket-fabrication and launch facility at the southern tip of Texas. Two of his Starship rockets—gleaming, pointy-nosed, 160-ft. stainless-steel silos—are silhouetted behind him in the setting sun. “But you know, not all jokes land.”

This is the man who aspires to save our planet and get us a new one to inhabit: clown, genius, edgelord, visionary, industrialist, showman, cad; a madcap hybrid of Thomas Edison, P.T. Barnum, Andrew Carnegie and *Watchmen*’s Doctor Manhattan, the brooding, blue-skinned man-god who invents electric cars and moves to Mars. His startup rocket company, SpaceX, has leapfrogged Boeing and others to own America’s spacefaring future. His car company, Tesla, controls two-thirds of the multibillion-dollar electric-vehicle market it

pioneered and is valued at a cool \$1 trillion. That has made Musk, with a net worth of more than \$250 billion, the richest private citizen in history, at least on paper. He’s a player in robots and solar, cryptocurrency and climate, brain-computer implants to stave off the menace of artificial intelligence and underground tunnels to move people and freight at super speeds. He dominates Wall Street: “The way finance works now is that things are valuable not based on their cash flows but on their proximity to Elon Musk,” Bloomberg columnist Matt Levine wrote in February, after Musk’s “Gamestonk!!” tweet vaulted the meme-stock craze into the stratosphere.

Musk has spent a lifetime defying the haters; now, it seems, he’s finally in position to put them in their place. For 2021 was the year of Elon Unbound. In April, SpaceX won NASA’s exclusive contract to put U.S. astronauts on the moon for the first time since 1972. In May, Musk hosted *Saturday Night Live*. In October, car-rental giant Hertz announced it planned to add 100,000 Teslas to its fleet. The juvenile missives from his unmistakably phallic Twitter avatar came days after one of his rockets launched NASA’s first anti-asteroid planetary-defense test; a few weeks before another launched a first-of-its-kind mission to study cosmic X-rays; and amid Musk’s sale of 10% of his Tesla stock, a process that roiled markets, cost him billions and should

►
MUSK AT THE TESLA
GIGAFACTORY
IN GRÜNHEIDE,
GERMANY, ON OCT. 9



produce enough tax revenue to fund the Commerce Department for a year. The sale was prompted by a Twitter poll Musk posted in a fit of pique over liberal Senators' proposals to tax billionaires.

Many people are described as larger than life, but few deserve it. How many of us truly exceed our life span? How many will make it into the digital textbooks our spacefaring descendants will study? As Shakespeare observed in *Julius Caesar*, it's far easier to be remembered for doing evil than doing good. How many will leave a mark on the world—much less the universe—for their contributions rather than their crimes? A few short years ago, Musk was roundly mocked as a crazy con artist on the verge of going broke. Now this shy South African with Asperger's syndrome, who escaped a brutal childhood and overcame personal tragedy, bends governments and industry to the force of his ambition.

To Musk, his vast fortune is a mere side effect of his ability not just to see but to do things others cannot, in arenas where the stakes are existential. "He was raised in a tough environment and born with a very special brain," says Antonio Gracias, Musk's close friend of two decades, who has held seats on the boards of Tesla and SpaceX. "Ninety-nine-point-nine percent of people in that situation don't come out of it. Some small percentage come out of it with the ability he has to make great decisions under extraordinary pressure and the never-ending drive to change the course of humanity."

Such cosmic ambition rarely comes without consequences, and Musk still must answer to earthly authorities. His companies have faced allegations of sexual harassment and poor working conditions; in October, a federal jury ordered Tesla to pay \$137 million to a Black employee who accused the automaker of ignoring racial abuse. The businesses have also been fined for numerous regulatory violations. The feds are probing Tesla's Autopilot software, which has been involved in an alarming number of crashes with parked emergency vehicles, resulting in injuries and death. The company's expansion in China required cozying up to its repressive autocrats.

The toll his hard-driving style takes on staff is legendary. Former associates have described Musk as petty, cruel and petulant, particularly when frustrated or challenged. He recently separated from the experimental musician Grimes, the mother of his seventh son. "He is a savant when it comes to business, but his gift is not empathy with people," says his brother and business partner Kimbal Musk. During the COVID-19 pandemic,

he's made statements downplaying the virus, broken local health regulations to keep his factories running and amplified skepticism about vaccine safety. Musk tells TIME that he and his eligible children are vaccinated and that "the science is unequivocal," but that he opposes vaccine mandates: "You are taking a risk, but people do risky things all the time," he says of the unvaccinated. "I believe we've got to watch out for the erosion of freedom in America." The vast expanse of human misery can seem an afterthought to a man with his eyes on Mars.

Musk is easily cast as a hubristic supervillain, lumped in with the tech bros and space playboys, for whom money is scorekeeping and rockets are the ultimate toy. But he's different: he's a manufacturing magnate—moving metal, not bytes. His rockets, built from scratch on an autodidact's mold-breaking vision, have saved taxpayers billions, reinvigorated America's space dreams and are launching satellites to expand Internet access across the globe. If Tesla delivers on its pledges, it has the potential to strike a major blow against global warming. The man from the future where technology makes all things possible is a throwback to our glorious industrial past, before America stagnated and stopped producing anything but rules, restrictions, limits, obstacles and Facebook.

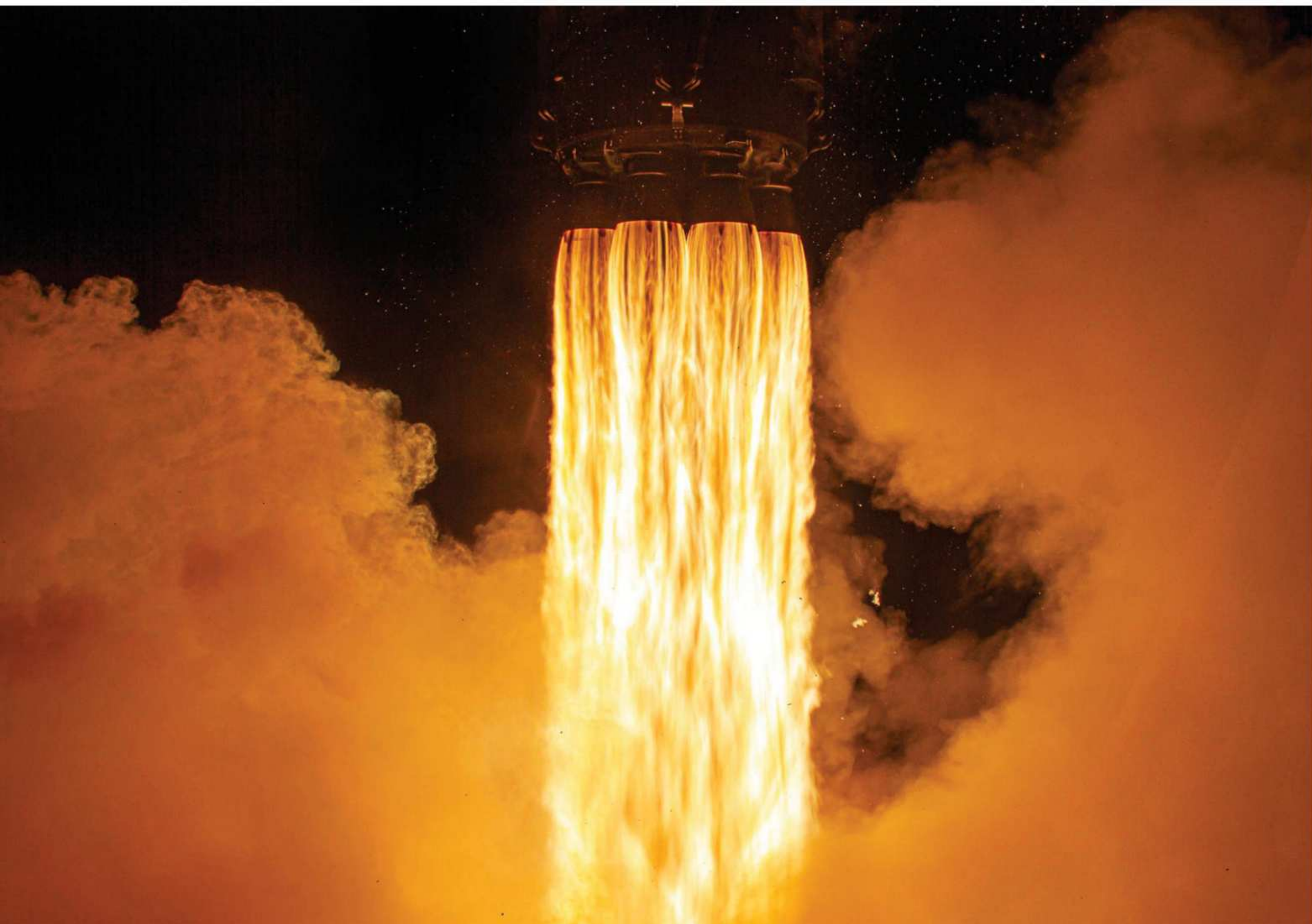
"He is a humanist—not in the sense of being a nice person, because he isn't," says Robert Zubrin, founder of the Mars Society, who met Musk in 2001, when the young, newly minted dot-com millionaire sent a large unsolicited check to the organization. "He wants eternal glory for doing great deeds, and he is an asset to the human race because he defines a great deed as something that is great for humanity. He is greedy for glory. Money to him is a means, not an end. Who today evaluates Thomas Edison on the basis of which of his inventions turned a profit?"

For all his outlier qualities, Musk also embodies the zeitgeist of this liminal age. This was the year we emerged from the hundred-year plague only to find



'I'll be surprised if we're not landing on Mars within five years.'

—ELON MUSK



▲
A FALCON 9
ROCKET LIFTS
OFF ON APRIL 23,
CARRYING A
CREW TO THE
SPACE STATION

there was no normal to go back to, a year that felt like the cusp of a brave or terrifying new world, with nobody in charge and everything up for renegotiation—from how we work and travel to what we find meaning in and cherish. Musk is our avatar of infinite possibility, our usher to the remade world, where shopworn practices are cast aside and the unprecedented becomes logical, where Earth and humanity can still be saved. Perhaps no one man should have all that power. Perhaps this vision of the greater good comes with a human cost. But if many never voted or signed up for Musk's wild zero-gravity ride, that is of no consequence to him.

MUSK DUCKS his large frame under the massive steel ring that holds the tallest, most powerful rocket ever designed and peers up at the dozens of engine nozzles that will power it. His fluffy little gray dog, Marvin, follows close behind the heels of his black cowboy boots, which Musk has paired with a black Tom Ford jacket

and black jeans. His excited technical patter suddenly goes quiet; he sees something up in the gnarled mass of metal tubes that displeases him. "If one engine catches fire," he explains, "we want to ensure that fire does not spread through the entire volume." There are

barriers between the engines for this purpose, but he's not convinced they're sufficient.

Musk has a soft handshake and an even voice that expresses exasperation, joy and breathtaking ambition in the same quiet register. Tesla may be the principal source of his stupendous wealth and fame, as well as his greatest impact on the planet to date. But it is space that animates his wildest, most extreme ambitions. Musk's toddler, X Æ A-Xii (pronounced "X"), has recently started saying *car*, to which his father responds, "*Rocket!*"

"The goal overall has been to make life multi-planetary and enable humanity to become a space-faring civilization," Musk says—not because it would be profitable, but because it would be "exciting," at least to him. "And the next really big thing

is to build a self-sustaining city on Mars and bring the animals and creatures of Earth there. Sort of like a futuristic Noah's ark. We'll bring more than two, though—it's a little weird if there's only two."

How Musk can believe something so improbable is easier to understand when you learn just how unlikely his current spacefaring success has been. Before it was America's passport to the solar system, SpaceX nearly bankrupted Musk. Its first rocket, the Falcon, failed three times before reaching orbit in 2008. The company proceeded to create the Falcon 9 and then the Falcon Heavy, which has three clusters of nine engines. Clustering engines was previously considered a bad idea because of the number of moving parts that can go explosively wrong—one of many assumptions Musk upended. "When I first looked at the clustering of engines on the Falcon 9, I had to roll my eyes," says Scott Pace, director of George Washington University's Space Policy Institute. "But that's why Elon Musk is smarter than me."

Rockets also weren't supposed to fly more than once. For decades, spent rocket stages were abandoned to the sea. "No one has ever made a fully reusable orbital rocket of any kind whatsoever," Musk says. "We just live on a planet where this is an extremely difficult job." He describes the challenge with evident relish. "It's like, if this was a video game, the setting is on maximum but not impossible." In the past six years, SpaceX has successfully landed the first stage of 90 of its Falcon 9 rockets and reflown 72 of them. Musk has yet to achieve full reusability by reflying both rocket stages.

Before Musk, America's space industry was moribund. In 2011, NASA mothballed the last space shuttle, after inking a deal with SpaceX to make uncrewed cargo resupply runs to the International Space Station (ISS). SpaceX made its first such trip in 2012, two years ahead of the competition, and in 2014, NASA tapped the company and behemoth Boeing to fly crews to the ISS.

'He was my little genius boy. From the time he was 3, we used to call him that—Genius Boy.'

—MAYE MUSK, ELON'S MOTHER

SpaceX launched its first crew to the ISS aboard a Dragon spacecraft in May 2020. Boeing, delayed by development problems, is not planning even an uncrewed test flight until next year.

For the Dragon, Musk swept away old-school instrument panels and replaced them with three oversize touchscreens. There's no control stick; the spacecraft's attitude, orbit and re-entry engines are all governed by the screens. Astronaut Doug Hurley, commander of the first crewed Dragon flight, worried the screens would delay reaction times, but SpaceX solved this by making Dragon an automated ship. "There's no plans to do any more manual flying, certainly on the NASA missions," Hurley says, "unless there's a need for it from a systems-failure kind of scenario."

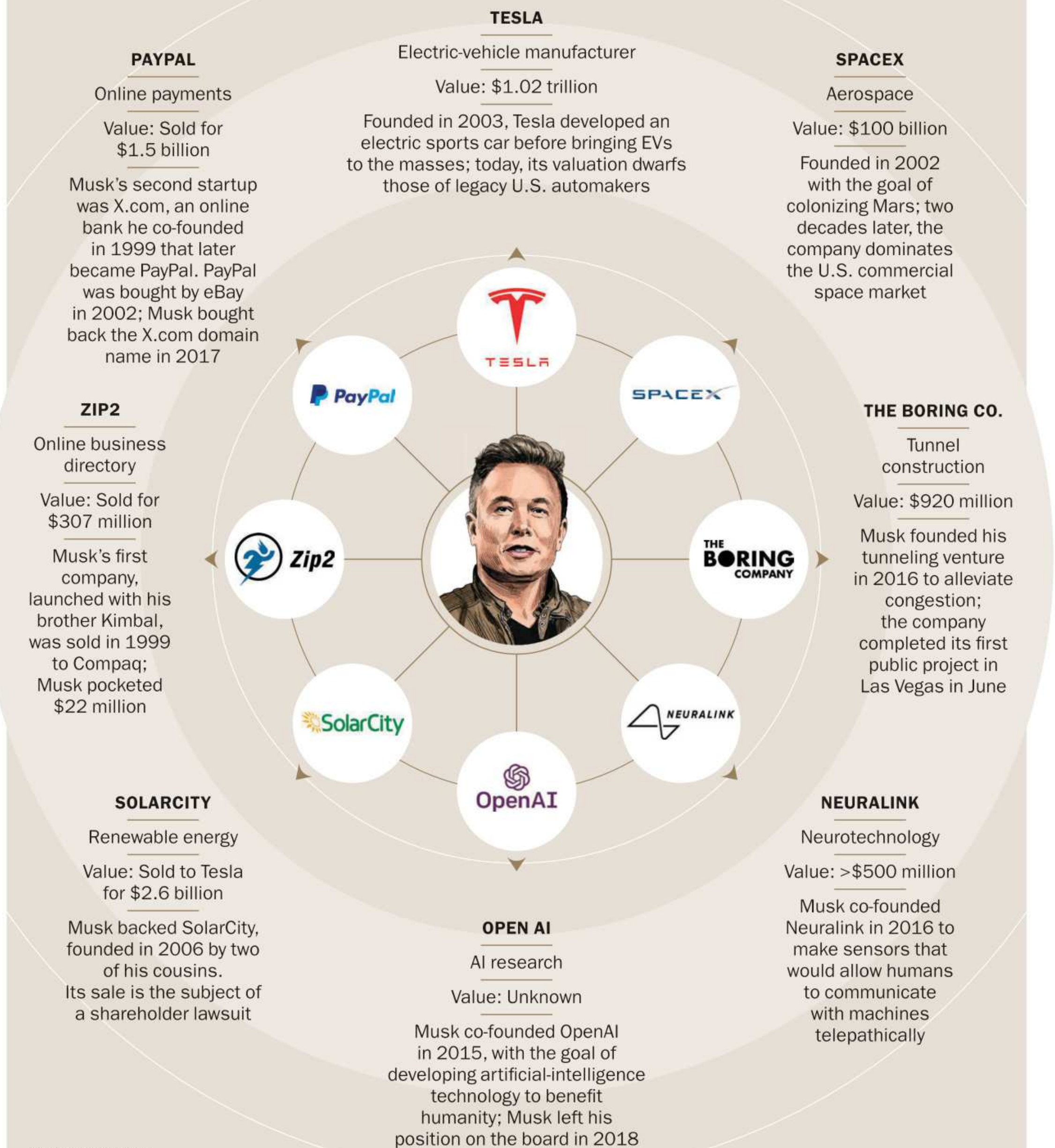
Success has not dampened Musk's appetite for risk. After being lofted into space by a Falcon Super Heavy, his next rocket, the Starship, will light out for the moon, land there, take off and return to Earth, with no stages expended on the lunar journey. This so-called single-stage-to-orbit model has been the white whale of rocket designers for generations. In test flights, four prototype Starships exploded on landing before a successful test last May. For NASA and most private aerospace companies, a single crash is a setback that can take years to recover from. SpaceX works more like a Silicon Valley startup, where the goal is to fail quickly and iterate. This gets expensive fast. Over Thanksgiving, Musk emailed employees that Starship's new Raptor engine was facing a "production crisis" that could bankrupt SpaceX if it did not achieve a "Starship flight rate of at least once every two weeks next year." In a "worst-case situation," he tells TIME, "bankruptcy is not out of the question, not that it's likely." The point, he says, was to remind staff that "we cannot lose our edge or get complacent."

With its Starlink program, SpaceX hopes to launch a constellation of as many as 42,000 satellites to provide Internet service to the world. But that kind of orbiting swarm wreaks havoc on sky gazing. "Just how much stuff do you want to put up there?" asks Neal Lane, senior fellow in science and technology at Rice University. "The astronomers are appropriately making noise about interfering with their ability to observe." (Gwynne Shotwell, SpaceX's president, tells TIME the company is working on the problem.)

In April, NASA selected SpaceX to build the lunar lander for the Artemis program, thanks in part to a lowball \$2.9 billion bid. A bid by Jeff Bezos' Blue Origin came in at more than twice that. Bezos sued, accusing Musk of undercutting

Elon's Universe

MUSK'S VENTURES HAVE SPANNED EVERYTHING FROM INTERNET STARTUPS TO SUSTAINABLE ENERGY TO ARTIFICIAL INTELLIGENCE



VALUATION SOURCES: CNBC, FORBES, SEC, YAHOO! FINANCE, BLOOMBERG, CRUNCHBASE



the competition. Musk took the opportunity to rub his victory in the face of the world's second richest man: "If lobbying & lawyers could get u to orbit, Bezos would be on Pluto," he tweeted. In November, the federal claims court ruled in Musk's favor.

Sometime in the next month or two, Musk hopes to launch the Starship into orbit for the first time, powered by 33 engines at the base of an enormous, 230-ft. steel tube containing nearly 7.5 million lb. of supercooled liquid fuel. "I think we can do a loop around the moon maybe as soon as 2023," he says, and land on the moon's surface within three years.

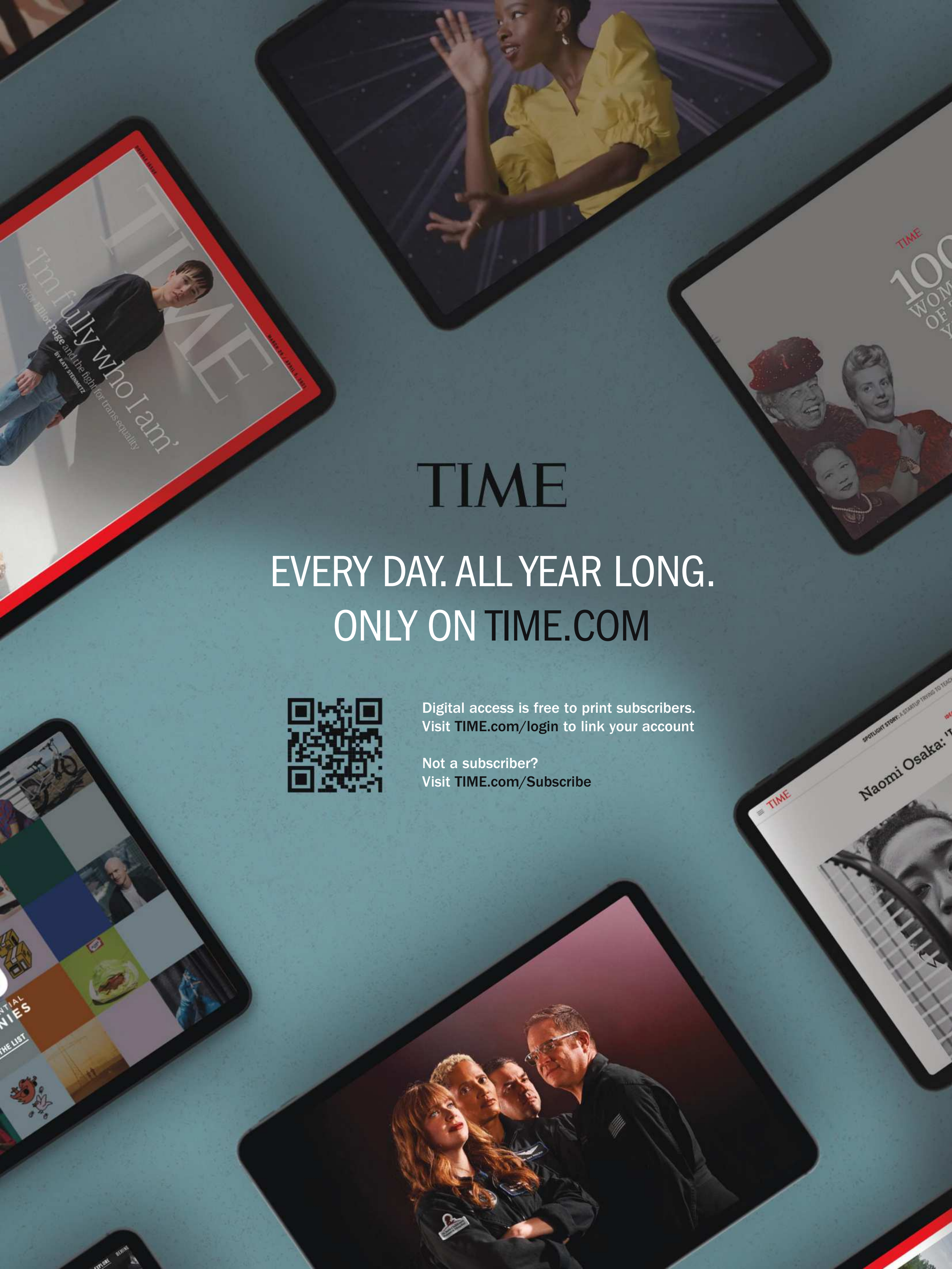
SpaceX is a private company, so whether it's profitable is not publicly known. (Note: TIME's co-owners, Marc and Lynne Benioff, have invested in companies connected to space exploration, including SpaceX. They have no involvement in TIME's editorial decisions.) But that's not the point, Musk says. One day, he hopes, the rockets will carry 100 people at a time to Mars, where the ships can be refilled with fuel manufactured on the Red Planet and shuttled back to Earth. Asked when he sees this happening, Musk pauses for a long moment, as if calculating all

THE BODY
OF A TESLA
MODEL 3 AT THE
COMPANY'S
FREMONT, CALIF.,
FACTORY

the variables—federal regulations and production schedules, test-flight targets and bathroom requirements. "I'll be surprised if we're not landing on Mars within five years," he finally says.

What will humans do there, and for how long? We have had little use for the moon since landing there 50 years ago. Musk argues that interplanetary life is the next great leap of evolution, like the emergence of multicellular organisms, and also that Mars could provide a home for humanity if Earth becomes uninhabitable. Experts aren't so sure. "I have real doubts about the viability of a large settlement on Mars," says John Logsdon, founder of Space Policy Institute. "What would people do there to earn a living? What would be the basis of a Mars economy?"

Musk is not deterred. Gamboling around the concrete slab littered with massive machines of his own creation, Musk acknowledges his latest rocket could go the way of his first three. "I wouldn't say that our odds of getting to orbit the first time are high," he says. "I would say optimistically it's 50%." The dark surface of the Gulf stretches over his shoulder; cell phones here pick up signals from Mexico, a stone's throw away. How does it feel to think about the most powerful



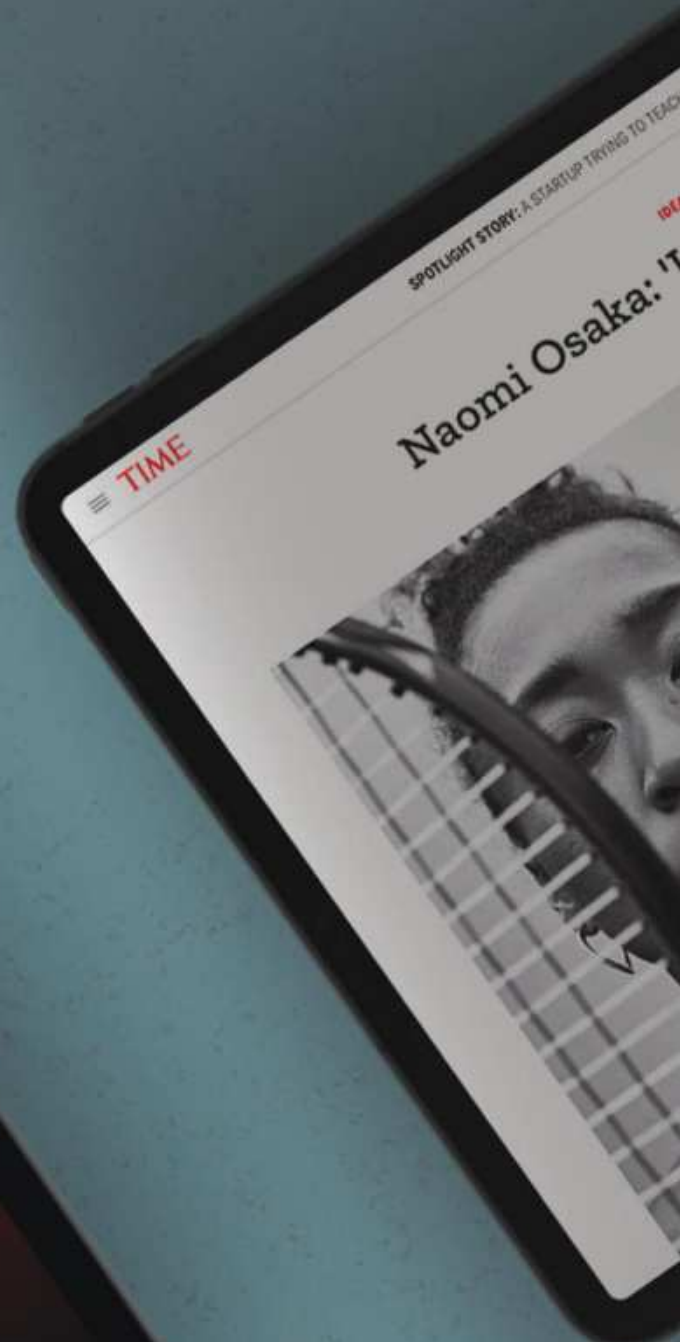
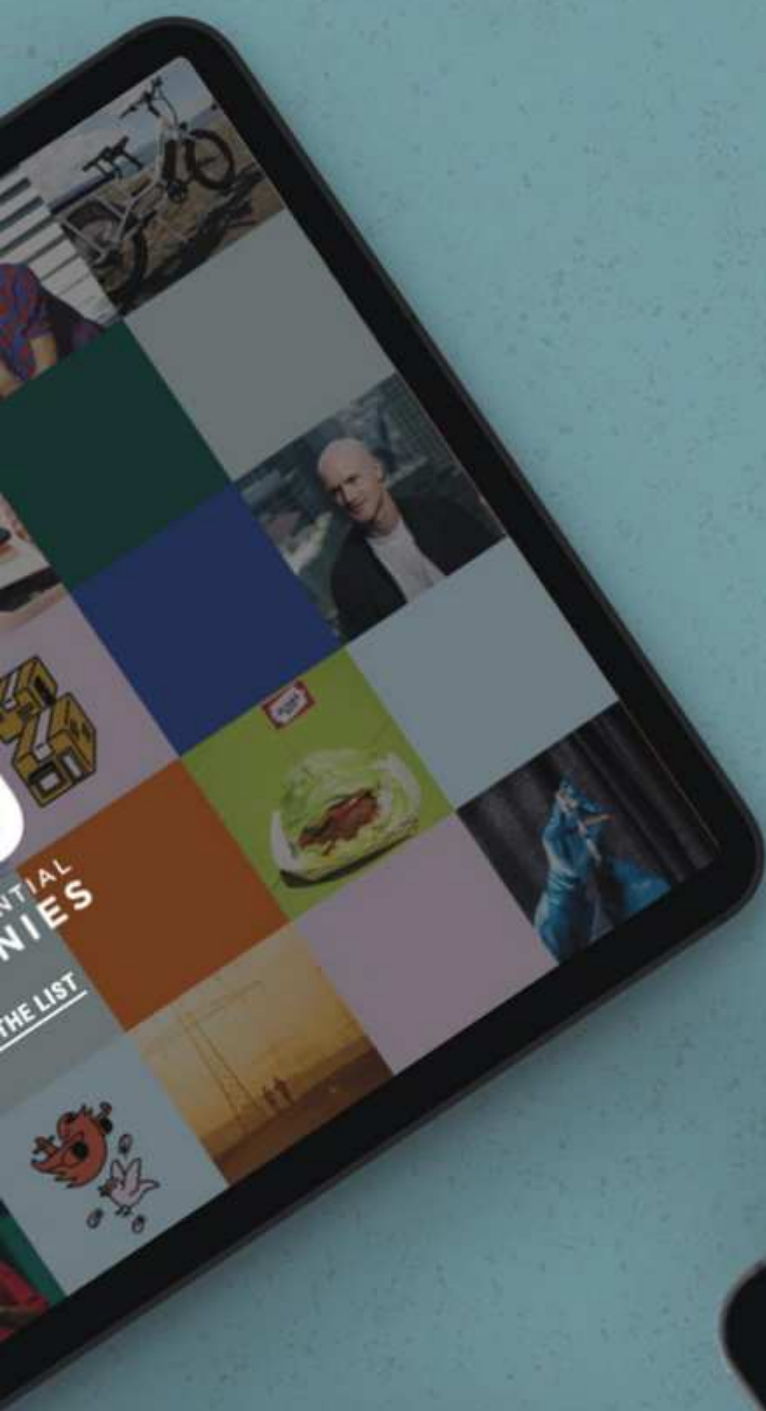
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rocket ever built exploding in a billion-dollar fireball? “Pretty scary!” he says, grinning. “So, excitement guaranteed on launch day!”

Then the tour is over. Musk turns, whistles to Marvin and strides briskly to his waiting Tesla.

ELECTRIC CARS, like homemade rockets, were a graveyard of well-intentioned investment before Musk barreled into an industry in which he had no academic training. For decades, legacy automakers had stymied the development of electric vehicles, lobbying against fuel-efficiency standards and filing lawsuits against state mandates to develop the cars. Tesla’s business was sustained in part by generous support from the federal government, though the company got off the ground before it became available. A \$465 million federal loan in 2010 helped prop up Tesla at a crucial juncture, and its customers have benefited from hefty tax incentives.

Musk believed from the start that advances in lithium-ion battery technology made long-range

Musk’s adviser Omead Afshar, who slept on a cot. “He would be in there reviewing the system, redoing the code himself, solving problems, bouncing from station to station. He will endure the most pain to lead by example, and all of us around him really can’t complain when we’re not working that hard.” For Musk’s 47th birthday that June, he briefly paused for a bite of grocery-store cake, then went back to the paint-shop tunnel.

The cars finally rolled off the line, but soon enough, Musk shot himself in the foot. In August 2018, he tweeted that he had funding to take the company private for \$420 a share. The Securities and Exchange Commission sued him, alleging he had committed securities fraud. The resulting settlement cost him his perch as Tesla’s board chair, though he was able to retain the title of CEO. The adult supervision extends only to a point. Three months later, Tesla sent a software update that enabled the car to make farting noises on command. (“Please put ‘invented car fart’ on my gravestone,” Musk tweeted.) But for all the immaturity, his public profile has an upside as well. “We don’t spend any money on advertising,” notes Tesla board chair Robyn Denholm. “His ability to communicate with a very wide range of people globally through social media, I think, has been a huge asset to the company—you know, by and large.” His longtime friend Bill Lee, who finds his memes and trolling “charming,” says he was the one who persuaded Musk to join Twitter. “I remember when he had zero followers,” Lee recalls. “He’s probably the most viral social influencer ever.”

Today, thanks in large part to Musk’s pace-setting, auto companies from VW to Nissan are jostling to invest billions in electric vehicles. Their about-face is driven less by altruism than by a dawning realization that Musk is eating their lunch. “Musk and Tesla forced the change,” says Michelle Krebs, an analyst at Cox Automotive. “He proved that there was a market for EVs.”

That has made Musk arguably the biggest private contributor to the fight against climate change. Had the 800,000 Teslas sold in the last year been gas-powered cars, they would have emitted more than 40 million metric tons of CO₂ over their lifetimes—equivalent to the annual emissions of Finland. But EVs may ultimately be less important to the climate fight than the central innovation that made them possible: batteries. Tesla has repurposed the lightweight, energy-dense cells that power its cars for huge grid-scale batteries that provide essential backup for renewables. Demand for Tesla’s smaller home-based Powerwall,



‘He is a humanist—not in the sense of being a nice person, because he isn’t.’

—ROBERT ZUBRIN, FOUNDER OF THE MARS SOCIETY

electric vehicles possible. In practice, it wasn’t that easy. Tesla’s first decade was plagued by unmet deadlines, technical snafus and cost overruns. During the 2008 financial crisis, cash was so tight, the company came within days of missing payroll. With a dwindling fortune, Musk borrowed \$20 million from SpaceX to lend the company, cajoled another \$20 million out of investors and raised the price of the company’s debut sports car to survive.

Tesla went public in 2010, but for years it remained in crisis mode. With production behind schedule, and the company at risk of running out of money, Musk spent much of April 2018 sleeping on the factory floor as he tried to iron out assembly-line issues. “He would wake up, look at the monitors on the wall and go chase the constraint,” says



◀ **TIME'S KLUGER, LEFT, INTERVIEWS MUSK; TWO STARSHIPS LOOM IN THE BACKGROUND**

In His Own Words

TIME SPOKE WITH MUSK AT HIS BOCA CHICA, TEXAS, FACILITY ON DEC. 3. EXCERPTS FROM THE CONVERSATION:

BEING THE RICHEST PERSON IN THE WORLD

"Well, I think there's like some, you know, sovereigns. I think [Russia's] President Putin is significantly richer than me. I can't invade countries and stuff."

INCOME INEQUALITY

"When looking at income and asset distribution, it is very important to normalize that for age. So as societies age, there are more older people; the older somebody is, the richer they are. But a lot of the push for higher government involvement and sort of expropriation of assets by the government is pushed by a bunch of politicians who are actually saying that resources shouldn't be in control of private individuals. They should be in control of the government."

BEING A "UTOPIAN ANARCHIST"

"If there's a utopia where people have access to any goods or services that they want, there's plenty for everyone. If we have a highly automated future with the robots that can do anything, then any work you do will be because you want to do it, not because you have to do it. I don't mean to suggest chaos, but rather that you're not under anyone's thumb."

TESLA'S VALUATION

"I've tried to just tamp down expectations, saying I think the stock's maybe too high. Current valuation is pretty high, which suggests that the market has faith in future execution of the company because it's certainly not based on historical profitability, that's for sure."

COMPETITION IN THE ELECTRIC-VEHICLE MARKET

"If somebody makes better cars than we do and they then sell more cars than we do, I think that's totally fine. Our intent with Tesla was always that we would serve as an example to the car industry and hope that they also make electric cars so that we can accelerate the transition to sustainable technology."

MARK ZUCKERBERG'S LEADERSHIP

"I'm more concerned about the fact that Facebook, now Meta, has an equity structure that makes it such that his great-great-grandchildren will still control the company. Share structures that give super-voting rights should be removed."

OVERCONFIDENCE AT SPACEX

"If we have ships and boosters but no engines, we would be losing billions of dollars a quarter. And if that continued, then bankruptcy would not be out of the question. I feel

as though we've had many years of success and a lot of people at the company have never seen a launch failure. A lot of people have never in their career experienced a recession. If somebody entered the workforce after 2009, it just seemed like things always go up. I was concerned that we may be getting complacent."

CRYPTOCURRENCY

"I'm not a huge hater of fiat currency like many in the cryptoworld are. But there are advantages with crypto relative to fiat in that fiat currency tends to get diluted by whatever government it is. It ends up being a pernicious tax on people, especially those who have cash savings with dilution of the money supply. I could wax on about the nature of money for hours because I played a significant role in creating PayPal. There are very few people that understand the money system better than me."

HIS TWEETS

"I'm not really trying to do brand optimization. So sometimes, I obviously shoot myself in the foot. As is obvious from my tweets, they're humor that I find funny, but not many other people find funny."

LOVE AND HIS RELATIONSHIP WITH MUSICIAN GRIMES

"Grimes and I are, I'd say, probably semi-separated. Her work has her being in different places a lot vs. my work. So we weren't seeing each other that much, because what she needs to do is mostly in L.A. or touring, and my work is mostly in remote locations like this. I'm human and all; I'm not a robot, but this place is basically a techno monastery."



A ROCKET AT
STARBASE, THE
SPACEX LAUNCH
SITE IN BOCA
CHICA, TEXAS

PHOTOGRAPH BY
MARK MAHANEY
FOR TIME



which can store electricity from rooftop solar systems, has spiked as consumers look for alternatives to the grid, driven by everything from February's Texas power shortage to the fire risk in California that has led to power shutoffs. In some areas, software enables utilities to tap into home-energy reserves when the grid is strained, instead of turning on high-polluting standby generators. Gerry Hawkes, a 72-year-old forester from Woodstock, Vt., has been participating in one such program since 2017, allowing his local utility to draw power from a pair of Tesla backup batteries in his basement. "It makes sense for power backup, and it makes sense for climate change," Hawkes says.

Some of Musk's initiatives have generated more controversy. His effort to produce and sell solar roof tiles has stumbled. The Boring Co., which Musk started in 2016, put forward a plan to alleviate urban congestion by building miles of underground tunnels to whisk cars along at more than 100 m.p.h., but critics say plain old subways would be more efficient and equitable. Musk's move to accept Bitcoin as payment for Teslas this spring prompted accusations of hypocrisy; the cryptocurrency's computational "mining" operations are a climate disaster, drawing gargantuan amounts of electricity to process transactions. Musk subsequently shelved the plan.

Musk's January announcement of a \$100 million climate prize rankled some environmentalists because of its inclusion of proposals for direct-air carbon capture—giant machines to suck carbon dioxide out of the atmosphere. While some experts say researching that technology is necessary, others see it as a costly distraction. "Direct-air capture is a boondoggle," says Mark Jacobson, director of Stanford's Atmosphere/Energy program. "We can't waste our time and money on things that just don't work very well."

Tesla's hard-charging approach has also raised concerns. In May 2020, Musk reopened his Fremont, Calif., factory against local public-health orders. "It makes you wonder if your life is worth \$20 an hour," an anonymous Tesla worker told *SF Weekly*. Musk says the regulators were wrong. In March, the National Labor Relations Board ruled that a 2018 Musk tweet had broken labor laws, as did the company's firing of a union activist. Tesla is appealing the ruling.

This summer, the National Highway Traffic Safety Administration opened a probe into Tesla's Autopilot system, which has been involved in 11 crashes with parked emergency vehicles since 2018, leaving 17 people injured and one dead.

Journey To the Stars

HOW A QUIET, BOOKISH CHILD FROM PRETORIA, SOUTH AFRICA, BECAME THE RICHEST MAN ON EARTH

▼ Musk was born to a wealthy family in 1971. His parents divorced when he was young, and he and his brother went to live with their father, an engineer whom Musk has described as "evil"



► Musk with his friend Navaid Farooq at Queen's University, Canada, which he attended in the early 1990s; Musk later studied at the University of Pennsylvania and, briefly, Stanford





◀ Musk, standing, at age 4 with his mother Maye, brother Kimbal and sister Tosca; Maye, a model, began calling Elon her “genius boy” when he was 3 years old

▼ Peter Thiel, left, and Musk at PayPal’s Palo Alto headquarters in 2000; two years later, eBay acquired the company for \$1.5 billion, netting Musk \$180 million



◀ Musk, age 24, at his computer in 1995; that year, he co-founded his first company, Zip2, an online city guide that was a precursor to MapQuest and Yelp



▲ Musk, his girlfriend Grimes and their son, X Æ A-Xii, in 2021 at Musk’s Starbase facility in Boca Chica, Texas; Musk says he and Grimes are “semi-separated,” due in part to work commitments that keep them in different places

► Musk tweeted this photo in 2017, saying, “On my cousin’s farm in Canada at 17, wearing a hat on a hat”; Musk moved to Canada in part to avoid military service



Musk has been accused of overstating and misrepresenting the system's abilities, starting with the name: despite the promises of an imminent driverless future, Tesla drivers still have to keep their hands on the wheel. "We still obviously have a lot of work to do," Musk says of truly autonomous vehicles, though he insists the current software is safe. Tesla's newest autonomous beta software has already been blamed for at least one crash since its broad release in September, and videos showing the cars making dangerous errors have circulated online. A former high-level employee in Tesla's autonomous-development program tells TIME that the new system's name, "Full Self-Driving," is irresponsible.

In 2018, the Chinese government repealed a law against foreign ownership to allow Musk to build a factory in Shanghai. Now Tesla appears to make about half of its cars in China, but it risks losing its hold on the world's largest car market as the one-party state turns to favor homegrown

best-selling vehicle in Europe in September, and the company is swamped by new orders. With demand soaring, Musk is expanding production, preparing to double its output with new factories in Germany and Texas.

Tesla's gains have inspired investors to pour billions of dollars into EV startups like Rivian and Fisker. One rival, Lucid Motors, is run by a former Tesla engineer who helped create the Model S. The Lucid Air sedan was recently named the *MotorTrend* Car of the Year. Ford and GM have pumped money into thwarting Tesla's expansion into pickup trucks, the most profitable segment of the domestic market. But Musk says he isn't worried about being outcompeted. "If somebody makes better cars than we do, and they then sell more cars than we do, I think that's totally fine," he says. "Our intent with Tesla was always that we would serve as an example to the car industry and hope that they also make electric cars, so that we can accelerate the transition to sustainable technology."



'I saw plenty of examples of people that had enormous wealth, and were entirely cautious. In Elon, there was this complete opposite mindset.'

—J.B. STRAUBEL, TESLA CO-FOUNDER

rivals like NIO and BYD. Musk has faced criticism for pandering to America's increasingly assertive authoritarian rival. "Overall, Tesla has a good relationship with China," Musk told a business conference on Dec. 6. "I don't mean to endorse everything China does."

Despite supply-chain shortages, Tesla delivered 241,300 vehicles in the most recent quarter, a record for the carmaker. Ford and GM's combined market cap is less than a fifth of Tesla's, even though they together sold 3½ times as many vehicles. The Tesla Model 3 became the

MUSK'S MOTHER was a model and his father was a monster. Born in Pretoria in 1971, Elon was prone to long silences and speed-reading the encyclopedia. When he was 12, he wrote the code for a video game called *Blastar*, which he sold to a computer magazine for \$500. "He was always different. He was my little genius boy," his mother, Maye Musk, tells TIME. "From the time he was 3, we used to call him that—Genius Boy."

His parents divorced when Musk was 9. After the divorce, Elon and brother Kimbal went to live with their father. Errol Musk was a brilliant engineer and entrepreneur; he was also, in Elon's telling, an "evil" man who tormented the boy psychologically in ways Musk still finds painful to discuss. Errol Musk told *Rolling Stone* he once shot and killed three armed robbers who broke into his home. In 2017, Errol later acknowledged, he fathered a child with his ex-stepdaughter, 42 years his junior. Musk has said he no longer has contact with his father.

School was nearly as bad as home for the precocious child. Vicious gangs of bullies targeted Musk relentlessly, at one point beating him so badly he was hospitalized, until he hit a growth spurt in high school and started punching back. Musk's maternal grandfather had moved from Canada to South Africa in 1950, arriving during the early years of apartheid. When Musk was 17, he made the opposite journey, in part to avoid the regime's military draft. He took off for

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Canada, enrolling at Queen's University in Ontario.

Musk later transferred to the University of Pennsylvania, from which he graduated with a double major in physics and economics. Accepted to Stanford University's Ph.D. program, he moved to California but dropped out after two days. Instead, Elon and Kimbal decided to get in on the nascent Internet boom. They rented a tiny office in Palo Alto, slept on the floor, showered at the YMCA, pirated an Internet line from a neighbor and lived on Jack in the Box. While Kimbal tried to drum up business, Elon wrote code nonstop.

Their first company, Zip2, was the first Internet mapping service, using GPS data to help consumers find businesses in their neighborhood—a precursor to MapQuest. In 1999, Compaq bought the company and Musk netted \$22 million for his share. For his next act, Musk decided to reimagine the global banking system. His company, X.com, eventually became part of PayPal, which was purchased by eBay in 2002. Musk came away with about \$180 million. But instead of gloating over his payday, Musk still seems irked that these early companies never fulfilled their potential as he saw it. If PayPal had “just executed the product plan I wrote in July 2000,” he told a podcast last year, it could have put the entire banking industry out of business.

At 30, Musk was fabulously rich, but whiling away his days on a yacht didn't appeal to him. After a severe bout of malaria nearly killed him in 2001, those close to him say, he seemed to feel an urgency to make more of his time on Earth. Around then, he was shocked to discover that NASA had no plans to go to Mars. Zubrin, of the Mars Society, introduced Musk to the community of serious space people, even though he was skeptical of the latest in a parade of rich man-boys with astro fetishes. A globetrotting engineer named Jim Cantrell lent Musk his college rocketry textbooks, which Musk devoured, and agreed to take him to Russia, where Musk hoped to buy an old Soviet intercontinental ballistic missile and turn it into a rocket launcher. “He did not come across as credible,” Cantrell recalls. “It was, ‘Who is this charlatan? This guy's crazy; he's not going to make a rocket.’”

After a couple of trips, Musk concluded that the Russians were trying to rip him off—and that their rockets weren't even very good. He packed up and flew home from Moscow with Cantrell and Mike Griffin, who would go on to serve as NASA administrator under President George W. Bush and Under Secretary of Defense under President Donald Trump. “Griffin and I are back in coach drinking

whiskey, and Mike says, ‘What do you think the idiot savant's doing up there?’ loud enough for everyone to hear,” Cantrell recalls. “Elon's sitting in the row ahead of us. And he turns around and says, ‘Hey guys, I think we can build this rocket ourselves. I've got a spreadsheet.’ We start looking at the spreadsheet, like, ‘Elon, where did you get this?’ I still use something similar to model a rocket today. He'd just gone and figured it out.”

Around the same time, Musk met a Stanford-trained engineer named J.B. Straubel, who was trying to turn old Porsches into electric cars. Energy storage had always been the biggest stumbling block—a conventional battery would have to be so big and heavy that the car would expend most of its power hauling its own weight around. Straubel believed recent advances in lithium-ion batteries would enable much denser, lighter power cells, if only someone would give him the money to prove it. Most investors he met dismissed him as a crazy gadfly. Musk did the math and concluded on the spot that Straubel was right. A few months later, Musk pledged \$6.5 million to a lithium-ion car startup called Tesla, becoming its largest investor and eventually taking it over. “I saw plenty of examples of people that had enormous wealth, and were entirely cautious,” Straubel says. “In Elon, there was this complete opposite mindset.”

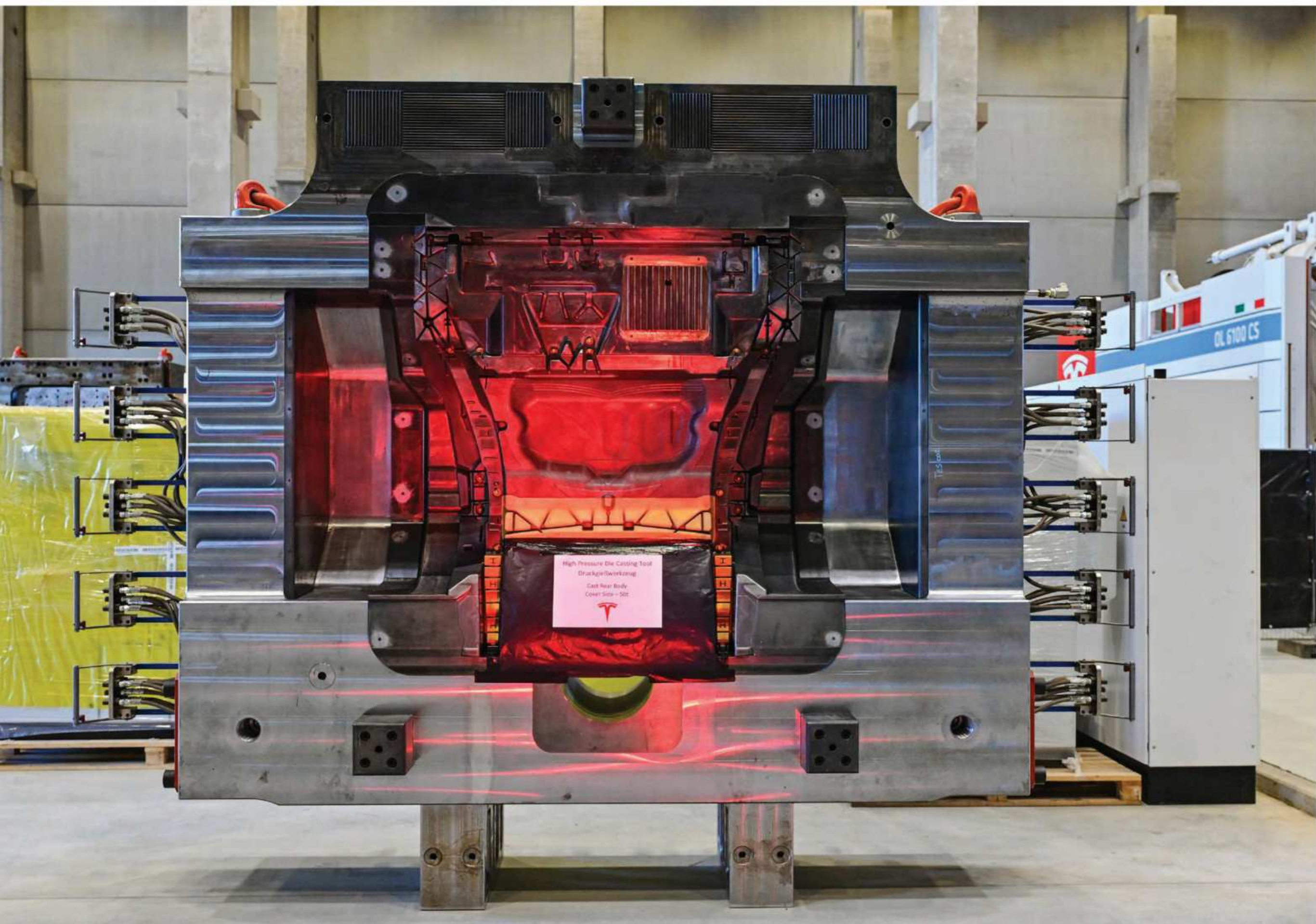
Musk had made the incredibly risky decision to plow his fortune into simultaneous startups in industries with high costs, long development timelines and massive barriers to entry. The last successful startup in the American automotive industry, Chrysler, was founded in 1925. “I said, ‘Just choose one: solar or cars or rockets,’” Maye Musk recalls. “Obviously, he didn't listen.”

By 2008, the scale of the challenge became clear. Tesla had taken deposits of up to \$60,000 from over 1,000 EV enthusiasts but had yet to deliver more than a few sample vehicles. An automotive blog was running a regular “Tesla Death Watch” feature. SpaceX had attempted to launch



‘Hey guys, I think we can build this rocket ourselves.’

—ELON MUSK, TO JIM CANTRELL AND MIKE GRIFFIN



three single-engine Falcon rockets from a remote atoll in the Pacific, and all had exploded. Then the financial crisis hit.

“The world imploded. GM and Chrysler went bankrupt. We did not want Tesla to go bankrupt,” Kimbal Musk recalls. “I remember him calling me in October and asking me if I had any money. I had no money—everything was gone, except for about \$1 million I was saving to survive the recession. I wired it to him to put into Tesla. I told him, If everything goes to hell, at least we’ll be in hell together.” Musk scraped together \$8 million of his own money to cover payroll one week.

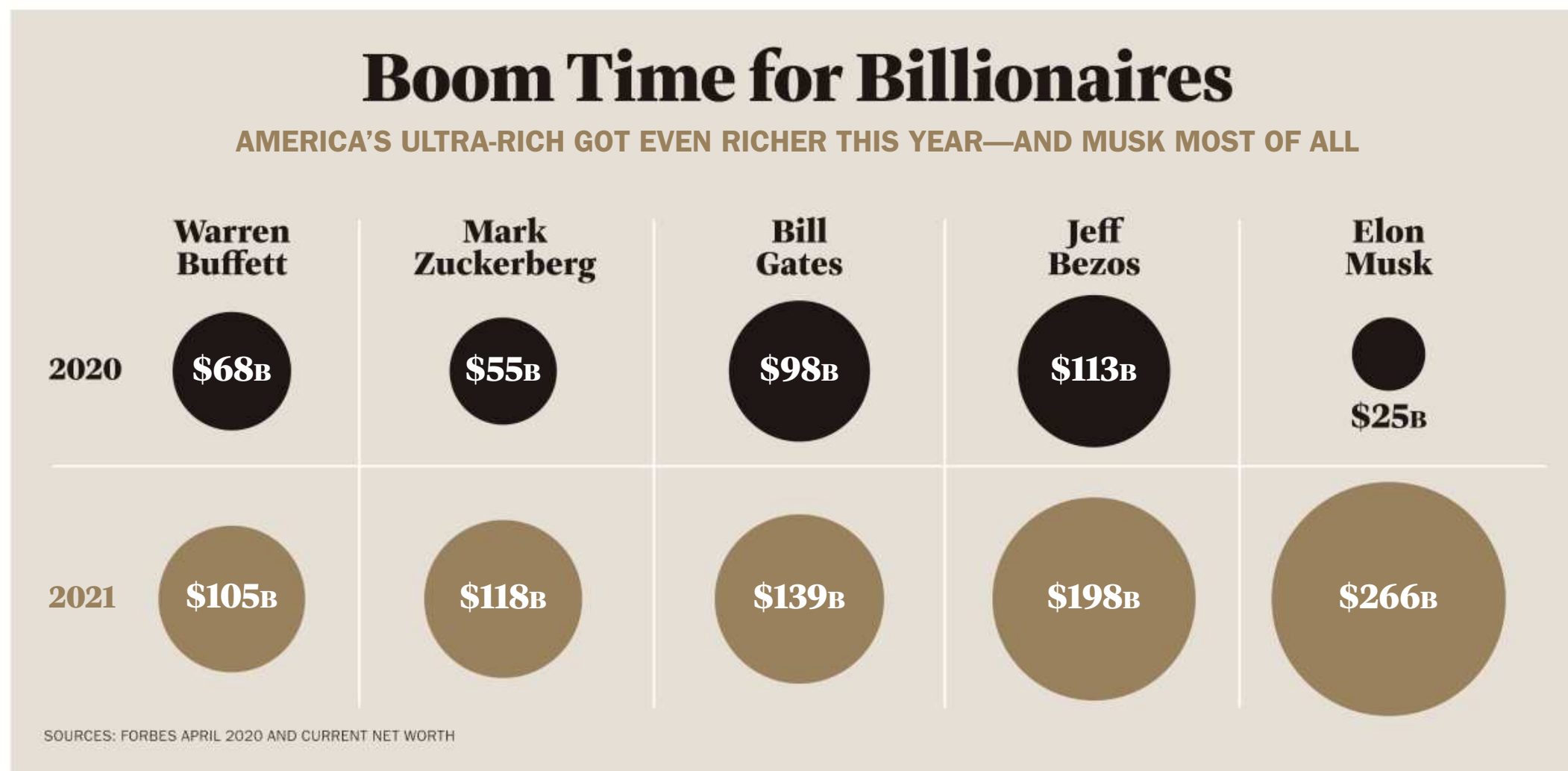
Then, finally, the fourth rocket made a successful launch. And two days before Christmas, NASA made the shocking decision to award SpaceX \$1.6 billion for 12 flights to the ISS. “I do sometimes wonder if other people have easier times building businesses, because all our businesses have been really freaking hard,” Kimbal Musk says. “Something about our upbringing makes us constantly want to be on the edge.”

A DIE-CASTING
TOOL FOR THE
MODEL Y AT A
TESLA FACTORY
IN GERMANY

MUSK HAS BEEN KNOWN to discuss his emotions as frankly and analytically as he does thrust-to-payload ratios, but he can be remarkably vulnerable in public. “If I’m not in love, if I’m not with a long-term companion, I cannot be happy,” he

once confessed. He has cried in several interviews, and announced on *Saturday Night Live* that he has Asperger’s, an autism-spectrum disorder. Musk uttered this intimate disclosure so awkwardly that many viewers took it as a joke.

His first marriage was to his college sweetheart, Justine Miller, a writer. “I’m the alpha in this relationship,” he told her as the newlyweds danced at their wedding, according to a 2010 essay she wrote in *Marie Claire*. Tragedy struck two years later, when their 10-week-old son Nevada stopped breathing in his crib. Distraught, the couple began in vitro fertilization treatments, and Justine gave birth to twins and triplets, all of whom are boys. As Justine later told it, Elon abandoned her to tend to his companies as she spiraled into depression inside an L.A. mansion that became a gilded cage.



Elon filed for divorce in the spring of 2008, and six weeks later announced his engagement to the British actor Talulah Riley. He and Riley were married, then divorced, then remarried, then divorced again in 2016.

In 2018, Musk began dating the musician Claire Boucher, whose stage name is Grimes. Their son, X, was born in May 2020. This September, the couple announced their relationship had ended. Grimes recently released a new song, “Player of Games”: “Sail away to the cold expanse of space,” she sings. “Even love couldn’t keep you in your place/ But can’t you love me like that?”

Musk explains the split as a matter of logistics. “Grimes and I are, I’d say, probably semi-separated,” Musk tells TIME in Texas. “We weren’t seeing each other that much, and I think this is to some degree a long-term thing, because what she needs to do is mostly in L.A. or touring, and my work is mostly in remote locations like this.” He says they are still good friends and he does not have a new girlfriend. “This place is basically like a technology monastery, you know. There are some women here, but not many. And it’s remote.”

“He would be happier with a partner,” says Kimbal. “But he’s also a very hard person to be partnered with.” Family and friends say Musk is sensitive and can take slights personally—particularly attacks on his wealth and media reports he views as unfair. Having pledged on Twitter this year that he would no longer own a residence, Musk has sold off his seven houses

and considers his primary home a rental near the Starbase site in Boca Chica, Texas.

X is with his daddy today in Texas, and a nanny brings the child to Musk between appointments. The toddler has his father’s porcelain skin and a mane of straw blond hair, shaved on the sides into the same fauxhawk Musk recently adopted. Musk takes him over to a patch of AstroTurf in front of the Starbase employee restaurant (“Astropub”), which has an awning made of rocket flaps. X toddles for a few minutes while Musk watches, arms crossed. Then it’s time to leave, and Marvin departs with Musk while X goes with his nanny.

IN THE FUTURE Musk envisions, no one tells you what to do. Robots perform all the labor, and goods and services are abundant, so people only work because they want to. “There’s, like, plenty for everyone, essentially,” he says. “There’s not necessarily anyone who’s the boss of you. I don’t mean to suggest chaos, but rather that you’re not under anyone’s thumb. So you have the freedom to do whatever you’d like to do, provided it does not cause harm to others.”

Musk has disavowed terrestrial political affiliations and maintained good relations with politicians of both parties, including Presidents Obama and Trump, though he quit the latter’s business council after only a few months over the decision to pull out of the Paris climate accords. Of President Joe Biden, he says, “I don’t think he’s doing an amazing job, but I don’t know—it’s hard

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to tell.” He has an ardent following in some of the nastier precincts of the far right, but Musk claims that when he tweeted “Take the red pill” last year, he had no idea that “red-pilling” was a right-wing dog whistle: “I was just referring to *The Matrix*,” the movie from which the meme derives.

Unlike some techno-libertarians, Musk doesn’t anticipate a grim future of competition for resources in which only the naturally gifted prevail. But he rejects the idea that the size of his fortune constitutes a policy problem in and of itself, or that he is morally obligated to pay some share of it in taxes. A recent ProPublica investigation found that Musk and many others in his tax bracket paid no individual federal taxes as recently as 2018 because they had no income, only assets. In October, Senate Democrats considered imposing a “billionaires’ tax” on wealth. When Democratic Senator Ron Wyden of Oregon tweeted in support of it, Musk responded with a vulgar insult of Wyden’s appearance in his profile photo.

When the topic of government comes up in TIME’s interview, Musk briefly amuses himself by humming rapper Warren G’s ’90s hip-hop hit “Regulate.” “They’re basically saying they want control of the assets,” he says. “This does not result in, actually, the good of the people. You want those who are managing capital to be good stewards of capital. And I think the government is inherently not a good steward of capital.”

In an interview, Wyden agreed with Musk’s interpretation of his position, at least in part: the purpose of such a tax is to take assets out of private hands for public use. Government, he argues, is inherently a more public-spirited and accountable steward of resources than any individual, and is empowered to ensure all of society benefits from the profits a dynamic economy generates. “In this country, I think there is a consensus that we ought to pay for the priorities we really care about, and everyone ought to pay their fair share,” Wyden says.



‘He is a savant when it comes to business, but his gift is not empathy with people.’

—KIMBAL MUSK, ELON’S BROTHER

MUSK AT AN EVENT
FOR THE BORING
CO., HIS HIGH-SPEED
TUNNELING VENTURE

James Pethokoukis, an economic analyst with the conservative-leaning American Enterprise Institute, thinks Musk does have a coherent politics, whether or not he articulates it. “The reason it’s confusing is it’s not on the traditional left-right spectrum,” he says. “It is a politics of progress.” At a time when segments of the right and left alike champion protectionist populism—from Republican Senator Josh Hawley’s hostility to free trade to Bernie Sanders’ redistributionism—this puts Musk at odds with both. “It is a view that says the solution to man’s problems is growth and technological progress and maximizing human potential,” Pethokoukis says. “It’s not a view fully represented by either side in this country.”

Musk’s belief in progress is not absolute. He has been outspoken about confronting what he sees as the dangers of out-of-control artificial intelligence, and cofounded the AI companies Neuralink and Open AI to advance that goal. He finds cryptocurrency interesting and can talk endlessly about the conception of money as “an information system for resource allocation.” But he doubts that crypto will replace fiat currency, and disavows responsibility for the way his tweets have sent markets into a tizzy. “Markets move themselves all the time,” he says, “based on nothing as far as I can tell. So the statements that I make, are they materially different from random movements of the stock that might happen anyway? I don’t think so.”

Zubrin, of the Mars Society, believes three qualities could fell Musk: his workaholicism, his recklessness or a sort of earned hubris. “Great leaders become incapable of hearing criticism,” he says. “Why did Napoleon fail in Russia? Because every time before, he had succeeded. Plenty of French generals were saying, ‘Why don’t we just take Poland and be good?’ But every time in the past, the people who urged caution had been wrong.”

Nevertheless, Zubrin would not bet against his old friend. “*Genius* is a word that is frequently associated with Musk; *wisdom* is not,” he says wryly. “But there is one sense in which Musk, in my view, is very wise, which is that he understands that he doesn’t have forever.”

In other words: Get in, loser. We’re going to Mars. —With reporting by MARIAH ESPADA, NIK POPLI and JULIA ZORTHIAN





HEROES
OF THE YEAR

The Miracle Workers

IN GIVING THE WORLD A WEAPON AGAINST COVID-19, THESE
SCIENTISTS BUILT A DEFENSE AGAINST CHALLENGES YET TO COME

BY ALICE PARK AND JAMIE DUCHARME

PHOTOGRAPHS BY
MATTIA BALSAMINI FOR TIME



NO ONE KNOWS FOR SURE WHERE THE VIRUS came from. It could have been the murky depths of one of the hundreds of bat caves scattered across China. Carried inside a bat on a nightly sojourn, the virus may have jumped to another wild animal, perhaps one of those sold in the wet markets in the region. It's also possible SARS-CoV-2, the virus that causes COVID-19, slipped out of a lab at the Wuhan Institute of Virology, unbeknownst to the researchers studying bat-borne coronaviruses, who were perhaps unintentionally infected by the very thing they were trying to learn how to defend against. In either case, it had to ride in something. A virus, being just a bundle of genetic material wrapped in a bundle of proteins, needs the machinery of a living thing to reproduce. It's in the dark caverns of bodies that it continues to shift shape, finding new ways to spread and thrive.

Only as the virus emerges from the shadows

of these favored havens does it confront its most formidable foe: the scientists quietly awaiting it. How they responded was less mysterious, and certainly less unpredictable, than the virus they targeted. Their medium was light, and the brightness of scientific truth, which they painstakingly pursued in brilliantly lit research labs and "clean rooms" scrubbed of airborne particles—and produced brilliant results.

About a month after the first cluster of patients appeared wheezing in a Wuhan hospital, the entire genome of the responsible coronavirus—30,000 specific nucleotides—had been sorted, identified and posted online.

FROM LEFT: KATALIN KARIKO, DREW WEISSMAN, KIZZMEKIA CORBETT AND BARNEY GRAHAM ALL PLAYED KEY ROLES IN MAKING COVID-19 VACCINES A REALITY



Two weeks later, designs were already being keyed into machines to create a vaccine that would unlock a world that had not even locked down yet.

Given that speed, it was easy to imagine that a solution to the problem of SARS-CoV-2 was inevitable. After all, things we took to be miracles not long ago have become the stuff of everyday life—routine, apparently effortless. A miracle is as close at hand as your average smartphone, which has 100,000 times the computational power as the computer that took humankind to the moon. In 2020, if scientists in China were able to map the genetic structure of a novel virus in a few days, that sounded, well, about right. Later, as countries went into lockdown, we continued to assume progress, to regard vaccines as our due.

Except there was nothing inevitable about them. The vaccines that first arrested the spread of COVID-19—and that will almost surely be adjusted to thwart the Omicron variant and future mutations—were never a foregone conclusion. Far from it. They were, after all, produced by human beings, subject to the vagaries of systems and doubt. There were times in their careers when, deep in the work that would ultimately rescue humanity, Kizzmekia Corbett, Barney Graham, Katalin Kariko and Drew Weissman felt as though the problems they faced were ones they alone cared about solving. But exposing the inner workings of how viruses survive and thrive is what made the COVID-19 vaccines possible.

The four were hardly alone in those efforts: scientists around the world have produced COVID-19 vaccines using a variety of platforms and technologies. Many—like the shots from Oxford-AstraZeneca and Johnson & Johnson—Janssen—came from more established methods, modified with impressive speed to fight a new virus. Still, Corbett, Graham, Kariko and Weissman achieved a breakthrough of singular importance, introducing an innovative and highly effective vaccine

platform, based on mRNA, that will impact our health and well-being far beyond this pandemic.

Progress flows from the gradual accretion of knowledge. In the case of the COVID-19 vaccines, it started with the initially painstaking process of decoding the genomes of all living things; then folded in the development of sequencing machines that reduced that genetic reading time to hours; and finally weaved in the insights—“Put it in a fat bubble!”—that seemed to come in brilliant flashes but were actually the result of wisdom developed over decades working on how to manipulate a finicky genetic material called mRNA. What drives it all might, in less divisive times, seem too obvious to mention: fealty to facts. It’s the basis of the scientific method and the structure of our world. Without trust in objective reality, the lights don’t turn on, the computer doesn’t boot up, the streets stay empty.

“We have turned a disease that has been a once-in-a-generation fatal pandemic, that has claimed more than 780,000 lives in America, into what is for the most part a vaccine-preventable disease,” says Dr. Leana Wen, professor of health policy and management at George Washington University. “That is the difference that the vaccine has made.”

For those of us lucky enough to live in wealthy countries with access to these top-shelf vaccines, it has made all the difference. The miracle workers behind the COVID-19 vaccines are the TIME Heroes of the Year not only because they gave the world a defense against a pathogen, but also because the manner of that astonishing achievement guards more than our health: they channeled their ambitions to the common good, talked to one another and trusted in facts.

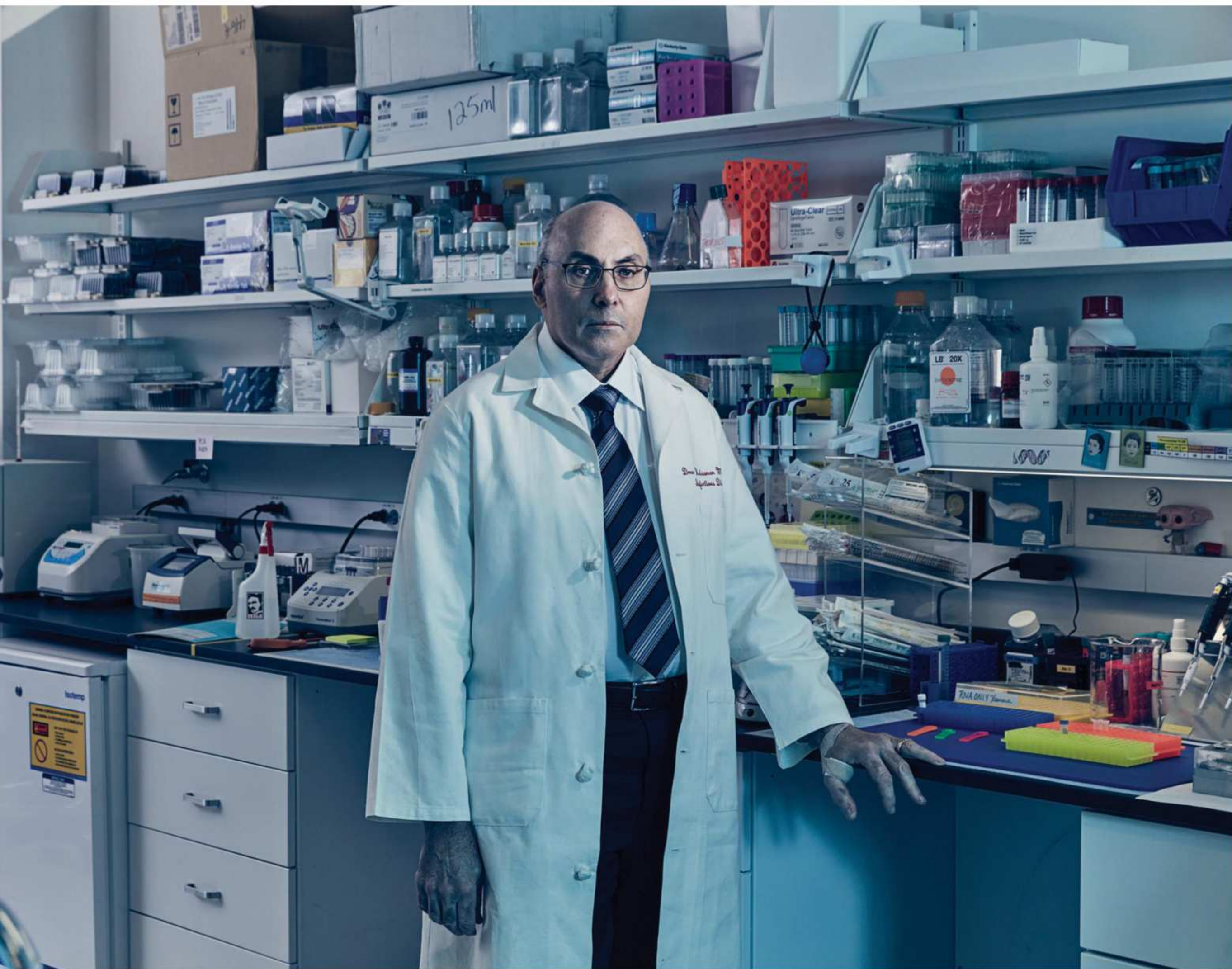
KATALIN KARIKO GREW UP the daughter of a butcher in a small town in Hungary, living under Communist rule in the 1950s and ’60s. The family had electricity, but not running water or a refrigerator. Watching her father at his job, the young Kariko became fascinated with figuring out how living things work. That took her to undergraduate studies in biology at the University of Szeged, where she first learned about RNA. It would become her obsession through her biochemistry Ph.D. studies, postgraduate work and, really, the rest of her life. If DNA makes up the letters of life, RNA creates the words, and ultimately the sentences. Indeed, RNA, and specifically messenger RNA, or mRNA, instructs the body how to make all the proteins, enzymes, receptors and other molecules that enable living things to function. As a Ph.D. student,

❖ ————— ❖

‘We have turned a fatal pandemic into a vaccine-preventable disease.’

—DR. LEANA WEN,
GEORGE WASHINGTON UNIVERSITY





Kariko grew convinced that mRNA, modified in the right way, could be used to turn the body into its own drug-making factory, and churn out tailored, precision compounds to treat any disease caused by a lack of a certain protein, which could be an enzyme or a hormone.

The challenge with mRNA is that it's notoriously unstable: inject it into the human body, and it gets chewed up before it can serve its purpose. It is also difficult to work with, since it needs to be stored at extremely low temperatures to remain intact. After a few years of frustrating work at the Biological Research Centre at Szeged with no success in corralling mRNA, Kariko lost funding to her lab.

To continue her work, in 1985 she found a position at Temple University in Philadelphia but faced a new obstacle: to discourage defection, the Hungarian government limited citizens to taking only

WEISSMAN'S
INSIGHTS
HELPED MAKE
IT FEASIBLE TO
CREATE MRNA-
BASED VACCINES

\$50 with them when they left the country. Kariko and her husband sold their car for \$1,200 and sewed the cash inside their 2-year-old daughter Susan's teddy bear.

Kariko moved to the University of Pennsylvania in 1989. Few others at Penn or elsewhere were pursuing mRNA at the time, because its payoff seemed uncertain. But Kariko persevered, envisioning a bonanza of new treatments for heart disease, stroke and other conditions. She worked late nights and early mornings at her Penn lab and wrote at least one new grant application every month—only to get turned down again and again. “I think I was rejected at least 24 times,” she says, “but I kept pushing, because every time, I wanted to understand why they rejected it and how could I improve.”

After six years, her supervisors at Penn grew weary of a lack of results and demoted her, cutting



off her research funding and control of a lab. Undeterred, she moved to the neurosurgery department for a salary and lab space to continue her research.

Things finally changed for Kariko in 1997, thanks to a casual office conversation by the copy machine. An immunologist and physician named Drew Weissman had just joined Penn to start a lab focused on developing a vaccine against HIV and other diseases. He and Kariko shared a habit of photocopying articles out of recent scientific journals from the research library. By the machine, they discussed their respective approaches to vaccine development. Kariko tried to convince Weissman of the still unappreciated merits of the synthetic RNA she was making. “I’m open to anything,” says Weissman, and so he decided to give it a shot.

Kariko’s problem was that she hadn’t found a way to tamp down RNA’s tendency to trigger the immune system’s inflammatory response, which destroyed the RNA. Over nearly the next decade, Kariko and Weissman combined efforts, and eventually made a breakthrough: changing a specific mRNA building block helped the molecule evade the immune system. Building on that, Weissman figured out that encasing the mRNA in a fat bubble protected the precious genetic code when it was introduced to the body of a living thing, while at the same time triggering the immune system to target it—which is what a vaccine needs to do.

After that, their research sped up rapidly. For disease after disease—more than 20 in all, including norovirus, influenza, HIV, hepatitis and Zika—the mRNA-based vaccines the duo developed during the 2000s were nearly 100% effective in protecting lab animals from getting infected and sick.

The beauty of the platform lay in its flexibility. Influenza vaccines, for example, take months to develop because most require growing the virus in chicken eggs. An mRNA vaccine requires only a readout of a virus’s genetic sequence. Scientists can take that code, pick out the relevant parts of the genome, build the corresponding mRNA with chemical compounds, pop it into the fat bubble and—presto!—a new vaccine is born.

◀
IT TOOK A PANDEMIC
FOR THE WORLD TO
SEE THE VALUE OF
KARIKO’S WORK

In 2005, Kariko and Weissman reported their findings in what they thought would be a landmark paper in the journal *Immunity*, then waited for the accolades to flood in. “I told Kati the night before the paper was published, Tomorrow our phones are going to ring off the hook,” says Weissman. No one called.

It would take another 15 years—and the emergence of the devastating SARS-CoV-2 virus—before the global science community would finally grasp the importance of their discoveries. In the meantime, some scientists were gradually starting to build the case for the promise of mRNA, including Ugur Sahin and Ozlem Tureci, co-founders of a German company called BioNTech. In 2013, Kariko joined the company to head its mRNA program, focused at the time on cancer vaccines. In January 2020, Chinese researchers published the genetic sequence of the

◀...
**‘I think I was
rejected 24 times,
but I kept pushing.’**

—KATALIN KARIKO, BIONTECH

new coronavirus causing COVID-19. BioNTech quickly pivoted toward working on a vaccine for the novel coronavirus, eventually partnering with pharmaceutical giant Pfizer. By then, the groundbreaking nature of the technology Kariko and Weissman had pioneered finally had the attention of scientists worldwide, who realized that the plug-and-play model meant potentially lifesaving shots could be developed—and, more important, delivered—in record time.

The duo had created the perfect vehicle for targeting any virus or pathogen. But making a truly effective vaccine—one that could also efficiently stir a powerful immune response inside the body—would require another step.

THE FAINT DRAWL and easygoing nature of Kansas native Dr. Barney Graham can hide an intensity of devotion and singularity of purpose, qualities that Dr. Anthony Fauci back in 1997 felt made Graham the perfect deputy director of the newly



created Vaccine Research Center (VRC) of the U.S. National Institute of Allergy and Infectious Diseases. Vaccines appealed to Graham's MacGyver tendencies; as a child, he loved to troubleshoot broken-down equipment on the family farm. In the intervening years, those problem-solving interests migrated to HIV and respiratory syncytial virus (RSV). Graham was working on a vaccine for RSV, a coldlike contagion, when a new target, SARS-CoV-2, emerged.

Over the decades leading to the pandemic, one approach in particular had captured his scientific curiosity: "structure-based design"—essentially, constructing a vaccine based on the shape of the virus's proteins. It sounds intuitive enough, but at the time wasn't technologically feasible.

It would take Graham 25 years to solve that problem. It turns out the configuration that a key RSV protein takes on just before it fuses with a healthy cell looks drastically different from the form it takes after infection. The latter was where most vaccine efforts had been focused up to that point, in part because it's only in that pre-fusion shape for a very short time, as it

GRAHAM'S WORK
ON STRUCTURE-
BASED VACCINE
DESIGN
WOULD PROVE
FOUNDATIONAL

reconfigures itself constantly to evade the most potent antibodies. But a more effective vaccine would target the virus *before* it attached. By 2012, Graham and a postdoctoral fellow had figured out a way to stabilize that ephemeral formation long enough to attract the right immune cells. That revelation would turn out to be foundational because other viruses also adopt a similar pre-fusion form. "They're on many of the envelope proteins that we study, like HIV, influenza paramyxoviruses and Ebola," he says. "And they're also on coronaviruses."

In 2014, to put the discoveries of Graham's team to the test, the VRC began collaborating with Moderna, a small biotech company based in Massachusetts. (Like BioNTech, Moderna was working on making mRNA vaccines a reality, though focused on infectious diseases instead of cancer.) In July 2019, Graham and his team published early results showing that a vaccine built on Moderna's mRNA platform and containing their modified RSV protein boosted the immune response in people by more than tenfold over previous RSV vaccines.

Today's Family Caregiver

Being a caregiver for an older family member often means more than taking them to doctor's appointments, helping with meals or assisting them with help around the house. Some family caregivers help modify their loved ones' homes to be safer and more comfortable, provide legal and financial support, and serve as advocates for more care options at home.

And these are just three examples of caregiving provided by family members who usually don't identify as family caregivers, seeing their role instead as simply caring for their loved ones. But what people often don't recognize is that defining and understanding caregivers' roles can help them access a range of programs providing additional resources and support for their loved ones, and themselves. Here, experts at AARP share invaluable insights, advice, and suggested resources that may help today's caregivers meet the often unacknowledged needs of a rapidly growing population of older adults.

Home Safety

The majority of Americans ages 50+ say they prefer to stay in their own homes as they get older, and depend on family caregivers to ensure their home is safe and comfortable as their needs change. Hidden hazards such as poor lighting, loose rugs, and even small elevation changes can present dangers that aren't always as obvious as those associated with hard-to-navigate stairs and bathrooms. Updates to make homes safer can sometimes be as small and low-cost as changing light bulbs to a brighter wattage, changing door or cabinet handles, and taping down throw rugs. But sometimes they may involve thinking ahead and addressing potential home updates well before they become an issue. "The first thing is to think

broadly about your current and future needs, and to have this conversation up front so whoever you're working with understands those needs," says Dr. Rodney Harrell, Vice President of Family, Home and Community for AARP's Public Policy Institute. "Thinking ahead is the approach everyone needs to take. Think about yourself now and in the future, all the people that could enter your home, all the family members and friends who might have physical challenges. If we start thinking that way, that's when you can end up having the renovation solutions that really meet your needs now and in the future."

Finances

Helping a loved one manage their finances and legal needs may be one of the first things you do as a family caregiver and it can be a sensitive subject for all. That may mean starting a conversation about creating a will, organizing important documents, managing a loved one's assets on their behalf, or protecting them from financial scams targeted at older adults. Regardless, says AARP's Vice President of Caregiving, Bob Stephen, the key is to always start from a place of empathy and sensitivity.

Stephen suggests that family caregivers begin delicate conversations about financial and legal planning with open-ended questions, making sure to include all relevant family members in any discussion about money, wills, and estate planning. And if you

are planning to provide financial support for a loved one, try to understand in advance what the financial needs will be, determine if other family members will be helping, and budget accordingly.

Health Care and Home Care

The pandemic is changing the future of care. Over the past year, an entire generation has watched, and in some cases experienced, the crisis that has unfolded around care for older loved ones. Now, families face difficult decisions about trusting their loved one's care to others or potentially taking on even more responsibility. One of the most essential roles to play when helping a loved one is managing their health care needs and supporting care at home. This means researching all possible care options, assembling a team, asking questions during doctor visits (in person or virtually), and arranging and coordinating care. Families and their loved ones are often not aware of potential care options or how to evaluate what's available near them to make medical and non-medical care easier and more comfortable for all.



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your ever-changing role as a family caregiver

aarp.org/caregiving

Courtesy of the Vaccines

WHERE COVID-19 VACCINATION RATES WERE HIGH, LIFE REGAINED A SEMBLANCE OF NORMALCY

Locals dance inside a bar in Lisbon on Oct. 1; Portugal's high vaccination rate means almost all COVID-19 restrictions have been eased



Suzy Odell, traveling with her two kids from London, embraces her mother after arriving at Dulles International Airport in Virginia on Nov. 8, as U.S. borders were reopened to fully vaccinated travelers



Young people kiss in Tel Aviv on April 19, after the government said masks were no longer required outdoors; Israel had one of the world's fastest vaccination campaigns



Chinese fans attend a pre-Tokyo Olympics qualifying women's soccer match between China and South Korea in Suzhou, China, on April 13



▲ The Foo Fighters reopen Madison Square Garden on June 20, the first concert to be held there at full capacity since March 2020; proof of vaccination was required to attend

◀ Yoshia Uomoto, 98, reacts as her son and niece surprise her with an in-person visit, after restrictions were lifted at her assisted-living facility in Seattle, on March 30

In the meantime, Kizzmekia Corbett, a Ph.D. graduate in microbiology and immunology from the University of North Carolina at Chapel Hill, joined Graham's team, and had begun work applying what the group had learned about RSV to coronaviruses. By 2019, she and her colleagues had figured out how to design what's known as the spike protein, the part of the virus that attaches to the healthy cell, in such a way that the immune system could mount a maximal response. It was, essentially, advance work for the coming pandemic.

When the first reports of the new coronavirus emerged from China, Graham and Corbett were confident the technique would work on it, says Corbett: "All of that knowledge culminated to the point where we said, 'O.K., we know how to design a really good vaccine, because we've been doing this for six years.'" All they needed was the genetic code for SARS-CoV-2.

‘Once the sequence came out, we knew exactly what [to] do.’

—KIZZMEKIA CORBETT, HARVARD UNIVERSITY

Based on his success with freeze-framing the right viral structure of other viruses, Graham figured that stabilizing the SARS-CoV-2 spike protein at its similar state just before infecting a cell would have the same immune-activating effect in a vaccine. "We had done it with a dozen other coronaviruses and it worked every time," he says. "I was anxious to get the sequence for SARS-CoV-2." On Jan. 9, 2020, he emailed the director of the Chinese Centers for Disease Control, requesting the genomic data, then went to see Fauci. "He came into the room on the seventh floor," says Fauci, "and in his typical Southern drawl said, 'I just need the sequence. I'm telling you I think we can do this.'"

On Jan. 10, Chinese scientists published the sequence of the new virus, and the team got to work. "Dr. Graham and I had discussed exactly how we would maneuver in that moment, so once the sequence came out, we knew exactly what we would do," says Corbett. "We knew where to make

the mutations in the spike protein [to stabilize it] and we knew the type of platform we would like to make the vaccine with, which was the mRNA platform with Moderna. So we really had a plan."

Graham's insight—to target the pre-fusion spike protein—became the basis for several of the major vaccines being tested or used around the world now, including the ones from Pfizer-BioNTech, Moderna, Johnson & Johnson–Janssen, Sanofi and Novavax. Corbett predicts that it will also help humanity defend against other viruses that may emerge in coming years. "If we as scientists learn how to make a vaccine for a cousin in a viral family, and one of those cousins decides to make a pandemic," she says, "then we'll be ready, because we can apply the knowledge from one virus and vaccine to another in a plug-and-play way."

AFTER DECADES of largely unsung research, Corbett, Graham, Kariko and Weissman didn't have to wait long to see the results of their work on COVID-19 vaccines. On Nov. 8, 2020, Fauci received a call from Pfizer CEO Albert Bourla. "Are you sitting down?" he asked Fauci. "Because you're not going to believe the results. They're unbelievable, over 90% efficacy."

Graham's son and grandchildren were visiting when the news reached him. "We pretty much had a group hug and then I went back to work," he says. "After those 10 months of working all the time ... and trying to get to an end point, just the relief to know that we had something that might make a difference was the thing that was most meaningful to me."

Kariko was celebrating her daughter's birthday with her husband when she got the call from Sahin, BioNTech's CEO. He asked if she was alone, so she walked to another room, then celebrated in the same understated way that characterized her entire scientific career—with her favorite treat, a box of Goobers.

Weissman and Kariko got their first doses of the vaccine they helped develop on Dec. 18, 2020, and just before Christmas, Graham and Corbett got their first shots. "Most scientists never get to see their product actually used," says Graham. "To watch the evening news and see the relief from health care providers who were getting immunized, to see people in the clinic at NIH being vaccinated and being so relieved and so grateful—those were special moments."

The fastest any earlier vaccine had been developed was four years (for mumps, in the 1960s). The shots developed by Pfizer-BioNTech and

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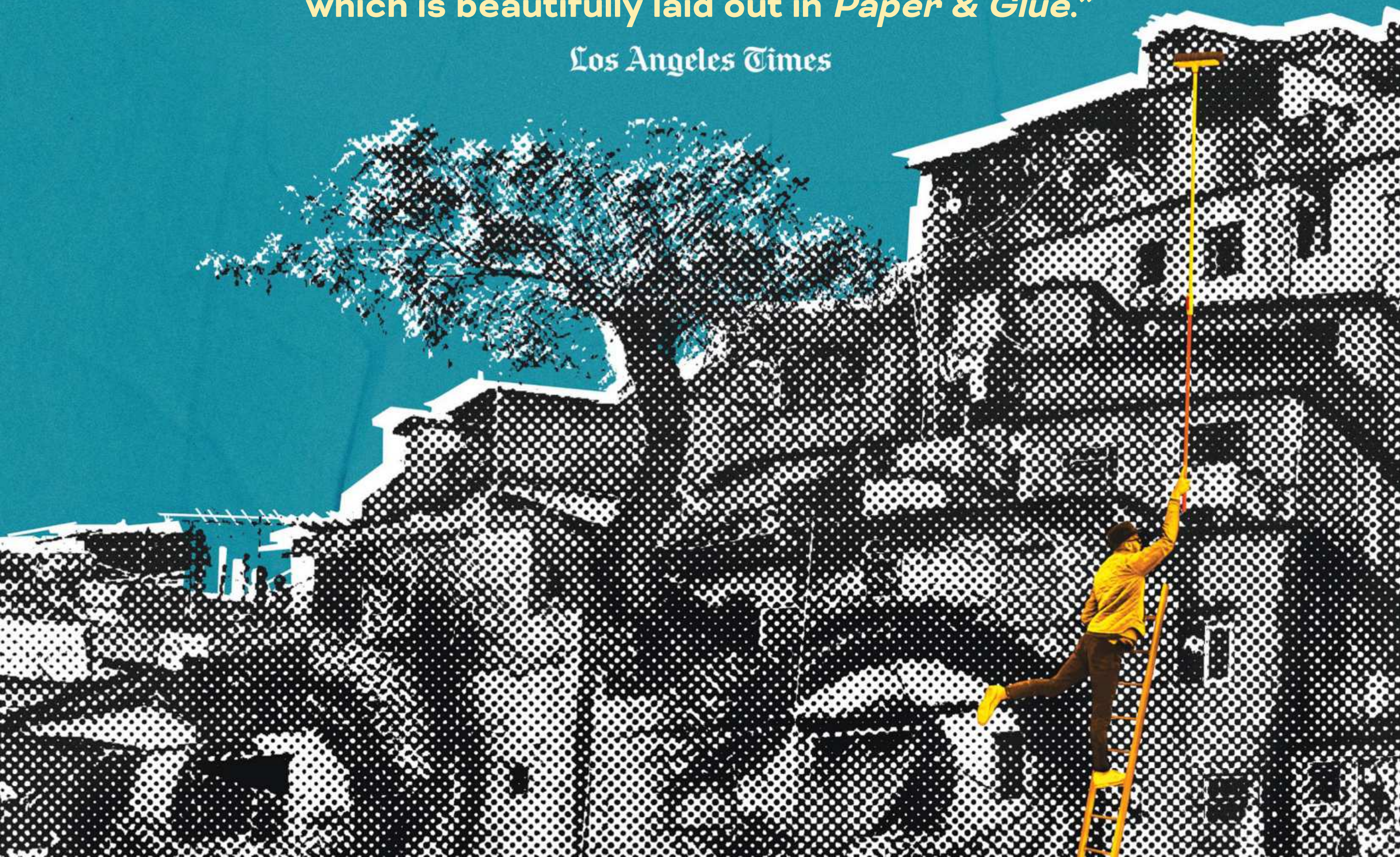
A JR PROJECT

“...his gift to us, at a time when people seem, indeed, as far apart as ever.”

The Washington Post

“It’s a collectivist pursuit of creating and interacting with art in public, especially among marginalized communities, which is beautifully laid out in *Paper & Glue*.”

Los Angeles Times



Moderna took less than 12 months. That made some skeptical: Could one trust a brand-new technology, engineered in record time to fight a brand-new virus?

That question, however, overlooks the years of work scientists had put into perfecting an mRNA platform. “Without [decades of] basic research, those vaccines would not have been possible,” says Dr. Stanley Plotkin, a veteran vaccinologist who invented the rubella vaccine. “When the epidemic broke out, the technology was available.”

Corbett admits that scientists themselves could have better communicated that fact. “Sometimes I regret the way that we announced that we could have a vaccine,” she says. “Because it came without the understanding of all the work that we had done before. While we did design a vaccine basically overnight, and move quickly into clinical trials, there was so much confidence in the way we did that because we’d been preparing for years.”

It was hardly the first miracle of science to defy belief. A year after the Apollo 11 lunar landing, 30% of Americans surveyed said they did not believe humans had actually walked on the moon. And that was long before social media, the rise of the antivax movement and the many other recent crises of truth that have created barriers to the successful rollout of the vaccines. In the U.S., tens of millions of people refuse to get the shots that are available almost everywhere.

Globally, vaccine hesitancy has combined with inequality and lack of access to create a disastrous state of affairs in poorer parts of the world. COVAX, the multinational program designed to distribute vaccines to low-income countries, is only about a quarter of the way to its original goal of distributing 2 billion doses by the end of 2021. Some of that can be chalked up to wealthier countries hoarding doses, but there are other problems. In some parts of the world, when doses arrive, health workers must overcome significant

CORBETT’S FOCUS AT THE VACCINE RESEARCH CENTER WAS TO FIGURE OUT THE BEST WAYS TO TARGET CORONAVIRUSES, LIKE SARS-COV-2

logistical challenges to get them from airport tarmac to people in hard-to-reach places, and doubts about vaccine safety and efficacy have proved a global phenomenon. That mix of challenges has created severe vaccine inequality, such that only 30% of India is completely protected, and not even 10% of people in Africa have been fully vaccinated. As long as that’s the case, the virus will continue to mutate, giving rise to new variants as it spreads almost unchecked.

That doesn’t mean the virus wins. The plug-and-play feature of the mRNA vaccines makes it possible to update them within months to target new variants, be it Omicron or whatever form the virus takes next. The virus moves fast, but scientists have created weapons just as nimble. Even the historically fast development of COVID-19 vaccines may seem slow in the future, now that mRNA platforms have been pressure-tested and fine-tuned.

“A renaissance in vaccinology” is what University of Pittsburgh Center for Vaccine Research director Paul Duprex calls the tools crafted by Kariko, Weissman, Graham, Corbett and the many scientists who collaborated with them over the years. They represent a novel path out of this pandemic, but also a new approach to quelling future ones. Already, vaccine makers are testing mRNA-based vaccines against influenza, potentially making them more effective, safer and easier to produce.

Thanks to the scientists leading the groundbreaking development and elegant construction of these COVID-19 vaccines, we now have a list of near-infinite possibilities. The vaccines work with a magnificence that only highlights how far science has come—and how far behind society remains in recognizing and accepting what is now possible. Our communications, our politics, our splintered cultures are still snarled in confusion and skepticism, keeping people from getting the shots. Through the harrowing first winter of COVID-19, scientists gifted humanity with the ultimate prize: a weapon to fight the pandemic. It’s now up to humanity to return the favor. —*With reporting by* LESLIE DICKSTEIN *and* JULIA ZORTHIAN □

‘Without [decades of] basic research, these vaccines would not have been possible.’

—DR. STANLEY PLOTKIN,
INVENTOR OF THE RUBELLA VACCINE





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ATHLETE
OF THE YEAR

Simone Biles

WITH THE EYES OF THE WORLD UPON HER, THE GREATEST GYMNAST
OF ALL TIME FORCED A GLOBAL CONVERSATION ABOUT MENTAL HEALTH

BY ALICE PARK AND SEAN GREGORY

AROUND 9 P.M. ON JULY 27, AS SIMONE BILES soared high above the vault at the Tokyo Olympics, she lost herself. You could see the confusion in her eyes, which darted sideways instead of locking onto the ground as she made her way back to earth. She would later reveal that she was suffering from a frightening mental hiccup, known as “the twisties,” that left her unsure of her whereabouts in midair.

As the Greatest of All Time (GOAT) in a sport that captivates the globe every four years, Biles is all about control. Her life is dedicated to micro-managing every possible element—her diet, her training, her sleep—that goes into performing, so when the lights are brightest, and the stakes highest, little is left to chance. But for Biles, control isn’t just about winning; it can be the difference between life and death. She now has four skills named after her, each a breathtaking combination of daring flips and twists. Avoiding disaster requires a constant, firm grip on mental acuity.

On that night, however, the careful tapestry of control that Biles, 24, had stitched began to

►
BILES AT WORLD
CHAMPIONS CENTRE,
HER GYM IN SPRING,
TEXAS, ON AUG. 29

unravel. Or at least started to, until she responded in a way that stunned millions of viewers around the world. In the middle of the Olympics for which she had trained for five years, and which was supposed to be the triumphant capstone on a historic career, Biles slipped on her warm-up suit, packed her competition bag and told her teammates she wouldn’t be competing with them, but rather cheering them on in the team event. Her mind and body weren’t in sync, she said, which put her at serious risk. She also withdrew from her next four events, returning only to participate in the final one. At an Olympics in which five gold medals for Biles seemed preordained, she won a team silver and a balance-beam bronze.

For her teammates, her withdrawal from events was a decision they didn’t have time to process as they scrambled to fill her position in the lineups. “We all knew we had to continue not without her, but for her,” says Sunisa Lee, who stepped up to win the all-around gold in Tokyo. “What Simone

PHOTOGRAPH BY
DJENEBA ADUAYOM
FOR TIME



did changed the way we view our well-being, 100%. It showed us that we are more than the sport, that we are human beings who also can have days that are hard. It really humanized us.”

An athlete’s clout is increasingly measured in much more than wins and losses. If 2020 showcased the power of athletes as activists after the murder of George Floyd, this year demonstrated how athletes are uniquely positioned to propel mental health to the forefront of a broader cultural conversation. While a few sports stars have opened up about mental health—Michael Phelps, for instance, has been candid about his post-Olympic depression—in 2021, the discussion became more wide-reaching and sustained. After withdrawing from the French Open in May to prioritize her well-being, citing anxiety, Naomi Osaka wrote in a TIME cover essay, “It’s O.K. not to be O.K.” Biles, by dint of her status at one of the world’s most watched events, raised the volume. “I do believe everything happens for a reason, and there was a purpose,” she tells TIME in an interview nearly four months later. “Not only did I get to use my voice, but it was validated as well.”

While supporters lauded Biles, critics lambasted her for “quitting.” But what Biles did transcended the chatter: she fought the stigma that has long silenced athletes, and shrugged off the naysayers who belittled her decision. “If I were going to quit, I had other opportunities to quit,” she says. “There is so much I’ve gone through in this sport, and I should have quit over all that—not at the Olympics. It makes no sense.”

A month after the Games, Biles put her vulnerability on display once again. Along with three other of the hundreds of other athletes who had been sexually abused by former team doctor Larry Nassar, Biles gave emotional testimony before the Senate about the failures of institutions like the FBI, USA Gymnastics (USAG) and the U.S. Olympic and Paralympic Committee (USOPC) to stop him.

Colin Kaepernick, no stranger to criticism for taking a stand, praises Biles’ “grace, eloquence and courage.” “Simone Biles has used her remarkable position as the world’s greatest gymnast ever to inspire a long overdue global conversation on mental health,” he tells TIME. “Her influence extends far beyond the realm of sports and shows us that another world—a better world—is possible when we speak our truths with integrity and authenticity.”

At a time when anxiety and depression rates are skyrocketing—the CDC reports a 50% rise in suicide attempts by teenage girls during the pandemic—and many people are struggling with



what they owe themselves vs. what others demand of them, Biles made clear the importance of prioritizing oneself and refusing to succumb to external expectations. With the eyes of the world upon her, she took the extraordinary step of saying, *That’s enough. I’m enough.*

BILES THOUGHT SHE WAS, as she puts it, “good to go” before the Games. In retrospect, she acknowledges that she was shouldering a heavy load as she trained. She was the face of Team USA, and fans around the globe were anticipating watching her gravity-defying skills. Gradually, she began to feel the Olympics were less about her fulfillment and more about theirs.

◆◆◆◆◆
‘It showed us that we are more than the sport.’

—SUNISA LEE, OLYMPIC GOLD MEDALIST



◀
**BILES AT A SENATE HEARING
ON THE FBI'S HANDLING
OF THE LARRY NASSAR
INVESTIGATION ON SEPT. 15**

In the past, when she left the gym, she didn't allow issues with certain skills to spill over into the rest of her day. But as Tokyo loomed, "my mind was racing and I wasn't going to sleep as easily," she says. The pandemic, which had delayed the Games from 2020, played a huge role in that, she thinks, since safety protocols meant she was limited to going to the gym and staying home. For the gregarious Biles, that meant more time alone with her thoughts. Things only got worse in Japan. "We couldn't hang out because of COVID-19 protocols," she says, "so things you normally don't think about because you don't have time, now you have hours on end to think about—those doubts, those worries and those problems."

Biles is the only survivor of the Nassar sexual abuse scandal still competing, and pushing for USAG and USOPC to be held responsible is part of what's driven her over the past few years. "I definitely do think it had an effect," she says of that burden. "It's a lot to put on one person. I feel like the guilt should be on them and should not be held over us. They should be feeling this [pain], not me."

It took Biles about a year after the first Nassar survivors came forward to reveal publicly that she is one of them; her mother Nellie remembers Biles calling her in tears in 2017, saying she needed to talk to her. Training every day only served as a reminder of what she had been through and the lack of accountability by USAG. Biles didn't feel she could even drive herself to and from her therapy sessions, so Nellie did, waiting outside in the car in case her daughter needed her.

That work, Biles felt, mentally prepared her for her second Olympics, which she attended without family because of COVID-19 restrictions. She had stopped going to therapy for about six months before the Games, Nellie says, insisting, "I'm fine, Mom." But after her scare on the vault, she called Nellie crying. "The only thing Simone kept saying was, 'Mom, I can't do it. I can't do it,'" says Nellie. In the days that followed, Biles says she got support from Team USA's mental-health experts, who were on-site for the first time at an Olympics. That helped her make another courageous choice: competing in the balance-beam final. "At that point, it was no longer about medaling, but about getting back out there," she says. "I wanted to compete at the Olympics again and have that experience that I came for. I didn't really care about the outcome. On that beam, it was for me."

BILES' ASSUREDNESS IN SPEAKING her truth and taking ownership of her fate offered permission for athletes and nonathletes alike to talk more openly about challenges they'd once kept to themselves. "Sacrifice gives back way more than it costs," says Kevin Love, a five-time NBA All-Star whose 2018 discussion of his in-game panic attacks helped start to destigmatize mental struggles in his sport. "I do believe that it often takes one person to change the trajectory of a whole system."

Olympian Allyson Felix, who gave birth to her daughter Camryn in 2018, knows how athletes are expected to make winning their everything. She says Biles will have more influence for stepping back and taking stock of what really mattered than she would have by snapping up more medals. "To see her choose herself, we're going to see the effects of that for the next generation," says Felix,

who became the most decorated female track-and-field athlete of all time in Tokyo. “When thinking about role models for Cammy, wow, here is someone showing you can choose your mental health over what the world says is the most important thing.”

THE MESSAGE IS ALREADY being put into practice. As head coach for women’s gymnastics at the University of Arkansas, Olympian Jordyn Wieber, another Nassar survivor, sees Biles’ decision as an opportunity for her team to “take those lessons she’s displaying on a worldwide level and apply them to their daily lives as student athletes.” During the Olympics, Ty-La Morris, 14, an aspiring gymnast from the Bronx, stayed up past her bedtime to watch coverage of the gymnastics events. When she heard people questioning Biles’ fortitude, she defended her. “Everybody

‘It often takes one person to change the trajectory of a whole system.’

—KEVIN LOVE, FIVE-TIME NBA ALL-STAR

kept coming after her, and nobody was in her shoes,” she says. Witnessing a Black woman thrive in a traditionally white sport gives Morris the confidence that she too can make the Olympics, but in addition, she’s now more likely to tell her coach if she’s having difficulty, which she wouldn’t have been comfortable doing before.

Experts agree that especially for young Black women, Biles’ actions were a signal that it’s acceptable to claim agency over both their minds and their bodies. Since the days of slavery, says LaNail Plummer, a therapist who specializes in providing mental-health services to Black and LGBTQ communities in the D.C. area, the bodies of Black women have been subject to fetishization: for purposes of labor, reproduction or athletic entertainment. Throughout their careers, for example, tennis stars Venus and Serena Williams have been the targets of racist and sexist comments because of their appearances. “Our bodies

have always been under scrutiny,” says Plummer. “Oftentimes, Black women are not given the freedom to be able to just be authentic. Oftentimes, they have to be what somebody asked them or designed for them to be.”

So when a Black female athlete like Biles takes visible steps to safeguard her own mental and physical health, to indicate that it’s worth protecting, that action carries a special power. Plummer has noticed that since Tokyo, more personal and professional contacts have initiated conversations about their mental health. This is significant, as research has found that many Black women feel they must project an image of invulnerability and the stigma around mental health deters them from seeking help. And although Black adults are more likely than white ones to report symptoms of emotional distress, only 1 in 3 Black adults who needs mental-health care receives it. “It is a privilege of people who have money to see a therapist,” says Reuben Buford May, a professor of sociology at the University of Illinois Urbana-Champaign who studies race and culture. “Intertwined with that is that African Americans have disproportionately been among the poor and have not been able to have health care to pay for mental-health services.”

Biles alone won’t change mental-health inequities or force a society that has long paid lip service to the importance of mental health to do more. But she made it that much harder to look away. And, according to school psychologist Shawna Kelly, a member of the National Association of School Psychologists’ board of directors, Biles’ actions will help accelerate a trend that was already under way. Recently, Kelly has seen more kids asking for help, as well as expressing concern for their friends. “Often that’s before a real crisis, which is where I feel there is more opportunity to work with kids preventively and proactively.”

In June, before she had any idea of the experiences to come, Biles had Maya Angelou’s *AND STILL I RISE* tattooed on her collarbone. “It’s a reminder and a tribute to everything I had been through, and that I always come out on top,” she says. The Olympics did not go the way she or anyone else expected, but she’s not wallowing in what-ifs. She’s back in therapy, just finished headlining a U.S. tour and is feeling confident about the decision she made in Tokyo. “I was torn because things weren’t going the way I wanted,” she says. “But looking back, I wouldn’t change it for anything.” —*With reporting by NIK POPLI and SIMMONE SHAH* □

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RODRIGO,
PHOTOGRAPHED
IN LOS ANGELES
ON NOV. 22

ENTERTAINER
OF THE YEAR

Olivia Rodrigo

THE 18-YEAR-OLD SINGER-SONGWRITER'S
UNINHIBITED, CONFESSIONAL ALBUM
CAPTURED THE TONE OF A TURBULENT YEAR

BY LUCY FELDMAN

PHOTOGRAPH
BY KELIA ANNE
FOR TIME

THE AIR IS MUSTY, *BUFFY THE VAMPIRE SLAYER* IS playing on an ancient TV by the door, and Olivia Rodrigo is flipping through racks of slip dresses and flared pants. "What's your style?" she asks. I tell her, unhelpfully, that I'm looking for something I might actually wear. She nods and says, "Vibes."

We're at a vintage shop in East Los Angeles, one the 18-year-old singer-songwriter frequented while working on her debut album, *Sour*. She was out late last night at the American Music Awards, but she's moving so quickly this morning you'd never guess. She's using one hand to browse, the

other to grip a matcha latte, and somehow, without my noticing, has managed to collect at least five pieces under her elbow.

She suggests, for me, a T-shirt reading #1 MOM. I explain why I can't take it home: once you're in your 30s, there's no room for irony about motherhood. Instead, the winner is a baby blue tee with a spy plane on it. "It's soft," she says, handing it my way. I can't describe why it's cool. It just is.

Rodrigo has a gift for picking the best of the past—whether a well-worn shirt, the faded feedback of a guitar or the intensity of first love—and finding just the right way to situate it in the present. Her songs have hit with audiences of all ages, in large part because she renders adolescence so viscerally: she's resentful, seething, crushed, itching to just grow up already. On *Sour*'s opening track, "Brutal," she rants, "And I'm not cool and I'm not smart/ And I can't even parallel park." It's teen angst, delivered with a wink.

Her rise to pop stardom was swift and definitive: it started on Jan. 8, when Rodrigo, already a Disney actor with an audience, released her first single, "Drivers License," a torch song that took off on TikTok and stirred up theories about who inspired it. By Jan. 23, she became the youngest



solo artist ever to debut at No. 1 on the *Billboard* Hot 100, where her song stayed for eight weeks. Soon after, Rodrigo was performing on *Saturday Night Live*, which had already aired a sketch about bros in a bar weeping along with the lyrics (“I got my driver’s license 55 years ago—why is this hitting me so hard?”). Halsey sent Rodrigo a cake, Cardi B shouted her out on Twitter, and Taylor Swift offered her props on Instagram.

Any questions about whether Rodrigo could repeat the success of “Drivers License” were put to rest when she released *Sour* on May 21. The album, scruffier than the symmetrical, beat-driven music that tends to dominate pop culture, announced her as a serious artist. With moody, confessional lyrics that added chapters to the story told in “Drivers License,” *Sour* offered something we needed after more than a year of unending distress: an outlet for anger and permission to cry. Hailed by critics, it also continued Rodrigo’s streak of smashing records: with approximately 385 million streams, *Sour* became Spotify’s most popular release by a female artist in its first week.

After dropping her music in pandemic-era isolation, Rodrigo sang at multiple awards shows, earned seven Grammy nominations—including Best New Artist, and Song, Record and Album of the Year—and was revealed to have the most-streamed album and song of the year around the world on Spotify. Somewhere along the way, she even appeared at the White House with President Joe Biden to encourage young people to get vaccinated. And on Dec. 6, she announced a 41-city tour for 2022.

For now, Rodrigo’s taking things one step at a time. She moved into her own place this year, but her parents are still a big part of her routine (she hasn’t quite figured out the whole grocery shopping and laundry thing yet). She knew the shape of her world was forever changed right after she released “Drivers License”—she shelved her fantasy of attending Columbia University—but she isn’t forcing anything. “I’d be lying if I said there wasn’t any pressure,” she says. “But I sometimes remember: This happened 10 months ago. You don’t have to have it all figured out yet.”

RODRIGO HAS BEEN WORKING toward her meteoric rise for more than a decade. A Filipino American, she grew up the only child of a therapist and a teacher in Temecula, Calif., and started writing songs, taking voice lessons and auditioning for acting jobs in grade school. Her first big role was in *Grace Stirs Up Success*, a 2015 American Girl movie about a spunky baker. By 12, she was playing



a vlogger on Disney’s *Bizaardvark*, for which she learned to play the guitar and took the family to L.A. In 2019, Rodrigo made the jump to another Disney show that would change everything for her: *High School Musical: The Musical: The Series*, a reboot of the hit movies.

As Nini, a theater kid cast as the lead in her school’s production of *High School Musical* while going through a breakup with her co-star (an instance of art imitating life, if you believe the gossip about “Drivers License”), Rodrigo deftly stepped into the role of an ingenue balancing ambition and heartache. She was also able to showcase her songwriting skills: when they needed a reflective song for Nini, showrunner Tim Federle, who had seen videos of Rodrigo playing songs she wrote on Instagram, invited her to give it a shot. He sent her an email, with her mom copied, but noted that schoolwork and SAT prep should come first. Just a few days later, Rodrigo played him a draft. “She plugs into something that is so well observed and so raw,” Federle says. Her song “All I Want” took off on

—*—
**‘This happened
 10 months ago.
 You don’t have to have
 it all figured out yet.’**



TikTok in late 2019, the hit of the season.

Instead of signing with Disney's Hollywood Records, once home to Miley Cyrus and Selena Gomez, Rodrigo went with Geffen Records, which had emphasized her skill as a songwriter. The deal was announced in January 2021, and she chose to make her album with Dan Nigro, a producer who has worked with alt-pop darlings like Conan Gray and Caroline Polachek. Together, Nigro and Rodrigo had already made "Drivers License."

Nigro and Rodrigo bonded over shared references: he and her mother are just a few years apart, which meant that his nostalgic favorites were the songs Rodrigo heard at home. "She knows the whole Rage Against the Machine catalog the same way I do," Nigro says. And he respected her impulse to continue innovating as they crafted the songs that became *Sour*, even with the overwhelming success of "Drivers License." "It made her feel empowered to do other things, which felt so mature," he says. When Rodrigo released the swoony midtempo "Deja Vu" as her second single, she became the first artist ever to debut both of their first official singles in the top 10 of the Hot 100.

"Songwriting is the thing I take most seriously in my life," Rodrigo says. "It's the most personally gratifying too." She'll return for Season 3 of the *High School Musical* series, which starts filming in January, and maybe she'll act more in the future. But music is her priority. While she was surrounded by adults with more power and

▲
**RODRIGO ONSTAGE
AT THE VMAS ON
SEPT. 12; VISITING
THE WHITE HOUSE
TO ENCOURAGE
YOUNG PEOPLE TO
GET VACCINATED,
ON JULY 14**

experience when making *Sour*, she held firm in her belief that people want to hear something honest. The songs had to come from her. "I literally wrote them in my bedroom," she says. "And I think you can tell."

RODRIGO HAS A SENSE of humor about what she's laid bare to the world. Recently, her therapist listened to "Brutal," the teen tantrum anthem, for the first time. "She was like, 'That song is like everything we talk about today,'" Rodrigo says. "And I'm like, 'Oh, no! Have I not grown at all?'"

She embraces a key quality of her generation: messy, uninhibited vulnerability. It shows up in her songs and in the way she shares her life. She talks about her mental health, she watches *Twilight*, she gets angry, she posts pictures of her parking tickets—she does in the open all these things that 18-year-olds used to do in secret, making me ask myself why I was so ashamed to derive pleasure from cheesy movies, to have needs, to make mistakes.

Like other young stars before her, she's forming her identity and figuring out how to run her career in real time. "You definitely have to be a businesswoman to be a musician," she says. She has a partnership with Geffen to be able to own her masters, the copyright to the recordings of her songs. Masters are typically held by labels—a practice that has prompted Swift to remake her albums so she can own the recordings. "There's a path for me to have a stake in the music and art I create, which is only fair," Rodrigo says.

She's also found herself in the center of an industry debate that's growing louder. As music-copyright claims have skyrocketed, artists and labels have sought to avoid bad publicity and costly lawsuits. Rodrigo, who took inspiration from Swift for a *Sour* track and credited her when it was released, faced Internet accusations that there were similarities between more of her songs and others'. She later added credits on two additional tracks. For her, it was a lesson in business, but also something deeper. "It was really frustrating to see people discredit and deny my creativity," she says. (Nigro is more coy: "It seems like people get funny about things when songs become really popular.")

The conversation about ownership often collides with questions about artistic influence. Music critics have identified echoes of Swift, Carly Simon and Alanis Morissette in Rodrigo's visceral lyrics, and tones reminiscent of Avril Lavigne, Lorde and Paramore in the punky inflections of *Sour*'s melodies. She's been put in prestigious company—but this also means she's talked about as if she doesn't stand on her own. Rodrigo knows the latter is impossible to avoid, but wishes it weren't. "Young women are constantly compared to each other. I'm the 'new this' or 'this woman meets that woman,' and that can be reductive," she says. "I'm just Olivia. I'm doing my own thing. It's meaningful when people recognize that."

Her idols do. She named Gwen Stefani as the person she'd most like to write a song with. "I'd be honored," Stefani says. Morissette sees a "solidity" in her. "She has a steadfast care about self-expression. She's not precious about it, nor does she seem overwhelmed by it all." And songwriting legend Carole King, whose music Rodrigo discovered through her mother, says she has "a gift of knowing how to tell a story in a song."

THERE'S AN UNDENIABLE SATISFACTION in watching someone spin a heartbreak into a hit—and Rodrigo is open about how incredible that feels. At the same time, she's aware that writing

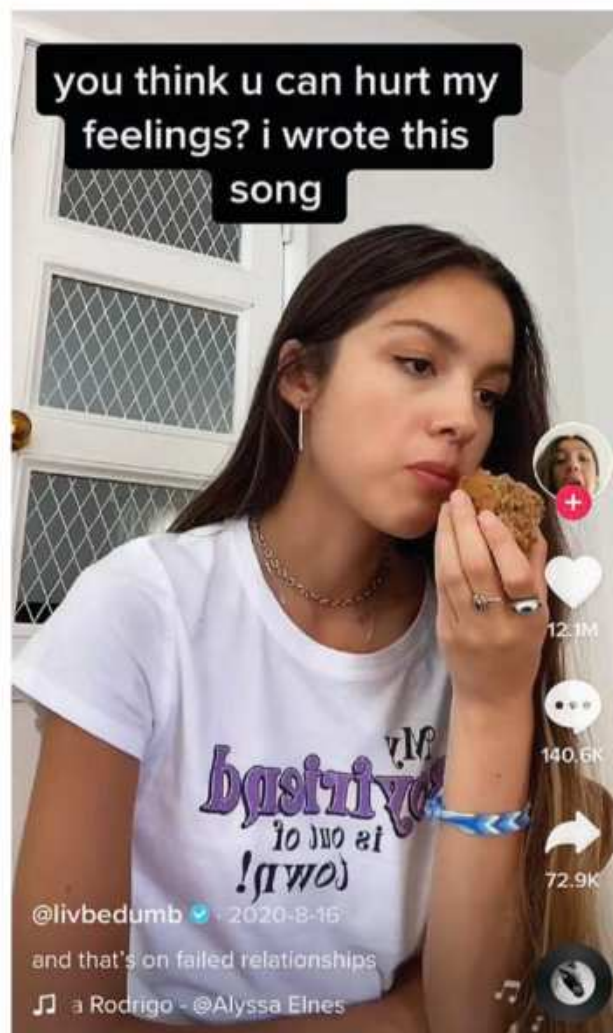
revealing lyrics also means inviting questions about the people she addresses in her songs. When I ask her what, if anything, she feels she owes those people, she laughs, her tone shifting. "At the core of it, all my songs are about me and my experiences and my feelings," she says. She understands the alchemy at work for the listener—how anyone could take her words and apply them to their own life. Naming names would only ruin the effect. "It's an important lesson in controlling your own narrative too," she says. People

write stories about her that she can't control. Songwriting is a way of reclaiming her power.

And listening to Rodrigo's music can be a way for her audience to reclaim theirs. She tilts the frame away from the people who've let you down and the disappointments you've faced and back toward the person who matters: you. Her songs offer validation—a kinship in knowing that your heartbreak, rage or self-doubt is universal. Young people feel seen, and adults get a potent reminder of how we all feel like that insecure deflated kid version of ourselves sometimes.

For an artist, it's an impressive trick—time travel for the listener. In the vintage store, she moves through the decades herself, skimming confidently through things of the

past. Now there's a pile of clothes on the counter: the spy-plane shirt and another top for me; a slip dress, feathery tank, leather skirt and graphic tee for her. Everything in Rodrigo's haul has Winona Ryder vibes—as a kid, she was more into the Audrey Hepburn look, but now she's fascinated by the '90s and Y2K. "It was the last time people could exist without being hypersaturated on social media," she says. "People seemed cooler because they weren't sharing every aspect of their lives." She wraps the waist of the skirt around her neck to see if it will fit—a trick she saw on TikTok. She'll give it to a friend if it doesn't work out. As we walk to the back door, we stop to take a selfie. Rodrigo purses her lips, lifting her bag of clothes into the frame. At 18, she already knows: everything old becomes new again. —With reporting by MARIAH ESPADA and SIMMONE SHAH



RODRIGO IN A 2020 TIKTOK VIDEO SET TO "ALL I WANT"

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BEST OF CULTURE

The books, music, films,
TV shows and podcasts that
delighted, provoked and
propelled us through the year

RUTH NEGGA
GIVES AN
OTHERWORLDLY
PERFORMANCE
IN *PASSING*

PHOTOGRAPH BY DIANA MARKOSIAN

ZAUNER IS HAVING A
MAJOR YEAR: JAPANESE
BREAKFAST IS
NOMINATED FOR BEST
NEW ARTIST AT THE
2022 GRAMMY AWARDS



BEST NONFICTION BOOKS

BY ANNABEL GUTTERMAN

1 **A Little Devil in America**

A finalist for the National Book Award, **Hanif Abdurraqib**'s work of cultural criticism is an astonishing accounting of Black performance. In lyrical essays, Abdurraqib analyzes everything from the rise of Whitney Houston to a schoolyard fistfight. The author, also a poet, seamlessly blends pop culture references with U.S. history and stories from his own upbringing. He

covers broad ground with ease and wit, an impressive balance for a book that is as bold as it is essential.

2 **Crying in H Mart**

When **Michelle Zauner**, founder of the band Japanese Breakfast, was 25 years old, her mother was diagnosed with terminal cancer. That

illness and her mother's eventual death shattered Zauner's sense of self—and forced her to re-evaluate her relationship with her Korean culture. In her memoir, the artist searches for answers about her identity and creates a devastating portrait of a mother and daughter and the life they shared.

3 **Invisible Child**

For almost a decade, reporter **Andrea Elliott** observed the coming-of-age of a girl named Dasani, who has lived in and out of the New York City shelter

of slavery and how it has shaped the country. The result is an insightful dissection of the relationship between memory, history and America's ongoing reckoning with its past.

5 **Aftershocks**

Born in Tanzania and raised all over the world, from England to Italy to Ethiopia, **Nadia Owusu** never felt she belonged anywhere. In her aching memoir, she embarks on a tour de force examination of her childhood, marked first by her mother's abandoning her when she was a toddler and later by the death of her beloved father. Through assessing the people and places that shaped her, Owusu picks up the pieces of her life to make sense of it all. In lyrical and lush prose, she crafts an intimate and piercing exploration of identity, family and home.

6 **Empire of Pain**

From the author of the 2019 best seller *Say Nothing*, which dived into Northern Ireland during the Troubles, *Empire of Pain* is a stirring investigation into three generations of the Sackler family. **Patrick Radden Keefe** explores the Sacklers and the source of their infamous fortune, earned by producing and marketing a painkiller that became the driving factor behind the opioid crisis. It's a sweeping account of a family's outsize impact on the world—and a dogged work of reporting that showcases the horrific implications of greed.

7 **A Swim in the Pond in the Rain**

George Saunders is deeply familiar with the 19th century Russian short story—he's been teaching a class on the subject to M.F.A. students for two decades. Here, he opens up his syllabus, analyzing seven iconic works by authors including Chekhov and Tolstoy to highlight the importance of fiction in our lives. In a world bursting with distractions, *A Swim in the Pond in the Rain* demands the reader's attention; Saunders begins by breaking down a story line by line. In less thoughtful hands, this exercise would be draining, but Saunders infuses

so much heart into the practice that instead it is simply fun.

8 **The Copenhagen Trilogy**

Originally published as three separate books in Danish between 1967 and 1971, *The Copenhagen Trilogy*, now presented in a single translated volume, is a heartbreaking portrait of an artist. In precise and brutally self-aware terms, **Tove Ditlevsen** reflects on her life, from her turbulent youth during Hitler's rise to power to her discovery of poetry and later to the dissolution of her multiple marriages. Though the story was written decades ago, the complexities of womanhood that Ditlevsen captures are timeless.

9 **Finding the Mother Tree**

In her first book, pioneering forest ecologist **Suzanne Simard** blends her personal history with that of the trees she has researched for decades. *Finding the Mother Tree* is as comprehensive as it is deeply personal, especially as Simard writes of her curiosity about trees and what it has been like to work as a woman in a field dominated by men. Her passion for the subject at the book's center is palpable on every page, coalescing into an urgent call to embrace our connection with the earth and do whatever we can to protect it.

10 **The Kissing Bug**

When **Daisy Hernández** was a child, her aunt traveled from Colombia to the U.S. in search of a cure for the mysterious disease that caused her stomach to become so distended that people thought she was pregnant. Growing up, Hernández believed her aunt had become sick from eating an apple; it wasn't until decades later that she learned more about Chagas disease. As Hernández describes in her deftly reported book, Chagas—transmitted by “kissing bugs” that carry the parasite that causes it—is an infectious disease that sickens hundreds of thousands of people in the U.S., many of whom are poor immigrants from Latin America. She traces the history of Chagas and the lives most impacted by it, offering a nuanced and empathetic look into the intersections of poverty, racism and the U.S. health care system.

system for most of her life. Dasani's existence is full of contradictions—her Brooklyn shelter is just blocks away from some of the borough's most expensive real estate—and Elliott is relentless in her efforts to capture them all. In exact and searing detail, she places Dasani's story alongside the larger issues of inequality, homelessness and racism in the city and more broadly the U.S.

4 **How the Word Is Passed**

Amid a discussion of what students should be learning about history, **Clint Smith**, a poet and journalist, takes readers across the U.S.—from the Monticello plantation in Virginia to a maximum-security prison in Louisiana—to underline the legacy

BEST FICTION BOOKS

BY ANNABEL GUTTERMAN

1 Great Circle

The beginning of **Maggie Shipstead's** astounding novel, a Booker finalist, includes a series of endings: two plane crashes, a sunken ship and several people dead. The bad luck continues when one of the ship's young survivors, Marian, grows up to become a pilot—only to disappear on the job. Shipstead unravels her protagonist's life in glorious detail through a narrative made to be devoured, one that is both timeless and fulfilling.

2 The Prophets

At a plantation in the antebellum South, enslaved teenagers Isaiah and Samuel work in a barn and seek refuge in each other until one of their own, after adopting their master's religious beliefs, betrays their trust. In *The Prophets*, a National Book Award finalist, **Robert Jones Jr.** traces the teens' relationship within the complex hierarchy of the plantation. The result is a crushing exploration of the legacy of slavery and a delicate story of Black queer love.

3 My Monticello

Jocelyn Nicole Johnson's searing short-story collection is one to read in order. Its narratives dissect an American present that doesn't feel at all removed from the country's violent past, and build to a brutal finish. The unnerving standout story—the titular novella—follows a group of neighbors on the run from white supremacists. It's as apocalyptic as it is realistic, a haunting portrait of a community trying to survive in a nation that constantly undermines its very existence.

4 Detransition, Baby

Reese is a 30-something trans woman who desperately wants a child. Her ex Ames, who recently detransitioned,

just learned his new lover is pregnant with his baby. Ames presents Reese with the opportunity she's been waiting for: perhaps the three of them can raise the baby together. In her delectable debut novel, **Torrey Peters** follows these characters as they wrestle with a life-altering decision.

5 The Love Songs of W.E.B. Du Bois

The debut novel from poet **Honorée Fanonne Jeffers** is a piercing epic spanning 200 years. At its core is the mission of Ailey Pearl Garfield, a Black woman coming of age in the 1980s and '90s, determined to learn more about her family history. What Ailey discovers leads her to grapple with her identity, particularly as she discovers secrets about her ancestors. In 800 rewarding pages, Jeffers offers a comprehensive account of class, colorism and intergenerational trauma. It's an aching tale told with nuance and compassion—one that illuminates the cost of survival.

6 The Life of the Mind

Dorothy is an adjunct English professor enduring the sixth day of her miscarriage. In **Christine Smallwood's** taut debut, Dorothy relays amusing observations on her ever collapsing universe. Languishing in academia, Dorothy wonders how her once attainable goals came to feel impossible. Her endlessly entertaining catalog of thoughts gives way to a gratifying examination of ambition and freedom.

7 Cloud Cuckoo Land

The five protagonists of **Anthony Doerr's** kaleidoscopic and remarkably constructed third novel, all living on the margins of society, are connected

by an ancient Greek story. *Cloud Cuckoo Land*, a National Book Award finalist, moves from 15th century Constantinople to an interstellar ship to a dusty Idaho library as the characters interact with the tale. Doerr's immersive world-building and dazzling prose tie together seemingly disparate threads as he underlines the value of storytelling and the power of imagination.

8 Afterparties

The nine stories that constitute **Anthony Veasna So's** stirring debut collection, published after his death at 28, reveal a portrait of a Cambodian American community in California. From a story about two sisters reflecting on their father to another about a high school badminton coach stuck in the past, So's narratives offer a thoughtful view into the community that shaped him. While he describes the tensions his characters navigate with humor and care, So also reflects on immigration, queerness and identity.

9 Open Water

In his incisive debut novel, **Caleb Azumah Nelson** tells a bruising love story about young Black artists in London. His protagonist is a photographer who has fallen for a dancer, and Nelson proves masterly at writing young love, clocking the small and seemingly meaningless moments that encompass longing. He celebrates the art that has shaped his characters' lives while interrogating the unjust world that surrounds them.

10 Klara and the Sun

The eighth novel from Nobel Prize-winning author **Kazuo Ishiguro** follows a robot-like "Artificial Friend" named Klara, who sits in a store and waits to be purchased. When she becomes the companion of an ailing 14-year-old girl, Klara puts her observations of the world to the test. In exploring the dynamic between the AI and the teen, Ishiguro crafts a narrative that asks unsettling questions about humanity, technology and purpose.



PETERS' NOVEL
DETRANSITION,
BABY IS SET TO
BE ADAPTED FOR
TELEVISION BY
GREY'S ANATOMY
PRODUCERS

PHOTOGRAPH BY CAMILA FALQUEZ



INDIE RAPPER STAPLES
REVEALS MORE OF
HIMSELF ON HIS SELF-
TITLED FOURTH ALBUM

BEST ALBUMS

BY ANDREW R. CHOW AND CADY LANG

1 Promises

Listening to *Promises* by **Pharoah Sanders** and **Floating Points** is like driving through an ever changing coastal landscape, as sheer cliffs, flowing rivers and rolling fields of purples and reds emerge out of the haze. Organized around one recurring ethereal riff, the unlikely collaborative duo of Sanders (an 81-year-old Arkansan free-jazz saxophonist) and Floating Points (a 35-year-old British electronic producer) build a topography of reverie and chaos, with some help from the magisterial London Symphony Orchestra. It's a stunning nexus of jazz, classical and ambient influences that transcends genre to create something wholly new.

2 Vince Staples

On his eponymous fourth studio album, *Long Beach, Calif.*, rapper **Vince Staples** fully leans into the elements that have garnered him a cult following in the indie rap scene: downtempo beats; moody melodies; and dark, deadpan wit about the grim realities of the street. Produced entirely by his friend and hip-hop producer of the moment Kenny Beats, this tightly curated 10-track LP offers the most intimate look yet at who the inscrutable Staples is—as both a man and an artist.

3 to hell with it

If you're searching for the sound of the future, look no further than **PinkPantheress**'s exhilarating debut mixtape for the digital age. The 20-year-old artist pulls from old-school house and garage samples, fortified with doses of breakbeat, to construct her dreamy, emotive dance tracks, bolstered by her

silky, angelic vocals. The 10 songs clock in at just under 19 minutes, but this brevity highlights her dextrous ability to deliver a vibe in two minutes or less.

4 Blue Weekend

Elegant, petulant, abrasive, foreboding: the third album from the English rock band **Wolf Alice** covers a lot of emotional and musical ground, and it does so fluidly and flawlessly. Lead singer Ellie Rowsell sounds tremendous throughout, whether she's sweetly harmonizing with herself in tributes to California (on the standout "Delicious Things") or screaming with the feral energy of Courtney Love.

5 Still Over It

Like any true diva of the R&B genre, **Summer Walker**'s music is fueled by romantic melodrama. Her excellent second studio album is no exception. Inspired by the rumored infidelity of a former partner, London on da Track, not only the father of her daughter but a producer on several of the album's songs, Walker uses *Still Over It* as both dialogue and catharsis. The result is a soulful, intoxicating breakup album destined to become a contemporary R&B classic. With smooth-as-hell vocals and deliciously wry misandry, heartbreak never sounded so good.

6 The Marfa Tapes

While most country music coming out of Nashville these days wears a glossy sheen, this record from **Miranda Lambert**, **Jack Ingram** and **Jon Randall** was recorded in the desert of Marfa, Texas, where you can hear beer cans crack open and planes fly overhead. But what the album lacks in production value it more than makes up for in breathtaking triple harmonies, tender fingerpicked guitar work and an ineffable sense of communal joy. Together, the trio finds ecstasy in small things—like homegrown tomatoes—and deliverance after brutal heartbreak.

7 Donda

It would be easy to let the polarizing controversies of **Kanye West** overshadow the exhilarating thrills of his 10th studio album, but to do so would be to miss out on a glorious, if slightly messy, opus. The album, which rolled out after a series of highly publicized listening parties, finds Ye pondering his faith and mother (for whom the album is named), his impending divorce and his family over a sprawling and ambitious 27 tracks. Though haters derided its length and contentious release, its joy lies within its huge roster of guest talent, from the Weeknd to Jay Electronica, and West's impressive ability to commandeer this wealth into a sonic experience both spiritual and sublime.

8 The Hands of Time

The percussionist **Weedie Braimah** draws a link between West African drumming traditions and newer strains of Black American music—including hip-hop, funk, jazz and fusion—on this astonishingly diverse yet cohesive album. While more famous luminaries like Trombone Shorty and Christian Scott aTunde Adjuah show up for solos, Braimah's powerful djembe work remains at the forefront throughout.

9 Navy's Reprise

The Brooklyn rapper and skateboarder Sage Elsesser, who goes by **Navy Blue**, raps with a cool patience, his lyrics spilling out not so much in couplets as amorphous word clouds. Over dusty soul samples, deft piano voicings and whining saxophones, Elsesser raps of family, strife and salvation, employing a flurry of homonyms and internal rhymes that will keep listeners finding new sleights of tongue upon every play.

10 Heaux Tales

Jazmine Sullivan fully commits to her pleasure—and ours—with *Heaux Tales*, her fourth studio album, a paean to the triumphs and tribulations of sex and love. Interspersed with spoken-word interludes by a chorus of different women, the album is an ode to female desire, driven by Sullivan's sultry, powerhouse vocals.

BEST MOVIES

BY STEPHANIE ZACHAREK

1 **The Power of the Dog**

In 1920s Montana, a misanthropic rancher (Benedict Cumberbatch) meets a reedy, dreamy teenager (Kodi Smit-McPhee) who arouses his contempt—and more. Jane Campion's gorgeous, sinewy western, based on Thomas Savage's 1967 novel, is a movie as big as the open sky—but also one where human emotions are distinctly visible, as fine and sharp as a blade of grass.

2 **The Worst Person in the World**

Danish-Norwegian director Joachim Trier's staggeringly tender comedy-drama feels like a gift from the gods. On the road to figuring out who she is, Julie (Renate Reinsve, in a performance of marvelous, sturdy delicacy) falls in love first with one man and then another, only to realize she's more lost than ever. Trier guides this story to a joyous, bittersweet landing—a reminder that we're all works in progress, unfinished beings whose only imperative is to turn toward the light.

3 **Summer of Soul**

Ahmir "Questlove" Thompson's radiant documentary chronicles a star-studded free concert series that took place in a Harlem park during the summer of Woodstock but received far less attention. The Harlem Cultural Festival drew huge crowds, but in the years since, this civil rights-era celebration of pride and music had been largely forgotten—or, perhaps more accurately,

simply neglected. Like jewels hidden in plain sight, the film showcases glorious performances from Mahalia Jackson, Stevie Wonder and Nina Simone. At last, the world is ready to take notice.

4 **The Souvenir Part II**

In English filmmaker Joanna Hogg's piercingly wistful semiautobiographical film, a young student in 1980s London (Honor Swinton Byrne, in a subtle, captivating performance) tries to make sense of a heartbreaking personal tragedy as she completes her graduate film. With that seemingly simple story, Hogg captures a thousand facets of what it's like to be a young person eager to make a mark on the world—while also needing desperately to make sense of it all.

5 **Parallel Mothers**

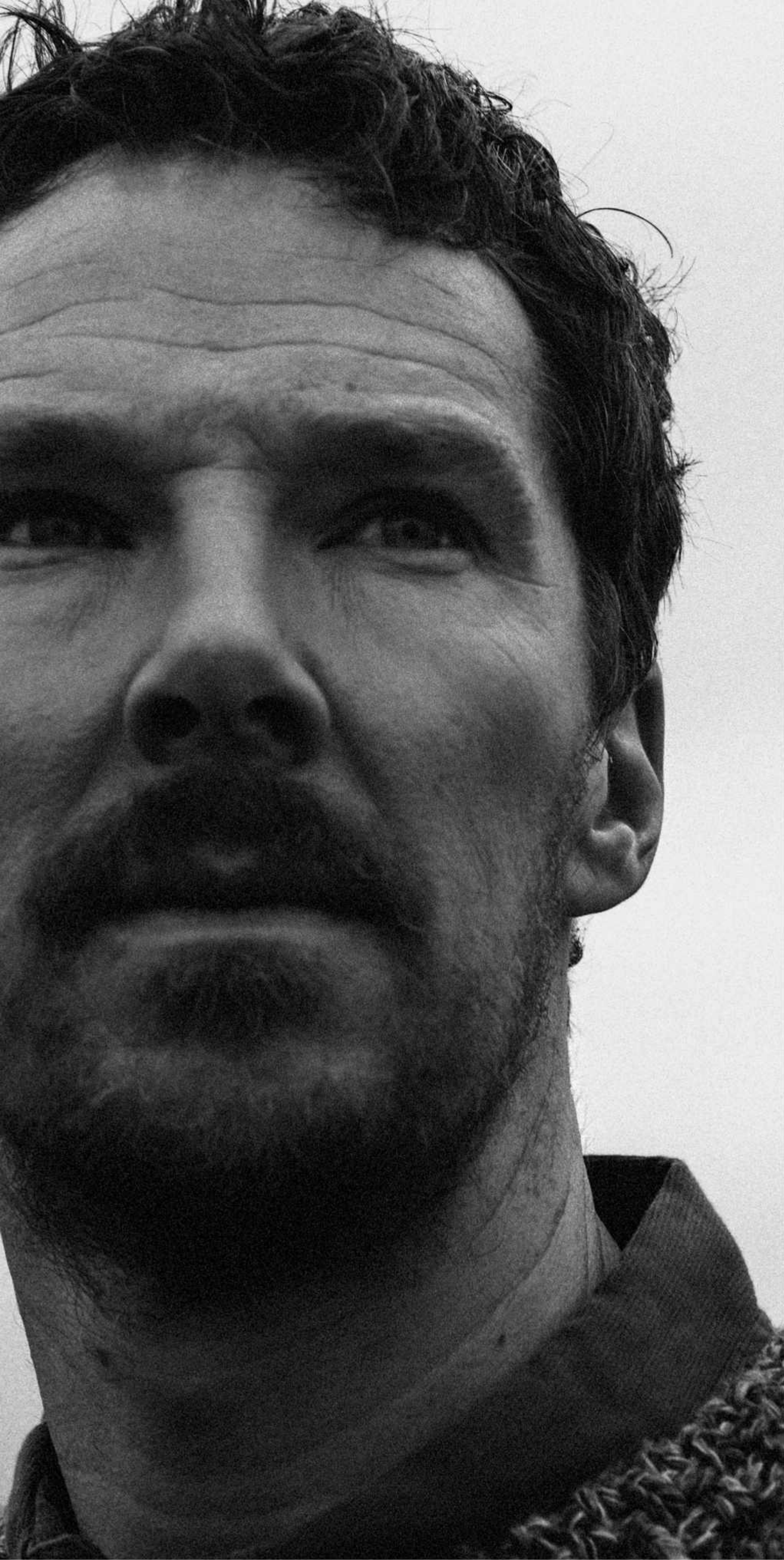
Penélope Cruz gives a smashing performance as a Madrid woman who becomes a mother in middle age—even as she's striving to win justice for her great-grandfather, murdered during the Spanish Civil War, his body tossed into a mass grave. Director Pedro Almodóvar uses melodrama to reckon with the painful history of his country, but also to reaffirm an essential truth about motherhood: history is the work of mothers—civilization can't move on without them.

6 **Passing**

In this beautifully rendered adaptation of Nella Larsen's compact, potent 1929 novel, two girlhood friends (played, superbly, by Tessa Thompson and Ruth Negga) reconnect as adults, their lives not just intersecting but colliding: both women are Black, but one has chosen to live as white. First-time director Rebecca Hall gives us a deeply thoughtful spin on what we commonly call the American Dream, the ability to make something of ourselves, or to remake ourselves as we wish—a so-called freedom that comes, sometimes, at perilous cost.

CUMBERBATCH
PLAYS A
CONTEMPTUOUS
RANCHER IN THE
POWER OF THE DOG

THE NEW YORK TIMES/REDUX



7 The Disciple

A singer with great drive and discipline (played, with searching openness, by Aditya Modak) strives to make a life for himself in the rarefied and decidedly unlucrative world of Indian classical music—only to be forced to recognize he's missing the essential spark of genius. Director Chaitanya Tamhane's luminous, quietly affecting film examines what it means to pursue a dream of art so feverishly that living in the real world takes a backseat.

8 C'mon C'mon

Joaquin Phoenix gives a funny, finely wrought performance as a childless New York City radio journalist who takes charge of his precocious 9-year-old Los Angeles nephew (Woody Norman) for a few weeks. How does that even sound like a whole movie? But in the hands of writer-director Mike Mills, it's everything. No one is better at chronicling late 20th and early 21st century family affection, in all its thorny, shimmery beauty.

9 The Tragedy of Macbeth

You may have seen this material a hundred times before. But Joel Coen's shivery black-and-white rendering—starring Frances McDormand and Denzel Washington as the treacherous, scheming Scots, compelling as a demon's spell—pulls off that rare feat: it puts you in the shoes of the play's first audience, as if this 400-year-old play were unfolding anew. Now, as then, it chills to the bone.

10 Drive My Car

In Ryusuke Hamaguchi's swimmingly gorgeous three-hour drama—adapted from a Haruki Murakami short story—a widowed actor and theater director from Tokyo (Hidetoshi Nishijima) accepts a gig in Hiroshima, mounting a production of Chekhov's *Uncle Vanya*. A young woman from the country (Toko Miura) has been hired to drive him; their slow-building friendship helps illuminate how lost he really is. Hamaguchi weaves a lustrous story of loss and forgiveness—a gentle nudge of encouragement suggesting that no matter how tired you feel, you *can* move on in the world.

BEST TV SHOWS

BY JUDY BERMAN

1 **The Underground Railroad**

In adapting Colson Whitehead's novel about a young enslaved woman's (Thuso Mbedu) slightly fantastical journey north, Barry Jenkins improved upon a masterpiece, expanding minimal prose into an immersive audiovisual and moral landscape. While his insightful direction yielded indelible performances, bespoke music and production design made each episode a discrete allegorical world. Although it would've been a breathtaking achievement at any time, in a year when racists revolted at the Capitol and in the classroom, it felt as essential as any work of art could be.

2 **The White Lotus**

Asked to pitch a series that could be shot in a single location, for COVID-19 reasons, creator Mike White cannily picked a Hawaiian resort. Well, he earned both the trip and a surprise second season, with this perfectly cast pseudo-mystery that made rich people on vacation avatars for a mess of social ills. Yet White's scripts left room for empathy. Instead of diluting his critique, that controversial choice reinforced it, insisting that these overindulged clowns were not so different from ourselves.

3 **Work in Progress**

This deeply underappreciated traumeddy is a portrait of co-creator and star Abby McEnany as a self-described "fat, queer

dyke" battling suicidal ideation. In a second season that improved upon an excellent debut, our hero stared down demons that had tormented her since childhood. What might sound like a downer is buoyed by scenes of tenderness, wonder and expertly deployed cringe comedy.

4 **Exterminate All the Brutes**

In a big year for nonfiction TV, Raoul Peck's four-part essay raised the bar for serious art, and serious political engagement, in the genre. *Brutes* approaches inequality from the

broadest possible perspective, tracing capitalism, colonialism, white supremacy and genocide around the world and through the centuries. He gets personal too, illustrating how global power dynamics can shape a life. Not every stylistic choice works, but that's to be expected when a creator is experimenting this boldly.

5 **Reservation Dogs**

Creators Sterlin Harjo and Taika Waititi have given TV something it desperately needed: a great show by and about Indigenous people. Set on an Oklahoma reservation, this dramedy follows four teens mourning a friend as





MBEDU
CAPTIVATES ON
THE UNDERGROUND
RAILROAD

they scam and save to honor his dream of moving to California. Like many great recent shows (*Atlanta*, *Betty*), it has a hazy surreal-meets-DIY vibe, moving fluidly between hijinks, gallows humor and earnest emotion. Add stars who disappear into their roles and writers' refusal to dilute Indigenous culture—or anger—for non-Native audiences, and the result is as uncompromising as it is groundbreaking.

6 Yellowjackets

It's still anyone's guess where this wild post-*Lost* survival drama is headed. And it's probably safe to assume that not everyone is getting as much

pleasure out of the eerie '90s-set tale as I—a child of that decade who grew up watching stars Christina Ricci, Juliette Lewis and Melanie Lynskey play disturbed teens—am. (Oh, well. My list, my rules.) Just know that amid a 25-year narrative that probes what really happened during the 19 months that the members of a high school girls' soccer team spent in the wilderness following a plane crash, the show carves out some of the deepest, strangest and most distinctive characters in recent memory.

7 Succession

HBO's Murdochian *Lear* became a breakout hit in two scathing seasons

that capitalized on America's love-hate obsession with our billionaire elite. And it was just getting started. In the aftermath of patriarch Logan's (Brian Cox) betrayal at the hands of his love-starved son Kendall (Jeremy Strong), the Roy clan devolved into a civil war conducted through elaborately uncivil dialogue, for a third season that raised the stakes without sacrificing what makes *Succession* such cathartic fun.

8 We Are Lady Parts!

In this U.K. import, a timid microbiology Ph.D. student (Anjana Vasan) strays from the path to achievement, arranged marriage and perfect womanhood when her killer guitar chops get her recruited by an all-Muslim-girl punk band. A subversive, hilarious and—dare I say it?—empowering comedy, *Lady Parts* shatters stereotypes just by authentically inhabiting its characters. Each young woman is a whole person, and one we've never seen on TV before.

9 I Think You Should Leave

A cable show called *Coffin Flop*. “Wet steaks,” the disgusting meal of choice for cretins out on the town. Dan Flashes, a men's store where shirts are expensive “because the pattern's so complicated, you idiot.” The concepts Tim Robinson cooks up for this sketch comedy, which dropped its second season in 2021, are so absurd that they shoot straight into the meme-o-sphere. But they linger because his characters—dudes throwing tantrums for nonsensical reasons—evoke the incoherent anger that defines our era in a way straight-faced shows never could.

10 You

It's an enticing premise: a cute, bookish romantic turns out to be a psycho killer. But by the end of Season 1, this insanely popular rom-com satire had made its point about the genre's hidden creepiness. Happily, the show has found new targets. This year's third—and best—season sent Penn Badgley's murderous Joe and his unhinged bride to a ritzy California town to raise their baby, taking on everything from momfluencers to swingers in a searing send-up of pop culture's obsession with suburbia.



PASHMAN
PURSUES THE
PERFECT PASTA
IN *THE SPORKFUL*

BEST PODCASTS

BY ELIANA DOCKTERMAN

1 9/12

The best work yet from prolific podcaster **Dan Taberski** (*Missing Richard Simmons*) focuses not on Sept. 11 itself but how that day changed America. He unspools the tale of how the CIA recruited Hollywood creators to dream up the attacks that U.S. enemies might attempt next, examines the persecution of Muslim Americans and traces the rise of conspiracy theories. A genial but shrewd interviewer, Taberski paints a portrait of a society redefining its identity in the wake of tragedy.

2 S***hole Country

The pseudonymous narrator of *S***hole Country* is one of podcasting's most promising storytellers. The series turns on her difficult decision to either stay in the U.S., where she's lost her job and health care, or move into the free apartment her parents are offering in their homeland of Ghana. Her beautiful rendering of a trip there undercuts how certain Americans have characterized African nations (hence the title). But at the heart of this series is her own struggle to feel at home in either place, told through moving and funny conversations with friends and family.

3 Sway

Kara Swisher—who made her name drawing out the Silicon Valley elite and here expands to media, business and politics—takes a productively combative approach to interviews. She is one of the few journalists with the guts to call out political hopefuls like Andrew Yang and Matthew McConaughey for vagueness and puffery and still line up an all-star guest the next week.

4 Fighting in the War Room

After 11 years on the air, friends and culture critics **Katey Rich**, **Matt Patches**, **David Ehrlich** and **Dave Gonzales** have developed an irresistible chemistry as they gleefully argue over the latest superhero film or Emmy snub. The show is a spiritual heir to the enchanting squabbles of Gene Siskel and Roger Ebert.

5 The Just Enough Family

Succession fans will find much to love in this addictive series about the rise and fall of a high-society New York family. *New Yorker* writer **Ariel Levy** tells the story of corporate raider Saul Steinberg and his relatives, replete with eccentric characters and dastardly schemes that illuminate how wealth erodes family connections.

6 Poog

Comedians **Kate Berlant** and **Jacqueline Novak** know the idea of achieving one's "best self" is a myth. Yet they're so dedicated to obsessing over wellness trends that it can be hard to tell whether they're joking when they swear allegiance to something called face yoga. Amid laughs, listeners will reconsider this multibillion-dollar industry.

7 Spectacle

Writer **Mariah Smith** compellingly argues that reality TV, still dismissed as trash, is worthy of scholarship. One episode focuses on an HIV-positive *Real World* star who reshaped the AIDS conversation, another on *Survivor* predicting political divides in America. By contextualizing these shows, she proves how they reflected and galvanized cultural change.

8 StraightioLab

Each week, comedians **George Civeris** and **Sam Taggart** invite a guest to discuss some "crucial element" of straight culture, like "tabletop role-playing games" or "ketchup," segueing into bits like which condiments are straight, gay or bi. The premise is loose, the laugh-out-loud jokes pushed to the brink of absurdity.

9 The Sporkful

Disappointed by the array of available pasta shapes, **Dan Pashman** embarked on a mission to create a better one, documenting the surprisingly suspenseful, delightful adventure in a miniseries dubbed "Mission ImPASTAble."

10 Criticism Is Dead

So much pop-culture analysis of late veers into unabashed fandom or reflexive cynicism. Hosts **Pelin Keskin-Liu** and **Jenny G. Zhang** take a more nuanced approach, connecting seemingly unrelated songs, movies and shows for thoughtful conversations on the larger cultural landscape.

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TIME'S NEWEST NEWSLETTER

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YOUR GUIDE TO THE FUTURE OF THE INTERNET



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CHINA WATCH

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The perfect farm combo: rice and fish

New farming methods are helping harvest a tourism wave in Guangxi Zhuang autonomous region

BY YANG FEIYUE

Harvest time always presents Sanjiang Dong autonomous county at its picturesque best.

Farmers are busy harvesting the rice paddies amid the golden farmland and fishing the ponds in October, and the air is filled with optimism for a big harvest in the county in the Guangxi Zhuang autonomous region.

Wei Fahong seems content with the harvest from his family's farmland of half an acre in Linlue village of Sanjiang.

This year he reaped more than 3,300 pounds of rice, which will bring his family an income of more than 10,000 yuan (\$1,570).

Amid the high wheat straw in the pond, fish were fattened perfectly for the dining table.

Some farmers celebrated harvest ahead of time with fresh roast fish.

"It's harvest season, and having fish is an auspicious practice that expresses our wish for a surplus harvest," said Shi Shilian, a villager in Sanjiang.

In Chinese, the word for fish and a word meaning surplus are pronounced in the same way.

"It's a good way to celebrate our gains," Shi said.

Sanjiang county is home to the ethnic Dong people, accounting for 57% of the local population. Locals have relied on paddies and fishing for a

living since ancient times.

The fertile land, rich water resources and pleasant climate make things ideal for agricultural development.

The symbiosis of the two brings the benefits as the fish eat pests and microorganisms that are bad for the rice, while producing fertilizer for the crop, the local authority said.

The county was named a demonstration zone for standardized fish culture in paddy fields this year, and the authority has come up with standards for all links in the fish culture chain.

The standards have helped increase production of paddy rice and fish, improving their popularity among consumers, said Hou Menglin, director of the Sanjiang market supervision bureau.

The method has enabled locals to produce premium, high-quality rice and fish, both of which have helped to draw visitors from the city.

They can go fishing and grill their catch, while taking in the distinctive rural and ethnic culture as they enjoy the unrivaled hospitality of Sanjiang.

The Chengyang Bazhai scenic area in Sanjiang comprises eight villages with more than 10,000 Dong residents and features a rich ethnic culture.

It allows visitors to get a fascinating glimpse into the well-preserved ancient traditions of the ethnic group, including its songs, dances, religious beliefs, folk customs and textile skills.

Ethnic Dong women catch fish in the paddy fields in Sanjiang Dong autonomous county in the Guangxi Zhuang autonomous region.

WU LIANXUN / FOR CHINA DAILY



Tourists from home and abroad enjoy traditional Dong food during a festival banquet. GONG PUKANG / FOR CHINA DAILY

The historical bridges and traditional wooden buildings are picture perfect, especially the drum towers and houses on stilts.

Yongji Bridge, for instance, features pagodas and pavilions across its span. Completed in 1912, it is typical of many local artistic structures, some of which can boast a history stretching back more than 2,000 years. It was named among the world's top 10 most spectacular bridges by the American Broadcasting Co. in 2008.

From January to July Sanjiang received a total of 5.71 million visits, 124% more than in the corresponding period last year, and tourism revenue reached 6.7 billion yuan, 125% higher.

By last year a total of 25,000 people in Sanjiang had engaged in the tourism industry by offering various related services, including running rural home-

stays and selling local farm produce.

Tang Xinguang of Dashu village was one of the first to answer Sanjiang's call to take up rice production and fish farming.

He rented idle land from villagers and applied the new agricultural standards. At the same time, he got help in promoting the farm's produce via e-commerce and various agricultural shows.

"The standardized paddy-field-fish-culture has spread in our village," Tang said, adding that the area dedicated to the farming technique has expanded from 22 acres to more than 74 acres in Dashu.

Many locals have opened rural restaurants serving a feast of fish for visitors.

Sanjiang has built five paddy and fish culture demonstration bases, which altogether cover



an area of more than 470 acres.

The local authority has adopted a plan to upgrade paddy and fish farming technology. It aims to develop a cultivation area of about 11,600 acres over the next three years, increasing per capita annual income by 1,000 yuan in the county.

Some villages have consolidated their farmland base and dug fishponds on the side.

"The advantage of this is that it can support ratoon cropping (pruning the part of the crop that sits above the waterline but leaving the roots intact, to encourage recovery and stronger yield the following season), prolonging the growth period of the fish," said Wu Xin, a village official.

"It ensures the quality of fish while promoting the stable yield of rice," he said.

Improved agricultural development has paved the way for tourism as Sanjiang county continues to integrate agriculture with its ethnic festivals.

"The benefit of planting alone was minimal, and many people were unwilling to plant, resulting in the serious problem of a lot of abandoned paddy fields," said Wu Chengdong, deputy head of Sanjiang county.

"If we do a good job with the infrastructure of paddy fields and combine aquaculture with tourism we can not only solve the problems of land waste and food security, but also improve soil stratification and environmental sanitation."

Ping-pong envoys relish Games power

BY LINDA DENG

Connie Sweeris, who has witnessed the power of sports said she is hopeful about the upcoming Winter Olympics in Beijing.

"It's just a great opportunity to gather the world together. We do want to get together and compete again," Sweeris said.

The U.S.A. Table Tennis Hall of Famer was a member of the pioneering team from the U.S. that made the historic trip to China in 1971, that launched ping-pong diplomacy between the two nations.

"When it's only every four years, for some athletes that are getting toward the end of their career and wanted to make the Olympics, they maybe cannot have another chance to make an Olympic team or make the Olympics," said Dell Sweeris, Connie's husband, doubles partner and also a Hall of Famer.

Fifty years since the birth of ping-pong diplomacy between the U.S. and China, the couple said they firmly believe sports can foster friendship between nations and peoples.

"When you compete against each other from countries all over the world, you begin to break barriers down, and you begin to understand their culture, and you have exchanges with them," she said.

"And it just brings about understanding between individuals, which then can seep into the rest of the culture. Especially for me, that became true in 1971, when I was on the U.S. team in Nagoya, Japan, representing the U.S. at the World Table Tennis Championships. On the last day of that competition, China had extended an invitation to our U.S. team to come and play friendship matches," Connie said.

"As we did that, we realized that we were the first Americans that were going to be led into China since 1949. When we got into China, the slogan when we played our matches was 'Friendship first, competition second', and it broke open a door between our two countries to establish a relationship or diplomatic ties, and to begin talks with each other."

Judy Hoarfrost, the youngest player in the nine-member U.S. table tennis team that arrived in Beijing in 1971, said ping-pong diplomacy has given her a unique perspective on how a sport can help bring people together. The sporting endeavor helped open up exchanges between the two countries, culminating in president Richard Nixon's trip to China in 1972.

"The U.S. and China have many, many ties, business ties and personal ties, so many ways that we are inter-related now that we were not in 1971," Hoarfrost said.

"Ping-pong diplomacy was the thing that just ignited it and got it started. I do think that sports, and other cultural exchanges, play a huge part in bringing people together, nations together.

Hoarfrost said she loves the slogan for the 2022 Beijing Winter Olympics, "Together for a shared future".

"We have to work together to have our common health goals and our common environmental goals. I think that we should all give some thought to that."

Connie Sweeris said: "By doing these exchanges, and what this slogan means, is we can do things in the world together better than separate. And it will create more of a peaceful world if we have this understanding and togetherness."

The Sweerises' son Todd is a former two-time table tennis Olympian. He told his parents about his dream of being in the Olympics when he was 8. When he represented the U.S. and competed in the 1996 Summer Olympics in Atlanta, his parents were thrilled.

"The highest thing that you can attain in your sports is becoming an Olympic athlete," Connie Sweeris said.

"And that is just an amazing event, doesn't matter whether it's in the United States or China or any of these states," her husband added.



Chinese and U.S. table tennis mixed doubles players at a training session in Houston, Texas, for the 2021 World Table Tennis Championships in the city last month.

WU XIAOLING / XINHUA

CHINA WATCH

PRESENTED BY CHINA DAILY 中國日報

Concert brings Chinese and U.S. artists together at Lincoln Center

BY MINLU ZHANG

Inspired by connections between the East and the West, musicians from China and the United States staged a concert, performing pieces from two sides of the world at the Lincoln Center in New York on Nov. 13.

Presented by the China Arts and Entertainment Group, *East/West: A Symphonic Celebration* is part of Image China, a cultural exchange initiative aimed at introducing traditional and contemporary Chinese performance arts to people around the world.

Featuring conductor Cai Jindong of the Bard College and the New York City Ballet Orchestra, the concert presented several traditional Chinese musical pieces and one U.S. musical piece, including *Butterfly Lovers*, *Great Wall Capriccio* and *Appalachian Spring Suite*.

"If the concert tonight can be illustrated as a picture, then this picture is from the Appalachian Mountains to the Great Wall," Cai said. "Through this picture, everyone can feel the connection between the cultures."

"Music indeed is a very good art form for communication. Putting aside politics, economy and idealism, communication between people is the most important. And music is the best way to communicate."

The concert included performances by U.S. musicians, providing the audience with the opportunity to get to know traditional Chinese music. By performing traditional Chinese music, Cai said, the musicians try to interpret it themselves.

"During our rehearsals I heard someone say, 'Wow, Chinese traditional music is so beautiful,'" Cai said.

Many enjoyed Chinese traditional music at the concert.

"It's very different from Western music, absolutely," said Wesley Michalski, a member of the



Soprano Esther Maureen Kelly (left) and coloratura soprano Holly Flack sing during the concert, *East/West: A Symphonic Celebration*, at the Lincoln Center in New York on Nov. 13. PHOTOS BY LI RUI / XINHUA

EAST AND WEST MEET IN HARMONY



Violinist Hu Shenghua leads the orchestra during the concert.

audience. "Especially when you listen to how the soloists play, you can hear a lot of different inflections and styles of playing that are not traditionally done in Western music, which I thought is really interesting."

Hu Shenghua, the violinist who played the *Butterfly Lovers* violin concerto, says he felt proud to play Eastern music at the Lincoln Center, one of the world's leading performing arts centers.

"Music is the universal language of mankind. Music helps peoples and nations communicate through means that are more efficient than words, because it touches the core of humanity by awakening empathy and compassion."

Holly Flack, a coloratura soprano who sang songs derived from ancient Chinese poems *A Night Mooring by the Maple Bridge*, *Ode to the Goose* and *Song of Snow*, said the concert brought hope to people in China and the U.S.

"The concert is very reflective of hope. Everybody everywhere went through an unquestionably difficult time that was unprecedented. But it's like the crocus coming up for spring out of the snowy winter. We can come back slowly as long as we all cooperate together, and music itself is universal."

"You don't even have to speak the same language to be moved by a piece of music. If everyone feels the same way emotionally, we can almost get over any other kind of problems we have."

This year marks the 50th anniversary of Ping-Pong Diplomacy between China and the U.S., a mission that helped to open up exchanges between the two countries, culminating in president Richard Nixon's trip to China in 1972.

"Since then, people of all walks of life in China and the U.S., including those in the art field, have deeply engaged in promoting China-U.S. relations and made contributions to build a healthy and stable bilateral relationship," Huang Ping, China's consul general in New York, wrote in a letter to the concert.

Since 2012, Image China has presented a series of Chinese dance dramas at the Lincoln Center's David H. Koch Theater, including *The Peony Pavilion*, *Silk Road*, *The Red Dress*, *The Legend of Mulan*, *Dragon Boat Racing*, *Confucius*, *Soaring Wings* and *Princess Zhaojun*.

A second concert, *China Inspirations*, was staged on Nov. 28 with artists from the Chamber Music Society of Lincoln Center.

In mists of Shennongjia the legendary wild man remains elusive

Exquisite scenery
brings in tourists
all year round

BY XU LIN

Shennongjia is said to be the place where the mythical Emperor Yan once lived. Some visitors hope that they may encounter the legendary *yeren* (wild man), China's equivalent of Bigfoot, in the remote mountains and virgin forests.

They may not see any such creature, but they are attracted by Shennongjia's vibrant ecology, rich biodiversity and karst landforms.

The nature of Shennongjia's beauty varies over the year as time takes its course. Tourists can enjoy flower blossoms in spring, be shaded from the summer heat, appreciate red leaves in autumn and go skiing in winter.

In 2016 China announced that it would build 10 pilot national parks for ecosystem preservation, including in Shennongjia Forestry District, Hubei province.

Trips in such a mountainous region depend very much on the weather. An early rise by visitors may be rewarded with a stunning view of a sea of clouds beneath.

The natural beauty of karst landforms is ubiquitous.

There are waterfalls, pools and a 56-ft.-high arch that resembles a bridge crafted by nature after centuries of rain erosion.

Visitors can hike in a forest, climb a mountain and explore a large, dark cave to listen to the sounds of swallows nestling.

Tourists may come across an area in which golden snub-nosed monkeys that are ill or injured are treated before they go back into the forest.



Clockwise from top: In Shennong Altar Scenic Area of Shennongjia, a long stone staircase leads to a 69-ft.-high stone sculpture of the head of Emperor Yan (Shennong). XU LIN / CHINA DAILY Shennongjia is known for its stunning view of a sea of clouds and its colorful autumn leaves. WAN ZHONGYI / FOR CHINA DAILY AND XU LIN / CHINA DAILY

Guanmenshan Scenic Area showcases rich biodiversity, with a natural ecology museum, a garden with precious plants and areas that animals such as deer and giant salamanders inhabit.

On a zigzag wooden plank road in the forest are small exhibition boards that present information about bird species, and there are fish ponds. It is a perfect place to discover natural science.

Being in Dajihu National Wetland Park when the wetlands are shrouded in mist early in the morning is like being in a wonderland, with reflections in the water

and mountains and reed marshes as the backdrop.

Chinese proclaim themselves *yan huang zi sun*, the offspring of mythical Emperor Yan (Shennong) and the Yellow Emperor.

Shennongjia was so named because it is said to be the place where Shennong tasted various herbs to figure out how to use them to cure sickness.

Shennong, often depicted with the horns of an ox, was a man of all trades. He invented farm tools and discovered tinder and tea, and made cooking utensils out of pottery.



Shennongjia boasts rich biodiversity. WAN ZHONGYI / FOR CHINA DAILY

In Shennong Altar Scenic Area, a long stone staircase leads to a 69-ft.-high stone sculpture of Shennong's head. With two ox horns, his eyes are closed and his chin raised as if he is lost in thought.

Looking up, visitors will gaze in awe at the stone head as they ascend the stairs. They can also appreciate murals depicting Shennong's legend, with a row of traditional Chinese sacrificial vessels to the side.

Legends similar to that of the wild man can be found all over the globe, ranging from Bigfoot in North America to Yeti in the Himalayan mountains.

Between 1976 and 1981 the Chinese Academy of Sciences organized three large-scale scientific investigations — and anthropologists, zoologists and botanists were sent to the region's thick forest.

Scientists have collected hair, footprints and excrement suspected of belonging to the wild man, but some experts argue that most were left by bears, monkeys or even human beings.

What they did discover was the area's rich biodiversity. During the second mission in 1977, the golden snub-nosed monkey was observed in Shennongjia.

In 1999 Chinese authorities announced that there is no wild man in Shennongjia. Nevertheless, in 2016 the wild man legend was added to Hubei's intangible cultural heritage list.

These days it is Shennongjia's flora and fauna that are its biggest drawcard.

Tomorrow's Innovator

BY WALTER ISAACSON

ELON MUSK MIGHT BE THE MOST INTERESTING person on the planet. And given his passionate quest (so far surprisingly on track) to make humans into a multiplanetary species, he could someday become the most interesting person in the solar system.

O.K., those statements may be hyperbole. But Musk's ability to turn hyperbole into reality is one of his superpowers. Through his intense focus on driving every problem down to the level of basic physics, he has already earned himself a spot in the pantheon of history's great innovators.

His endeavors are not merely digital concoctions conjured up in a dorm room or garage. They involve devising and manufacturing physical products, such as cars and batteries and rocket ships, like America used to be able to do:

Tesla (no, Mr. President, not General Motors) is the primary driving force transporting the world into the age of electric cars. And self-driving ones.

Tesla Energy, with its solar roof tiles and battery walls, is heralding an era of decentralized, carbon-free electricity.

SpaceX has enabled the U.S. to launch humans into orbit for the first time since NASA shut down the space-shuttle program a decade ago.

Starlink has deployed more than 1,800 satellites and is quietly rebuilding the Internet in space.

Neuralink is making the next great leap in the storied history of human-machine interfaces by creating implants that can link to the neurons of a brain.

The Boring Co. is building tunnels designed to conquer the scourge of traffic.

And Starship, the biggest rocket ever built, will someday take us to Mars.

Musk's input-output mechanisms can be unnerving. He displays a manic wackiness and semicalculated craziness that occasionally skitters, like a too early beta version of Full Self-Driving, across the line between wiliness and weirdness. With ultracapacitor bursts of energy, he is addicted to sparking dramas that he can use for strategic purposes. Having endured

psychological and physical violence as a kid in South Africa, he has a greater-than-normal mental ability to calculate risk and emotional ability to tolerate it.

As a biographer who has covered the shapers of technological revolutions, I see in Musk many of the traits of earlier innovators. Like Thomas Edison, he knows that vision without execution is hallucination, a weakness that sometimes hobbled the original Tesla, as in Nikola. So he expends 90% of his time on the nuts and bolts (literally) of his products.

Like Henry Ford, he understands the importance not only of the products he devises but also the factories that can churn them out. His gigafactories for cars and batteries—in the U.S., Germany and China—are showing that innovative methods for manufacturing a product are even more important than innovative products themselves.

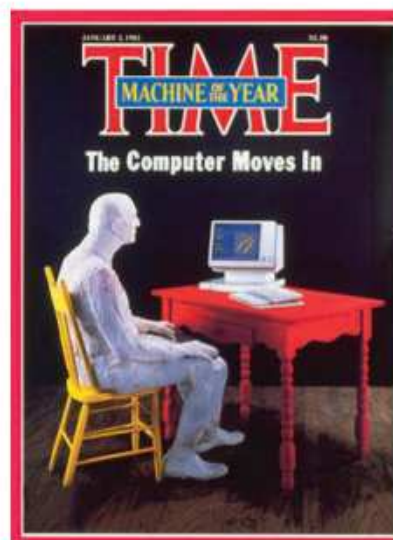
Like Steve Jobs, he is reinventing multiple industries with the strategic use of reality-distortion fields. He questions every assumption in order to drill down to the first principles of physics.

Like Bill Gates and Jeff Bezos, he has a hardcore intensity that can drive colleagues (and himself) to near madness but also drive them to do things they thought were impossible.


And like Benjamin Franklin and Leonardo da Vinci, he has an obsessive but playful curiosity about all of the wonders of nature that helps him see patterns across disparate fields.

But more than most other great innovators, Musk is driven by a larger sense of mission. He has a fierce urge to make life on this planet sustainable, turn humans into a spacefaring species, and assure that artificial intelligence will be beneficial rather than malign to us mortals. These goals are audacious, and he may fail. But at the moment, he has become the most important single individual in designing and deploying the innovations that will bring us a few steps closer to each of these aspirations.

Isaacson, a former editor of TIME, is writing a biography of Musk



PAST CHOICES
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ANDREW GROVE (1997);
JEFF BEZOS (1999)



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