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Everything You've Heard About Section 230 Is Wrong

BY GILAD EDELMAN

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Angela Watercutter

Culture
05.20.2021 07:00 AM

Coder Dee Tuck Is on a Mission to Help Diversify Hollywood

At Ava DuVernay's Array film collective, Tuck is making it easy for showbiz types to hire a more inclusive workforce.

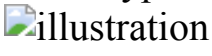
illustration with Black creators in film
Illustration: JIAQI WANG

Dee Tuck has heard all the excuses. "I want to hire more women, but I just don't know where they are." Yep. "I want to hire more people of color, I just don't know anybody." That too. She's been working in tech for more than a decade and has often been the only Black female engineer on her team. She has reviewed company hiring practices and pointed out that "maybe you're weeding out a lot of people who can't code with eight non-people-of-color watching them on Zoom." Tuck doesn't want to hear the excuses anymore.

Last November she was tapped to be chief technology officer at Array, the film collective founded by director Ava DuVernay. Her main objective: launching Array Crew, a database of women and people of color that studios can use when staffing up for movies and TV shows. The goal is to see if the industry will diversify its ranks when the "We can't find anybody" barrier is removed. "When we really diagnosed the issue, it wasn't that people weren't willing to do it, it was that people weren't willing to be inconvenienced to do it," DuVernay says. "So what we tried to do is create a platform that made it really easy. And so now we're in a space where, to be frank, if you still don't do it, you never really wanted to."

Hollywood has been in the midst of a yearslong reckoning with its overabundance of white male directors and stars. But less noticed is how few women and people of color appear in what are known as below-the-line jobs—the ones on the bottom half of the production budget. For decades, the industry has relied on people hiring the folks they already know for these gigs, leaving out swaths of qualified applicants. “It's harder to manage on the production side, because hundreds of productions come and go each year within each studio,” says Kevin Hamburger, head of production at Warner Horizon Unscripted Television. Array Crew, which debuted online in February and will be available as a mobile app in June, allows job seekers to create a profile that includes their résumé, location, images, reels, and contact information so that line producers can pull up every candidate near their film set; it also has tools to help managers keep track of the people they hire for each shoot.

On its face, there's a tension in how Array is using technology to solve Hollywood's inclusivity problem. We now have search engines optimized to find everything from adoptable pets to dinner (for better or worse), but leaving something as complicated as workplace diversity to machines is far more tricky. Which might be why Array's fix is purposefully simple. The database's results are organic; there aren't algorithms boosting some folks and not others. Someone crewing up a movie can search for certain positions (makeup artist, grip), locations (Los Angeles, New York), names, trade union membership, and experience level, but that's it. Unlike, say, Google results, Crew's list of candidates comes up in the most analog way possible: alphabetically. Hiring managers can sort by first or last name or those most recently added, but from there it's up to them to pick a team.

Zooming from her Atlanta home, wearing a sweatshirt from her alma mater, Tuskegee University, Array's CTO speaks pointedly about the best ways to remove barriers. Tuck has witnessed roadblocks to hiring throughout her career, and from the beginning her team was intentional about spotting and eliminating them. “We have conversations about the smallest things,” she says. Like that search function. Array could have made every field on a user's profile searchable, but doing so might have left someone out of the results just because they didn't include a certain keyword. “We realized that could've created some type of barrier to entry for people,” Tuck says. That

puts an onus on the line producer to look through the list of candidates. But that's the point—to make them look somewhere they hadn't been looking.

Born and raised in Cincinnati, Tuck started trying to figure out Windows 95 at her uncle's house when she was about 11 years old. “A few times,” she laughs, “he had to call me and be like, ‘What did you do? I can't get in.’” She spent time at IBM and worked on missile defense at Lockheed Martin. By the time Tuck got to GitHub in 2020, she was making sure every job she took gave her a say in hiring decisions. “I really do believe in building diverse teams, because we ship better products that way,” Tuck says. “If you just have one demographic building a thing, you're not going to end up with the best solution.”

Array chief technology officer Dee Tuck (left) with filmmaker Ava DuVernay in Atlanta.

Photograph: Paul Garnes/Array

When Tuck and I spoke, Array Crew had more than 5,000 verified users. It's free for work-seekers; studios pay an annual fee. “This is an investment. It's incumbent upon us to make sure this works,” says Jennifer Lynch, who oversees corporate social responsibility at Paramount Pictures, one of several studios, including Netflix and Disney, that signed on to be a Crew launch partner. “We're in this for the long haul.”

That footslogging is key. Too often diversity efforts fail when old habits creep back in. Studios must buy in, because for the effort to succeed it's essential that their employees and partners use the service. One function Tuck's team is working on is the ability to provide demographic breakdowns for each production. DuVernay notes that she doesn't want Crew to become just a “report card” for whether studios keep their promises, but Tuck sees other benefits: “We have to be able to tell a story of how we impacted the industry.”

As we're wrapping up our Zoom, Tuck's team jumps on. She opens the conversation by asking everyone to name the song they currently have on repeat. (Bill Withers, Big K.R.I.T., and “Baby Shark” are all represented.) Kelsey Kearney, who handles Array's relationships with studios, notes that

it's been a week of questions and requests from partners wanting more from the Crew database, like support and help desk functions. A lot of these wants will be fulfilled by the new mobile app. “I love a deliverable,” she laughs.

But there's something else they want. Hollywood's push for diversity goes far beyond LA. Could Crew release an international version? Tuck says it's at the top of her to-do list and promises there's “more to come on that.” So, yes, she's on it. No excuses.

This article appears in the June issue. Subscribe now.

Virginia Heffernan

Ideas
05.18.2021 07:00 AM

To Observe the Muon Is to Experience Hints of Immortality

Attempting to model the universe as precisely as possible is to try to see the one thing that even the strictest atheist agrees is everlasting.

 illustration with organic multicolor shapes with a square around them
Illustrations by Kate Dehler

All people want to enact a paradigm shift, don't they? Even if it's not mRNA, or Lego, we want at least, on our one chance on Earth, to make a meme happen.

So imagine the excitement on April 7, when more than 200 physicists from seven countries convened on a Zoom call for a kind of nonexplosive gender-reveal party. What was to be disclosed was not a baby's sex but the fate of particle physics.

While the rest of the world has spent more than a year preoccupied with epidemiology, this team of physicists has spent three years collecting data for something called the Muon g-2 experiment, a much anticipated project headquartered at Fermilab, a physics and accelerator laboratory in Batavia, Illinois, that is overseen by the Department of Energy. The physicists had done their work half in the dark, with a key variable concealed. If you want a eureka badly enough, after all, you might be tempted to help the data along. Now the lights were coming on.

“We had no idea” of the outcome, Rebecca Chislett, a physicist at University College London, told *Scientific American*. “It was exciting and

nerve-racking."

Eureka.

The experiment had aimed to determine, to the finest measurement, the strength of the internal magnetic field generated by a muon, a particle similar to an electron but 200 times more massive and supremely unstable, with a lifetime of 2.2 microseconds. Muons rain down on us all the time, the indirect product of cosmic rays colliding with particles in Earth's atmosphere. But Fermilab's accelerator makes its own.

Many subatomic particles act like magnets, and the so-called Standard Model predicts the strength of their magnetism with great exactitude. To test the model, the team watched muons as they wobbled in a magnetic field and clocked whether the wobble deviated from what theory had predicted it would be. Indeed, it did. As Galileo might have said: *Eppur si deviare*.

In the journal *Physical Review Letters,* the researchers reported that the infinitesimal deviation—0.0000002 percent away from what theory stipulated—was highly significant. In its press release, Fermilab even suggested that the discovery could force us to revise our basic model of how subatomic particles work.

"The strong evidence that muons deviate from the Standard Model calculation might hint at exciting new physics. Muons act as a window into the subatomic world and could be interacting with yet undiscovered particles or forces," read the press release. Graziano Venanzoni, a physicist at the Italian National Institute for Nuclear Physics in Pisa, called the findings "an incredible result … long awaited not only by us but by the whole international physics community."

The known universe seemed, briefly, muonstruck. But it took only 12 days for another Italian physicist to throw cold water on the bliss. Carlo Rovelli, a founder of loop quantum gravity theory, which seeks to combine quantum mechanics and general relativity, and the author of *Helgoland: Making Sense of the Quantum Revolution*, which was published in English in May, wrote in *The Guardian*, "Physicists love to think of themselves as radical."

This self-conception, Rovelli went on, is understandable, especially among physicists, who make their names in the outer reaches of human understanding. But it also leads labs to overhype their findings. He cited examples of would-be "discoveries" in supersymmetry that initially seemed groundbreaking but didn't live up to the hype. Rovelli especially zeroed in on the word "hint," which appeared in that Fermilab press release. "I do not remember a time without some colleague talking about 'hints' that new supersymmetric particles had been 'nearly discovered.'" The *nearlys* and *hints*, presumably, are often at a value that, unlike Fermilab's 0.0000002 percent, may not be statistically significant.

In 1807, William Wordsworth published an ode that was to Romantic poetry as the discovery of quarks was to particle physics in 1964: a breakthrough. "Intimations of Immortality from Recollections of Early Childhood" chronicles the poet's emotional detachment from nature; his blissful rediscovery of it in memories of childhood; and his bittersweet resolution that, though the Earth will die, the suggestions of deathlessness in the present moment will sustain him in his grief.

Though nothing can bring back the hour
Of splendour in the grass, of glory in the flower;
We will grieve not, rather find
Strength in what remains behind;
In the primal sympathy
Which having been must ever be;
In the soothing thoughts that spring
Out of human suffering; In the faith that looks through death ...

An intriguing approach to literature called ecocriticism, pioneered in the 1990s by the English philosopher Jonathan Bate, argues that Romantic poetry like this ode can suggest ways to conceive of our dying planet as one that we must save—or perhaps, in sorrow, and maybe love, allow to die. But Wordsworth's poem doesn't just concern the fate of humans and the blue planet. Its subject is also intimations—what the physicists on the Muon g-2 project call "hints."

As it happens, they are hints of the same thing: immortality.

The central contention of physics has it that the building blocks of the universe will endure even if, or even when, the humans who tally them, and the planet we live on, all die. To see into the deathless universe is to try to see nothing so flamboyant as Wordsworth's favorite daffodils and walnut groves, but to peer into the coldest spaces, the black holes and the fractional electric charge of theoretical subatomic particles. These entities have no blood flow, of course, but also no DNA; they're not susceptible to pandemics, however virulent, or the dividends and ravages of carbon. They don't live, so they don't die. To model the universe as precisely as possible is to try to see the one thing that even the strictest atheist agrees is everlasting—to try to achieve, in a lab, an intimation of immortality.

Back to the living world that's under our feet. Rovelli is right to caution against the potential delusions of those who are greedy for eurekas. But, as a fellow physicist with a radical streak, he is also sympathetic to their ambitions, a drive to "learn something unexpected about the fundamental laws of nature." To Rovelli, whose latest book describes quantum mechanics as an almost psychedelic experience, a truly radical discovery entails the observation of phenomena that fall outside three existing frameworks in physics: quantum theory, the Standard Model of particle physics, and general relativity. Only by blowing up one of those frameworks can one achieve the kind of immortality that scientists get, the glory of someone like Einstein or Heisenberg.

But to keep looking, as Rovelli has, as Fermilab has with this study on the muon's magnetism, is also to apprehend hints. To follow hints. In that way, the physicist's work and the poet's are the same. And if Wordsworth is right, immortality can be found, of all places, in the hint—the staggering proposition by nature itself that, in spite of all the dying around us, something of all we love might be imperishable, might still flicker or shine or wobble when the rest of our world is gone.

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William Ralston

Backchannel
05.04.2021 07:00 AM

They Told Their Therapists Everything. Hackers Leaked It All

A mental health startup built its business on easy-to-use technology. Patients joined in droves. Then came a catastrophic data breach.
Illustration: Mark Harris

Jere woke up on the morning of October 24, 2020, expecting what Finnish college students call *normi päivä*, an ordinary day. It was a Saturday, and he'd slept in. The night before, he had gone drinking by the beach with some friends. They'd sipped cheap apple liqueur, listened to Billie Eilish on his boom box. Now Jere (pronounced "yeh-reh") needed to clear his head. He was supposed to spend this gray fall day on campus, finishing a group physics project about solar energy. The 22-year-old took a walk around the lake near his apartment outside Helsinki. Then, feeling somewhat refreshed, he jumped on the bus.

The day went quickly. Jere caught up with his friends, many of whom he hadn't seen since the pandemic began. They chatted about their Christmas plans, ordered pizzas from a favorite local spot, and knuckled down to work in the cafeteria.

At around 4 pm, Jere checked Snapchat. An email notification popped up on his screen. His hands began to shake. The subject line included his full name, his social security number, and the name of a clinic where he'd

gotten mental health treatment as a teenager: Vastaamo. He didn't recognize the sender, but he knew what the email said before he opened it.

A few days earlier, Vastaamo had announced a catastrophic data breach. A security flaw in the company's IT systems had exposed its entire patient database to the open internet—not just email addresses and social security numbers, but the actual written notes that therapists had taken. A group of hackers, or one masquerading as many, had gotten hold of the data. The message in Jere's inbox was a ransom demand.

"If we receive €200 worth of Bitcoin within 24 hours, your information will be permanently deleted from our servers," the email said in Finnish. If Jere missed the first deadline, he'd have another 48 hours to fork over €500, or about $600. After that, "your information will be published for all to see."

Jere had first gone to Vastaamo when he was 16. He had dropped out of school and begun to self-harm, he says, and was consuming "extreme amounts" of Jägermeister each week. His girlfriend at the time insisted he get help; she believed it was the only way Jere would see his 18th birthday.

During his therapy sessions, Jere spoke about his abusive parents—how they forced him, when he was a young kid, to walk the nearly 4 miles home from school, or made him sleep out in the garden if he "was being a disappointment." He talked about using marijuana, LSD, DMT. He said he'd organized an illegal rave and was selling drugs. He said he'd thought about killing himself. After each session, Jere's therapist typed out his notes and uploaded them to Vastaamo's servers. "I was just being honest," Jere says. He had "no idea" that they were backing the information up digitally.

In the cafeteria, Jere grabbed his bag and told his friends he'd turn in his portion of the physics project the next day. On the bus ride home, he frantically texted his best friend to come over. Then his mother called; as the adult listed on his old account, she'd received the ransom note too. She and Jere were on good terms now, but if she got involved she might learn what he'd said in his sessions. Then, he says, he'd probably lose her from his life completely. He told his mother not to worry. That afternoon, he filed an online police report.

Jere poured himself a shot of vodka, then two or three more. He found his vape pen and took a Xanax, prescribed to him years earlier for anxiety. He'd stored a few pills in his bedroom drawer just in case, but he never believed he'd need them again. He passed out shortly after his friend arrived.

The next morning, Jere checked Twitter, where he was both horrified and relieved to learn that thousands of others had received the same threat. "Had I been one of the only people to get the mail, I would have been more scared," he says.

Vastaamo ran the largest network of private mental-health providers in Finland. In a country of just 5.5 million—about the same as the state of Minnesota—it was the "McDonald's of psychotherapy," one Finnish journalist told me. And because of that, the attack on the company rocked all of Finland. Around 30,000 people are believed to have received the ransom demand; some 25,000 reported it to the police. On October 29, a headline in the *Helsinki Times* read: "Vastaamo Hacking Could Turn Into Largest Criminal Case in Finnish History." That prediction seems to have come true.

If the scale of the attack was shocking, so was its cruelty. Not just because the records were so sensitive; not just because the attacker, or attackers, singled out patients like wounded animals; but also because, out of all the countries on earth, Finland should have been among the best able to prevent such a breach. Along with neighboring Estonia, it is widely considered a pioneer in digital health. Since the late 1990s, Finnish leaders have pursued the principle of "citizen-centered, seamless" care, backed up by investments in technology infrastructure. Today, every Finnish citizen has access to a highly secure service called Kanta, where they can browse their own treatment records and order prescriptions. Their health providers can use the system to coordinate care.

Vastaamo was a private company, but it seemed to operate in the same spirit of tech-enabled ease and accessibility: You booked a therapist with a few clicks, wait times were tolerable, and Finland's Social Insurance Institution reimbursed a big chunk of the session fee (provided you had a diagnosed mental disorder). The company was run by Ville Tapio, a 39-year-old coder

and entrepreneur with sharp eyebrows, slicked-back brown hair, and a heavy jawline. He'd cofounded the company with his parents. They pitched Vastaamo as a humble family-run enterprise committed to improving the mental health of all Finns.

For nearly a decade, the company went from success to success. Sure, some questioned the purity of Tapio's motives; Kristian Wahlbeck, director of development at Finland's oldest mental health nonprofit, says he was "a bit frowned-upon" and "perceived as too business-minded." And yes, there were occasional stories about Vastaamo doing shady-seeming things, such as using Google ads to try to poach prospective patients from a university clinic, as the newspaper *Iltalehti* reported. But people kept signing up. Tapio was so confident in what he'd created that he spoke about taking his model overseas.

Before "the incident," Tapio says, "Vastaamo produced a lot of social good." Now he is an ex-CEO, and the company he founded is being sold for parts. "I'm so sad to see all the work done and the future opportunities suddenly go to waste," he says. "The way it ended feels terrible, unnecessary, and unjustified."

Tapio grew up in a "peaceful and green" neighborhood in northern Helsinki during a bad recession. His mother, Nina, was a trauma psychotherapist, and his father, Perttu, a priest. His grandparents gave him a used Commodore 64 when he was 10, which led him to an interest in coding. Something in his brain resonated with the logical challenge of it, he says. He also saw it as a "tool to build something real."

The obsession endured: In middle school Tapio coded a statistics system for his basketball team, and in high school he worked for the Helsinki Education Department, showing teachers how to use their computers. Rather than going to college, he set up an online shop selling computer parts—his first business, funded with "a few tens of euros," he says. A couple of years later, at age 20, he joined a small management consultancy.

The idea for Vastaamo came to Tapio when he was working with the Finnish Innovation Fund, a public foundation that invests in solutions to social and environmental problems. The fund sent him on a survey of health care systems in Western Europe. Being his mother's son, he noticed that the Netherlands and other countries seemed to do a better job of providing mental health services than Finland did; the public system at home was known for patchy coverage and long wait times. Ever the coder, he wondered whether a web-based counseling service would help. It could sell vouchers to cities and towns, which could distribute the vouchers for free to residents. People could use the service anonymously. They wouldn't have to worry about the stigma of seeking care, and they'd have access anytime, anyplace.

In 2009, the Finnish Innovation Fund backed Tapio's idea with an initial grant of about $12,000. He and his parents used the money—along with more than $13,000 of their own savings—to start Vastaamo, Finnish for "a place where you get answers from." Tapio registered the company as a social enterprise, meaning that the bulk of its profits would be poured back into its mission to improve mental health services. He would own around 60 percent, and most of the remainder would belong to his parents. Perttu would serve as CEO.

Clients could send a message to Vastaamo, and within 24 hours they'd get a personal response from a qualified therapist. (Wahlbeck, of the mental health nonprofit, notes that such services aren't regulated by the government.) But counseling by internet "was not enough for customers," Tapio says. Many of them needed access to in-person therapy.

One way to meet that need was to grow Vastaamo into a network of brick-and-mortar clinics. Tapio planned to digitize whatever he could, from bookings to invoices to medical records—everything but the appointment

itself. The idea was that independent therapists would join Vastaamo to avoid dealing with their own administrative headaches. Freed by automation, they'd have more time to spend with clients (and rack up billable hours).

To deliver on this vision, Vastaamo needed an electronic medical record system, but Tapio didn't like the options he found. Either the systems bristled with irrelevant features or they were too tightly tailored to a different area of medicine. The lack of good software, Tapio says, was one of the "main reasons" nobody had done what Vastaamo was about to attempt.

A Vastaamo clinic location in Espoo, near where Jere lives.

Illustration: Mark Harris

Rather than use an existing system, the company designed its own. It launched in late 2012, around the same time Vastaamo's first in-person clinic opened, in the Malmi district of Helsinki. Tapio wouldn't go into technical detail about the system, but in court documents he suggests it was browser-based and stored patients' records on a MySQL server. More important for Vastaamo's purposes, the interface was easy to use. When therapists applied for a job at the company, they heard all about how much it would quicken their work.

But the slick exterior concealed deep vulnerabilities. Mikael Koivukangas, head of R&D at a Finnish medtech firm called Onesys Medical, points out that Vastaamo's system violated one of the "first principles of cybersecurity": It didn't anonymize the records. It didn't even encrypt them. The only thing protecting patients' confessions and confidences were a couple of firewalls and a server login screen. Anyone with experience in the field, Koivukangas says, could've helped Vastaamo design a safer system.

At the time, though, fears of a breach were far from Tapio's mind. The summer after Vastaamo's first clinic opened its doors, he took over as CEO and set the company on a path toward expansion.

In 2014 there was a change in the regulations around Vastaamo's business. The Finnish Parliament decided to split medical information systems into two categories. Class A systems would connect with Kanta, the national health data repository, so they'd need to meet strict security and interoperability standards. Anyone who planned to keep their patients' records in long-term electronic storage would have to use a Class A system.

Smaller organizations, the kind that kept vital records in manila envelopes and filing cabinets, would be allowed to use Class B systems. These weren't as tightly regulated, in part because they wouldn't make very interesting targets for a hacker. Class B operators would simply self-certify to the government that their setup met certain requirements. "The government" being, in this case, a single man—Antti Härkönen—whose purview includes all 280 Class B systems in Finland.

The new law gave Vastaamo several years to adopt a Class A system. The problem, Tapio says, is that the Finnish government hadn't specified how psychotherapy practices should format their data. Vastaamo could build a Class A system and plug into Kanta, but there was "no way to stop, for example, general practitioners at health care centers or occupational health physicians from accessing" therapy records, he says.

Outi Lehtokari, Kanta's head of services, pushes back against this claim. "Tapio might have misunderstood how Kanta works," she says. Patients can choose to restrict access to their information.

In any event, on June 29, 2017, Vastaamo registered a Class B system. As Tapio tells it, the company was eager to upgrade to Class A as soon as the government released formatting specs for psychotherapy. But that didn't happen. Instead, when the specs came out, Vastaamo kept on going with its Class B.

Tapio says that Finland's "supervisory authorities" then signed off on the system "numerous times" in the years ahead. Härkönen, who is one of those authorities, says that to monitor all the Class B systems carefully would be "mission impossible" for him. He adds, however, that there should be more "proactive inspections."

By 2018, Vastaamo was operating nearly 20 clinics and employing around 200 therapists and staff. By the end of 2019, annual revenue had risen to more than $18 million. The company drew the interest of Intera Partners, a Finnish private equity firm, which bought out the majority of Tapio's and his parents' stakes. Tapio took home nearly $4 million from the deal.

With each new clinic that opened, the original process repeated: Härkönen reviewed Vastaamo's self-certification and gave the thumbs-up. More patient data flowed into the MySQL server. And the reservoir behind the dam rose a little higher.

Tapio first heard from the hacker on September 28, 2020. The demand was 40 bitcoin, around half a million dollars at the time. The message came to him and a pair of developers he'd hired in 2015, Ilari Lind and Sami Keskinen. Lind was responsible for maintaining the company's IT systems, including its servers and firewalls; Keskinen was the data protection officer.

According to a statement Tapio made to Helsinki District Court, he immediately notified various government authorities, including the police. Lind sifted through Vastaamo's network traffic logs but reported finding no evidence of a hack. Tapio hired a security company called Nixu to investigate further. Two days later, Tuomas Kahri, COO of Intera Partners and chairman of the board of Vastaamo, sent an email to Tapio to thank him for his diligence in handling the breach. Kahri would later say that some of his own loved ones had been targeted in the attack.

In early October, Tapio got another shock. Keskinen and Lind called with a confession: Just before they'd joined Vastaamo, they had been arrested as part of a security breach at Tekes, the Finnish Funding Agency for Technology and Innovation. Lind had discovered that he could download Tekes' entire database, containing information on as many as 20,000 companies, by changing the URL on a funding application. He informed Tekes, which fixed the vulnerability—but he also notified Keskinen, who downloaded the database. There was a pretrial investigation for aggravated fraud, breach of confidentiality, and burglary, but the prosecution could not establish that Lind and Keskinen had used the database for financial gain.

Tapio says that if he had known about the two men's histories, he would never have hired them. (Keskinen and Lind declined to comment.) As it was, though, he had more pressing problems to worry about.

On the morning of Wednesday, October 21, the hacker posted a message on Ylilauta, an anonymous public discussion board. "We have attempted to negotiate with the Ville Tapio, the CEO of vastaamo, but he has stopped responding to our emails," they wrote in English. Until they got their 40 bitcoin ransom, they were going to leak 100 patient records each day. The first batch was already up on a Tor server. Anyone who wanted to could go read them.

The hacker started emailing with Henrik Kärkkäinen, a reporter at the newspaper *Ilta-Sanomat*. To prove they were the real McCoy, they uploaded a file to the Tor server called "henrik.txt"—a snippet of their exchange. In emails to Kärkkäinen, the hacker scorned Vastaamo: A company with security practices that weak was the real criminal, he recalls them writing. They claimed to have been sitting on the stolen database for 18 months, unaware of its value.

When Ylilauta's moderators removed the posts, the conversation migrated to Torilauta, a popular discussion forum on the dark web. The hacker took on a name: ransom_man. At least one desperate person offered to pay the full 40 bitcoin. Another wrote, in English, "I have discussed about very private things with my therapist and will literally kys myself if they are released." They had their bitcoin ready: "I can send it in minutes, I'm constantly refreshing this page." About 30 payments ended up going to the hacker's Bitcoin wallet, according to Mikko Hyppönen, the chief research officer at F-Secure, a global cybersecurity company. It is unclear whether ransom_man actually deleted anyone's information.

The hacker did follow through on another promise, however. On October 22, they leaked 100 more patient records. Some belonged to politicians and other public figures. They contained details about adulterous relationships, suicide attempts, pedophilic thoughts. The next batch came around 2 am the following morning. The hacker also put all the records they'd leaked so far into a single file called "Vastaamo.tar."

And then something strange happened. Ransom_man replaced the first "Vastaamo.tar" with a much bigger one. It was 10.9 gigabytes—the entire leaked database. This file also contained a Python script that the hacker had used to organize the therapy records. The 10.9 GB upload seems to have been a mistake, because it disappeared in a matter of hours, along with the entire Tor server. Some speculated that Vastaamo had paid the 40 bitcoin, though company officials denied it.

Either way, ransom_man soon changed tactics and started extorting individual patients. This was unusual. Most of the time, cybercriminals go after institutions, according to Hyppönen. He knew of only one earlier instance of patients being singled out—in late 2019, after a breach at the Center for Facial Restoration in Miramar, Florida. (Since the Vastaamo attack, he adds, two other hacks have also targeted patients of plastic surgery clinics.) "Most attackers want money, and health care data is not directly monetizable," Hyppönen says. But with real-world examples of the crime paying off, he adds, "it could become more common."

Vastaamo reacted by offering patients a free counseling session. Therapy continued as normal. One patient says her therapist advised her to consider that not everything being said in the news was true. Some patients picked up a physical copy of their records, to learn what had been stolen, and others joined Facebook groups dedicated to victim support. Jere, however, opted not to; he wanted to minimize his online presence. He changed his phone number and purchased credit protection. He never seriously considered paying the hacker, he says, because "there was absolutely no guarantee they would obey" their own terms.

A Vastaamo clinic location in Turku.

Illustration: Mark Harris

On the Monday after the breach became public, Tapio went to Vastaamo headquarters in Helsinki. He'd been summoned there by Tuomas Kahri, the Intera COO who a month earlier had thanked him. Instead of speaking to Tapio face to face, Kahri had a consultant hand him a letter. It said that Tapio's contract as CEO was terminated.

Hours later, the company announced Tapio's dismissal. Shortly after that, in response to a legal motion filed by Intera, the Helsinki District Court ordered the temporary seizure of $11.7 million worth of the Tapio family's assets—exactly what Intera had paid for its share of Vastaamo. Kahri declined several requests to comment on Intera's claims, but they're described in public (albeit redacted) court documents.

In its filings, Intera says it became aware of two previously unreported breaches at Vastaamo, in late 2018 and the spring of 2019. The second date fell shortly before the buyout went through. "Based on the information received so far, it is reasonable to assume that Ville Tapio was aware of the breach," Intera argues. Not only that, but he "sought to conceal" it. Intera wanted to dissolve the transaction and reclaim the purchase price.

Tapio, as the defendant, submitted written testimony in rebuttal. He claims to have been blindsided by the news of the 2019 breach. The reason he didn't find out about it at the time, he writes, is that Keskinen and Lind—the "system architects"—never told him about it.

On the morning of March 15, Vastaamo's servers crashed and the patient database was replaced with a blackmail message. Tapio notified staff of the crash at 11:18 am, but no one appears to have discussed the possibility of a breach in either of the reports submitted to the government.

According to Tapio's testimony, Keskinen and Lind—who shared an administrator account—told him that the crash might have been caused by some minor adjustments they'd made shortly beforehand. But he says that Nixu, the cybersecurity company he hired in September, found something else: The shared account read the ransom message and deleted it.

In Tapio's version of events, then, whoever was using that account covered up the March breach. And the reason they did it, he contends, was to conceal a vulnerability they'd created themselves—one that had left Vastaamo's patient database "without firewall protection" for more than a year.

There were supposed to be three levels of security surrounding the database, Tapio tells me: one firewall at the network level, which blocked

connections from the public internet; another around the individual server that stored the patient database; and the server configuration itself, which prevented connections from outside accounts. In November 2017, Lind spent a few hours configuring the server to allow remote access. Tapio believes that Lind and Keskinen wanted to be able to manage the server from offsite, and that instead of going to the trouble of setting up a VPN, they simply peeled back the firewalls.

“Those are two professionals that know much more about the network and firewall and server management than I,” Tapio says. “I was not responsible.”

Keskinen and Lind have not testified in the Intera case. They declined to comment on Tapio’s numerous allegations. Until the dispute is resolved, the $11.7 million that Intera wants back—the fortune that Vastaamo built—will remain frozen.

In early January of this year, the Vastaamo patient database reappeared on at least 11 anonymous file-sharing services across the public internet. The file contained all the same records as before but was a fraction as big, so it spread easily. Without an accompanying message, the motivations for the upload are hard to discern—but it did appear fewer than 48 hours before Vastaamo’s board was due to discuss the company’s future. Was this a spiteful push to bring the company down?

If so, then it was a success. On January 28, Vastaamo was put into liquidation, and it filed for bankruptcy two weeks later. In early March, its staff and services were transferred to Verve, a provider of occupational welfare services. The acquisition did not include Vastaamo’s customer data, and Verve will use a Class A system.

Almost immediately after the hack happened, Parliament fast-tracked legislation that would allow victims like Jere to change their social security numbers in case of a serious breach. But patients were spooked, one counselor told the newspaper *Helsingin Sanomat*. “Not everyone who needed help may have sought treatment,” he said. Some argue that therapists should never be able to enter session notes into Kanta; now more

than ever, patients will not risk having their data travel beyond the consultation room.

In wider medicine, Koivukangas says, the Vastaamo scandal has highlighted the "unmet demand" for electronic medical record systems that are scalable, easy to use, and—crucially—secure. This is an area ripe for disruption, he says, and "prior to this breach, many thought with good reason that Vastaamo would've been one of those disruptors." Until the marketplace improves, he says, expect more bespoke solutions, and more breaches.

Unless ransom_man is caught and the Finnish authorities sort out everything that happened at Vastaamo, it will be impossible to know exactly how "the incident" began. Would it have happened, for example, if Finland had been more proactive in policing electronic medical systems? Or if Tapio had implemented a more secure system? What's clear is how it ended—in the most painful way possible for tens of thousands of patients. As more health care systems across the world go digital, the risk of that outcome rises.

"Being honest about my mental health turned out to be a bad idea," Jere says. He worries about identity theft, about some debt collection company calling him out of the blue and demanding tens of thousands of euros. He worries that his history of teenage alcoholism, so well documented on the web, will make it hard for him to find meaningful work as an adult. And he still worries that his mother may read his file one day. It's somewhere in the ether, accessible to anyone.

Photographs: Akseli Valmunen; Getty Images

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Adam Rogers

Backchannel
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How Pixar Uses Hyper-Colors to Hack Your Brain

The animation studio’s artists are masters at tweaking light and color to trigger deep emotional responses. Coming soon: effects you’ll only see inside your head.

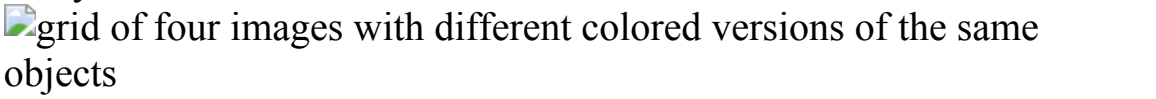
grid of four images with different colored versions of the same objects

Illustration: Simoul Alva

The scene wasn't working. It was a moment from the Pixar film *Coco*, still in production at the time—the part when the family of Miguel, the main character, finds out he's been hiding a guitar. It takes place at twilight or just after, a pink-and-purple-tinged time of day everywhere, but even more so in fictional Pixarian Mexico. And Danielle Feinberg, the photography director in charge of lighting the movie, didn't like it. She pressed Pause with a frown.

Lighting a computer-rendered Pixar movie isn't like lighting a film with real actors and real sets. The software Pixar uses creates virtual sets and virtual illumination, just 1s and 0s, constrained only by the physics they're programmed with. Lights, pixels, action. Real-world cameras and lenses have chromatic aberration, sensitivities or insensitivities to specific wavelengths of light, and ultimately limits to the colors they can sense and convey—their gamut. But at Pixar the virtual cameras can see an infinitude of light and color. The only real limit is the screen that will display the final product. And it probably won't surprise you to hear that the Pixarians are pushing those limits too.

Of course the people at Pixar still have to make all the choices that'll produce the final outcome. To prepare, Feinberg had gone on multiple trips with the team to Mexico, taking lots of pictures and notes on the lighting and colors she saw there. And even though this critical moment in Miguel's house looked lovely, it didn't look *right*. But it was awfully late to realize it. “We had finished lighting. We were at the point where we were going to show it to the director,” Feinberg says. “And I asked the lighter to put a green fluorescent light in the kitchen.”

It was an unusual request. In the conventional chromatic grammar of today's motion pictures, greenish-tinged fluorescence usually means a movie is about to turn eerie, even ominous. But Feinberg wanted to see the kinds of lights she remembered from the warm, homey kitchens they'd seen in Mexico. “I wasn't sure the director was going to be happy with me putting green fluorescent light in the background,” Feinberg says. “It was a little bit of a risk.”

But after seeing the light, the director, Lee Unkrich, agreed. It looked like Mexico, he said. He remembered those lights and the resulting mood from their travels too. The green glow, which usually had one narrative meaning, assumed another.

In a way, every filmmaker is really just playing with moving light and color on surfaces. That's the whole ball game, a filmic given. But Pixar takes it further, or perhaps just does it more self-consciously and systematically. Its emotionally weighty, computer-generated animated films deploy precisely calibrated color and light to convey narrative and emotion—from the near-total absence of green in *WALL-E* (until postapocalyptic robots find the last plant on Earth) to the luminous orange marigolds that symbolize Miguel's trip to the magical Land of the Dead in *Coco* through the contrast between the cool blue luminosity of the afterlife with the warm, snuggly sepia of New York City in last year's *Soul.*

In fact, almost every Pixar movie works within a specific color palette, a story-specific gamut that filmmakers like Feinberg pull from and use to plan the look of each scene, a road map known as the color script. But *Coco* complicated that process. When its story moves to the Land of the Dead, it cranks up all the dials, colorwise. Those scenes look made out of neon, like

a bio-organic version of Tokyo's Shinjuku District at night. “When it came time to do the color script, it was like, ‘The Land of the Dead has every color. All of it takes place at night, so we can't use time of day to elicit emotion. There is no weather in the Land of the Dead, so we can't use weather to elicit emotion.’ Those are three pretty typical things we use to support the story,” Feinberg says.

Using color to express emotion is a hallmark of life. (Humans aren't even the only animals to send signals with a bit of sexy red or dangerous green.) But the mechanical production of color has defined and changed human cultures since before recorded history. The technology for making colored things and the science of how those colors work in the world and in our minds changes and evolves, transforming culture along with it. Right now, that technology is evolving again.

If talking about music is, as someone once said, like dancing about architecture, then talking about color is like doing a trapeze act in zero-g on a space station. But here goes: First of all, you have to forget the dorm-room philosophizing about whether you see the same red that I do even though we both call it “red,” man. If we both agree—and let's agree to agree—that “red” is light with a wavelength of somewhere above 620 nanometers, well, waves of *what*, exactly? (It's fluctuations in electrical and magnetic fields, as if that helps.) Or we could agree that “red” light is made of subatomic particles called photons, the irreducible quanta of energy—1.8 electron volts, to be more or less exact.

Go ahead and map those electron volts and nanometers for red, plus the ones for all the other colors you can name, into a straight line, or even wrap them into a circle as the physicist Isaac Newton did. You still won't be capturing everything that comes together to mean a color. The real map needs more dimensions than that. It needs the *amount* of color, from pastel to saturated. It needs the amount of light you're talking about. That's “luminance,” or sometimes “intensity.” Color that's made of light is different from color that's light bouncing off a surface, changed not only by how that light reflects or refracts but also by whether the surface is colored itself, maybe by a pigment. Map all *those* values together, usually in three dimensions, and try to match the objective numbers to the vagaries of the

way human color vision works—we see yellow as brighter than other colors, even if the actual brightness is equal, and that's just the beginning of the headaches—and you have what's called a color space.

At the movies? Whoof. Even more complicated. The pictures you see on a screen are made of light shining through a colored strip or generated by a digital device, projected outward onto a reflective surface and then bouncing into your eyeballs. (And what happens once it gets in there, where biochemical photoreceptors transduce photons into neuroelectrical signals, is a whole other thing.)

The point is, “color” means a lot of different things, depending on how you're using it. And using it has been a defining trait of humanity since we all first started thinking. We see colors in the world, in nature, and we use what we see and learn to make newly colored things. It's a hallmark of human activity, practice, and culture. We started by collecting objects with colors, turned to grinding rocks into powders and pastes and smearing them onto cave walls and on our bodies—and have arguably reached an evolutionary acme with the ability to control and create light with the precision and fidelity of a Pixar.

None of that highfalutin philosophy would help Danielle Feinberg, though. Her team had a job to do. With too many colors in play and too wide a gamut to narrow, she couldn't use specific colors to code for emotions. So Feinberg's team did it with varying amounts of light—with luminance.

Take the scene where the old ghost Chicharrón dies unremembered in the Land of the Dead. It's a tear-jerking sequence, but the color palette is still

just as wide (though it does lean hard into moonlit blue for this moment). Instead of taking away color, the scene is actually just less bright, lit not by the virtual neon or glowing-orange *cempasúchil* flowers but by just a couple of lanterns. “That was the way we had to do it on *Coco,*” Feinberg says, “just because it was a colorful, lively world, but we still needed to elicit that emotion.”

Control the lighting, control the colors, control the feelings. That's filmmaking. As of this writing, Pixar's last 23 movies—going back to 1995's *Toy Story*—have made a combined $14 billion globally, and that's not even adjusting for inflation. Kids like them; adults like them. Even in a locked-down, movie-theater-free world, the latest Pixar movie, *Soul*, grossed $117 million worldwide.

But I'll tell you a secret: When it comes to wringing emotion from color, Pixar cheats.

In a very special screening room at Pixar's Emeryville, California, headquarters is a very special screen. It's not huge, perhaps just 10 feet across, and it's at the front of a room dominated by a huge control panel studded with five smaller computer monitors and at least two keyboards. The ceiling is covered in felt, and the carpet squares are black instead of the gray that's standard at Pixar, to keep light contamination to a minimum.

Explaining what comes next requires me to deliver some bad news. Remember the primary colors you learned in elementary school? Red, blue, and yellow, right? So, yeah, that's wrong. You were supposed to be able to mix those into all the other colors, but that never worked, did it? Blue and yellow were supposed to be green, but you got brown. Red and blue were supposed to make purple, but you got … brown.

That's partially because *subtractive* colors reflect some wavelengths of light and absorb others. Mix them together and you absorb more and reflect less. Things get dark. Unless you carefully manage the pigments and the mixing, and you start with the primaries cyan, magenta, yellow, and black—the CMYK beloved of magazine designers.

It's also wrong because oftentimes people confuse light streaming from a source like a TV or a star with the color that happens when light hits a surface. Those primary-school primaries aren't the only possible primaries. But even Newton was a little confused about this. His primaries are the specific basic colors he identified in the spectrum he projected from a window onto a wall in 1665, holed up at his mom's house while a pandemic raged back at his university. You can relate, right? Newton broke whitish sunlight into a rainbow's worth of colors and chose to draw the borders at seven: red, orange, yellow, green, blue, indigo, and violet. He called that a spectrum, but of course that categorization leaves out a lot—the "extraspectral" colors like pink or purple or, yes, brown. (Brown is just dark yellow. Shh.)

If you're reading this on a screen instead of on paper, you're seeing a concatenation of light generated by red, green, and blue pixels—a whole other set of primaries, not coincidentally at similar wavelengths to those the color receptors in your eyes are tuned to. A little more or a little less of each, and just as with CMYK pigments (and white light or white paper), you can make just about every color that the human eye can discern. Point is, the colors we see aren't actually mixed from a list of available ones, like buying from a paint store. It's a continuum of light and reflection, interpolated by the biological sensors of our eyes and the not-totally-understood think-meat just behind them.

That big screen at Pixar isn't lit by a typical projector. Instead, mounted in the wall behind us is a custom-built Dolby Cinema projector head. If you've been to a theater with a Dolby setup, you were looking at images cast by a projector that was actually a pair of triple-barreled laser guns—red, green, and blue beams capable of combining to produce a range of colors closer to what human vision can perceive than anything else out there. The two guns had wavelengths slightly offset from one another so that special 3D glasses can distinguish them, one lens for each, and your brain can combine them to create the illusion of dimensionality.

But at Pixar, all six beams come from one source, which means this projector has six primary colors. Also, the Dolby rig has a span of brightness, from dark-dark to bright-bright—in screen terms that's called

dynamic range—and the one at Pixar is more than 10 times brighter than one in a civilian-class Dolby Cinema.

Part of how we see color is how much light is behind it, how much overall energy is pumping toward us. So most modern color spaces have an axis that measures this, with black (no light) at one end and white (all the light) at the top.

The standard unit for measuring what's called luminous intensity, the amount of light coming from a source over a given angle of view, is the candela—as in one candle's worth. But if you're talking about "luminosity," the amount of light emitted by something like a TV screen, what you want is candelas per square meter, also known as a nit. Dolby Cinema output is 108 nits, but Pixar amps it up even more. Sitting at the control panel of the Pixar system, senior scientist Dominic Glynn practically glows with praise. "We've goosed this projector with an extra 600 percent laser power. We can get well above a thousand nits on this screen," he says. "It's one of the most linear, perfect reference color-grading displays you can conceive of."

So this projection room is where wide-color-gamut, high-dynamic-range colorcasting abilities merge with Pixar's creation of virtual sets, each with their own virtual physics of light. People like Glynn can actually generate a world of color wholly unlike the one you and I usually live in. "We could light the whole set with a green laser," Glynn says. "That's kind of hard to do in the real world."

You saw it in *Coco*, but the movie where it might have made the most difference was *Inside Out*. That's the one about personified emotions living in the brain of an 11-year-old girl. When *Inside Out* was in production, Dolby was working on its in-house version of new standards for high dynamic range.

The range of colors it could convey was bigger. The "gray scale ramp" between darkest black and brightest white would allow a theater equipped with these lasers—only a half dozen initially—to turn its light output so low that the screen becomes a black indistinguishable from the walls ("exit signs notwithstanding," Glynn says). It was an entirely new standard of

color, but Pixar's directors of photography were already working to expand even that envelope.

The colors a projection system can reproduce are bounded by a triangle-shaped color space—red, green, and blue at the corners, and everything else a mixture of those inside the lines. But that color triangle is invariably smaller than the possible colors of the universe, or even those that the human eye and mind can distinguish. Which leaves a little wiggle room for Pixar. “The specific hues at the red, green, and blue corners of that triangle are not really what you'd experience under, say, ultraviolet illumination,” Glynn says. “We said, ‘Hey, what would happen if we tickled all the portions outside a traditional cinema gamut?’”

Glynn taps on the control panel keyboard and calls up a scene from *Inside Out* where Joy and Sadness walk into the Realm of the Subconscious. Glynn hits Play; Joy and Sadness enter a dark room and see a forest of giant broccoli, lit from the side so it seems outlined in a bright green. They move to a red staircase headed down into infinity and then meet another character, the clownish imaginary friend Bing Bong, imprisoned in a cage of candy-colored balloons. “These are all basically as saturated a color as one can achieve in digital cinema today,” Glynn says.

Then he cues it up again, in super-high-end digital cinema fireworks, using everything the screen can give us. “They go through the doors, and you see the little long shot of them in the distance, then all of a sudden we kind of have *everything*.” The shot widens, and the camera heads toward the broccoli forest, but now the broccoli is laser-pointer green, glowing against the blackness.

The red archway around the staircase is the most vivid red I have ever seen, and when Joy and Sadness start walking down the stairs, the edges of the screen disappear. The room, the world, is nothing but black except for the stairs. The balloons of Bing Bong's prison look unearthly, like a Jeff Koons dog with eldritch powers. “I want to say 60 percent of this frame is outside the gamut of traditional digital cinema,” Glynn says. “We have a version of this film that has been creatively approved and built for exhibition on televisions that don't exist yet.” You can see them only if you saw *Inside Out* in a fancy-pants Dolby-equipped theater.

You can't buy these colors for your house. But Pixar does have a prototype of what that TV might be like. It's in a room next to the screening room. I convince Glynn to show it to me in action, and when he fires it up to maximum brightness, it's actually painful to look at. The light leaves an afterimage like one caused by staring at the sun.

Once these technologies are in every movie theater and every living room, maybe even on every phone, things are going to get really weird. They will test the limits of human color perception and maybe even extend them. Poppy Crum, the neuroscientist who runs research at Dolby, has been working on all the ways that, for example, seeing images in really high dynamic ranges can trigger not just autonomic responses—like flushing from heat exposure after just seeing video of flames—but psychological ones too. Crum says her research shows that these tricks of light heighten the entire emotional experience of moviegoing.

The Dolby screen has given Glynn some pretty out-there notions too. He asks if I know how color receptors in the human eye can “bleach,” which is to say that they essentially use up the molecules that absorb specific wavelength-ranges of light and transmit color signals from retina to brain.

I tell him yes. “You're talking about contrast effects and afterimages,” I say.

“For sure,” Glynn answers.

This quirk of human color vision has vexed scientists since before anyone knew about the color photoreceptors in the eye. Color-thinkers in the 19th century recognized that the same colors—or rather, objects of the same color—might look different depending on context, on what colors they were adjacent to.

They also recognized the obverse—different spectra can appear the same in different contexts. This was one of the tricks that the color-seeing brain could play. Varying levels of brightness change the colors people see. Look away from a bright light, like a candle, and the afterimage you'll see is the color of that light's complement on a color wheel. In all those cases the brain seems to be generating colors that aren't there.

Now, Glynn says, it might be possible to take control of those illusory effects. Blast the middle-wavelength greenish receptor in the eye with light at its peak sensitivity and "you can actually heighten the sensitivity or perceived sensitivity to other colors in complement to that." It'd be like a laser-powered version of Jasper Johns' famous painting *Flags*, where you only see the "correct" colors of the United States flag when you look away, as an afterimage.

So what if, Glynn proposes, a scene in a movie added, subtly, light in a very specific wavelength of green? Then just kept ramping up, more and more green—and, at a key moment, the screen dropped all the green out at once. The movie would induce the complementary color as an afterimage. You'd *imagine* you were seeing a specific red, not projected on the screen but as a neurophysiological response to stimulus. And if you pick the precise wavelength, "you could actually cause someone to perceive a color that they could never otherwise see. Like, there's no natural way for you to have the perception of that color."

That color wouldn't be onscreen. It wouldn't be anything a projector could cast or a computer could generate. It'd be a function of pure cognition, different for every viewer, existing only in the mind, then fading to nothingness. Which is true for all colors anyway, when you think about it.

Excerpt from Full Spectrum: How the Science of Color Made Us Modern *by Adam Rogers. Copyright © 2021 by Adam Rogers. Available May 18, 2021, from HMH Books & Media.*

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Virginia Heffernan

Ideas
04.14.2021 08:00 AM

Who Let the Doge Out? The Cryptocurrency Is As Nutty and Joyful As Ever

The much wow Dogecoin has had its notable influencers—including, for a brief moment, me.

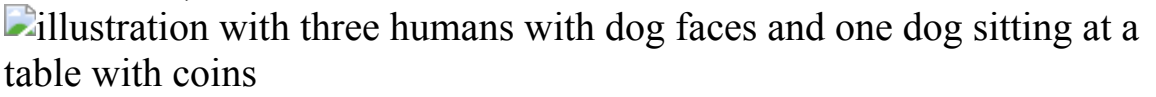


illustration with three humans with dog faces and one dog sitting at a table with coins

Illustrations: GABRIEL ALCALA

Every human endeavor must have its influencers, and Dogecoin is no exception.

But in case these influencers haven't influenced you yet: Dogecoin is a cryptocurrency, a virtual medium of exchange made valuable not by any bank or government but by those who use it. Don't worry. It's not a Johnny-come-lately crypto like Potcoin or Fonziecoin; it's almost venerable. Invented in 2013 by Billy Markus (then a software engineer at IBM) and Jackson Palmer (then a product manager at Adobe), Dogecoin was conceived as a cute comeback to the deadly serious Bitcoin, the cloak-and-dagger global-finance opera that started in 2009. Meant to be relatable, Dogecoin was inspired by the beloved Doge meme of the Obama era, which shows a photo of a cream-colored Shiba Inu embellished with enigmatic phrases in Comic Sans typeface.

Doge is a misspelling of—well, yes, *doggy*. That's the joke. That's all. To spin cryptocurrency out of this joke is a better joke still. The best joke of

all? The price of Dogecoin has jumped more than 1,050 percent from the beginning of 2021 to the time of this writing. Of course, by the time you read this, that percentage will be much higher. (Or lower. Crypto proceeds in tantrums.)

And Dogecoin would never have gotten that far without influencers. In the Gilded Age, influencers were known as robber barons, and if one of them, someone like Andrew Carnegie or J. D. Rockefeller, invested in a commodity, you'd see it on ye olde steam-powered stock ticker. More than making steel or railroads, the job of robber barons, with their enormous shares of the whole market, was to manufacture fluctuations by pumping money in or dumping stock—and then buying and selling at whatever prices they chose. These days, influence is exerted by those who don't even (necessarily) invest. No one knows exactly, for example, what Jack Dorsey of Twitter is into, but since February 2, 2020, the day he tweeted the hashtag "#bitcoin" (and debuted Twitter's Bitcoin emoji), the price of $BTC has gone wild.

I want to try that. #bitcoin. #bitcoin. Nothing? Anyone?

In any case, the influencers who dusted off silly old Dogecoin, after the joke had gotten shopworn and trading was flat, are a forerunner of the merry pranksters on Reddit who put the squeeze to hedge funds that were short-selling GameStop in January. The Reddit investor-pirates liked $DOGE for the same reason others liked $GME: It's a damned likable thing, with childlike nostalgia to it, and it was down on its luck. Over the years, $DOGE turned from a once-cute teen to a disgruntled pandemic-grounded twentysomething (who is now trading crypto). Along the way, vice-signaler and chronic crimer John McAfee, who Belizean police suspected was involved in the killing of his neighbor, allegedly pumped and dumped Dogecoin and, according to court documents unsealed in March, made a cool $2 million. Then, in 2019, enthusiasm for Dogecoin went back to the Redditors, where it belonged. Earlier this year, the price spiked from about a third of a cent per coin to five cents a coin—and has stayed in the black ever since. The subreddit r/dogecoin does indeed make Dogecoin look like fun: "The most amazing place on reddit! A subreddit for sharing,

discussing, hoarding and wow'ing about Dogecoins. The much wow innovative crypto-currency."

But the chief Dogecoin hype man is not Reddit. It's Elon Musk. As amusing as Doge is, a jeu d'esprit in a world of stormy libertarians, we would not be talking about it at all if Musk the oracle hadn't tweeted, "One word: DOGE," on December 20, 2020. This drove the price up 20 percent and led some—maybe just me—to wonder whether Doge was not a misspelling from a goofy meme but rather the right-spelled word for a Venetian grandee in gold robes the weight of a Tesla. Someone like Musk.

In fact, though I myself do nothing with crypto, all year I have been wondering about dogs, doges, memes-made-currency, and whether it's possible to put a price on lulz. And as I wondered this, this past March, I decided $DOGE was a good punch line for something. As one does, I kept the word canistered until I saw my chance to deploy it, and then I tweeted at a friend that I'd be happy to pay him in $DOGE for something or other.

The tweet wasn't even especially funny. It was just a pretext to type "$DOGE"!

But then *I* became a Dogecoin influencer!

I learned about my astonishing new status on, naturally, Twitter—the most inefficient trading desk in global history—when a document was tagged to my attention that showed a list of Dogefluencers, including me. Actually the list was called "The Ultimate DogeCoin All-Stars List," so I'd say we're all stars, but in Doge world it's all a caper, and woe betide you take it seriously and end up trolled. At the top of the list is, no surprise, @elonmusk, who has some 50 million followers. (More than the population of Spain.) Then comes Mark Cuban, a separate account for Cuban's Dallas Mavericks, and Kevin Jonas, an esteemed JoBro. @mcuban does not have #dogecoin—*or* #bitcoin—in his Twitter bio. Instead, his bio urges fans to "check out my NFTs" and gives a website.

Sigh. NFTs. Cuban may be over sweet $DOGE if he has moved on to NFTs—the outlandish nonfungible tokens whose blockbuster entry into the open market last year suggests an internet-wide effort to restore originality, art

status, and “proof of ownership” to valuable bits and pieces of the internet. (In March, Jack Dorsey's first tweet, and the fragment of the blockchain that marked it as the real thing and not a copy-and-paste job, sold to Sina Estavi, a Malaysian CEO, for $2.9 million.)

My friend, this All-Star is not over $DOGE. In fact, I've decided to stop complaining about the crypto obsessives around me—the ones who say “HODL” for “hold on for dear life” and seem to measure out their lives in satoshis. As of this spring, some of the crypto youngs also possess limited-edition BlockClocks, clocks that can be customized to show real-time updates on various Bitcoin stats. When Dorsey testified to Congress via Zoom in March, he had a BlockClock Mini in the frame. The throwback design conjures the Soviet era, and the numbers on the face jump around as if in a perpetual glitch. All this might as well measure the effect of chemtrail antibodies on air elves, for all I know, but it's all just so esoteric and leet and ridiculous, like the earliest days of the internet. Naturally, I preordered a BlockClock mini.

And I'm all in for $DOGE. One coin was worth about a nickel at the time I bought in. Check the price today; I bet I'm up. And if I have cast my influence on you, maybe you are too.

This article appears in the May issue. Subscribe now.

Zak Jason

Ideas
04.01.2021 07:00 AM

Portraits of a Neighborhood’s ‘Wood Wide Web’

During quarantine, photographer Andres Gonzalez wandered his city and captured lone redwoods, trapped by human sprawl but linked by nature’s networks.

Sometimes, mature douglas firs send sugar to saplings via miles of underground, gossamer-thin mycorrhizal fungi. Through these same passageways (the “Wood Wide Web”) birches can loan carbon to fir trees in the summer, while firs pay it back in fall. And trees of different species might share nitrogen leached out of salmon carcasses left over from a bear's lunch.

Virginia Heffernan

Ideas
03.30.2021 08:00 AM

Bed Tricks, Cod, and the Hidden History of Catfishing

Intriguing, maddening deception can shake up our existence and sometimes —*sometimes*—set us free.

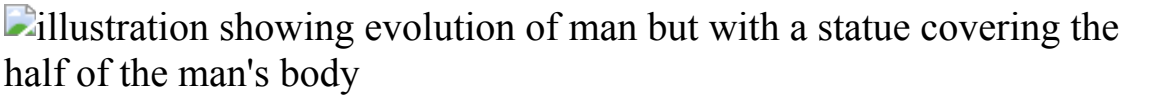


illustration showing evolution of man but with a statue covering the half of the man's body
Illustration: Sam Whitney

“Quite early in life George Tracy discovered that if he were to be reasonably happy and prosperous he must pretend.” So begins a mesmerizing psychological novel by Charles Marriott, published in 1913. The tale of George's lifelong obsession with an elusive frenemy named Mary, who has “the key to the side door of his nature,” has long been out of print. It's remembered chiefly for its title: *The Catfish*.

Yes, this century-old book gives us the figure of the modern-day catfish, the shrewd machinator who breaks hearts and passwords with nothing but Wi-Fi, cunning, and yottabytes of imagination. This conceit was reprised in the 2010 documentary by Ariel Schulman and Henry Joost, *Catfish*, which tells the story of a Michigan artist, Angela Wesselman, who used fake Facebook profiles and other online trickery to deceive Schulman's brother, Nev.

If you're confused, you're where you should be. The numberless catfish who now course through social media, the ones who devastate lives with sophisticated online masquerades, exist to beguile and disturb. Catfish like the fictional Mary or the real-life Angela are foxy and artistic. Others are in

it for money or the lulz. But in all catfishing cases, the happiness of the catfish requires your disequilibrium—and your obsession with them.

The contemporary 2021 catfish leverages everything from Hinge to Photoshop to WhatsApp. But the catfish dynamic long predates the internet, and even Marriott's novel. In the 1660s, the dauntless Mary Carleton concocted letters and official certificates to steal hearts and monies from rich chumps, using a deck of beguiling identities, from a principled virgin heiress to an orphaned German princess.

Around 1700, George Psalmanazar, a fraudster, probably French but posing as a Taiwanese adventurer, published a book describing his pretend homeland as a polygamous bacchanalia where men, naked except for gold and silver genital plates, sacrificed children and ate their wives. The dubious shtick won him admirers for his heroic escape from paganism to Christianity. One of his admirers paid his living expenses.

Shakespeare's characters, of course, can catfish as dexterously as any Finsta phantom, and they gender-bend and trans-humanize their way through exquisite courtship chicanery. A "bed trick," a favorite device of Shakespeare, happens when one person subs for another in the *midst of a sexual act*. Take that, ye online catfish pikers.

I recently spoke by phone to Nev Schulman, the original catfish victim who is now famous as the host of MTV's reality show *Catfish*. He called my attention to *A Midsummer Night's Dream* as an ace catfishing precedent. Otherwise, he said, he isn't big on literary allusions, and formal education doesn't suit him. (Indeed, he was kicked out of college for beating up a woman whom he says he took for a man.) But his grandmother, Marlene Strauss, is a distinguished art historian. In 2016 she appeared on a Manhattan stage with Nev, for an intergenerational discussion of love and lies. While Strauss infused the evening with erudition, citing proto-catfishing in works from *Cyrano de Bergerac* to *Some Like It Hot*, Schulman talked about latter-day digital catfishing, a darker affair, which too often ends "in courtrooms and restraining orders."

Though he did cite Genesis. "Jacob had to stand before his father—though his eyesight was failing—and physically pretend to be someone else,"

Schulman said. “Of course, now we've removed the human element.” With human bodies out of the way, catfishing can finally happen at scale.

In Marriott's novel, the catfish Mary is less a liar than an agitator. She meets George in childhood and nips at the edges of his life into late middle age; she gets him to question everything; he can't tell if he loves or despises her. She also goads him to a more engaged and ecstatic existence. In this way, she is akin to Nev's catfish, Angela, who turned him from a defeated dropout to a man with a purpose.

Angela introduced Nev online to an 8-year-old prodigy painter, a 19-year-old seductress, and a whole cast of supporting characters composed of MP3 fragments, online video, photographs, text messages, and nearly a dozen Facebook profiles. Schulman at 24 had his worldview blown open when he fell hard for the seductress, who in pictures looked like Jennifer Lawrence. Only when he and his brother's film crew, suspecting something was up, drove to Michigan's Upper Peninsula to door-stop Angela did the scales truly fall. Angela, who does not look like Jennifer Lawrence, was playing all the characters. Nev was first annoyed, then impressed, then grateful. He told me that Angela is still the greatest catfish he has ever encountered.

Ultimately, Marriott uses “catfish” to describe “anything or anybody that introduced into life … the queer, unpleasant, disturbing touch of the Kingdom of Heaven.” Angela's husband, Vince, who likely came to the catfish allegory by way of the popular Christian writer Joel Osteen, puts his own spin on it. “They used to tank cod from Alaska all the way to China,” he says, mixing up the geography. “By the time the codfish reached China, the flesh was mush and tasteless. So this guy came up with the idea that if you put these cods in these big vats, put some catfish in with them and the catfish will keep the cod agile. And there are those people who are catfish in life. They keep you on your toes. They keep you guessing, they keep you thinking, they keep you fresh.”

Thus is the catfish brought full circle. The person of Angela recalls the fictional Mary: Each is an intriguing and maddening woman who shakes up the existence of another.

Not long ago, Schulman's MTV show became a podcast. Schulman and a cohost help a range of young lonelyhearts, who fear they've fallen for digital specters, determine fact from fiction. Over and over the show features catfish victims who have been daydreaming into their phones, shoring up fragmentary missives from outer space to create alternate lives.

“Privacy has become so unbelievably rare,” Schulman told me. “There's been a pendulum swing. Young people are desperately looking for something private in their life—just for them.” The people who appear on *Catfish* don't want to be relieved, right away, of their illusions of intimacy; they want to live in the fantasia a while, juice it for self-knowledge. But by the time they contact Schulman, it's because, as he told me, “something isn't quite right. It's grown and grown as a pit in their stomach.”

The love objects are almost always a mirage. The catfish almost never look like their profile pics. Sometimes they're of another gender or race. Generally they're less successful, less rich, more lost, more incarcerated.

Schulman on the podcast shows something like admiration for anyone sweetly naive enough to end up in the catfished seat, *his* seat. At the same time, he's surprised that many guests don't know he was once nabbed. They never saw his movie. “People in this situation are people who don't do their research,” he told me. Right on.

Catfish makes obvious what most adults know: Romantic love is shot through with projection. Our phones mirror back to us our fondest hopes, and into the text bubble we pour all our yearnings. “I can't wait to fill my fingers with your hair,” Schulman once texted his catfish. “My body is

craving your touch tonight," wrote Angela. It's cringe-hyperworthy now. But it's what infatuation sounds like. You're always writing to a half-imagined other. Every sexter is a poet.

But *Catfish* never fails to end in disappointment. "Inevitably, the second they see them they have an instantaneous drain of affection," Schulman said.

Back to *The Catfish*, 1913. Though George and Mary are both married to other people by the end of the book, George discovers in a flash that he and Mary have something "beyond love," as only his catfish can keep him honest. "Before he could be straight with himself he had to have it out with her—and all his life he had shirked it." The catfish is not the pretender. Quite the contrary, she's the spur to drop all pretense. In talking to Mary, George is finally talking to himself, the self he's been suppressing. He's liberated. Some of the participants on MTV's *Catfish* find the same thing: that once they have it out with their catfish, they are, in Marriott's words, "free to love elsewhere."

In profound gratitude, George turns back to his beloved wife with renewed passion. The provocations of the catfish have been enlightening, but real love is serene. And sometimes all you want is a person who, in not looking like their ravishing selfie, looks better.

Paul Ford

Ideas
03.12.2021 07:00 AM

So You Want to Prepare for Doomsday

There's no cool gear with my method, but it has other advantages.


rucksack with survival contents displayed
ILLUSTRATION: ELENA LACEY, GETTY IMAGES

The preppers have the best stuff. It's because they operate under such constraints: You have to pack your whole society—money, tinctures, food powders—in a lone bag. Then, when the big bug-out comes, you slip on your paracord bracelets and shemagh scarf and vanish into the woods, to an already-scouted redoubt obscured by trees. There, beside your tent, you gnaw jerky and sip bleached snowmelt out of 5-gallon bags, wrapped in a 26-micron bivy that reflects 90 percent of body heat. A society of one.

By day you carefully inventory the dozens of curated objects in your bag, rifling through sub-pockets, enumerating ibuprofen, contemplating seed packets, calculating caloric yields. *Portable hand-cranked flashlight. Clove oil for toothache.* At night, with darkness yielding to bright gray inside your night-vision goggles, you patrol, hand hovering near your CZ-75 P-01. Far off down the mountain you hear the cracks, groans, whistles, and shots of a splintering society. A week ago you administered an Oracle database. Now your job is to survive.

And you dream: One day, after the smoke of civilization has drifted away, you'll link up with others exactly like you. A new world will rise out of your duffel bag. You'll hang up solar-powered mesh networks from trees

and make your own internet. You'll transact for potatoes and penicillin on the blockchain under the watch of vigilant owls. But now, jerky.

What the preppers do is fully acknowledge their fears and turn them into a particular aesthetic. Like goths. They make their anxieties perfectly legible. I get it. I read *My Side of the Mountain* when I was a kid. But while prepper gear is awesome, I keep thinking: *We should be trying to avoid a civil war, not packing for one.*

The Aesthetics Wiki has hundreds of different entries—Preppy and Punk, of course, but also more modern aesthetics like Dark Academia (Eurocentricity, Whit Stillman, sweaters), Vaporwave (synths, VHS boxes, teal), or Cottagecore (shortalls, Hozier). Many of the aesthetics have left- and right-wing offshoots: Vaporwave has produced Laborwave and Fashwave; Tradwifery (patriarchy, heteronormativity, childbirth) can be understood as reactionary Cottagecoreism.

I would have told you I don't have an aesthetic. But a few months ago my family moved to an old house, not far from our old apartment. This house has a yard and asbestos and a plaque on the front that says: 1913. Multiple generations of telephone wiring run along and inside the walls, and jacks abound: Bell System four-pin 404A jacks and modular 6P4C jacks, too, all useless in 2021. I like them. They suggest critical infrastructure come and gone. The people who lived in the house before us sent a kind, slightly melancholy note, wishing us the best, but we never met them. Pandemic transaction.

When we moved in, we immediately started to plan for an apocalypse. (My spouse's elementary school overlooked Donner Lake in California, so worst-case scenarios come easily to her; she has a disaster-preparedness Pinterest board.) I figured out where we could put the tilapia tanks and pondered a new fence. We could store barrels of powdered food in the basement. Following decades of living within the collective fortress of an apartment building, a house—just sitting there by the street—feels extremely vulnerable. After a few days, a nice older neighbor dropped off a box of candy. Hardly the Purge.

Oddly, we keep not buying furniture. We did find a dining room table, cut out of a lane in a decommissioned bowling alley, with little inlaid arrows to guide your throw. Cheap and heavy. We bought some chairs, eBayed out of a university library in Georgia. Each chair carries the shadow of thousands of college butts. We like things that remind us of people gathering, playing, or working. Not shabby-chic, but institutional-heavy. Things that have been rubbed down to a shine.

My kids are doing ballet and tae kwon do on Zoom, I am sending Slack messages in a half-empty house, and my spouse is in the kitchen calling strangers to offer them help navigating the state vaccination website. This is the pandemic aesthetic: Everything is connected, but you can't connect. I lull myself to sleep listening to FDR speeches. In one, he spoke sadly of a Boy Scout jamboree canceled for an outbreak of polio. This is my aesthetic. In this way I achieve safety and control. It's a little silly, really, but I'm Infracore.

My therapist (cognitive-behavioral, Thursday 2 pm, takes Venmo) tells me that one becomes angry when expectations aren't met. Thus, to remain calm, you have to adjust your expectations. The kicker: Behaviors tend to stay the same over time, so don't expect other people to change. Your only real choice, the only thing you can control, is whether to calm down—or not.

This advice has made me think differently about social media. Perhaps social media is not, as people say, a machine for the transmission of viral outrage, but rather an aggregator of shared expectations. In fact, people online are constantly talking about what they expect. They expect political victories, total respect for Taylor Swift, resolution of HR issues, financial aid, and apologies—and they expect it all right now. People online say, *We will never adjust our expectations, so you must adjust your behavior.* Twitter is the exact opposite of therapy.

Personally, I expect the apocalypse will come slowly, with episodic spikes (pandemics, terrorism, superstorms, buildings collapsing in space or value). There's no shortage of warnings, feature articles about human climate migration and wet-bulb temperatures, or op-eds asking us to stop buying fridges.

At least for now the infrastructure we have keeps finding ways to route around the crises. When a train tunnel floods, you run a bus. You dump sand on a damaged beach, and one might always use public funds to construct a fine berm. And when that berm is submerged you can build a bigger berm. We are expecting that we can find solutions, ways to preserve the order of things. Just a little science and some elbow grease, maybe a colony on Mars, and society can be good as new.

What else are we going to do? The therapeutic suggestion is: Broaden your expectations, so that when bad things happen you are ready. For some, this means being ready to grab your stuff, slipping into warm, gray clothes, and vanishing from civilization. For me, the only thing that calms fear is the idea that we'll keep helping until we need help. Doctors at the hospital, National Guard members at the vaccine center, neighbors dropping by with food. Lest you think me too much a fool, we do have a go bag. We just keep raiding it for cash and ibuprofen. And every morning I wake up and prep, by thinking: Expect everything to change but people.

Clive Thompson

Ideas
03.10.2021 07:00 AM

Good-Bye Zoom. Hello Low-Key Ambient Snooping

If you are missing out on serendipity in your remote work, try ramping up your 2D audio copresence.

ILLUSTRATION: KATTY HUERTAS

One year into our all-remote existence, executives at white-collar companies are realizing two things. One is that they're pleased (stunned, even) by how productive employees have been. They'd worried that "work from home" would turn into "Netflix and chill." Instead, their people are killing it: Deliverables are being delivered, milestones milestoned.

But companies have run into a serious problem. They have lost serendipity. Sure, colleagues are connecting on video chat. But it's all very planned and formal; there are no *how's-it-going* encounters at the coffee station. This is a shame, because those chance run-ins help cement a sense of togetherness, and they can engender new ideas too—like when the VP of HR eats lunch next to a salesperson and casually mentions a new market that winds up being worth millions.

So now people are wondering: Could software replicate some of that office magic?

Various startups are giving it a shot. One is Teamflow, a browser-based app that lets you set up a virtual office that you view from above, in 2D, sort of like a cartoony Ikea floor plan. You can set up different rooms and fill them

with furniture icons (or even weird memey images, if you want a MySpace vibe). When employees log in, their faces appear in tiny round video streams. You drag your icon around the virtual office to hang out "near" others, and voice-talk to them too; the closer your icon is to a colleague, the louder they sound. Move farther away for peace and quiet.

It sounds kooky. Frankly, it *looks* kooky. But early users tell me it replicates many of the dynamics of in-person hanging out. "This really streamlined my life," says Rafael Sanches, the cofounder of Anycart, a food-shopping service. We met recently inside his company's Teamflow space. The little video icons for Sanches and me were perched at his virtual desk; three engineers were clustered together, chatting, in the corner of the office. Sanches dragged his icon over to say hello to them, then zipped back over to me.

"I do this all the time," he says. He'll plant himself near groups of employees, where they'll work together, sometimes in silence, other times chitchatting. Sanches will also frequently invite an employee to wander off to a corner to talk one on one. He likes the fact that other employees can see that he's meeting with someone individually; it replicates some of the quasi-public nature of conversation in a real office. "Socially, the engineers know I'm still there, like I'm *around*," he notes. He's not vanishing into private Zoom calls with people.

The whole thing felt oddly gamelike. That makes sense, because video games pioneered the art of letting far-flung people hang out online. Some workers have even playfully used games as meeting places during the pandemic. When the author and artist Viviane Schwarz was working on a project last year, she met her team inside *Red Dead Redemption 2*, a cowboy fighting game. They'd sit around a virtual campfire and talk shop (while also watching out for danger: "Was that gunshots?"). Some new copresence apps, like Bonfire and Remotely, riff explicitly off game aesthetics and let you hang out with workmates as avatars in a 3D environment.

One thing you can see, in all these remote experiments, is that audio beats video. Zoom-staring into a webcam is wearying. So most of these apps actively downplay full-screen video, and users seem to like that. Pragli,

another virtual-meeting startup, gives users a choice to connect with audio or video, and its cofounder, Doug Safreno, estimates that people use the audio-only method twice as often as video. Consider this the revenge of the old-school telephone call: Turns out we just want to talk.

And, more subtly, to listen. Many of these apps allow for a bit of the ambient eavesdropping that happens in an office, where you can look across the room and see that two colleagues are talking—maybe even get a sense what they're discussing—without fully tuning in. This semiprivate, semipublic nature of office chat helps give a team a proprioceptive sense of itself, one that's too often missing in our remote world of one-on-one calls.

An office has power dynamics, for good and for ill; part of how we navigate a job involves keeping tabs on how others interact. Is your manager talking to the boss a lot? Maybe it means your team is in trouble? Or that you're *impressing* the head honcho? We gather intelligence, chew it over with colleagues, become more connected.

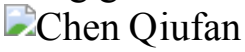
One benefit of the physical office, in other words, is that it lets us low-key *creep* on each other. It turns out we might want some of that even in our software.

Yi-Ling Liu

Backchannel
03.09.2021 07:00 AM

Sci-Fi Writer or Prophet? The Hyperreal Life of Chen Qiufan

As China's science fiction authors are elevated to the status of oracles, Qiufan's career—and his genre's place in society—have gone through the looking glass.


Chen Qiufan

Chen Qiufan wants his writing to provoke a sense of both wonder and estrangement, like a "fun-house mirror, reflecting real light in a way that is more dazzling to the eyes."Photograph: Yilan Deng

When Chen Qiufan took a trip to the southwest Chinese province of Yunnan 15 years ago, he noticed that time seemed to slow down as he reached the city of Lijiang. Chen was a recent college graduate with a soul-sucking real estate job in the pressure-cooker metropolis of Shenzhen, and Lijiang was a backpacker's refuge. Wandering through the small city, he was enchanted by the serrated rows of snow-capped mountains on the horizon and the schools of fish swimming through meandering canals. But he was also unnerved by the throngs of city dwellers like himself—burned out, spiritually lost, adrift. He wove his observations together into a short story called " The Fish of Lijiang," about a depressed office worker who travels to a vacation town, only to discover that everything is artificially engineered—from the blue sky to the fish in the streams to the experience of time itself.

Chen has since gone on to pen many more stories, win virtually every sci-fi literary award in China, and establish himself as a leading voice among the country's growing roster of acclaimed writers in the genre. But unlike Liu

Cixin, the lionized author of *The Three Body Problem*, who grapples with the faraway grandeur of outer space, Chen is drawn more to the interior lives of characters struggling to anchor themselves in a moment of accelerated change—much the way nearly anyone in China struggles to anchor themselves today. His work is often described as "science fiction realism."

At the beginning of his writing process, Chen says, he often tries to act like "an anthropologist conducting fieldwork." Before writing his debut novel, *The Waste Tide*, a 2013 eco-thriller about a workers' uprising in a futuristic dump called Silicon Isle, Chen spent time in the southeastern city of Guiyu, one of the world's largest dumping grounds for electronic waste, observing migrant workers toil in the toxin-laden trash. Once he has a feel for a given landscape in the real world, he transports the scene into what he calls the imagined "hyperreal"—a zone where the fantastical and factual are so blurred it is unclear where one begins and one ends. (In the novel, one of his main characters transforms into a cyborg, having become subsumed into the world of waste.) He wants his writing to provoke a sense of both wonder and estrangement, like a "fun-house mirror, reflecting real light in a way that is more dazzling to the eyes."

But in the past few years—a period that has seen China's sci-fi authors elevated to the status of New Age prophets—Chen's own career has become an object in the fun-house mirror. After *The Waste Tide* garnered widespread attention at home and abroad, reviewers began praising Chen as the "William Gibson of China," and the tech industry has embraced him as a kind of oracle. An institute run by AI expert and venture capitalist Kai-Fu Lee's company has even developed an algorithm capable of writing fiction in the author's voice. (Chen's recent short story "The State of Trance," which includes passages generated by the AI, nabbed first prize in a Shanghai literary competition moderated by an artificially intelligent judge, beating an entry written by Nobel Prize in Literature winner Mo Yan.) In China, it is the place of science fiction itself—and the status of writers like Chen—that have taken a turn toward the hyperreal.

Born in the '80s, in the wake of China's opening up and reform movement, Chen grew up during a moment of exhilarating upheaval: The market

economy was introduced, state control over culture loosened, and Western ideas flowed freely into the country—from McDonald's to rock 'n' roll to Star Wars. He lived in the city of Shantou, in the culturally diverse, coastal region of Chaoshan, Guangdong, close to the Hong Kong border, with easy access to foreign entertainment. As a teen, he would devour golden-age sci-fi classics by Arthur C. Clarke and Isaac Asimov that his father, an engineer, brought home for him, and he would watch a movie a day, buying bootleg DVDs of *Blade Runner* and *2001: A Space Odyssey*. "I was a young boy who liked to ask, 'Why?' and so I turned to science for answers," Chen says. "But when science couldn't explain everything, I turned to science fiction."

But the very reforms that brought intergalactic epics to China also ushered in the myth of capitalism—the belief that "to get rich is glorious." Along with it came rampant corruption, pollution, and inequality. China transformed from a nation of communes and Mao jackets into a land of Gucci-wearing super-tycoons and migrant workers hustling in Nike sweatshops. While most people were dazzled by the bounty of China's economic boom, Chen was ambivalent. In his first short story, "The Bait," which he wrote as a precocious high schooler, aliens arrive on Earth, give humans an invaluable new technology, and eventually enslave them with it.

"I was a young boy who liked to ask, 'Why?' and so I turned to science for answers," Chen says. "But when science couldn't explain everything, I turned to science fiction."

Photograph: Yilan Deng

By the time Chen graduated from Peking University in 2004, China was perched on the edge of another revolution—the internet boom—and the Chinese people had bought into another myth: that technology had the power to change the world for good. After completing a dual degree in Chinese literature and film arts and enduring a brief and dispiriting stint in real estate, he left to work in the tech industry, first in advertising at Baidu, then in marketing at Google, all the while writing science fiction on the side. In 2008, Chen emailed the Chinese American science fiction writer Ken Liu to express admiration for his work. The two became online friends, and in 2011, Liu offered to translate "The Fish of Lijiang" into English. That small, serendipitous idea would kick-start Liu's role as the preeminent English translator of Chinese sci-fi, and in turn set the stage for the genre's booming global popularity. (Liu went on to translate not only Liu Cixin's *The Three Body Problem* but also a diverse range of new voices, from Hao Jingfang to Xia Jia to Ma Boyong.)

Chen, still moonlighting as an author, kept taking jobs in tech into the 2010s. In 2013 he returned to Baidu to work in product marketing and strategy, then joined the marketing team at a virtual-reality startup in Beijing two years later. He was enchanted by the tech world's wide-eyed idealism and its central belief that a product, if scaled and optimized, could transform the lives of billions. But he also intuited that those ideals were "ultimately hollow at the core," Chen says. In 2017 he quit his job in VR to write full-time.

By then, though, such a move didn't exactly qualify as stepping off the treadmill. Indeed, in the past five years, China has become a nation obsessed with its own science fiction. What was once a niche subculture with a small circle of hardcore fans has blossomed into a full-fledged 66 billion yuan ($10 billion) industry of films, books, video games, and theme parks. In 2015, Liu Cixin had become the first Chinese writer to win a Hugo Award, for *The Three Body Problem*. The next year, Hao Jingfang became the first Chinese woman to win a Hugo, for her novelette *Folding Beijing*. *The Wandering Earth*, a 2019 film adaptation of a story by Liu Cixin, earned more than $300 million in its first week after release and would become China's fourth-highest-grossing film ever. Once dismissed as frivolous children's literature, science fiction now commands the attention

of all kinds of enterprises hoping to profit from its popularity: film studios hungry for screenplay fodder, universities setting up sci-fi research institutions, talent agencies eager to jump on the bandwagon, tech companies keen to borrow the genre's aura of profundity, and even government officials looking to ennoble the national project of innovation.

In hindsight, the ascendancy of sci-fi in Chinese literature seems almost inevitable. After all, walking the streets of Beijing today can feel like inhabiting a cyberpunk fiction: Bright yellow shared bikes line the streets, facial recognition cameras hang on street lamps, robot servers deliver hot-pot dinners to your table. Liu Cixin has compared present-day China to the US after World War II, "when science and technology filled the future with wonder." It's also a time when science and technology have filled the present with a sense of estrangement, ennui, and anxiety, and a writer like Chen is a natural chronicler of that tension.

But for the people working in the genre, the sudden crush of attention and esteem has been vertiginous. "None of us had the goal of taking over the world," says Emily Jin, a translator and protégé of Ken Liu who has worked closely with Chen. "We're just a bunch of nerds having fun together." In China, where rapid technological change keeps transfiguring the world beyond recognition, "one of the most important qualities in a writer is sensitivity—the ability to capture the strangeness in everyday life," Chen says. And it can be hard to maintain that sensitivity when you're squinting under the spotlights.

Chen turns 40 this year, but at first glance—lithe and graceful, sporting candy-colored Adidas high-tops—he could easily pass as a man in his twenties. He is cerebral, wry, and soft-spoken. Chen lives in Shanghai but came to Beijing for two weeks in October, where I meet him at a café. He switches seamlessly between languages (English and Mandarin), dialects (Teochew and Cantonese), and names (Chen Qiufan and Stanley Chan). He moves with ease between conversation topics, from autonomous terrorism to his trip to Burning Man, and midway through our discussion of Taoist philosophy, he excuses himself to take a quick call from his investment adviser. He also reads voraciously—citing Aldous Huxley, the Chinese novelist Lao She, and a 10,000-word academic paper on asteroid mining.

When I see him next, he's standing on a neon-lit stage in the banquet hall of the Grand Millennium Hotel, a slab of glass and steel in Beijing's central business district, giving a speech titled "Mind Reset and Embracing the Unknown: The Way of Science Fiction" to an audience of suited-up professionals. The *Financial Times* organized the conference, inviting a lineup of modern-day oracles—the CEO of a health care startup, a professor of economics, a machine-learning expert, and Chen—to prognosticate about the near future. To dress up for the occasion, Chen put on a blazer but kept the high-tops.

His visit to Beijing in October was packed with similar engagements. Tencent, the tech monolith behind China's super app WeChat, had invited Chen—again, a literature major—to predict developments in genetic engineering alongside a panel of world-class biophysicists, because he once wrote a story about genetically modified Neo Rats. Kai-Fu Lee summoned him to the glassy offices of his company, Sinovation Ventures, to join a panel on AI-human cooperation in the creative arts and to demonstrate the algorithm that writes fiction like Chen.

It is no surprise that Lee tapped Chen to participate in the panel. The two are collaborating on a book, *AI 2041: Ten Visions for Our Future*, to be published this fall. Pairing Chen's speculative fiction with Lee's real-life technical perspective, the book explores how artificial intelligence will transform humankind and the global order in the next 20 years, in areas ranging from contactless dating to natural language processing to job displacement. "Computer scientists and science fiction writers don't speak the same language. If I describe how speech recognition works, it'll go right over people's heads," Lee tells me in a glass-walled conference room called Back to the Future (all the rooms at Sinovation are named after science fiction films: Total Recall, Cloud Atlas, Star Trek). "I needed a writing partner who understands the technology but can also tell a good story."

"I tend toward darker endings, and Kai-Fu toward the positive," Chen says. "He thinks of the narrative as a step-by-step process, like a manual, and I prefer to preserve a story's ambiguity."

Given all the time he spent at tech companies, Chen is both insider and outsider in an environment like Lee's; he's fluent in the language of data

and metrics and KPIs. But it's not just that he's at home in tech. I've noticed that in any new environment, Chen is observant and open-minded, careful to absorb its rules and rituals before synthesizing them as his own. Zipping from one engagement to the next, I watched him make a straight-laced professor feel at ease, charm a hippie Mongolian shaman over lunch, then pen an op-ed for a state-run newspaper at night.

This ability to move between disparate worlds has proved useful for navigating more perilous waters: Chinese politics. In China, writers have to be sensitive not only to commercial pressures but also to shifting political winds, evading the ever watchful eyes of the censors. They have to gauge what the government is thinking, pay attention to developments on the international stage, and discern what to play up and play down, what is OK to write, what is not, and when. In addition to capturing the attention of profit seekers, science fiction's popularity has piqued the interest of the authorities, who are eager to use its skyrocketing profile to boost their own agendas. "If I'm speaking to the government, I emphasize the importance of sci-fi as a tool to strengthen innovation and promote creativity. I fill my message with *zheng neng liang*," Chen says wryly, quoting a hackneyed catchphrase of officialdom. "How do you say that in English?"

"Positive energy," I respond.

Although Chen's *The Waste Tide* can be read as a dark and scathing critique of the government's failure to deal with ecological destruction, the novel can just as easily be interpreted as a criticism of American hypocrisy, a manifesto against global consumerism, or simply an apolitical exploration of post-human consciousness. "With science fiction, I can probe real-life issues through an imaginary narrative," Chen says, "without explicitly arguing who is right or wrong, good or evil."

Lately, though, the leeway afforded to cultural expression seems to be tightening even further. In recent years, authorities have scrubbed the internet clean of not only sensitive political content such as the Three T's—Tibet, Tiananmen, and Taiwan—but also anything the party deems immoral, from tattoos and one-night stands to hip hop. Last summer, film authorities issued a set of guidelines on how to make sci-fi films, urging filmmakers to "highlight Chinese values," "cultivate Chinese innovation," and

“thoroughly study and implement Xi Jinping thought.” These measures have made writers and publishers more paranoid about making a misstep. (Last year, Chen wanted to write a story about Californian independence, but he was advised against it by his publishers for fear that it would not get past the censors. “It wasn’t even about China,” he exclaims, rolling his eyes.)

Abroad, China’s science fiction writers find themselves caught in a tug-of-war between competing geopolitical agendas. The Western world has always perceived China as a monolith, reading Chinese literature through the lens of Western dreams and fears and viewing Chinese authors as either romantic dissidents clashing with the regime or soft-power tools parroting the Party’s agenda. Recent developments—the US-China trade war, conflicts with Huawei and ZTE, closed borders, and China’s aggressive posture as a technological superpower—have only exacerbated the situation. Hawkish academics pen reductive op-eds with subtitles such as “To Know What the Chinese Are Really Up To, Read the Futuristic Novels of Liu Cixin,” as if one novel could demystify a nation of a billion people. Whereas five years ago President Obama touted *The Three Body Problem* as a must-read, last September, Republican senators condemned its Netflix adaptation, criticizing Liu for his politics.

“We do the works a disservice when we focus on the geopolitics alone,” Ken Liu has written. But as much as China’s science fiction writers aspire to transcend the boundaries of nationalism, they find themselves swept into a whirlpool of forces outside of their control. According to Chen, the timing of *The Three Body Problem*’s publication was crucial. If it had come out today instead of in 2008—the days of bilateral relations, economic cooperation, and the Beijing Olympics—perhaps it would be censored by the Chinese government or condemned by the American one, targeted by both. “I stay away from politics, because—what do I know?” Chen says. “Sometimes I feel like I’m just being pulled along by the strings of history.”

Sunday evening, at the end of Chen’s jam-packed time in Beijing, we share a Didi ride from the Tencent headquarters back to the city center. I can tell he’s exhausted. “Nap a little?” I ask. He nods, and we both pull out our

headphones. I listen to Bon Iver; he tunes in to a meditation app, carving out a rare period of stillness after a long day.

For a moment, I'm reminded of a passage toward the end of "The Fish of Lijiang," when the protagonist discovers schools of fish swimming in the waterways. At first sight, they seem to be hovering calmly in the water, but as he looks closer he sees they are struggling to maintain their position. Once in a while, a fish gets pushed out of formation. "But soon," the passage continues, "tails fluttering, they fight their way back into place."

Late last year, 15 years after his first visit, Chen returned to Lijiang to find that it had transformed. The city had morphed into the fictionalized Lijiang of his story—a digitized tourist hub where self-driving cars shuttle smartphone-toting visitors around town and local delicacies are served up by automated bots.

"Today we live in a world dominated by technology," Chen says. "Where everything is driven by data, productivity, metrics." In China, with a swipe of a touchscreen, you can order a Luckin coffee that appears wordlessly at your doorstep and hail a nameless Didi driver whenever you want to go somewhere. We turn to algorithms for all the answers: where to eat, what to watch, who to love. The tech industry has learned how to monetize not only consumer goods but also experiences, attention, relationships. In many ways, we've become just like our devices—efficient, optimizable, operating faster than ever, caught in the endless churn of increasing productivity. But nobody knows to what end.

In any new environment, Chen is observant and open-minded, careful to absorb its rules and rituals before synthesizing them as his own.

Photograph: Yilan Deng

Of course, this is happening everywhere, but in China the transformation has been faster, vaster, and more bewildering. There's even a word for this sense of sped-up purposelessness today—an arcane, academic term that has exploded on Chinese social media and popped up in Chen's speeches: *involution*. The opposite of evolution, a process of involution spirals in on itself, trapping its participants. Originally used by anthropologists to

describe the dynamics that prevent agrarian societies from progressing, the term has become a shorthand used by people from all walks of life: tech workers clocking long hours at the office, delivery workers hustling from one gig to another, high school students toiling over college entrance exams. Technological progress has humanity caught in an inward-turning shell. Fifteen years after "The Fish of Lijiang," everyone, like the story's burned-out wanderers, is lost, adrift and desperately looking for something to hold onto. "The times have changed," Chen says. "And the story needs to be renewed."

So Chen has returned to the drawing board, doing what he does best: going out into the world and observing, gathering material for his next project. Lately he's been interested in shamans. He's gone on several field trips, interviewing and shadowing shamans, in hopes of understanding the rites, rituals, and traditions of China's Buddhist and Taoist past. Last summer he met a shaman named Aodeng Toya through a WeChat group, and the two became fast friends. He stayed with her in Mongolia and spent a night at the foot of the sacred Bogd Khan mountain, where thousands of villagers gathered to pray to the mountain gods—drinking, eating, and dancing under the stars. For most of the year, Toya practices in Beijing, helping urbanites through all kinds of spiritual ailments. "Depression, overwork, bad luck with love, to ward off evil spirits, to commune with the dead," she tells Chen and me over lunch. "I'm booked up every day for the next month."

In our accelerated transition to a technological culture, Chen believes that we've lost so much—our relationship to our bodies, to nature, to our roots, to our faiths—and he has set out in search of them. "Shamans used to predict the weather, prevent disease, counsel leaders, show us how to coexist with the natural world," he says. "Today, technological tools have replaced those functions, but not all. Why do we still go to them? What are we looking for?" We thought we could divine, precisely and quantifiably, where we're headed, but instead find ourselves hurtling toward an increasingly precarious future: skyrocketing housing prices, soaring unemployment, deepening inequality, accelerating climate change, and a shattering global pandemic.

It's not surprising, then, that people are turning to shamans—and to science fiction. "They are treating sci-fi as an anchor to reality and science fiction writers as prophets, to help them make meaning of an unfolding future and navigate a treacherous world," says Emily Jin, Chen's translator. How do we reclaim meaning and purpose in the age of computers? What does spirituality look like when everything is mechanized and mass produced? When our lives are so deeply embedded in our devices, how do we preserve what makes us human? "As a result of all this attention, science fiction writers have been given a burden," says Jing Tsu, a professor of comparative literature at Yale. "To be the soothsayers of technological salvation."

But Chen is not a soothsayer, he's a writer. And writers need time to write. "With all these panels and talks and attention, Chinese science fiction writers could find themselves stretched thin, eviscerated of their creative energy," Tsu says. "If science fiction is to have a future in China, they need a space to create and keep maturing."

Chen has ambitious goals for 2021: to wrap up his collaboration with Kai-Fu Lee, continue his research on shamans, and write a sequel to *The Waste Tide*. But he also wants to go home to Shantou to visit his parents (he didn't get to see them much during the pandemic), find a few months of quiet in the Cangshan mountains, and maybe return to rock climbing. Like the rest of us, he has no idea where things are headed. What he does know is that he needs to slow down, find things to hold onto, and remember what makes him human: taking the time to swim against the current, fighting his way back into place.

Makeup by Xiaodi Zheng

Meghan O'Gieblyn

Ideas
03.04.2021 08:00 AM

Why Can't I Stop Staring at My Own Face on Zoom?

WIRED's spiritual advice columnist on narcissism, Nabokov, and what it means to exist—really *exist*—for other people.

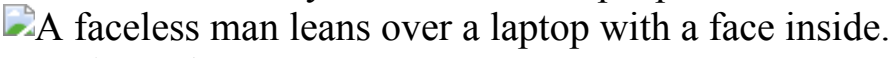


Illustration: Elena Lacey; Getty Images

Support Request:

I don't think I' m a particularly vain person, but whenever I' m on a Zoom call, I' m constantly looking at my own face instead of focusing on the other people. I' m not really admiring myself or scrutinizing my appearance. I' m just ... looking. What is this doing to my self-image? Should I turn off the self-view to avoid becoming a total narcissist?

—SEEN

Dear Seen—

Turning off the self-view would seem to be the easiest solution, but it's not one I would recommend—in fact, I'd strongly advise against it. From what I've heard, the sight of one's image disappearing from the gallery inspires, almost universally, anguish, terror, and in some cases profound existential despair of the sort that Vladimir Nabokov claims to have felt when he came across family photos taken before he was born. It feels, in other words, as though you no longer exist.

Your larger query—about the possible side effects of staring at yourself all day—is more complex and extends beyond the question of whether you're a narcissist, which I will venture is unlikely. (Fear of narcissism, at least in the clinical sense, is self-disqualifying: Only those who don't fit the definition worry that they do.) It's not as though you're alone in this fixation, in any event. People who would never dream of looking at a photo of themselves for more than a few seconds nevertheless report, like you, an inability to look away from their own face floating on the screen during virtual classes or PTA meetings, a preoccupation so intense that vanity remains, for me at least, an unconvincing explanation. Perhaps the more relevant question is not what the platform is doing to your self-image but, rather, what has already happened to it such that you—like so many others—are unable to stop staring at your pixelated reflection.

Zoom, of course, is not an ordinary mirror, or even an ordinary digital mirror. The self that confronts you on these platforms is not the static, poised image you're accustomed to seeing in the bathroom vanity or the selfie view of your phone camera—a blank slate onto which you can project your fantasies and self-delusions—but the self who speaks and laughs, gestures and reacts.

It's strange to recall how rare this view of the self-in-action was until recently. In your former life, you may have occasionally caught a glimpse of yourself laughing in a bar mirror or momentarily become distracted by the sight of yourself speaking to the salesperson standing behind you in the department store mirror. But it wasn't until a year ago that we were constantly, relentlessly, obliged to watch ourselves in real time as we interacted with others, to see our looks of dismay, our empathetic nods, our impassioned gestures, all of which appeared so different from how we'd imagined them, if we imagined them at all.

"Oh, would some Power give us the gift to see ourselves as others see us!" wrote the poet Robert Burns in 1786, a virtuous plea for the objective self-knowledge that most of us remain more conflicted about. The technological "powers" of our age have, by and large, given us the inverse capacity: to make others see us as we see ourselves. We're used to having complete control over our image—the angle, the filter, the carefully selected shot

among hundreds—and yet despite this, or perhaps because of it, there remains something fascinating about the unfiltered spontaneity of Zoom. The person you are seeing there is not the compliant reflection of your ego, but that most elusive of all entities: the self you become in the emergency of a social encounter, when all your premeditations fall away; the self who has always been familiar to your friends, family, and acquaintances while remaining largely invisible to you, its owner.

This desire—to see oneself as others do—is not in any way self-indulgent, but is crucial to forming and sustaining a viable sense of identity. Without getting too bogged down in theory and unnecessary references to Lacan, I'll briefly mention that mirrors have a social function, in that they reveal the self as an other, serving as a portal to the third-person point of view. The ability to pass the mirror test—the moment when infants stop seeing themselves as fragmented collections of body parts and recognize their image, whole, in the mirror—is a crucial rite of passage, marking the child's entrance into the social realm. The self is a fragile illusion that needs constant reinforcing, and this reinforcement happens most often through the gaze of other people, a process known in sociology as the "looking-glass self." We form our identities in large part by imagining how we appear to others and speculating about their judgments of us.

One aspect of your former life you probably took for granted were the thousands of gestures and reactions, most of them small and registered unconsciously, that contributed to your sense of a solid, continuous self: the curt thank-you from a person squeezing past you on the subway, the brief eye contact from a coworker passing your desk, the laughter in response to a joke you made at a party. Although you weren't forced to literally watch yourself interact with others, you were seeing yourself mirrored back through these intersubjective moments, all of which served, in a very real sense, as proof that you still existed—not merely as an ambient consciousness but as a real, embodied presence in the world.

It seems not coincidental that the most common complaints about social isolation—feeling scattered and fragmented, the inability to remember what one did from one day to the next—are recognizable symptoms of the social self breaking down. After spending the better part of the day alone, in front

of various screens, it becomes all too easy to believe that you are simply a pair of hands moving across a keypad, a pair of eyes scanning a newsfeed, a mind whose boundaries increasingly blur with the virtual world you inhabit. The self-view on Zoom is, unexpectedly, anchoring, and to remove it is to confirm our worst fear—that we have, in fact, dissolved into the ether.

All of which is to say, your obsession with your image likely stems from an impulse that is entirely natural and, at root, pro-social. You are trying to retain an identity that has been gradually eroded throughout the recent disruptions to public life. Far from being an exercise in vanity, the sustenance of this identity, I'd argue, is crucial. Seeing oneself mirrored back by others is bound up in complex ways with the ability to feel empathy and with the construction of consensus reality—the shared belief that there exist objective truths outside the solipsism of our individual minds. This is why, in cases of extreme isolation, people often lose the ability to determine what is real and what is imagined and can no longer identify a clear line between the self and external objects.

I'm not saying, exactly, that you should spend even more time staring at yourself on calls. But the impulse could serve as a reminder of the collective need for mutual recognition—a need likely felt by all the other faces tiled alongside yours in the gallery. It might prompt you to remember that others on the call are similarly experiencing a tenuous sense of identity, that the standard technical queries that accompany each logon (Can you see me? Can you hear me?) might express a deeper longing. The great thing about Zoom is that the mirror is two-sided. Every nod, every responsive gesture, serves to remind the person speaking that they exist for other people, that they remain a vital presence in the world that all of us—still, together—inhabit.

Faithfully,

Cloud

Be advised that CLOUD SUPPORT is experiencing higher than normal wait times and appreciates your patience.

Samantha M. Shapiro

Backchannel
03.04.2021 07:00 AM

Adoption Moved to Facebook and a War Began

As the adoption industry migrates to social media, regretful adoptees and birth mothers are confronting prospective parents with their personal pain—and anger.

 family walking in the park

Art by Amber Lee Williams; Photograph by Juan Diego Reyes

When Erin and Justin decided to adopt a child at the beginning of 2016, they paid $25,000 to sign on with one of the largest, most reputable adoption agencies in the United States. They imagined an orderly process, facilitated by lawyers and social workers.

They didn't foresee the internet trolls who would call them cunts and psychopaths. Nor did they imagine they'd be filing a police report, or pleading with Facebook to delete posts that called them human traffickers. They didn't expect the internet to be involved in the process at all.

Erin and Justin (not their real names) met in Chicago in 2010 on a dating site. Erin was 37 with blond, beachy waves and a Michigan accent. She was divorced at the time and approached the dating market pragmatically, uninterested in wasting time with men who were not serious prospects. When she met Justin, she knew she'd found what she was looking for. "He was so kind, different from anyone I'd dated, and I knew he'd be a good dad," she told me. They married in 2011 and planned to have children, but when Erin got a job offer that took them to New York City, they decided to wait until they were settled. Then, when they were ready to start trying, Erin learned that she had gone into premature menopause. "I wasn't devastated, because I knew I wanted to be a mom, and it didn't matter to me how my child came to me," she said. They forged ahead, excited to adopt.

But several months after they signed with the adoption agency, it filed for bankruptcy. Erin and Justin contacted an attorney, who advised them to

move their search online.

The adoption industry has never been very well regulated, and there is a history of certain firms engaging in unethical practices. But when agencies were the primary facilitators of adoption, they could at least perform basic vetting of expectant mothers and adoptive parents and manage complex legal processes. The open marketplace of the web removed that layer of oversight. A 2012 report on adoption and the internet, by the now defunct Donaldson Adoption Institute, found, among other things, that online adoptions create opportunities for fraud and for financial incentives that might push expectant mothers to give up their children. Online, prospective adoptive parents negotiate with expectant mothers directly via Craigslist ads. People who adopt children, often from overseas, and then change their minds find new homes for them in Facebook "adoption disruption" groups, without any supervision from child welfare agencies. "One thing that is true about adoption and the internet is that no one is paying attention," says Adam Pertman, who was the executive director of the Donaldson Adoption Institute. "Whatever is happening is happening because it can, and it's having enormous impact—some good, some bad, and some unknowable—without any repercussions."

Erin and Justin signed up for a platform called Adoptimist ("We're a technology company devoted to family-building. We are not an adoption agency or law firm") and set up a Facebook page about their "adoption journey." They filled their profiles with personal information, describing their love of basketball, football, and triathlons. Erin wrote that she came from a large Italian family and hoped to raise her children speaking Italian and English. They shared a picture of the two of them goofing around with a young nephew, another of them eating ice cream.

When they posted their profile to Adoptimist in 2017, Justin and Erin were approached by a woman from Las Vegas. She said she was pregnant with twins and had been diagnosed with cancer, and that she wanted the couple to raise the babies. After many texts and updates about the babies' heart rates, and an invitation to come meet the twins in the hospital, they discovered the woman had never been pregnant.

She was what Erin described as an “emotional scammer,” someone seemingly uninterested in money who torments prospective adoptive parents for reasons known only to them. Erin said another woman on Adoptimist who claimed to be pregnant sent her a message saying she was hungry and asking her to order a pizza. This was, Erin said, how most of the couple’s interactions on the site went. (Philip Acosta, the president and cofounder of Adoptimist, said that the company has in recent years focused on combating scammers. The site now offers to review the IP addresses of anyone who contacts a prospective adoptive parent, and also alerts users to different types of scams on a “scam blog.”)

Justin and Erin joined a support group for parents seeking to adopt. Several of the couples in their group who had already adopted children passed along advice about using Facebook’s advertising analytics to hone their search. So Justin and Erin paid the social media company between $25 and $150 a month to promote their adoption page in the feeds of women age 15 to 65 in college towns around the US. This range, they reasoned, might reach a grandparent or a friend of a pregnant woman.

Soon after they started buying targeted Facebook ads, Erin’s mother became seriously ill. Erin flew to the suburbs of Detroit, where she was raised, to help. For a hectic few weeks, she and her sister took turns staying in the hospital with their mother and watching Erin’s five nieces and nephews.

One night, Justin called Erin and, sounding stricken, asked if she’d seen their adoption page. She hadn’t had time to check it. “Oh my God,” he told her. “You have to go look now.”

That night in Michigan, when Erin logged on to Facebook, she saw, interspersed with encouraging messages, a torrent of abuse. Perhaps because of the increased exposure Facebook analytics offered, their adoption profile had come to the attention of anti-adoption blogs and Facebook groups. Now their profile had been screenshotted and tagged and mocked on many other pages. “How will you have time for a baby while you’re resting your facelift, and getting all that work done?” one poster asked. Another proclaimed, “Get a dog, you stupid cunts.” “No child deserves her … even the ‘man upstairs’ saw that.”

In the guest bedroom in her sister’s house, Erin stayed up late into the night deleting the comments on their adoption profile and trying to report the users who posted them. “I was trying to plug the dam, but there wasn’t enough time. It was a 20-person job,” she said. “There was no one to talk to at Facebook.” (A Facebook spokesperson said, “We continue to improve the technology we use to find bullying and harassing content” and that it had “removed the content that violates our policies.”)

As she jumped from one anti-adoption page to another, Erin saw that she and Justin were far from the only targets. Other prospective adoptive parents were called “vultures trolling the net for babies.” One group had shared the Adoptimist profile of a gay male couple, asking sardonically, “Which one will be listed on the birth certificate as the woman who gave birth to the child?”

Erin was dumbfounded. “I didn’t even know anti-adoption was a thing,” she told me.

The anti-adoption movement lives in Facebook groups and on blogs with names like the Wounded Adoptee, Changing the Adoption Narrative, and Adopted Ball of Hate, and it is comprised of people who wouldn’t have found each other elsewhere: older women who, as “unwed mothers” in the 1950s and ’60s, were forced to give babies up for adoption; women whose churches still pressure them to give up children born outside of marriage; adoptees who want to overturn laws in 40 states that deny them unrestricted access to their original birth certificates.

The people in this movement come to it from a wide range of perspectives. Some recognize the value of adoption in certain circumstances and have specific goals, like improving federal oversight, eliminating practices that are coercive to birth mothers, or giving them more time to reverse a decision to give up a child. Others see adoption as wrong in all cases, as an assault on some transcendent natural bond only possible between a biological mother and child. Some are finding community and expressing feelings of anger and pain for the first time; birth mothers describe pressure, regret, and lifelong mourning for the children they gave up, while adoptees talk about their sense of estrangement and about not knowing their medical history.

Members of these groups run an informal counter-messaging campaign to standard adoption narratives, one which incorporates their trauma and the role that poverty plays in adoption. When the economic devastation from Covid-19 shutdowns became apparent in April, Lifetime Adoption, an agency based in Florida, put up a blog post assuring prospective adoptive parents that the pandemic would open new opportunities. “Difficult times bring a greater need for adoptive parents,” the post read. “Lifetime Adoption has found that phone calls from potential birth mothers are three times what they normally are.” Anti-adoption groups took screenshots and critiqued the post, highlighting the more troubling issues underlying its assumptions, until the agency took it down.

The tactics that Erin encountered—targeting adoptive parents online, mocking their profiles, and calling them names like “womb wet baby snatcher”—are not the standard in the anti-adoption movement. The people who engage in those behaviors make up a small minority, but a vocal one.

For a while, one of the more aggressive anti-adoption posters and commenters was a woman whose online moniker is Julie Gray. She has been removed and blocked from many groups because of her use of harsh language to both birth mothers, whom she calls “relinquishers,” and adoptive parents. Gray was adopted, and she told me that one of her goals in trolling adoptive parents’ profiles was “to scare the crap out of them so they change their mind altogether. I want to stop other children from going through what I went through.”

When Erin told her adoption support group about the response to her profile, other couples acknowledged that they'd been trolled too. They told her, "Delete, block, and don't engage," Erin recalled.

But Erin wasn't the type to back down. "I'm an attorney. I always advocate for my client, and now I felt I had to advocate for my family. I was not going to shut up and ignore it and walk away. I'm Italian, I'm hot-blooded. If I see something that's wrong for me or someone else, I am not going to be silent."

Art by Amber Lee Williams; Photograph by Juan Diego Reyes

Whenever she saw adoptive parents being harassed, she reported it to Facebook. It seemed to Erin that Facebook removed a post only if a significant number of people reported it. (The company says one report is enough if a post violates its policies.) So in September 2017 she started a small Facebook group whose sole purpose was to monitor and report anti-adoption harassment. She sometimes commented acerbically on those posts she reported, and quickly became known in the anti-adoption community. One commenter wrote an ominous post saying she had eaten dinner at the restaurant on the ground floor of Erin's Manhattan apartment building. Another post named the law firm where Erin worked and discussed strategies for getting her disbarred. At that point, Erin says, she filed a police report about the woman who claimed to have been in her building.

Although she was in frequent battle with the anti-adoption movement, Erin shared some of their concerns. She found that the inconsistency of laws from state to state created confusion and believed all adoptees should have access to their original birth certificates. At some point Erin had signed up for a newsletter from an adoption facilitator who connected prospective parents with birth parents for a fee. The emails included what the facilitator called "situations": brief descriptions of children available for adoption along with a price, usually in the tens of thousands of dollars. The idea of putting a "price" on a child above basic expenses incurred by the birth mother disturbed Erin. She thought it might encourage women to place their babies for adoption. She was especially horrified to see enormous race-based discrepancies: In one situation a white child was $45,000, while in another a Black child was $20,000.

Then, in the fall of 2017, a pregnant woman from the South reached out to Erin and Justin through Facebook. The woman was in a long-term relationship, was raising three other children, and had previously placed another child for adoption. Erin tried not to get her hopes up, but she had a good feeling as the months passed and the woman kept in regular contact. New York state has strict rules on payments to birth mothers: It permits prospective adoptive parents to give money only for certain expenses and in the final months of pregnancy and just after childbirth. The expectant mother was on Medicaid and didn't need help with medical expenses, but Justin and Erin paid her $1,450 a month for three months because she said her doctor ordered her to stop working toward the end of her pregnancy.

As the baby's due date neared, Justin and Erin drove south to meet the family. They all went out for dinner, and Erin gave the birth mother a spa package.

When the baby girl was born, Erin and Justin were in the hospital. They held her soon after she was delivered. Erin cut the umbilical cord. They were overjoyed. Erin and Justin stayed with her in the neonatal intensive care unit for several weeks—she had breathing problems—before returning to New York City.

Erin took down her adoption page, but she continued challenging the harassment she saw on Facebook. For a while, she settled into a kind of routine. She'd tell the trollers to get a hobby, or worse. Sometimes, she'd threaten legal action. There was an anti-adoption Facebook group called Ask a Birth, First, Natural Mom, which Erin had taken to calling Ask a Moron in her posts encouraging her group to report it. She saw the heated exchanges as mutual sport. "They know who I am and know that I troll those pages. They don't block me. They like the engagement," she told me. "It was a cat-and-mouse game."

Then, in August 2019, something happened that changed the tone for Erin. The previous January, when her daughter's adoption was finalized in court, Erin had posted an album on Facebook that she hashtagged #familyday and #gotchaday, a phrase sometimes used by adoptive parents. In addition to taking photos at court, Erin had made a poster with her daughter's full name and stylized numbers showing her birthday and the date "you were forever

ours.” Erin put a bow in the toddler’s blond curls and took pictures of their little family posed on a white leather couch in front of the framed poster.

Erin believed her personal Facebook page’s privacy settings allowed only friends to see posts. But months after she posted the celebratory picture, she received notifications that it had been shared on two anti-adoption sites: Ask a Birth, First, Natural Mom and a group Erin hadn’t heard of: America’s Taken.

On America’s Taken, which has more than 14,000 followers, the picture, with Erin’s daughter’s full name in view, was posted with Erin’s name along with hashtags about kidnapping and trafficking. Soon others shared the link, and the mocking comments began.

That was nothing new, but now Erin’s name and her daughter’s were spreading with those hashtags. “The last thing I want is for her picture and mine to be on a dark web, as if we were available for trafficking,” Erin told me.

Erin mobilized her group to report America’s Taken and emailed Facebook repeatedly. Eventually Facebook removed the picture from pages that posted it.

America's Taken is run by Geri Pfeiffer, who lives in a trailer heated by a wood-burning stove in central Oklahoma, near the end of a narrow dead-end road. Pfeiffer, who is 61 and stands 6'2", has a big laugh and wears clear Coke-bottle-thick bifocals. She identifies herself on social media as a “hell raiser,” “memaw,” and “activist,” and in her spare time she knits prayer shawls for a local church.

On the America’s Taken Facebook page, Pfeiffer posts pictures of children who have been removed from their homes by child protective services, placed in foster care, and then adopted by new families. There are 135,000 adoptions every year in the US, and about 40 percent are from foster care. The birth parents in those cases no longer have the right to visit their children. The children’s names are often changed, and many states still seal a child’s original birth certificate.

Art by Amber Lee Williams

Pfeiffer logs long hours advising birth parents all over the country on how to find their children. She can be relentless. She once sent Facebook messages to nearly every business owner in a small northwestern Washington town, asking if anyone knew the whereabouts of a child who'd been in foster care there. (It worked.) The tougher cases she brings to the online network of amateur detectives who are known in the adoption community as search angels. Many of them are former adoptees or birth parents, but some are just genealogy buffs with time on their hands. Most use online consumer tools like Ancestry.com or data-mining sites like Beenverified or Spokeo.

A typical post on America's Taken might show a photo of a child (who a relative has asked Pfeiffer to locate) along with a message:

"As soon as you hit that 18th Birthday … your grandma and great grandma … will be waiting.

You weren't hard to find.

They love you. They miss you. They have waited a long time."

When she saw Erin's "forever ours" post, Pfeiffer had thought nothing of sharing a few choice words about it; she frequently compares adoption to kidnapping and trafficking. But Erin fought back. That week, Erin and Pfeiffer—and their respective followers—got into increasingly heated exchanges. On her Facebook group page, Erin posted, "Looks like the tables have turned. How does it feel, Geri Pfeiffer?" When Pfeiffer got online again, she composed a message to her followers with Erin's name: "To think that this attorney has adopted a child is another adoption horror story in the making. A child that was adopted to satisfy the narcissistic need of a psychopath attorney to be a 'mother.'"

Pfeiffer started America's Taken because of her own experience with child protective services. In 2009, one of Pfeiffer's sons—who was 19 at the time—learned that he had become a father. Neither her son nor the mother was prepared to raise a child, Pfeiffer told me, so Pfeiffer took over caring for

the baby. “I just held him that whole first year,” she remembered. “His skin was paper thin.” She had the boy baptized in a white tuxedo. When her grandson was old enough, she enrolled him in preschool through Head Start.

Then, when he was 4, everything fell apart. On Halloween morning in 2013, a witness said she saw Pfeiffer swinging her purse at the boy in front of his preschool, “with such force causing the child to be knocked approximately 10 feet down a concrete ramp causing scrapes to his left and right forearms and face and head,” according to court records. When we spoke, Pfeiffer denied that this happened; in a court record she had said “he was spanked outside of school grounds.”

When the Halloween report was filed, Pfeiffer was on probation for an incident of assault and battery. (In an official statement, she said a woman she knew attacked her with a tire iron, and “I fought off the blows with a rake. I ran to her truck and put it in neutral, and it ran down the hill and into a tree.”) Her grandson went into foster care.

Both Pfeiffer and her son say they tried to get the boy back. Pfeiffer completed an anger management course. Meanwhile her grandson bounced from one foster placement to another. Records from family court are sealed, so it is not possible to know the full details of this case.

Eventually one of the boy’s foster families filed adoption papers. The last time Pfeiffer saw her grandson was at their final visit in the county Department of Human Services building.

Afterward, Pfeiffer fell into a sleepless depression. She shut the door to her grandson’s room and didn’t open it for two years. She finally cleaned it out when her teenage granddaughter asked to take it over. Her granddaughter hung up a tapestry with an elephant on it, and Pfeiffer moved the boy’s belongings into storage containers. During my visit, she unpacked one that held the preemie outfit the baby wore the day she first met him, the small white tuxedo from his baptism, a plastic octopus he used to fall asleep with, his Spider-Man wallet, and a lock of dirty-blond hair from his first haircut.

“Precious memories from a boy that doesn’t exist anymore,” Pfeiffer said sadly.

She still occasionally feels something embedded in the corner of her quilt and discovers a crayon or Lego sword lodged in the fabric. “Right now the grief is not even acknowledged once your rights are terminated,” she said. “You’re just relegated to the trash heap of life.”

The termination of parental rights has been called the “civil death penalty,” because of its severity and finality. It is overwhelmingly levied against poor families. Some children are taken away from parents who abuse them horribly—and others who should be removed are not and die at the hands of abusers. Nationally, the majority of children are removed from their homes by child protective services not for abuse but neglect, which can be a more subjective state. Neglect can mean a child was left in a hot car for hours or that a child’s parent is an addict. Or it can mean that a child was alone at home while their mother worked an overnight shift or went to the store, or that there’s not enough food in the fridge. In other words, poverty can create conditions that lead to neglect, and the exigencies of poverty can also be interpreted as neglect.

Art by Amber Lee Williams

Many anti-adoption advocates, as well as some experts in child-welfare reform, argue that helping families get what they need—rehab, food stamps, child care subsidies—should be prioritized over permanently removing children from their parents. In a 2019 paper, “A Cure Worse Than the Disease? The Impact of Removal on Children and Their Families,” Vivek Sankaran, a professor at the University of Michigan Law School, and his coauthors note that removing children from their homes is traumatic for both parents and children, and that standards for removal vary from state to state. In some states there must be evidence that a child is in immediate danger; in others, suspicion of neglect is sufficient cause. Some states allow a parent to appeal the removal within 24 hours; in others a parent may have to wait 10 days. As a result, the authors note, states and even individual counties have widely varying rates of removing children. In 2017, West Virginia removed 10 times as many children from their homes as neighboring Virginia did. In Oklahoma, where Pfeiffer lives, the number of

children who are adopted from foster care is far higher than the national average.

Other child advocates, however, point out that, whatever its cause, neglect can be profoundly damaging to children. Elizabeth Bartholet, director of the Child Advocacy Program at Harvard Law School, agrees that "if we eliminated poverty in this country, that would be the best abuse- and neglect-prevention program." But protecting the welfare of children, she says, has to take priority over parental rights.

In some cases, a judge will rule that a birth parent poses a danger to a child and will prohibit the parent from making contact. But many avenues exist for a birth parent to reconnect with a child unsupervised. The internet, along with widely available genetic testing, has dismantled the possibility of a truly closed adoption. "Judges' strictures mean nothing if a child can search for his birth mother without [adoptive] parents knowing," says Pertman, now the president and CEO at the National Center of Adoption Permanency. "But that doesn't mean an 11-year-old should be forming relationships with people he doesn't know without parents' knowledge."

Martin Guggenheim, an advocate for parental rights and a professor at NYU Law School, who believes many removals are unjust, is not surprised that birth parents and relatives attempt DIY reunions through the web. When he saw the America's Taken Facebook page, he told me, "When you think about it, how do you not create this website?"

Other online groups have emerged where there are gaps in adoption processes. Adoption-disruption groups on Facebook, where adopted children are "re-homed," emerged at least partly because there is little post-adoption support and monitoring; some families know almost nothing about the issues their overseas-adopted children faced or how to cope with their medical or behavioral challenges. In private adoptions, the lawyer who represents a birth mother is often paid for by the adoptive family, and some adoption agencies fund flashy public relations campaigns that paint the experience in sunny tones. There are no major organizations that share with expectant mothers potential downsides or that help them with their rights.

Renee Gelin started an organization and Facebook group that plays that role by crowdsourcing assistance and advice that birth mothers might not have access to. As a single parent, Gelin gave up her second child for adoption 10 years ago because she was under crushing financial pressure at the time. Her job as a contractor in IT offered no maternity leave, and her health insurance would not cover her high-risk pregnancy. She was paid too much to qualify for Medicaid.

Just weeks before her son was born, Gelin agreed to place him with a family in another state. As soon as he was on the plane, she regretted the choice. Although she had arranged an open adoption for her son, she says that the adoptive family ended the relationship when they found critical blog posts she had written expressing grief about the process. Gelin felt she hadn't understood that open adoptions exist at the discretion of the adopting family. In fact, they are not legally enforceable in all states, and where they are enforceable the cost of a lawyer can be prohibitive for a birth mother.

Gelin's organization, called Saving Our Sisters, tries to persuade birth mothers that financial strain shouldn't prevent them from keeping their children. When a woman who is having second thoughts reaches out to SOS online, the group tries to find a "sister on the ground" nearby to bring her diapers, a month's rent, or a baby swing. Gelin says SOS has had around 90 "saves"—adoptions in process that the group helped reverse—in the past six years. Gelin transferred the blog about her adopted son to a public Facebook page years ago and still posts letters and updates to him, often signed, "Mom."

The woman who adopted Pfeiffer's grandson once gave her a framed image of the boy's handprint. Pfeiffer took the handprint, painted it red, and made it the bloody-looking logo of America's Taken. She printed up T-shirts and signs and stood outside the family court in Guthrie in front of her truck, which had a decal that read "my grandson is a victim of forced adoption in logan county." She handed out pamphlets and told her version of the story to anyone who would listen. At the time, her message did not get much further than the Guthrie courthouse steps.

But in 2013, Pfeiffer enrolled in a University of Oklahoma Medical Center study on congestive heart failure. The hospital gave her an iPhone 4 so she

could access a medical app she needed for the study. She had never used a smartphone, or even a computer. “I ran a laundromat,” she told me, “and you don’t need computers to clean people’s underwear.”

One day, as she entered her health data in the iPhone app, her brother asked her if she knew she could use it for other stuff. She didn’t know. He showed her how to text and then helped her set up a Facebook account. Pfeiffer immediately saw the possibilities. Here she could hold up her sign 24 hours a day, all over the country. The first post she wrote was about her grandson. Within minutes, other people were posting stories to her page of children they were looking for. “It just snowballed,” she told me. “The first person replied within a minute, and it just kept climbing and climbing.”

As Pfeiffer got more familiar with the phone, she started tracking her grandson’s adoptive family. Pfeiffer has liver disease as well as advanced heart failure, and she told me it’s unlikely she will live long enough to see her grandson turn 18, the age at which she could seek him out. She leaves messages for him on the internet. “I want him to know how hard we searched for him,” she says. “And I’m going to spend every minute I have left searching for other taken kids, teaching other parents to leave clues in cyberspace.”

In June 2019, Erin got a new message from her daughter's birth mother. The woman thought she might be pregnant again and wasn’t sure what she wanted to do. She eventually asked if Erin and Justin wanted to adopt the new baby.

Erin had loved becoming a mother. She and Justin had recently put their adoption journey Facebook page back up, hoping to add to their family. The prospect of a biological sibling for their daughter was more than they had dreamed of.

Art by Amber Lee Williams; Photograph by Juan Diego Reyes

I spoke to Erin when the birth mother was six months pregnant. At the time, Erin saw her adoption story as a rebuke to the ones she often saw on anti-adoption websites. The birth mother had reconnected unprompted, which confirmed to Erin that she had never felt bullied or coerced. Erin said she

had made a book of pictures of her daughter's birth family that she read to her, and she shared pictures of the girl with the birth mother.

But when we talked again a few months later, Erin's view had changed. In February, the birth mother had abruptly stopped returning her messages. Erin grew increasingly frantic and eventually learned that the baby—a boy—had already been born and was in the NICU, along with another couple who also believed they were the baby's adoptive parents.

It turned out that, some months earlier, the birth mother had posted anonymously on a Facebook adoption group and had connected with the other family. Justin and Erin rushed south with their daughter. When the boy was ready to leave the NICU, they were given temporary custody. They brought him to a townhouse they had rented, where their daughter was thrilled to meet her brother. They nested for almost four months.

The custody case became baroque. The birth mother was indicted for unlawful exchange of money in an adoption, a charge she said she was fighting as of early March. A judge ruled that the boy should be placed in foster care until custody was decided, with both couples granted an hour per week to visit him. The birth mother and her aunt also filed for custody. The birth mother and Erin described a scenario in which all four families visited the baby once a week in the midst of the pandemic. Eventually the second couple dropped their custody claim, and the baby was sent home with his birth mother, where he has lived for months. Erin and Justin are still pursuing custody.

Erin told me about this turn of events in June 2020. At the time, she was hunkered down in the rental, awaiting the final custody decision. She was sad and seething. But for the first time since we initially spoke nearly two years earlier, her target had changed. "The anti-adoption folks? Honestly, I get it now. I get why they say some of the things they say. A lot of their concerns are legitimate," she told me. "There's a dark side to adoption."

In the months she and her husband had spent with their daughter and her brother, she felt they had bonded. Then the boy was put in foster care. In her years of monitoring anti-adoption groups, Erin had read again and again about the trauma a child suffers when removed from his family. Now she

was haunted by the rupture and the baby's experience of losing the "only home he ever knew."

"It tore me up inside," she said. "I can't imagine what he must be thinking and feeling."

The experience confirmed to her the need for federal adoption reform. Maybe, she said, it made sense to have 50 different sets of state adoption laws when adoptions were done locally. But in a world where a child's future may be mediated on various digital platforms with little accountability, one set of rules is needed. For starters, "there needs to be a federal register of hopeful adoptive parents and birth moms," Erin said. "There should be a registry to see if someone is matched or not matched."

When I reached the birth mother in February, she told me that she had decided on adoption for her daughter, another child, and initially planned on it for her son, because she was raising three other children and is against abortion. She thought the kids would have a better life. But it was not easy. In the hospital, she told me, she asked for the baby to be put in a separate room with the adoptive parents. "After giving birth knowing the baby was going with someone else," she said. "That's a lot to endure." She got very quiet on the phone. "I step away because it gets harder and harder to say, 'Well, yes, this is what I want to do.'"

She had liked the idea of getting to know a family directly through Facebook. But the bitter fight over her son had convinced her she had not really known the people who adopted her children. She told me, "Never again would I choose adoption." The baby is now a year old.

When we spoke in June, Erin said she had mostly stopped following anti-adoption groups on Facebook. But the activists were on her mind as she navigated a chaotic custody case born out of unverified Facebook threads. In a vacuum of oversight, the anti-adoption groups seemed to be the only ones tracking, however imperfectly, the adoption industry. More than once when we spoke that day, she said, almost wistfully, "I would be really curious to hear what they would say about this."

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Virginia Heffernan

Ideas
03.02.2021 08:00 AM

While Jack Dorsey Mans the Monastery

The small but boisterous slice of Twitter that's preoccupied with politics imagines @jack, the author of our collective Twitter being, as all-powerful. He's not.

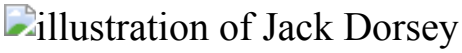


illustration of Jack Dorsey
Illustration: Sam Whitney

The day of January 6, when he hurled down the lightning bolt that cast Donald Trump out of Twitter and into outer darkness, should have been @jack's debut as an imperial overlord. But @jack never seems to flex. This can be maddening. Just when you want him to act Churchillian, @jack is more reticent than ever, a cipher, more Sphinx than Zeus. Last summer, *The New York Times* asked Jack Dorsey whether he's "one of the most powerful people on earth," and his voice was like a dial tone: "No."

On January 13, @jack threaded ambivalently about the Trump ban, ruminating on the question of how to address "offline harm as a result of online speech" while holding sacred "the noble purpose and ideals of the open internet." He left his pensées unfinished.

Dorsey doesn't generally use Twitter to tweet. "I use it to listen and to observe and to understand our world and my world and myself," he told the *Times*. At the same time, he views Twitter as a cosmic verity, a force that mysteriously predates his cocreation of it in 2006. Twitter "wasn't something we really invented. It was something we discovered." Like suffering, like samsara, Twitter was just always there.

Forty-four-year-old Jack Patrick Dorsey, the reclusive and peripatetic maxibillionaire from St. Louis, exists, presumably, in time and space, somewhere behind his Twitter handle. But it's @jack, that numinous avatar, that's credited with bestowing on his kingdom the relative well-being, quiet, and order that appears to bless us only when Donald Trump is in exile from civilization. The nation would come to know these unfamiliar sensations at the inauguration of President Biden, weeks after @jack, or someone acting in his name, enacted the excommunication. In retrospect, @jack was not just decisive and swift; he was prescient. So he could be forgiven for giving a spike-the-football press conference. But in the weeks since, he's remained every bit as elusive as Q. Or the Holy Ghost. Or Shiva the Destroyer.

And so it has been, for four strange years. @jack is everywhere and nowhere. He's either the emperor of geopolitics or a lost druid. The relatively small but boisterous slice of Twitter that's preoccupied with American politics has come to imagine @jack, the author of our collective Twitter being, as all-powerful. We call out for him, but he stays silent. We beg him to smite trolls; he does nothing. We plead for him to exile Nazis; he retreats to a meditation cushion. Sometimes (as in 2017) he adds characters to our rations. Sometimes (as in 2020) he introduces Fleets, which no one asked for. Because, like other deities, he's capricious—and often seems not to exist—we're stuck with tea leaves: what he likes, tweets, retweets. None of it adds up. All that can be said with any confidence is that @jack in general likes a laissez-faire Twitter—whether out of Buddhist acceptance of what is, blithe indifference, catch-all libertarianism, or anxiety about his untrained capacity for moral discernment.

When incarnate, as in occasional appearances and paparazzi photos, Jack Dorsey does little to give the lie to the online fantasy of him. In October, as he testified before Congress via video, he wore a foot-long gray-brown beard and a gold ring in his left nostril. Once a Missouri fashion model and tinkerer enchanted by dispatch technology, then a springy boyish billionaire on the TED-Davos circuit, Dorsey has now gone full Elminster Aumar. His deep-set eyes can still be called piercing, and the vanity of his early blue-steel pose is not lost. What is lost is the look of complaisance that defines young founders looking for capital. Dorsey, like @jack, no longer truckles to anyone.

But there's a twist. There is one at Twitter who takes action while Dorsey mans the monastery. She is Vijaya Gadde, Twitter's former general counsel, and now head of legal, policy, and trust and safety issues. At 46, Gadde wields so much influence at Twitter that she terrified the gnarly crowd at the late wingnut social platform Parler. One Parlerite called her “Goebbels in a pantsuit.” Another warned, “You don't know her face or name because she rules in the shadows.”

Off the mark, of course. Unlike Dorsey, Gadde is famously non-shadowy and forthright. Born in India, she grew up in Southeast Texas when it was still studded with sundown towns, which shut out people of color with threats, violence, and racist statutes. When her father, a jobless chemical engineer, found work knocking on doors to collect insurance premiums, he had to seek permission from no less than the local Ku Klux Klan leader to walk in his own neighborhood. “My family felt very powerless in those moments,” Gadde said in 2016, when she was honored at NYU School of Law, from which she graduated in 2000. “When people ask me why I went to law school—I went to law school to make sure that people have a voice and that people have someone to fight for them.” She now sits on the board of Mercy Corps, a global humanitarian group and NGO that is currently working to provide emergency supplies to especially vulnerable families and communities during the Covid-19 crisis.

Gadde's earnest moral commitments at Twitter might be explained in part by timing. She joined Twitter not at its start as a group-text goof by Dorsey and his crew in 2006, but in 2011, one decade ago, when it moved to center stage as a communication nexus for the so-called Arab Spring. Where most current social media leaders had no idea what they were getting into in the lighter-hearted days of Web 2.0, Gadde instantly saw the seriousness of the endeavor. She could see Twitter's activist possibilities, as well as its exploitation by those looking to stoke disinformation and racist speech. Above all, as she rose in the ranks, she gained Dorsey's druid ear. As one Twitter official told Politico, “I can't imagine a world where Jack looks at [Gadde] and says, ‘No.’”

In fairness, digging in and impeding change is not Dorsey's thing, so Twitter may for the foreseeable future be synced to the clear-eyed moral

vision of Gadde, whose Twitter feed, @vijaya, is focused more on Amanda Gorman's poetry and public health infrastructure than on Bitcoin, a topic that preoccupies @jack.

And while Gadde tweets without reservation about human rights initiatives and progressive projects she admires, and brooks right-wing trolls, the CEO of Twitter continues to be singularly ill-suited to the world of barbs and quips he helped create. He openly prefers the otherworldly interconnectiveness of the service to the tweets that serve as its component parts. When Dorsey reflects on the dynamic of tweeting in interviews, he still hearkens back to the heady early days, when it was "amazing" to be able to tell friends all at once, by making phones buzz in their pockets, that you were headed to a yoga class.

When he had to show up to thread about the Trump ban on January 13, though, he showed up as himself. He expressed his uncertainty, spoke with little ego, and made it clear he was just another human, improvising on insufficient data, hoping to promote both peace and openness in a world where those values are sometimes at odds. However much Twitter might urge him to play oracle, @jack will refuse. The last sentence of the thread's intro tweet would make an excellent epitaph and an excellent koan: "Was this correct?"

By Elliot Ackerman and Admiral James Stavridis

Backchannel
03.02.2021 07:00 AM

2034, Part VI: Crossing the Red Line

“Eventually, the Americans would find them. But by then it would be too late.”


A Russian vessel breaks through ice.

Illustration: Owen Freeman

01:46 MAY 22, 2034 (GMT+2)

BARENTS SEA

For the third night in a row, Farshad struggled to sleep. His cabin was right above the waterline, and he could hear the ice floes glancing off the bow, hitting like the tolling of a bell— *dong*, *dong*, *dong*. All through the night, the noise was relentless. When he had arrived in Tartus weeks before, a set of orders had awaited him. He wouldn't be assigned to liaison duties there, with the Russian Federation's short-sleeved, sun-bronzed Mediterranean Fleet, but far to the north with its Baltic Fleet. When he had stepped off the plane at naval headquarters in Kaliningrad, he didn't even have a winter coat. He assumed headquarters would assign him to one of the larger command ships, the *Kuznetsov*, or perhaps the battle cruiser *Pyotr Velikiy*. Instead, he found himself aboard the corvette *Rezkiy*, which rolled incessantly. Farshad found himself mildly seasick aboard this fast little tin can of a ship with its thin sides.

Dong, dong, dong—

He gave up and switched on the light.

His bed was cantilevered to the bulkhead of his cabin, which was so small that he couldn't open his door until he stowed the bed, and he couldn't stow the bed until he stripped it of its wool blanket, sheets, and pillow. This multistep process of putting away his bed, to open his door, to leave his cabin, was one of the myriad humbling routines that composed his life as a relatively junior liaison officer. Another was taking his meals in the cramped

wardroom among his fellow officers, few of whom spoke anything but Russian and all of whom were at least a decade younger. This had caused Farshad to eat mostly between meals, or to eat midrats, which were the day's leftovers placed out at around midnight by the messmen.

Over his pajamas he shrugged on his peacoat, a gift from a kindly supply orderly in Kaliningrad. The incessant noise of the ice floes banging off the hull kept him company as he padded down the red-lit passageway, staggering between the ship's steel bulkheads, toward the wardroom where he hoped to scrounge a bite to eat.

Like Farshad's room, the wardroom was an exercise in spacial economy. It was no more than a two-table banquette with a small galley attached. Sitting at the banquette was Lieutenant Commander Vasily Kolchak, the *Rezkiy*'s executive officer. He was nursing a cup of tea tapped from the wardroom's samovar. A cigarette receded toward his knuckles as he read from a laptop. Behind him was the room's only adornment, an aquarium populated by yellow-orange fish who poked their eyes from a novelty shipwreck at its bottom. The messmen had already laid out the midrats in two stainless-steel vats, one filled with a dark-colored meat in a brown sauce and the other filled with a light-colored meat in a white sauce. A placard sat next to each dish, but Farshad couldn't read Russian.

“The white one is fish, some type of herring, I think,” said Kolchak in English, glancing up from his laptop. “The dark one is pork.”

Farshad paused for a moment, hovering over the two options. Then he sat across from Kolchak with an empty plate.

“Good choice,” said Kolchak. The only other sound was the aquarium filter running in the corner. He wore a gold signet ring on his right pinkie. With his left hand he played nervously with the blond, almost snow-white hair that brushed the tops of his ears. His small, shrewd eyes were cold and blue, their color slightly faded like two precious stones that had been cut generations ago. His nose was long, sharply pointed, and red on its tip; it seemed as though Kolchak was battling a cold. “I don't imagine you've seen the news,” he said to Farshad. Kolchak's English accent sounded faintly

British and old-worldly, as if Farshad were eavesdropping on the conversational mores of a previous century.

Kolchak clicked on a video from his laptop. The two of them listened to an address made a couple of hours before by the American president. When the video cut out, neither of them spoke. Finally Kolchak asked Farshad about his missing fingers.

“Fighting the Americans,” he explained. Farshad then pointed to Kolchak's signet ring, which at a closer inspection he could see was adorned with a two-headed eagle. “And your ring?”

“It was my great-great-grandfather's. He was also a naval officer, the Imperial Navy.” Kolchak took a long drag on his cigarette. “He fought in our war with Japan. Then the Bolsheviks killed him when he was an old man. This ring remained hidden in my family for many years. I'm the first to wear it openly since him. Time changes everything.”

“What do you think the Americans will do?” asked Farshad.

“I should ask you,” answered Kolchak. “You've fought against them before.”

This slight gesture of deference caught Farshad off guard. How long had it been since someone had sought out his opinion? Farshad couldn't help it; he felt a certain measure of affection for Kolchak, who, like him, was the loyal son of a nation that had not always treated him or his family fairly. Farshad answered Kolchak by saying that American presidents had a mixed history when it came to the enforcement of self-imposed “red lines.” He wondered if the United States would be willing to resort to nuclear weapons—even tactical nuclear weapons, as the president had suggested in her remarks—to prevent the Chinese from annexing Taiwan. “The United States was once predictable; not so much anymore,” concluded Farshad. “Their unpredictability makes them very dangerous. What will Russia do if the United States acts? Your leaders have a great deal to lose. Everywhere I look I see wealthy Russians.”

Catch Every Chapter in This Series

“Wealthy Russians?” Kolchak laughed. “There is no such thing.”

Farshad didn't understand. He mentioned their ubiquitous mega yachts in the Mediterranean and Black Seas, their ostentatious villas on the Amalfi and Dalmatian coasts. Whenever Farshad traveled abroad and he saw some resplendent thing—a villa, a boat, a private jet idling on the tarmac, or a woman bejeweled beyond measure—and he asked to whom it all belonged, the inevitable response was always some Russian.

Kolchak was shaking his head. “No, no, no,” he said. “There are no wealthy Russians.” He stubbed his cigarette out in the ashtray. “There are only poor Russians with money.”

While lighting another cigarette, Kolchak began to pontificate about the Rodina, his “Mother Russia,” how in its many iterations, whether they be tsarist, imperialist, or communist, it had never enjoyed the legitimacy of other world powers. “During the empire our tsars spoke French at court,” said Kolchak. “During communism our economy was a hollow shell. Today, under the federation, our leaders are viewed as criminals by the rest of the world. In New York City, or in London, they don't respect any of us, not even President Putin. To them, President Putin isn't the grandfather of our federation; no, to them he is simply another poor Russian, a gangster at best, even though he has retaken our ancestral territories in Crimea, Georgia, and Greater Ukraine; even though he has crippled America's political system, so that now their president doesn't even have a party but has to run as one of these enfeebled ‘independents.’ We are a cunning people. Our leader is one of us and is equally cunning. You asked what Russia will do if the United States acts? Isn't it obvious? What does the fox do in the henhouse?” Kolchak's lips peeled back from his teeth in a smile.

Farshad had always understood, or at least understood intellectually, that his country and Russia had many shared interests. But with Kolchak, he began to understand the depth of their kinship, the degree by which their two nations had developed in tandem, sharing a trajectory. Both had imperial and ancient pasts: the Russian tsars, the Persian shahs. Both had endured revolutions: the Bolsheviks, the Islamists. And both had suffered the antipathies of the West: economic sanctions, international censure. Farshad also understood, or at least intuited, the opportunity now presenting itself to his Russian allies.

They had left their home port of Kaliningrad three weeks before. On the first week of their journey, the *Rezkiy* had tracked numerous ships from the US Third and Sixth Fleets, which aggressively patrolled the western Atlantic and these northern Baltic waters. And then, quite suddenly, their American antagonists had vanished. After the dual catastrophes in the South China Sea, the destination of the American fleet became obvious. Equally obvious was the opportunity presented by its absence. No fewer than five hundred fiber-optic cables, which accounted for 90 percent of North America's 10G internet access, crisscrossed these icy depths.

“If the Americans detonate a nuclear weapon,” said Kolchak, “I don't think the world will much care if we tamper with a few undersea cables.” He held Farshad in his gaze. “I also don't think the world would say much if our troops seized a sliver of Poland, to unite Kaliningrad to the Russian mainland.” Kolchak pointed to a map on the wall. He traced out a corridor with his finger, which would give Russia direct overland access to its one Baltic port. Putin himself had often spoken about reclaiming this strip of land. “If the Americans detonate a nuclear weapon, they will become the pariah state they have always claimed we are.”

“Do you think they'd ever go through with it?” Farshad asked Kolchak.

“Ten or even fifteen years ago, I would have said no. Today, I am not so sure. The America they believe themselves to be is no longer the America that they are. Time changes everything, doesn't it. And now, it is changing the world's balance in our favor.” Kolchak checked his watch. He shut his laptop and glanced up at Farshad. “But it is late. You must get some rest.”

“I can't sleep,” said Farshad.

“How come?”

Farshad allowed the quiet to settle between them, so that Kolchak could perceive the faint *dong, dong, dong* of the ice floes glancing against the hull of the ship. “I find that sound unnerving,” Farshad admitted. “And the ship constantly rolls.”

Kolchak reached across the table and grasped Farshad affectionately by the arm. “You mustn't let either bother you. Go back to your room, lie down. The rolling you will get used to. And the noise? It has always helped me to imagine that the noise is something else.”

“Like what?” Farshad asked skeptically.

Dong, dong, a couple more ice floes glanced against the hull.

“Like a bell, tolling out a change in the time.”

23:47 MAY 22, 2034 (GMT+8)
SOUTH CHINA SEA

A knock on his door.

Middle of the night.

Lin Bao groaned as he sat up. What can it be now? he wondered. Such interruptions to his sleep had become routine. Last night, the commanders of two destroyers in his battle group had a dispute as to their order in formation, which Lin Bao had to resolve; the night before that there had been an unexpected weather advisory, a typhoon that thankfully never materialized; then a missed communications window with one of his submarines; before that an excess of hard-water moisture in one of his ship's reactors. The list blurred in his sleep-deprived mind. If Lin Bao stood on the cusp of a great moment in his nation's history, it didn't feel that way. Lin Bao felt consumed by the minutiae of his command, and convinced that he might never again enjoy a full night's rest.

He did, however, feel a small surge of satisfaction that the complex mix of cyber cloaking, stealth materials, and satellite spoofing had kept his fleet well hidden. While the Americans surely suspected them of heading for the vicinity of Chinese Taipei, their old adversary had been unable to develop the precise targeting data required for a countermaneuver. Eventually, the Americans would find them. But by then it would be too late.

“Comrade Admiral, your presence is requested in the combat information center.”

Lin Bao awoke to another knock. “Comrade Admiral—”

Lin Bao flung open his door. “I heard you the first time,” he snapped at the young sailor, who couldn't have been more than 19 and who looked as sleep-deprived as the admiral. “Tell them”—he coughed—“tell them I'm coming.” The sailor nodded once and hurried down the corridor. As he dressed, Lin Bao regretted his outburst. It was a manifestation of the strain he was under. To exhibit that strain to his crew was to exhibit his weakness to them, and they were under a similar strain. For the past three weeks, ever since they had gone dark, the *Zheng He* Carrier Battle Group—along with the Navy's three other strike groups, elements of special forces from the People's Army, strategic land-based bombers, and hypersonic missiles from the air force—had all converged in a noose around Chinese Taipei, or Taiwan, as the West insisted on calling it. Although Lin Bao's command remained cloaked, he could almost feel the massive American global surveillance network groping for his precise location.

The operation, as designed by Minister Chiang and approved by the Politburo Standing Committee, was playing out in two phases, each of which adhered to one of Sun Tzu's famous axioms, the first being, *Let your plans be dark and impenetrable as night, and when you move, fall like a thunderbolt.* As dramatically as the Chinese fleet had vanished, it would soon reappear around Taiwan, moving like that proverbial thunderbolt. Never before had a nation concentrated its military strength with such stealth. It would take weeks, or even as much as a month, for the Americans or any other power to position combat assets to counter it. The second phase of Minister Chiang's plan was likewise based on Sun Tzu: *The supreme art of war is to subdue your enemy without fighting*. Minister Chiang believed

that the sudden revelation of his forces off the coast would present the Legislative Yuan, the governing body of so-called Taiwan, with only one choice: a vote of dissolution followed by annexation into the People's Republic. Not a single shot would need to be fired. When Minister Chiang had proposed his plan to the Politburo Standing Committee, he had argued that surrounding Taiwan so suddenly would result in a bloodless checkmate. Although skepticism existed among certain committee members, including Zhao Leji, the much-feared octogenarian secretary of the Central Commission for Discipline Inspection, ultimately the majority placed its confidence in Minister Chiang.

Lin Bao entered the combat information center and found Minister Chiang waiting for him via secure video teleconference. “Comrade Minister,” Lin Bao began, “it is good to see you.” When the *Zheng He* had gone dark, the two had continued to email, but because of security concerns they hadn't spoken. Upon seeing each other again there was an embarrassed silence, as if each were taking a measure of the other's strain.

“It is good to see you too,” began Minister Chiang, who then proceeded to laud Lin Bao and his crew on their exceptional conduct, not only in maneuvering the *Zheng He* Carrier Battle Group into position—a complex task to be sure—but also for repairing their ship while underway, so that it stood poised to achieve a great victory. On and on the minister went. The more congratulations he heaped on the crew of the *Zheng He*, the more it unsettled Lin Bao.

Something was wrong.

“Late last night, the Legislative Yuan scheduled an emergency session,” said Minister Chiang. “I expect a vote for dissolution in the coming days … ” His voice began to peter out, to choke even. “Our plan seems to be coming together … ” He pinched the bridge of his nose and squeezed his eyes shut. He took a long, heavy breath, and then, in a more defeated tone, he added, “However, there is a concern. The Americans have threatened a nuclear strike—no doubt you've heard.”

Lin Bao hadn't heard. He shot a glance at one of his intelligence analysts, who sat an arm's length away. For the last twelve hours they'd been in a

communications blackout. The young sailor immediately pulled up the *New York Times* home page on an unclassified laptop. The headline was in the largest, boldest font: “WITH RED LINE DRAWN, NUCLEAR WEAPONS AN OPTION, SAYS PRESIDENT.” The story had been filed several hours earlier.

Lin Bao wasn't certain how to respond to Minister Chiang. All he could think to do was provide the latest disposition of the *Zheng He* Carrier Battle Group, so he began talking mechanically. He reviewed the readiness of his flight crews, the placement of his surface escorts, the arrangements of his assigned submarines. On and on he went. But as he covered these technical details, Minister Chiang began to nervously bite his fingernails. He stared at his hands. He hardly seemed to listen.

Then Lin Bao blurted out, “Our plan remains a good one, Comrade Minister.”

Minister Chiang glanced up at him and said nothing.

Lin Bao continued, “If the Legislative Yuan votes to dissolve, the Americans can't launch a strike against us. They aren't brazen enough to attack us for a vote taken by someone else.”

Minister Chiang stroked his round chin. “Perhaps,” he said.

“And if they did strike, they can't attack our fleet. They don't have precise positional data, even for a tactical nuclear strike. Also, we're only a few miles off the coast of Taipei—the collateral damage to the ports would prove catastrophic. That is the genius of your plan, Comrade Minister. We subdue the enemy without ever fighting. As Sun Tzu said, it's ‘*the supreme art of war*.’”

Minister Chiang nodded and repeated, “Perhaps.” His voice was thin, as if he needed a drink of water. Then their video teleconference was over. The Legislative Yuan had a vote to take. The Americans had drawn a red line, one that they might or might not enforce. There was little for Lin Bao and his crew to do, except to wait. It was now early morning. On his way back to his cabin, Lin Bao checked the bridge watch. His crew, despite their youth

and inexperience, executed their duties vigilantly. Each understood the enterprise they were embarked upon. In the near distance was the Taiwanese coast, shrouded in a predawn fog. Their fleet was also concealed in this fog. The sun would soon rise, and that fog would burn away. The island would reveal itself and so, too, would they. But Lin Bao was tired. He needed to get some rest.

He returned to his quarters and attempted but failed to sleep. Eventually, he tried reading. He scanned his bookshelf and saw his copy of *The Art of War*, which, ironically, he'd first read at the US Naval War College in Newport. As he browsed the well-annotated pages, he thought of the fog in Newport, the way it clung to the coast, its consistency, how a ship sliced through it, and how it reminded him of the fog here. He then came to a passage, one he'd read many times before but seemed to have forgotten in the intervening years: *If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle*.

Lin Bao shut his eyes.

Did he know his enemy? He tried to remember everything he could of America. He thought of his years studying there, living there, and of his mother, that other half of him who was born there. When he shut his eyes, he could hear her voice, how she used to sing to him as a child. Her songs … American songs. He hummed one unevenly to himself, “The Dock of the Bay”; its rhythm, he knew it so well. At last he fell into a deep and peaceful sleep.

21:37 MAY 21, 2034 (GMT-4)
WASHINGTON, D.C.

The morning before it was delivered, a copy of the president's Oval Office address had been circulated widely and thoroughly staffed. It had traveled through the interagency coordination process—State, Defense, Homeland Security, even Treasury had all weighed in with their comments. The press secretary, senior political advisors, and select members of the national security staff, including Chowdhury, had been privy to the rehearsals, which

had taken place with the president sitting behind the Resolute Desk. Chowdhury thought she looked good, very composed, steady.

That evening, when it came time for her to deliver her remarks, Chowdhury was sitting at his desk while his colleagues gathered around one or another of the ubiquitous televisions that littered the cramped West Wing. Chowdhury wasn't watching; after the many rehearsals he hadn't felt the need to. It was only when he heard a collective murmur that he glanced up. Neither he nor any of his colleagues had known that the president planned to announce the authorization of a potential nuclear strike. Before they had a chance to do anything except to stare dumbfounded at the television, the door to the Oval Office swung open. A handful of cabinet officials strode past. Based on their demeanor—the blank looks, the tight whispers—they were caught off guard too. The only two who appeared unfazed were Hendrickson and Wisecarver. Wisecarver beckoned Chowdhury into his office, which in the previous week had been moved kitty-corner to the president's own.

“C'mon in,” said Wisecarver, as he waved Chowdhury through the door. “We can get this done with a five-minute stand-up.” Wisecarver's office was a chaos of neglect. A framed grade-school portrait of the son he'd lost sat next to his keyboard, but this was the only personal object amid the binders and folders that piled his desk and every shelf, one open on top of another. Each cover sheet contained an alphabet soup of classification codes. He began to stack documents one by one in either Chowdhury's or Hendrickson's outstretched hands, depending on whether the action needed to originate from the executive branch or Department of Defense. Wisecarver, a master in the language of bureaucracy, talked his subordinates through their paper chase with a practiced enthusiasm. Each minor task Wisecarver assigned to Hendrickson and Chowdhury took the country one step closer to a nuclear war.

Before Chowdhury could ask a question of his boss, the five minutes were up.

The door shut. Both he and Hendrickson stood out front of Wisecarver's office with a stack of binders in their hands. “Did you know ahead of time about the speech?” Chowdhury asked.

“Does it matter?”

Chowdhury wasn't certain that it did matter. He also thought this was Hendrickson's way of telling him that, yes, in fact he had known about the changes. He'd been the senior official from Defense in the room, so it made sense that he would have known. It also made sense that this knowledge would've stayed within a tight circle, one that excluded much of the cabinet and nearly all of the White House staff. Nevertheless, it felt like a deception to Chowdhury. Which is to say, it didn't feel right. But then again, he thought, how else should a decision authorizing such a use of force feel?

“There's no way we'll follow through with it,” said Chowdhury. But as he said this, he wasn't certain whether he was asking a question or making a statement. Although Chowdhury had been kept in the dark about the president's plan to draw a nuclear red line, he'd been kept in the dark about little else. For instance, he knew the latest disposition of Chinese forces near Taiwan; the noose they had drawn around the island was a combination of their navy, their land- and air-based missiles, along with a contingent of their special forces that could conduct a limited invasion. To stealthily execute this high-speed encirclement, they had used an impressive and still-mysterious combination of technologies. China's naval forces now hugged the Taiwanese coast, and given the danger of collateral damage, what, if anything, could an American tactical nuclear strike target?

Illustration: Owen Freeman

“They've just got to believe we'll do it,” said Hendrickson. “Right now, three of our carrier strike groups have orders in hand to transit the South China Sea. We need time. If we can get those ships on station, we can threaten the Chinese mainland. Then they'll have to pull resources away from Taiwan. A credible nuclear threat buys us time.”

“It's also risky as hell.”

Hendrickson shrugged; he didn't disagree. He began to gather his things, locking the binders and folders in a classified courier bag. He needed to

return to the Pentagon. Chowdhury offered to walk out with him. He'd likely spend all night at the office and so wanted to get some fresh air. “I saw your friend Hunt got command of the *Enterprise* Strike Group,” mentioned Chowdhury in an effort at small talk. The two stood outside the West Wing, a few steps from the last Secret Service checkpoint. Above them the sky was clear and thick with stars.

“Yeah,” said Hendrickson, who was looking away from Chowdhury, across the street toward Lafayette Park. “I saw that too.”

“Well,” said Chowdhury, “good for her.” He was smiling.

“Is it good for her?” asked Hendrickson. He didn't return Chowdhury's smile. He only stood there, alternating his gaze between the park and the clear night sky. It was as if he couldn't quite bring himself to take either a step forward or one backward. “If we do launch—because the Taiwanese cave, or because the Chinese misstep, or because Wisecarver gets his way—it's most likely Sarah who will have to pull the trigger.”

This hadn't occurred to Chowdhury.

When Hendrickson tried to step out onto Pennsylvania Avenue, the Secret Service held him back a moment. The Metro Police were responding to an incident inside Lafayette Park, where an old man with a tattered beard was screaming frantically about the “End of Days.” He had emerged only a few minutes before from a small, dirty plastic tent. With a smartphone clutched in his hand, he was listening to a streaming news channel, the volume turned all the way up. Chowdhury recognized the man as he scrambled past. He was part of the so-called White House Peace Vigil, which had protested continually against all war, but particularly nuclear war, since 1981. As the police descended upon the man, he grew more frenzied, tearing at his clothes and hurling himself at the gates of the White House. While Chowdhury waited for the Metro Police to make their arrest, he heard one of the Secret Service agents on the other side of the gates mutter, “Old loon …”

The next morning, when Chowdhury opened the news on his tablet's browser, he clicked on a brief story in the metro section dedicated to the

incident. The old man had been released without bail but charged, nevertheless, with a single count of disturbing the peace.

Chowdhury closed the browser; he placed his tablet on the table.

To read another word felt futile.

10:27 JUNE 18, 2034 (GMT+8)
20 NAUTICAL MILES OFF THE COAST OF TAIPEI

Water sluiced through the creases of Lin Bao's raincoat as he stood on the flight deck. On a clear day he would've been able to see the gleaming skyline in the distance. Now all he could see were the storm clouds that shrouded the city. Minister Chiang was scheduled to land any minute. The purpose of his visit wasn't entirely clear; however, Lin Bao felt certain that the time had come to resolve their current stalemate with the Americans and the Taiwanese. The resolution to that stalemate was the news Lin Bao believed the minister would bring.

Flickering in the distance, Lin Bao made out a dim oscillating light.

Minister Chiang's plane.

Pitching and yawing, it catapulted out of a rent in the clouds. Seconds later it was reeling on the deck, the pilots having perfectly caught the three-wire, much to Lin Bao's satisfaction. The engines whined in reverse, decelerating. After a few moments, the back ramp dropped and Minister Chiang emerged, his round face laughing and smiling at the exhilaration of a carrier landing. One of the pilots helped the minister remove his cranial helmet, which caught on his large ears. The minister's visit hadn't been announced, but like a politician he began distributing handshakes to the ground crew, who eventually surmised who he was. Before any fuss could be made on account of his arrival Lin Bao escorted him off the flight deck.

Inside Lin Bao's stateroom, the two sat at a small banquette scattered with nautical charts. A holographic map of Taiwan was projected over the table, rotating on its axis. An orderly poured them cups of tea and then stood at attention with his back to the bulkhead, his chest arching upward. Minister

Chiang gave the orderly a long, interrogatory look. Lin Bao dismissed him with a slight backhanded wave.

Now it was only the two of them.

Minister Chiang slouched a bit deeper into his seat. “We find ourselves at an impasse with our adversaries …” he began.

Lin Bao nodded.

“I had hoped the Legislative Yuan would vote to dissolve, so we might avoid an opposed invasion. That seems increasingly unlikely.” Minister Chiang took a sip from his tea, and then asked, “Why do you think the Americans threatened us with a nuclear strike?”

Lin Bao didn't quite understand the question; its answer seemed too obvious. “To intimidate us, Comrade Minister.”

“Hmm,” said Minister Chiang. “Tell me, does it intimidate you?”

Lin Bao didn't answer, which seemed to disappoint Minister Chiang.

“Well, it shouldn't,” he told his subordinate. According to the minister, the American threat of a nuclear strike didn't show their strength. Quite the opposite. It revealed how vulnerable they were. If the Americans had really wanted to threaten the Chinese, they would've launched a massive cyberattack. The only problem was they couldn't—they lacked the capability to hack into China's online infrastructure. The deregulation that had resulted in so much American innovation and economic strength was now an American weakness. Its disaggregated online infrastructure was vulnerable in a way that the Chinese infrastructure was not. “The Americans have proven incapable of organizing a centralized cyber defense,” said Minister Chiang. “Whereas we can shut down much of their country's electric grid with a single keystroke. Their threat of nuclear retaliation is outdated and absurd, like slapping someone across the face with your glove before challenging them to a duel. It's time we show them what we think of their threat.”

“How do we do that?” asked Lin Bao, as he clicked a remote that turned off the rotating hologram. He cleared away their cups of tea so as to reveal the nautical charts that covered the banquette table, as if the two might discuss a naval maneuver.

“It's nothing we do here,” answered Minister Chiang, disregarding the charts. “We'll handle it up north, in the Barents Sea. The American Third and Sixth Fleets have left those waters to transit south. With the American fleets gone, our Russian allies have unfettered access to the subsurface 10G internet cables that service the United States. Our allies will help us to, gently, remind the Americans that their power is outdated, that bombs aren't the only way to cripple a nation—not even the best way. What I need you to do is simple: Be ready. This will be a cyber show of force. It will be limited; we'll only cut a cable or two. We'll dip the Americans into darkness, allow them to stare into that void. Afterward, either the Legislative Yuan will invite us into Taipei, or we will go of our own accord. Either way, your command must be ready.”

“Is that what you came all this way to tell me?”

“I didn't come to tell you anything,” said Minister Chiang. “I came because I wanted to stand on this ship and see if you are, in fact, ready.”

Lin Bao could feel the minister's gaze boring into him. In the days ahead he understood how much would depend on his command's ability to act quickly, whether through an unopposed landing in Taipei, or alternatively a ship-to-shore assault. Before Minister Chiang could deliver his verdict as to the perceived readiness of Lin Bao and his command, there was a knock at the door, a dispatch from the combat information center.

Lin Bao read the note.

“What does it say?” asked Minister Chiang.

“The *Enterprise* is on the move.”

“Coming here?”

“No,” answered Lin Bao. “It doesn't make sense. They're sailing away.”

11:19 JUNE 18, 2034 (GMT+8)
220 NAUTICAL MILES OFF THE COAST OF ZHANJIANG

These waters were a graveyard. As the *Enterprise* set its course, Sarah Hunt knew the countless wrecks she sailed over. The Philippines were to her east. To her west was the Gulf of Tonkin. She considered the names of the ships—the USS *Princeton*, *Yorktown*, the *Hoel*, and the *Gambier Bay*—whose blasted hulls rested on the seabed beneath her. And Japanese ships as well, battleships and carriers. Hunt and her crew passed silently above them, taking up a position—for what?

Hunt didn't know.

Her orders had come in quick succession. Every couple of hours she was summoned to the radio room, an antiquated closet in the bowels of the ship that a senior chief, who everyone called Quint, treated as his own personal fiefdom. The nickname Quint came from his uncanny resemblance to the captain of the ill-fated *Orca* played by Robert Shaw in the film *Jaws*. Working alongside Quint was his assistant, a young petty officer third class who the crew of the *Enterprise* called Hooper, not because he looked like Richard Dreyfuss' character, Matt Hooper—the intrepid, bespectacled, Great White-hunting marine biologist—but simply because he spent every waking hour with Quint.

Hunt, who had spent a career receiving her orders over lengthy briefings via secure video teleconference, accompanied by kaleidoscopic displays of PowerPoint, was slowly getting used to this fragmented manner of communications. With their Chinese adversaries having the upper hand in cyber, the *Enterprise* had gone into an internet blackout. Indo-Pacific Command, which was in direct contact with the White House, kept tapping out these minimalist communications to Hunt in high-frequency radio bursts, the same long-range bandwidth employed by the US Navy in the Second World War.

Another of these messages had arrived, so Hunt traveled four levels down from her stateroom to the radio room, where she found Quint and Hooper surrounded by a tangle of electronics, the former with a pair of spectacles

perched on the tip of his nose as he unsnarled some wires and the latter holding a smoking soldering iron.

“Gentlemen,” said Hunt, announcing herself.

Hooper startled at her voice while Quint sat frozen with his chin tucked down as though calculating his share of the bill at a restaurant. Undisturbed, he continued to focus through his spectacles as his hands worked swiftly at the tangle of wires leading into the radio. “Mornin', ma'am,” said Quint. An unlit cigarette dangled from his mouth.

“It's evening, Senior Chief.”

Quint raised an eyebrow but didn't take his concentration away from the wires. “Then evenin', ma'am.” He nodded for Hooper to pass him the soldering iron, which he quickly applied to a connection he was grafting onto a circuit board. For the past two weeks, ever since they got underway, Quint and Hooper had been retrofitting a suite of antiquated VHF, UHF, and HF radios into the avionics of the single F/A-18 Hornet squadron aboard the *Enterprise*. This made the Death Rattlers the only squadron that would be entirely immune to cyber interference. At least that was the plan.

“How many of those have you got left to install?” she asked.

“None,” said Quint. “We finished the last Hornet this morning. This is an upgrade to our ship's HF receiver.” Quint drew silent for a moment, mustering his concentration. “There,” he said, a ribbon of smoke unspooling from the soldering iron as he handed it back to Hooper. Quint then screwed on the front panel of the radio they'd been tampering with. They powered it on. Its receiver was hooked to a speaker, which emitted a warbling sound.

“Can you turn that down?” asked Hunt.

Hooper glanced at Quint, who nodded, but kept his head canted slightly to the side, his one ear raised, like a maestro fine-tuning his instrument. While Hooper manipulated the dial, Quint gestured alternately with his left hand or his right as they cycled up or down the frequency ladder, searching for …

what? Hunt couldn't say. Then, as if perceiving her curiosity, Quint began to explain himself.

“We're searching for long-delayed echoes, ma'am. LDEs. When you transmit an HF frequency, it loops around the earth until it finds a receiver. On rare occasions, that can take a while and you wind up with an echo.”

“How long of an echo?” asked Hunt.

“Usually, only a few seconds,” said Quint.

“We picked up some yesterday,” added Hooper.

Hunt smiled at him. “What's the longest echo you ever heard of?”

While Hooper manipulated the dial, Quint made a gesture with his right hand, as though encouraging a piece of music. He was both speaking to Hunt and listening to the oscillations in frequency. “Old salts I served with said that in these waters they'd picked up conversations from fifty or even seventy-five years ago,” explained Quint. With a wide grin that revealed decades of the Navy's shoddy dental work, he added, “There's lots of ghosts out here, ma'am. You just got to listen for 'em.”

Hunt didn't return Quint's smile; still, she couldn't help but imagine the possibility of ages-old conversations lingering in the surrounding atmosphere—the lost pilots searching the darkness for their carriers off the coast of North Vietnam, the frantic gun crews calling out flights of incoming Zeros in the Philippine Sea. However, she needed to turn to the task at hand.

Quint reached across his desk to a piece of paper with the message he'd recently decoded from Indo-Pacific Command. “They aren't giving you much to go off of, huh?” he said.

The message was hardly a message, simply four latitudinal and longitudinal coordinates, so a box. There was no mission statement, no situation update; Hunt would place the *Enterprise* and its escorts within this box and then await further instructions. She tucked the scrap of paper in the pocket of her coveralls. As she went to leave, Quint stopped her. “Ma'am,” he said, reaching onto a back shelf. “We fixed this up; thought you might be able to

use it.” In his large grip was an old travel radio. “If you tune it just right, you can get the BBC World Service, even a bit of music, depending on where we're at. The dial is a bit tricky. It takes some finesse. But it should do all right for you.”

Quint and Hooper were still playing around with the HF receiver as she left, Quint making motions with his hands, Hooper manipulating the dial. With the decoded message in her pocket, Hunt bounded up the four levels to her stateroom. She set the slip of paper with the coordinates on her desk, already layered with an assortment of nautical charts. With a set of parallel rulers, a divider, a compass, and a sharp pencil, she sketched out the corners of the box. It was tight, but large enough to fit her carrier strike group. It was to the south of their current position, another eighty nautical miles further off the coast, a three-hundred-mile straight line overwater to Zhanjiang, the headquarters of China's South Sea Fleet. With the crisis around Taiwan, she wondered how many of the South Sea Fleet's ships were currently in port.

It wouldn't be many.

But it would be enough.

Hunt set her pencil down on the chart. She turned on the radio and managed to find the BBC World Service. With her arms crossed and her legs stretched out in front of her, she closed her eyes and relaxed. She tried to imagine the news reports—*USS* Enterprise *strikes Chinese naval facility with tactical nuclear weapons*—but she couldn't; it seemed too improbable. Although few Cold War precepts had aged well in the twenty-first century, the logic of mutually assured destruction was one of them. Even so, thought Hunt, her country had little to gain by wiping out the port at Zhanjiang. As she prepared to alter the course of the *Enterprise*, she couldn't help but recognize this maneuver for the theater it was—for the theater such maneuvers always had been—ever since man split the atom, unleashed its power, and nations coerced one another with the threat of that power. The current crisis would de-escalate, as crises always did. She felt certain of this.

That certainty gave her some peace of mind, enough so she dozed off in her chair. She slept dreamlessly, waking an hour later. Her radio was no longer

playing the BBC World Service. It had lost the signal. All it emitted was static. Hunt fiddled with the dial, trying to retune into the news.

Then she heard something.

A weak, indistinct voice.

As quickly as she heard it, it disappeared.

She left her radio tuned to the static, set on the same frequency, wondering if she might hear the strange transmission again. She knew what it was; Quint had told her.

It was ghosts.

14:22 JUNE 24, 2034 (GMT+2)
BARENTS SEA

This far north the sun held above them nearly twenty-four hours a day. The sky was clear, the weather unseasonably warm. The American fleet was nowhere to be found; it had sailed away. The Russian Federation owned these waters, and they knew it. Unencumbered by the looming threat of the US Navy, the crew of the *Rezkiy* and other ships of the flotilla indulged in bouts of recreation. On the battle cruiser *Pyotr Velikiy*, the crew descended its side boats to take plunges into the icy seawater. On the carrier *Kuznetsov*, the captain authorized sunbathing on the flight deck despite the cold. On the smaller *Rezkiy*, Kolchak allowed pop songs to play over the ship's intercom during the daily cleanup; most popular were classics like Elvis, the Jonas Brothers, and anything by Shakira. “Hips Don't Lie” was a favorite.

These little breaks with discipline, plus the general eccentricity of naval life, confounded Lieutenant Commander Farshad. His liaison duties consisted of little more than being a presence that evidenced two nations' faithfulness to one another, even though neither of those nations had ever been renowned for faithfulness to anything but themselves. Farshad had once said as much in the wardroom to Kolchak, who had asked in reply, “Has a nation ever been faithful to anything but itself?” Farshad had conceded the point.

Not long after this exchange, Farshad had been standing on the bridge of the *Rezkiy* when the watch spotted a school of sharks off the ship's port side. Kolchak had been manning that watch, and he took an uncanny interest in the sharks, even adjusting their ship's course to follow them for several minutes. “Perfect,” said Kolchak as he stared at their thrashing dorsal fins. As if sensing Farshad's confusion, he explained himself. “Those sharks are heading in the direction of the 10G undersea cables. They're attracted to the electromagnetic energy. Those cables connect to the United States, and sharks have been known to chew through them. Their presence will give us deniability.”

Destroying a few of the undersea cables would send a powerful message to the Americans, slowing internet across the country by as much as 60 percent, or so Farshad had been told by Kolchak. This might be enough to de-escalate the crisis, to bring everyone to their senses. When it came to acting pragmatically, which was to say acting in their national interests, it seemed to Farshad that only his country—and perhaps the Russians—were capable of clear thinking. The Russians, like them, knew that any scenario that weakened the Americans was advantageous. In fact, a de-escalation of the current crisis wasn't really in the Iranian or Russian interest.

Disruption was in their interest.

Chaos.

A change in the world order.

The sharks disappeared beneath the waves, and for the remaining hours of the day the *Rezkiy* and its sister ships idled over the 10G cables. The mood on the ship turned businesslike. Farshad lingered on the bridge, where Kolchak and the captain kept a vigil, the two speaking exclusively in Russian, while Kolchak took the occasional break to explain the situation to Farshad.

“We'll circle around this area here,” Kolchak said, pushing a yellowing fingernail at their navigation computer's interface. “The *Pyotr Velikiy* has a tethered submersible aboard that is going to place an explosive cutting charge on the cables.”

“How large is the charge?” asked Farshad.

The captain brought his eyes out of his binoculars. From over his shoulder, he glanced at them warily.

“Just enough to do the job,” said Kolchak.

The captain made a face, and then a transmission came over the radio in Russian. Kolchak snatched the receiver and promptly replied while the captain dipped his eyes back into his binoculars and continued to scan the open sea. The *Pyotr Velikiy* was recovering its submersible, the charge having been set. Planted on the horizon was the *Kuznetsov*, its decks crowded with aircraft. Kolchak continued to check his watch, the second hand making its steady orbit around the dial as they waited.

More minutes passed in silence.

Then an explosion, a geyser fountaining upward from the seabed. Followed by a shock. And a sound, like a clap. The entire ship rattled. The water splashed back onto the surface of the ocean. Another radio transmission came into the bridge. The voice was excited, congratulatory. The captain answered the call in the same congratulatory manner. The only person on the bridge who didn't seem pleased by the result was Farshad, who was confused. Grasping Kolchak by the elbow, he said, “That must've destroyed more than one or two cables.”

The smile vanished from Kolchak's face. “Perhaps.”

“Perhaps?” answered Farshad. He could feel the old familiar rage brimming up from the center of his chest, into his limbs. He felt duped. “That explosion must have destroyed every cable.”

“And so what if it did?” answered Kolchak. “A de-escalation between Beijing and Washington hardly benefits us. It doesn't benefit your nation either. Let's see what happens now. The result of this disruption will be advantageous, for both of our countries. Who knows, then we might—” Before Kolchak could finish the thought, the ship's collision alarm sounded.

Orders were rapidly shouted across the bridge—a new heading, a new speed ("Reverse right rudder, full ahead left!"), a reflexive set of impact-avoidance measures—while both Kolchak and Farshad scanned off the bow. At first, Farshad couldn't see the obstacle that threatened collision. There was no ship. No iceberg. No large object that assured catastrophe. There was only clear sky. And a mist of seawater that still lingered in the air after the explosion.

It was the mist that concealed the obstacle.

Sharks, dozens of them, an entire school, bobbing upward like so many apples in a barrel, their white bellies presented to the sun. The evasive maneuvers continued. Farshad could do nothing; a sailor in name only, he couldn't help the crew avoid the collision. The *Rezkiy* plowed through the field of dead fish, their bodies hitting the thin hull, reminding Farshad of the ice floes that had so often kept him awake at night—*dong, dong, dong*. Then a far sharper noise combined with this hollow thudding, a noise like a fistful of metal spoons tossed down a garbage disposal; the shark carcasses were passing through the twin propellers of the *Rezkiy*.

Farshad followed Kolchak out to the bridge wing. They turned to the stern of the ship to assess the damage. The seawater mist still lingered in the air. The sunlight passed through it, casting off brilliant rainbows—blues, yellows, oranges, reds.

So much red.

Farshad realized the red wasn't only in the air; it was also in the water. The slightly damaged *Rezkiy* set a new course, leaving a wide swath of blood in its wake.

21:02 JUNE 26, 2034 (GMT+8)
300 NAUTICAL MILES OFF THE COAST OF ZHANJIANG

The internet was out across the entire eastern seaboard. Eighty percent of the connectivity in the Midwest was gone. Connectivity on the West Coast had been reduced by 50 percent.

A nationwide power outage.

The airports closed.

The markets panicked.

Hunt listened to the updates arriving via the BBC World Service on the handheld radio Quint had given her. She immediately understood the implications. She scrambled down four levels to the radio room, where Quint was also listening to the news and awaiting her.

“Anything yet?” she asked.

“Nothing,” he said.

Hooper wasn't there, he was asleep in the berthing, and Hunt was glad it was only her and the old chief. She knew the message she was waiting for, and she felt as though she wanted the fewest people possible around when it arrived. The idea of receiving her task in front of someone from a younger generation, like Hooper, felt particularly difficult. Perhaps this was because he would have to live with the consequences longer than any of them. This was Hunt's train of thought as she sat in the cramped radio room with Quint, the two of them listening to static on the HF radio set, waiting.

And then the message arrived.

10:47 JUNE 26, 2034 (GMT-4)
WASHINGTON, D.C.

Chowdhury wasn't in the room when they made the decision. To assuage his guilt about what followed, he would always cling to that fact. In the years to come he would have ample opportunity to imagine the discussion around the Situation Room conference table beneath the dim generator-powered lights. He would imagine the positions taken by Trent Wisecarver, by the various service chiefs and cabinet secretaries, the tabulations of arguments *for* or *against* what they were about to do—what they had all committed themselves to do when the president had put down her “red line” and dared her counterparts in Beijing to cross it.

Which was what it seemed Beijing had now done, though not in the way anyone had anticipated. The cutting of the undersea cables and the resulting plunge into darkness was the demonstrable fact that, when discussed around the conference table, proved Beijing had crossed the red line. The question was the response. And even that was settled in remarkably short order. Chowdhury envisioned the scene—a disquisition of US interests by Wisecarver, followed by a range of options (or lack thereof) presented by the Joint Chiefs, and then formal nuclear authorizations being granted by the president herself. Chowdhury didn't need to imagine any more than that, because he had seen the principals as they exited into the West Wing, their dour expressions failing to contain the knowledge of the decision they had settled upon, even though they themselves didn't yet understand past intellectualization the destruction they would unleash. How could they?

With the orders dispatched, Wisecarver set up a duty rotation among the national security staff and Chowdhury was sent home, to return the following morning. He expected the strike to occur sometime in the night. There would, of course, be a response from Beijing. And the national security staff needed to be ready for it. On Chowdhury's drive home, entire blocks were still without power. Only about half the traffic lights in the city worked; the other half were blacked out or shuffling their colors nonsensically onto empty streets. In only a few more days, the trash would begin to pile up. When he tuned in to his favorite radio station he was met with static.

So he drove in silence.

And he thought.

He thought the same thought all through that night—as he ate dinner with his mother and Ashni, as he carried the girl up to bed with her arms looped heavily around his neck like two ropes, and as he wished his mother good night in the guest room and she kissed him, uncharacteristically, on the forehead and then touched his cheek with her cupped palm as she hadn't done in years, not since his divorce. The thought was this: *I have to get my family somewhere safe.*

Chowdhury knew where that place was. It wasn't a bomb shelter (if those even existed anymore) or outside of the city (although that wouldn't be a bad start). No, he concluded; none of that would be enough.

He knew what he needed to do.

Who he needed to call.

In the quiet of his home, with his mother and daughter sleeping so near he would need to speak in a whisper, he picked up his phone and dialed. The answer came after the first ring.

“Admiral Anand Patel speaking. ”

Chowdhury froze. A beat of silence followed.

“Hello? Hello?”

“Hello, Uncle. It's me, Sandeep.”

13:36 JUNE 27, 2034 (GMT+8)
300 NAUTICAL MILES OFF THE COAST OF ZHANJIANG

White light on the horizon.

That's how Sarah Hunt would always remember it.

11:15 JUNE 30, 2034 (GMT+8)
TAIWAN TAOYUAN INTERNATIONAL AIRPORT

Lin Bao believed he had known them, but he hadn't.

If he had once considered himself half American, he no longer thought so. Not after what they'd done at Zhanjiang three days ago. Every member of his crew knew someone who'd perished there, and almost all had family within the blast zone. Countless friends of his—from his academy days, to postings on other ships, to three cousins who had nothing to do with the Navy but who lived in that port city by the turquoise sea—each gone in an instant, in a flash. Others had not been so lucky. Lin Bao couldn't bear to

linger on the details; they were too gruesome. But he knew the hospitals in Beihai, Maoming, Yangjiang, and even as far away as Shenzhen had already filled to capacity.

If the American strike on Zhanjiang had been swift and decisive, the invasion of Taiwan by the People's Army had proven its equal—though it wasn't Beijing's response to the 150-kiloton blast; that was yet to come. A discussion of that response was the reason Lin Bao was summoned away from his ship to a conference, so that he was now awaiting the arrival of Minister Chiang in the airport's international terminal, in what had once been the British Airways first-class lounge. Floor-to-ceiling windows allowed Lin Bao to marvel at his country's occupation of the island. Though the invasion had shut down the airport to civilian traffic, it was busy—if not busier—with military traffic, commuter jets having been replaced with fighters and transports, and vacationers and business travelers having been replaced with soldiers. When Minister Chiang at last arrived in the lounge, he was followed by a vast retinue of security, which, as he explained apologetically, was the reason for his delay. “They've become very protective of me,” he said, and laughed nervously, offering one of his characteristically expansive smiles to his security detail, none of whom returned it.

Minister Chiang escorted Lin Bao into a conference room, a clean glassed-in cube designed for executives to use between flights. The two sat next to each other at one end of a long table. Lin Bao couldn't help but notice Minister Chiang's uniform, which wasn't his usual service dress but rather a set of poorly fitting camouflage utilities that still held the creases from where they'd been folded in plastic packaging. Like Lin Bao, the minister couldn't help but steal the occasional admiring glance at his troops as they moved efficiently through the airport, dispersing throughout Taipei and then beyond for the seizure and annexation of this stubborn republic, finally brought to heel.

However, when Minister Chiang's attention returned to the conference room, his expression turned severe, and he began to knead his chin, as if the action were a way to coax his jaw into motion. Eventually, he spoke, “Our position is becoming increasingly precarious. We have a week, maybe two, until the Americans will have massed their fleets so close to our mainland that we'll

no longer possess free access to the sea. Which is unacceptable. If we allow that to happen, the Americans will strangle us as we have done here, to this island. With our access to the sea blocked, our entire mainland will be under threat of invasion, to say nothing of the nuclear threat. The Americans have crossed that threshold. Once a nation has dropped one nuclear weapon the stigma of a second or a third is less. The moment has come for us to settle on a course of action."

Minister Chiang was speaking imperiously, which caused Lin Bao to hesitate before replying, "Is that the reason for this"—and Lin Bao struggled for a word to describe the nature of their meeting, which was ostensibly why Minister Chiang had summoned him here, away from his ship, to the British Airways lounge, which increasingly felt like a strange, even illicit location —"I mean, the reason for this *conference*?"

Minister Chiang leaned forward in his chair, placing his hand affectionately on Lin Bao's forearm. Then he glanced out the window, to his security detail, as if making sure his dark-suited entourage observed the gesture. And Lin Bao saw that they did. Gradually, he began to intuit the subtext for their meeting as Minister Chiang confessed that their "conference" was a "conference of two." Yes, he could have invited the commander of the special forces task force, an unimaginative major general whose troops had already fanned out across Taipei, seizing strategic targets such as radio, television, and power stations, as well as gathering up probable agitators; and he could have also invited the commander of their air forces, a technocrat who was coordinating a vast logistical web of resupply while keeping his fighter and attack aircraft poised for any counterstrike; but to invite either of them would have disrupted their efforts. Also, Minister Chiang explained that he wasn't certain they possessed "the required competencies for what would come next."

Which begged the question of what that *next* would be.

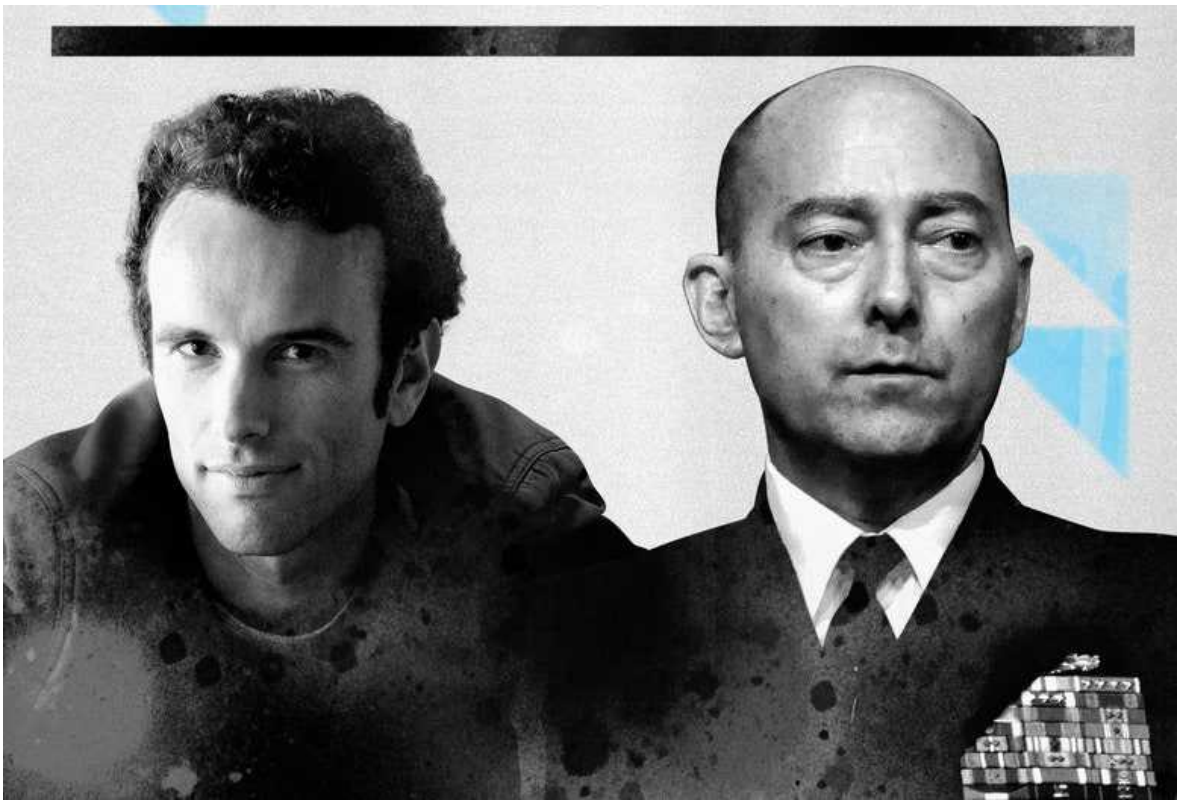
When Lin Bao asked, Minister Chiang grew uncharacteristically reticent. He crossed his arms over his chest, turned his chin slightly to the side, so that he was observing Lin Bao from the corners of his eyes as if to confirm that he had appraised him correctly from the start.

“It seems I've been recalled to Beijing,” said Minister Chiang. He once again glanced outside the glass conference room, to where his security detail lingered. Lin Bao now understood; those men were to ensure the minister returned—whether he wanted to or not. “After what happened three days ago in Zhanjiang,” the minister continued, “certain voices are saying that our planning miscalculated the American response.” He fixed his stare on Lin Bao, examining him for the slightest reaction to such charges of *miscalculation*. “Those same voices, both inside and outside the Politburo Standing Committee, are blaming me. Intrigue like this is nothing surprising. My enemies see a vulnerability and they strike after it. They claim I'm to blame for the actions of our unreliable allies in the Barents Sea, or for an American president whose greatest weakness is her fear of being perceived as weak. I haven't come as far as I have without possessing certain instincts that allow me to navigate such intrigues. And it is those instincts that drew me to you, Admiral Lin Bao. It is why I made you Ma Qiang's replacement, and it is why I am asking for your support now, against not only our enemies on the outside but also our enemies within.”

“My support?” asked Lin Bao.

“Yes, for what comes next.”

But Lin Bao still didn't know what came next. Perhaps they could hold their gains around Taipei and negotiate with the Americans. The devastation of Zhanjiang would be the price they'd pay to annex Taiwan. He said as much to Minister Chiang, reminding him that their original plan was based on a strategy of de-escalation, as well as Sun Tzu's wisdom about subduing one's enemy without fighting.



What Did I Just Read? A Conversation With the Authors of *2034*

By WIRED Staff

One of the dark-suited security men knocked on the glass with the knuckle of his middle finger. He pointed to his watch. It was time.

Minister Chiang stood, tugging down on his uniform, which had ridden up his soft belly. With all the dignity he could muster, he raised a finger to the impatient member of his security detail, insisting that he wait another moment. Then he turned to Lin Bao and rested his hand on his shoulder. "Yes, we all know that old bit of Sun Tzu. He was a master of asymmetric warfare, of defeating an enemy without giving battle. But he also tells us, *On difficult ground, press on; on encircled ground, devise stratagems*—"

The security man swung open the door, interrupting them.

Minister Chiang's eyes flashed in that direction, but then he fixed them determinedly on Lin Bao. "*And on death ground, fight.*"

As improbably as he had arrived, Minister Chiang was gone.

Illustrations by Sam Whitney; Getty Images

This excerpt appears in the February 2021 issue. Subscribe now.

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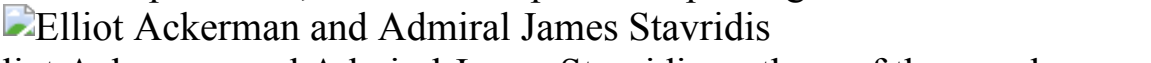
WIRED Staff

Security
03.02.2021 07:00 AM

What Did I Just Read? A Conversation With the Authors of *2034*

Elliot Ackerman and Admiral James Stavridis discuss their inspirations, personal experiences, and what keeps them up at night.


Elliot Ackerman and Admiral James Stavridis, authors of the novel *2034*.Photo-Illustration: Sam Whitney/Getty Images/Alamy

Earlier this year, as many of you know, WIRED dedicated our February issue of the magazine to an excerpt of *2034*. Then, for the past six weeks, we serialized the excerpt on this website. Today we are running the final WIRED chapter—and an interview with the authors. (The book in its entirety goes on sale next week.)

MARIA STRESHINSKY, WIRED: So, where did the idea for this book come from?

ADMIRAL JAMES STAVRIDIS: From another novel that I read many years ago, in the 1980s, called *The Third World War*, by Sir John Hackett. It is a superb novel that imagines a global war between the United States and the Soviet Union.

Over the past few years, the conversation about China and the United States heading toward a cold war began to gain real currency. You heard Henry

Kissinger, for example, say that “we're not in a cold war, but we're in the foothills of a cold war.”

I started to think: How can we avoid a war with China? And I think part of the reason we avoided a war with the Soviet Union was that we could imagine how terrible it would be. And part of imagining that is books like *The Third World War,* which kind of walks you through it.

MS: You two are clearly drawing from a deep knowledge base. How much of this story is real—how much of this is based on your own experience?

JS: The character who's the closest to me, career-wise, is Sarah Hunt. Well, there are a lot of differences—you know, like Sarah is much taller than I am and she has really great hair. [*Laughter*.] But our paths are very similar. She's a commodore and I've been a commodore, in command of a group of destroyers operating in the South China Sea. I've lived that opening scene, up to and including rescuing Chinese fishermen. I've been through these kinds of episodes—they just turned out better for me than that one does for Sarah.

I was also lucky enough to be a carrier strike group commander, just like Sarah. So I know that terrain well. And she has all the appropriate insecurities that people in command should have.

I think Elliot would tell you as a platoon commander, as a company commander, leading 30 grunts in a firefight, you never know what's around the corner. And Sarah never knows what's around the corner.

ELLIOT ACKERMAN: The doubts that she has—those are doubts that I very much identified with. The second you see your friends getting hurt, you start asking yourself hard questions that there's no answer to.

MS: I'm still processing the news that the South China Sea incident is based on real experiences you've had.

JS: Very real.

MS: What else in the book was inspired by specific experiences?

JS: The launching of strikes in combat is very real. I lived it. Also, I worked on the National Security Council staff in the 1990s. I know what the Situation Room is like, I know what it's like to come from the Old Executive Office Building into the West Wing and to be part of a code red.

The Russian character, Kolchak, is based on my experiences with Russians as the supreme allied commander of NATO. And I love the ambivalence of the Chinese attaché, Lin Bao, how he has a foot in both worlds. One of my classmates from Fletcher is Chinese and was educated in the United States; he has a foot in both worlds. I think Lin Bao is a very attractive, complicated character.

And, well, I think it's fair to say that Elliot knows Wedge.

EA: Yeah, I think that's fair. In the book, Wedge, the pilot, winds up as the commanding officer of Marine Fighter Attack Squadron 323, the Death Rattlers. One of my oldest friends is at this moment deployed to the Persian Gulf as the commanding officer of the Death Rattlers, so using that squadron was an homage to him.

But with novels—the ones that I enjoy reading, and the ones I try to write—often you're showing the topography of people's interior lives. And past a certain point, the characters I write are all me, or some version of me.

For instance, with Wedge, there's an opening refrain in the book where he talks about wanting to be close to *it*, and the *it* is flying on instinct, by the seat of your pants—something that his great-great-grandfather had done in the Second World War. He feels he's never had the opportunity to do that when the book opens up, and so much of his emotional journey is trying to be close to this *it*. I was never a pilot, but *it,* the quest for something real, is definitely an emotional journey that I feel familiar with. There are other characters too, like Chowdhury, who is in the National Security Council. He has a complex personal life and is divorced. I'm divorced.

And I've lived in DC, and have worked in the government and felt the crush of anonymity that comes with some of these bleak government jobs. Chowdhury talks about that; that's part of his character. I know how oppressive the bureaucracy can feel, but also how, even while you're

dealing with that feeling, you know you're sitting at the fulcrum of major decisions.

So, oftentimes you're excavating things from your own experience, your subconscious, and putting them into these characters.

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MS: With all these characters, as I read this book, I had a strong feeling ... well, I kept asking: *Why don't they just stop?* Just: Don't hit the button, don't drop the bomb. This book is an intense cautionary tale, but the people who have control don't stop. Is that just me, not having much of a sense of what it is like to be in the military, with the imperatives that come with orders and chains of command?

JS: I would say this isn't a military thing. I think this is a sociological, human thing. Just look at the last hundred years or so—years when we are supposedly evolved as a species, when we trade with each other routinely and we elevate the rights of women and minorities, all the marvelous things of the last 100 years. Yet we stumbled into two massive world wars, one from 1914 to 1918 and one from 1939 to 1945. Collectively, we killed 80 million people in the 20th century.

We see bad leadership, certainly, around the First and the Second World Wars. Those people could have stopped, but again and again they didn't. And we see that events take on a momentum of their own. This happened in particular with the First World War—the sleepwalkers, as they're sometimes called, these nations that were intertwined by blood and marriage and trade and similar political systems, yet they blunder into this devastating conflict. And you can draw a plumb line from that war to the Second World War.

EA: The question you ask is one of the central themes of the book: Why do we as humans do this over and over and over again? Another theme is that it's rarely good to *start* a war: You want to be the one who finishes a war. So much of our American century is predicated on the first two world wars: Those are wars that we did not start, but, you know, we damn sure finished them, and they set us up with great prosperity. If a war is started between the US and China, how does that war end? And is it even possible for it to end to the benefit of either party? Thematically, that goes throughout the book.

JS: It's important to say that this is not a predictive book. It's a cautionary tale designed to help us stay out of events like this. And it's about trends, where things are going.

MS: What are the trends that keep you up at night?

JS: The number one thing is the thought of a massive cyberattack against the United States—that our opponents will refine cyber stealth and artificial intelligence in a kind of a witch's brew and then use it against us.

“We didn't start with 2034. We were actually further in the future. And the more we wrote, the more we started bringing the date closer and closer and realizing, no, no, no, no, no. This stuff is happening.”

Number two, we have to worry about this sense you get of the US and China sleepwalking potentially into a real war. If it happens, I would argue it'll happen in the South China Sea because our forces are in confluence. It is the land of unintended consequences, the South China Sea.

I'd also note the spoiler role that a nation like Iran or Russia can play. It is interesting that both Iran and Russia are inheritors of huge empires. But their day has passed. And they can create a great deal of mischief on the international scene. Elliot?

EA: I would say I slept a lot better before I started working on this project.

MS: I slept better before I ever read this book.

This excerpt appears in the February 2021 issue. Subscribe to WIRED.

Illustration: Owen Freeman

EA: One thing that was fascinating while working on the book was that real-world events would overtake our drafts. A big one was the death of Qassem Soleimani, the commander of the Iranian Revolutionary Guard's Quds Force, assassinated in a drone strike in January 2020. In an earlier draft of this book he's mentioned a number of times, but in that draft he's alive in the year 2034. So we had to rework that. Then there's the coronavirus. It obviously needed to be mentioned in a few places.

Looking back, the world that we began writing this book into is now a very different world. So who knows what the world will look like in 2034?

MS: You know, when you start this book, it feels like a work of fiction set way in the future. But somehow by the time you end, it feels like it's gotten much closer.

JS: Yeah. When we started writing, you had a Trump administration that was in a trade negotiation with China, and you felt like, OK, we're gonna work through this. And boy has that cratered. In every dimension since we started writing the book, the relationship with China has worsened. And there's no reason to think that it's suddenly going to reverse itself with the Biden team. So your point is well taken. It does feel closer to us, and we are closer to 2034.

EA: You know we didn't start with that date, with 2034. We were actually further in the future. And the more we wrote, the more we started bringing the date closer and closer and realizing, no, no, no, no, no. This stuff is happening.

MS: Do the events that happened here, between the election in November and January 6th at the US Capitol, make you think differently about your cautionary tale?

EA: Toward the end of the book, Chowdhury is thinking of a speech by Lincoln, in which he said: "*All the armies of Europe, Asia, and Africa*

combined with all the treasure of the earth (our own excepted) in their military chest, with a Buonaparte for a commander, could not by force take a drink from the Ohio or make a track on the Blue Ridge in a trial of a thousand years. . . . If destruction be our lot we must ourselves be its author and finisher. As a nation of freemen we must live through all time or die by suicide." The events between the election and the riot at the Capitol certainly took us much closer to that "suicide." I very much hope we can find a way to avoid it.

MS: In the real world, are there voices that help you sleep better?

JS: Certainly on January 21 there were. I think what you are going to see is a Biden team that comes in with a deep knowledge of the issues: the challenges of dealing with China, cybersecurity, our trade and tariff disagreements, arguments over 5G networks, the South China Sea, and the construction of artificial islands.

I look for this team to create a strategy to deal with China. What we've had for the last four years is episodic tactical engagement—from dinners at Mar-a-Lago to a kind of quasi-trade agreement that never really got lift behind it to freedom-of-navigation patrols steaming through the South China Sea. None of it connected in a strategic sense that brings ends, ways, and means together. The Biden team, because it's their MO, will construct a strategy and they'll consult with the experts. You'll see a more coherent approach.

But it's not going to be a return to the idea that we can simply trade our way into a China that wants to be part of the global system. Those days are gone. China has a plan, has a strategy. One belt, one road, it's called. The Biden team is well aware of that. And we'll think concurrently, on the strategic side: How do we avoid a war but ensure that we aren't simply turning over the keys of the international car to China? That would be a mistake for the United States. India will be key to that, I believe.

Erika Hayasaki

Backchannel
02.23.2021 07:00 AM

How to Remember a Disaster Without Being Shattered by It

Margaret McKinnon survived a midair catastrophe, then became a major researcher of memory and trauma. Now she's studying how the pandemic will haunt us.

Photographs: Driely S. Carter

Inside the narrow airplane bathroom at 39,000 feet, Margaret McKinnon tried to turn on the faucet, but she couldn't get any water to come out. It was just past 5:45 am, Greenwich Mean Time, on August 24, 2001, and McKinnon was somewhere high above the mid-Atlantic.

Her husband of less than one week, John Baljkas, was asleep where she had left him in a center block of coach seats. The Toronto newlyweds were on their way to a honeymoon in Portugal. With a little less than two hours to go, McKinnon was hoping to get back and nap a bit before landing, but no matter how much she fiddled with the sink she couldn't get it to work. She had no idea that the bathroom's plumbing relied on air pressure generated by the plane's jet engines, and that a faulty tap can be a sign of a much deeper failure. So she thought little of it and gave up.

As McKinnon made her way down the dark aisle to her spot next to Baljkas, she noticed that passengers were beginning to stir. The retractable television monitors above the aisles had just finished playing the movie *Chocolat* and were a few minutes into an episode of *Seinfeld* when the show suddenly cut off. The cabin lights flickered.

She sat down next to Baljkas, who had just woken up. A voice came over the speaker, first in Portuguese: “Atenção passageiros …” The couple couldn’t understand the message, but they noticed passengers around them becoming alarmed and crying out. Then came English: “The pilot is experiencing difficulties.”

McKinnon and Baljkas heard the word “ditch,” but its meaning didn’t instantly register. The crew fanned out and directed passengers to pull their life jackets from beneath their seats. They told everyone to take off their shoes. They repeated the directions in three languages. A flight attendant began to speak, but broke down in tears before she could finish. Then the meaning of “ditch” came clear: “We’re going to land in the water,” said another flight attendant.

The intercom died. From the middle of the aircraft, McKinnon heard a noise. A click. Like part of the plane had shut off. Then the soft growl of engine noise fell silent, and suddenly they were surrounded by the whistling sound of air against the fuselage. A stillness.

At 6:26 am, McKinnon heard: “The engine has gone out.”

Now the powerless 338,000-pound machine—with nothing left to propel it—was floating swiftly downward from 34,000 feet, like a paper airplane drifting in the wind.

“We’re going to die,” a passenger cried.

McKinnon had grown up listening to police and fire scanners. Her father was a deputy fire marshal, and her mother was a nurse. From their living room, McKinnon heard about car crashes, people trapped inside of homes, or victims escaping from burning buildings, dragging themselves outside for help.

Overhearing these life-or-death intrusions into an otherwise ordinary childhood, she started out thinking she wanted to be a writer, drawn to stories of resilience in the face of trauma. “That was absolutely my dream,” she says. But in college her interests cut a new channel, and she majored in psychology.

By the time she got engaged to Baljkas, McKinnon was a PhD student studying memory and its pathways in the brain at the University of Toronto. Baljkas was a graduate student in graphic design, and they had met through McKinnon's best friend from high school. He was logical and cool-headed. She was empathetic, probing. "It will be fine," Baljkas told her as the plane bucked back and forth underneath them.

Onboard, a couple tried to wrap a life vest around their young child. People near McKinnon and Baljkas were praying, whispering, and weeping, calling out the name of Our Lady of Fatima in Portuguese. Pleading for their lives. Saying goodbye to daughters and sons. McKinnon, who had long suffered from asthma, struggled to inhale.

From her seat, she felt the aircraft swerve and rock as it glided. Oxygen masks tumbled from above, but some of them didn't work. "Please just make this end right now, God," someone aboard prayed. "Make it quick."

McKinnon remembers thinking in those moments: *You know, my life, it's been a good life. My husband, I love him.* As she grew more distraught and terrified, and the plane descended faster, she surrendered to the inevitable. She thought of a video she'd once seen that showed a hijacked Ethiopian Airlines flight in 1996. The pilot had attempted to land in the Indian Ocean after running out of fuel. The plane in the grainy footage broke apart immediately upon hitting the water. McKinnon knew the chances of surviving a water crash were slim.

But even as McKinnon accepted the end, Baljkas rejected the possibility completely. He believed they would survive, no matter what. He planned how their escape would go: They would crash into the ocean, climb out of an exit, make their way to shore. He knew they were both good swimmers, and he rationalized that they would not get hypothermia in the warmer Atlantic waters.

“We’ll need our shoes,” he told her as the wide-body Airbus 330 continued to drop.

She gripped his hand.

“We’re going to be OK,” he told her.

The disaster went on like that for 30 minutes. Earthquake survivors often say that a temblor seems to last an eternity, when its actual duration is a matter of seconds. To believe that you are about to die for half an hour—to jostle inside a metal tube as you imagine yourself careening into the ocean, killed by either the impact or by drowning—is to endure at least a few eternities.

At some point, the copilot announced that they were going to attempt a landing on an island called Terceira, in the Azores, within the next five to seven minutes. The pilot turned the gliding airliner around in a giant, hideous corkscrew, banking hard and turning everyone sideways, before leveling out and picking up speed. McKinnon’s thoughts jumped from imagining what it would feel like to die in a water landing to envisioning a crash on land. She pictured them plowing into a neighborhood of people, killing all of them too.

Outside the windows in the predawn dark, it was hard to see anything, but McKinnon caught a glimpse of the ground—then water again. Until the last second, it was unclear what lay beneath them.

Then, finally, the plane’s landing gear slammed into a hard surface. McKinnon’s body pitched forward, her ears filled with the sound of scraping and grinding until the plane came to a stop. Passengers began to cheer and applaud, until the crew began rushing them toward the exit slides for fear that the aircraft would explode on the ground. Baljkas figured they would need cash and IDs, so he grabbed their wallets.

After everyone was out, buses arrived and took the shaken, bruised survivors to a small terminal. And somehow, in that moment of relief and horror, McKinnon's scientific curiosities kicked in. How would all these people remember this event? She recalls looking around at her fellow passengers, these walking ghosts. McKinnon saw people still in their life jackets sprawled on the ground. The smell of vomit was everywhere. "Terrible," she would remember. "Brutal." Yet she also thought in that moment about what the world might be able to learn from them. Just hours after the crash landing, she thought: *We should really do a study on this.*

Less than three weeks later, McKinnon and Baljkas were back in Canada, sitting down for a set of interviews with the American TV host Chris Hansen, who was preparing a special segment on the miraculous crash landing of Air Transat Flight 236 for the prime-time newsmagazine *Dateline NBC*. The day after their interview, a pair of airliners flew into the World Trade Center in New York City, another crashed into the Pentagon, and a fourth plowed into a field in Pennsylvania.

As the entire world processed the shock of 9/11, McKinnon found herself identifying strongly with the passengers on the hijacked aircraft—with the feeling of "knowing you're on a doomed plane," as she describes it, "and that the end is near." She had nightmares about the Air Transat plane hitting the Twin Towers. But for Baljkas, the terrorist attack felt completely disconnected from his own near-death experience. McKinnon wondered how the rest of their fellow survivors experienced the attacks.

NBC finally aired its segment on Air Transat Flight 236, called "A Wing and a Prayer," on April 2, 2002. The show dramatically reconstructed the plane's descent from the passengers' point of view, minute by excruciating minute; it also added in certain God's-eye-view contextual details that had only become clear in the days, weeks, and months after the emergency landing: How, four days before the flight, Air Transat mechanics had accidentally installed mismatched parts during an engine replacement; how those parts had rubbed and chafed against a fuel line, causing a large leak to open up inside the plane's tank a few hours into the flight; how the lack of fuel had disabled first one engine, then the other; how the captain, a 30-year flying veteran, had set a course for Terceira when the island was still hundreds of miles away; how there were a total of 293 passengers and 13 crew members

aboard the plane; how the radio operators down on the island didn't really expect any of them to survive.

McKinnon and Baljkas watched the *Dateline* special together at home. By then, it was becoming clear how much McKinnon's life and career had been transformed by her experience over the mid-Atlantic. She was still an ambitious young scientist—she was now serving out a prestigious postdoctoral fellowship at the Rotman Research Institute in Toronto—but she moved through the world on high alert for danger, startling easily. She suffered from nightmares and anxiety-inducing flashbacks that sent her back into that seat on the plane. It was a little like living with the police and fire scanners of her childhood, only this time the life-or-death intrusions into her consciousness were her own memories, and she couldn't turn them off or get away from them.

Her research had begun to change course too. Before the crash, she had worked on studies about music and cognition, and then on memory in Alzheimer's patients. But now she was increasingly drawn to study memory and post-traumatic stress disorder, a condition whose symptoms she was experiencing herself. McKinnon had been trained in a tradition of Canadian neuropsychology that was built on the study of unusual brains—ones changed by injury or surgery or illness—and the particular behaviors and mental states that resulted from them. And now she was curious about her own brain. She wanted to know why she suffered from anxiety-inducing flashbacks while other people who survived the exact same events, including her own husband, did not. Baljkas didn't have nightmares, and did not feel changed or haunted by the event. He was just happy to be alive.

McKinnon never forgot about the idea she'd had that day in the Azores for a study of Flight 236. When she came back to Canada, she discussed the notion with one of her advisers at the Rotman Institute, a neuropsychologist named Brian Levine, who had independently considered the same thought. After all, it wasn't every day that you could expose a bunch of human subjects to the experience of *impending death* for 30 minutes, under conditions "approaching that of a laboratory experiment," as the two scientists later wrote. A study of such a near-fatal incident, both scientists realized, would be unprecedented. They agreed to work on it together. But

McKinnon would not only be one of the study's authors; she would also help hone their methodology as a test subject in a pilot study.

It took them years to track down enough passengers willing to participate in a study. Ultimately, 19 came forward. Half of them, like McKinnon, lived with the symptoms of post-traumatic stress disorder. The other half, like Baljkas, did not. The research would involve two major components: a set of brain scans and a set of structured interviews with the survivors that Levine and McKinnon would analyze.

The Strange Case of the Woman Who Can't Remember Her Past—Or Imagine Her Future

By Erika Hayasaki

Psychologists have long distinguished between two kinds of long-term, autobiographical memory, which are each stored in different parts of the

human brain. There are episodic memories, which are linked to a subject's first-person, emotional, embodied point of view (like McKinnon's memory of struggling to breathe in her seat during the descent of Flight 236), and then there are non-episodic memories, which are more factual and detached from one's subjective experience (like McKinnon's knowledge of the flight number). The scientists wanted to see how many memories of each kind the survivors retained, and to check those memories for accuracy. And in the brain scans, they wanted to see how the survivors responded neurologically to a vivid video re-creation of the accident—which came courtesy of the NBC News archive.

And so it was that, in 2004, as a guinea pig in her own research, McKinnon found herself lying face-up inside of a magnetic resonance imaging machine, staring up at a mirror reflecting a projection of B-roll from *Dateline NBC*: A plane taking off from a runway. A map of the flight route. Clips from *Chocolat* interspersed between plane animations. McKinnon's own younger face flashed before her eyes too—her barely-there makeup, blue eyes, and bob haircut.

For McKinnon, viewing the *Dateline* footage felt like being flung back in time. "Boom, my body is right over the top of the island again," she recalls. It was as if she were trapped inside her episodic memories: inside of the aircraft again, trying to breathe, utterly possessed by the awareness of impending death. It was not just a memory but an all-encompassing physical sensation. Waves of confusion and fear.

McKinnon hadn't realized how emotionally taxing her participation in the pilot study would be. And it wasn't just the exposure to the *Dateline* episode that was grueling. So was reading through the interviews with other survivors—some of whose memories she would eventually stitch into her own timeline. The other research participants would recall details that McKinnon hadn't: the smell of something burning. Darkness. The flight attendant's shaky voice. The pilot shouting: "When I say 'Brace! Brace!' lean forward and put your hands behind your head."

Some remembered the pilot counting down minutes to impact. Others spoke about the silence and the wind. They recalled the airplane making violent turns. A loud swoosh coming from inside the plane, followed by cries for

help. Some participants recalled the pilot saying, “About to go into the water.” Then the feeling of coming down too fast. Screams. They remembered the pilot suddenly shouting, “We have a runway! We have a runway!”

Published in the journal *Clinical Psychological Science* as two studies in 2014 and 2015, the research on Flight 236 found, not surprisingly, that the emotional memory centers of survivors’ brains—the amygdala, hippocampus, and midline frontal and posterior regions—showed increased blood flow when the passengers were exposed to video footage of the crash landing. Many of the passengers’ brains also exhibited remarkably similar heightened activity when the scientists showed them news footage of 9/11. Control subjects showed far more neutral responses to both disasters. For survivors, it was as if the trauma of Flight 236 had bled outside memories of the event itself.

But probably the most surprising finding was that all the passengers of Flight 236—those who’d developed PTSD and those who hadn’t—exhibited what the psychologists called “robust mnemonic enhancement.” Both groups remembered the incident in unusually rich, episodic, first-person detail. PTSD has long been connected to harboring vivid memories. But apparently, the study found, just because an individual retains lucid traumatic memories does not mean those memories will exert an intrusive hold on them.

To McKinnon and her colleagues, this indicated that PTSD is not necessarily driven by the storage of such an emotional memory. There was something else about the people holding those memories that made them susceptible to being haunted by them.

By the time those findings became public, McKinnon was well established in her career as a researcher of traumatic memory. And in her research, she now often joined forces with a neuroscientist and psychiatry professor named Ruth Lanius, a powerhouse who had published more than 150 papers and chapters on traumatic stress. The two women were drawn to each other, in part because they shared an interest in the untold varieties of ways people respond to traumatic events.

While McKinnon was gearing up for her study on Flight 236, for instance, Lanius had published a study about a married couple who had been traumatized in starkly different ways by the same incident. They had been driving along a highway when their car became involved in a violent 100-vehicle pileup; trapped inside their own car, they could hear a child begging for help in a burning vehicle nearby. They listened, helpless, as her screams came to an end. In interviews with Lanius' team, the husband recalled feeling intensely anxious throughout the ordeal, frantically trying to free them from the car. But his wife described being "in shock, frozen, and numb." She was incapable of moving, much less figuring out how to escape.

For her study, Lanius put the couple through an fMRI machine as they listened to scripted audio narrations of their accident experiences—much the way McKinnon's subjects reexperienced the crash of Flight 236 via *Dateline* footage. The couple's neurological and physiological responses in the machine mirrored those they described experiencing during the actual event. The husband's heart rate increased. His blood oxygen levels rose in specific regions of his brain. In contrast, the wife's heart rate remained at a baseline, and she exhibited a "shutdown response" in specific brain regions.

The couple both showed symptoms of post-traumatic stress, but the wife's symptoms seemed unusual. Follow-up studies by Lanius and colleagues found that, in fact, 30 percent of individuals with PTSD experience such a "numbing effect." For one trauma victim, a memory might bring all of the bodily senses and fear online, like receiving an electrifying jolt; the person becomes "hyper-aroused." For another it might switch the senses off, deadening them to the world. Neither response is a healthy way to live—and indeed, Lanius' research was instrumental in the addition of a "dissociative" form of PTSD to psychiatry's diagnostic bible, the DSM.

Today, McKinnon and Lanius are part of an emerging school of researchers and clinicians who believe that the field of trauma therapy needs an overhaul. PTSD, they say, is too often used as a blanket diagnosis for people suffering from complex and varied kinds of trauma, and the remedies that the field offers are likewise far too broad-brushed. For years, the predominant treatments for post-traumatic stress have essentially been forms of talk therapy: There's exposure therapy, a course of treatment in which patients revisit fearful memories and situations in hopes of becoming

desensitized; and there's cognitive behavioral therapy, a "solution-oriented" dialog meant to identify and root out unhelpful beliefs about one's trauma.

But in the minds of many researchers like McKinnon and Lanius, the stark variations in people's response to trauma don't primarily point to faulty beliefs on the part of the victims; they point to real differences in their brains, bodies, backgrounds, and environments. The job of trauma researchers is to home in on an understanding of those differences and come up with therapies informed by them.

The two women, along with others in their field, have helped bolster the case for some treatments that go beyond talking through tough memories. One of them is called Eye Movement Desensitization and Reprocessing, or EMDR. In a session, the patient is asked to hold a traumatic memory in their mind while a therapist prompts them to rhythmically swing their gaze back and forth from side to side. It sounds bizarre, but the approach has gained increasing acceptance in the medical mainstream for its efficacy. Scientists don't know precisely why it works—some argue that the technique mimics how the brain integrates and processes memories during REM sleep—but the effect is often that a patient can shift from reliving a traumatic memory in first-person terror to simply remembering it.

Another approach is a more controversial technique called neurofeedback, which involves strapping patients into an electroencephalogram cap, putting them in front of a screen that is reflecting their own brain waves, and then asking them to figure out how to change those waves a certain way, sometimes through a video game interface. Lanius has performed studies of neurofeedback as a way of treating PTSD.

McKinnon, who is now an associate professor of psychiatry at McMaster University and a senior professor at the Homewood Research Institute in Ontario, has researched some of these alternative therapies; she has also tried some, like EMDR, herself. The stakes of her work are still personal. Propelled by a sense of kinship with other survivors of trauma, McKinnon's research career has taken her into the minds and memories of soldiers, paramedics, veterans, police officers, and rape victims, as well as accident survivors. And in recent months, she has been paying particularly close attention to a new and growing group of people struggling with trauma: In

April, the Canadian Institutes of Health Research gave McKinnon and Lanius $1 million to study frontline health care workers in the nation's Covid wards.

You might say we've all experienced a collective period of trauma in the age of Covid-19. The pandemic has stolen away loved ones, cut off social contact, forced people to lose their jobs, heightened the fear of death, and left many of us feeling lonely, helpless, or in a state of grief. And there are stark variations in how we have reacted to this shared trauma. Some of us are prone to ride out this reality with quiet acceptance, despite feelings of anger, sadness, and frustration. Others are driven into states of severe depression or anxiety and ongoing fear of the unknown, exacerbated by that loss of control. Some live in denial.

Even within families and households, people can react entirely differently. One partner in a marriage might live in day-to-day fear of contagious droplets or mysterious coughs, panicking over the loss of control. Their partner might take an approach far more accepting of fate, problem-solving with a measure of patience or a calmer submission to the threat of the virus.

These drastic differences in coping with stress, anxiety, and trauma appear to have both a biological and environmental basis. For most people, a sudden car accident, an imminent plane crash, a life-threatening attack, or a brush with someone who might be infected with a novel virus can kick up the fight-or-flight response, releasing hormones like cortisol and epinephrine that propel energy to muscles. Neurotransmitters like norepinephrine, adrenaline, and dopamine filter into the amygdala, stimulating the brain to tell the heart and lungs to beat and breathe faster. Emotions and acuity go on high alert.

For the majority of people who are *not* susceptible to PTSD, those symptoms may begin to subside after several months, especially if they receive immediate therapeutic treatment. But for someone prone to the disorder, a traumatic event can cause those same stress hormones to go into overdrive. The brain might get stuck in a constant state of fight-or-flight—the kind of chronic stress that impedes the development of stem cells, brain connections, and neurons, and makes someone more vulnerable to chronic health problems like heart disease, stroke, diabetes, and cancer.

One day in May, over Zoom, a doctor named Will Harper from a Covid-19 unit at McMaster University Medical Center told McKinnon about a harrowing scene from one of his shifts: His patient, suffering from both dementia and coronavirus, had ripped out her IVs and yanked off her oxygen mask. She would not eat or drink. She pushed away medicine and thrashed. "We all knew she was dying of Covid, and there was nothing that could be done," explained Harper. But he looked over at a nurse on the shift with him —a veteran health care worker—and saw that she was visibly shaken and distraught.

As the situation deteriorated, the nurse went into her own emotional tailspin; she sat on the patient's bed and began tugging at her own protective gear in agitation. Now the nurse's safety glove was off, her wrist exposed. Now she was lurching toward the door, trying to run away. Distraught, she was not thinking about stopping to properly sanitize or remove her gown, mask, goggles, or gloves. Like the patient, it seemed the nurse only wanted to be anywhere but there. It was "like a scuba diver trying to get to the surface too quickly," Harper said.

He knew she might harm herself, that she was putting herself at risk of contracting Covid-19. He pulled his coworker aside. "Breathe," Harper said, trying to get her to snap back into the moment. "Breathe." For Harper, the memory was upsetting; but for the nurse, the event seemed to have been traumatizing.

This period of mass death, McKinnon knows, will reside within us long after the pandemic ends. And it's not clear who will keep carrying fearful memories of it around for years—who will be like Baljkas walking away from Flight 236, and who will be like McKinnon.

It is still largely a mystery what makes someone susceptible to PTSD. "We know what some of the risk factors are," McKinnon says. "But we don't really have a precise way of predicting whether or not they will go on to develop PTSD." Individuals with a history of trauma may be more vulnerable, she added, along with those of us who belong to a group that has been marginalized by society—people who've been bullied, taunted, subjected to discrimination, or raised in an environment of toxic stress.

McKinnon says she had a history of depression before she boarded Flight 236; scientists believe that depression can also be a risk factor for PTSD.

But she and Lanius hope that, by studying frontline workers like Harper and the nurse on his shift, they might one day be able to help those who emerge with PTSD improve their symptoms and everyday functioning. In therapy sessions, the patients learn skills to regulate their emotions and become more aware of sensations within their bodies. Are they hyper-aroused or emotionally offline? Do they relive memories or shut down in the face of them? Patients are given methods to tolerate their own distress and strengthen their sense of self.

Of a few things, Lanius and McKinnon are confident: Treating trauma, they believe, is not merely about examining or erasing a bad memory. Instead, the key is to recognize that there are memories that you recount at a distance—in third person—almost as if telling a story about someone else. And then there are the visceral, episodic ones, like the ones McKinnon formed on Flight 236, which send her traveling back in time, reexperiencing scenes as if her body were stuck inside the past.

The duo have devised techniques to help trauma survivors work toward a goal of moving away from reexperiencing a disturbing memory in first person. With awareness, practice, therapy, and sometimes interventions like EMDR and neurofeedback, patients focus on what they can control—in the hope that they can eventually hover outside of the memory instead, confidently and fearlessly, like an omniscient narrator.

“I can just tell the story,” McKinnon said recently, of her experience aboard Flight 236. She is now able to go over the details without feeling the pang of each one inside of her body, the heart palpitations, the overwhelming feeling of impending doom. The PTSD from that day has dampened. The nightmares come less often. She can offer the sequence of events and recount her thoughts from back then, as if reading a script.

“I’m just listing out the facts,” McKinnon explained. “I have the cognitive control to do that now.”

After years of therapy and two decades of her own research into the nature of trauma, she has the measure of mental and physical mastery that she hopes her patients can achieve. She can recall the day of the crash, how the smell of jet fuel filled the air—and the moment, just after the pilot's miraculous landing, when everyone realized the plane might explode. The landing gear was on fire. Passengers slid down escape slides and ran for their lives. McKinnon's dress flew up as she slid. She gripped her asthma inhaler, puffing. They stumbled through a field of tall, wet grass. It was foggy and cold.

She recounts how passengers spent five hours in the terminal before loading onto a boat headed for another island, to another airport. They would face their own version of exposure therapy in the days after, each survivor boarding yet another plane to get home, and then just three weeks later, watching as terrorists flew airplanes full of passengers into the Twin Towers and the Pentagon.

Yet McKinnon says she is not terrified now. She recalls the events of August and September 2001 as if fulfilling an obligation, in service of a greater good. She has turned these memories over in her mind so many times it's as if they are suspended outside of herself. They could be the details of someone else's story, really. Drifting like a paper airplane, elsewhere and away.

Illustrations by Alyssa Walker. Underlying portrait of Margaret McKinnon courtesy of John Baljkas.

By Elliot Ackerman and Admiral James Stavridis

Backchannel
02.23.2021 07:00 AM

2034, Part V: Sailing Into Darkness

“Somewhere in that black hole was the *Zheng He* and the rest of the Chinese fleet. And she would be expected to find and destroy it.”

Two men having a conversation in a trophy room.

Illustration: Owen Freeman
07:26 MAY 06, 2034 (GMT+8)
SOUTHEAST OF THE SPRATLY ISLANDS

Lin Bao could see early light on the water. It had been so long since he had been at sea. So long since he had held command.

Not so long, however, since their great victory in these waters, or since his government had released to the world news of its victory over the Americans—thirty-seven ships sunk from the Seventh Fleet, to include the carriers *Ford* and *Miller*—and that same stunned world had woken to a new reality: The balance of power on the ocean had shifted.

And not so long since he had received his orders from Minister Chiang himself to take command of the *Zheng He* Carrier Battle Group. He had left his wife and daughter in Beijing three days before and arrived at the South Sea Fleet Headquarters at Zhanjiang with his orders in hand.

Lin Bao was thinking of Ma Qiang as he flew out to meet what was now his ship. The two young pilots of his twin-rotor transport had invited him to sit in the cockpit's third jump seat. They were cheerful and proud of their assignment to deliver their new commander from Zhanjiang to his carrier, assuring him of a smooth flight and a perfect landing, “… which is good luck for a new commander,” one of them said with a toothy grin as they finished their preflight. Observing the sea from the cockpit, Lin Bao wondered if Ma Qiang's body was somewhere beneath him. His old classmate's dying wish having been a burial at sea. This, Lin Bao knew, was all part of a legend that Ma Qiang had orchestrated throughout his life, up to his death, which conveniently had arrived at the moment of his greatest victory. Like the naval hero Admiral Horatio Nelson at Trafalgar, Ma Qiang

had maneuvered his flagship recklessly close to the action, inviting the peril that would assure his glory. When one American aircraft, an old model F/A-18 Hornet, slipped the *Zheng He*'s defenses, the pilot did something distinctly un-American. The pilot had kamikazed into the *Zheng He*'s flight deck, right beneath the bridge.

The *Zheng He* now appeared on the horizon, as small as a postage stamp.

As his plane lined up its approach, Lin Bao imagined it wasn't all that different than the final journey taken by the Hornet. He recalled Minister Chiang's reaction to the news that several sailors, two junior officers, and Admiral Ma Qiang had been killed in this American kamikaze attack. “That was a very brave pilot,” the minister had said of the American, saying nothing of Ma Qiang, whose glory-hunting seemed to annoy Minister Chiang far more than his death seemed to disturb him. To Lin Bao, he had only added, “I suppose you'll be getting your command after all.” And if Minister Chiang had been privately dismissive of Ma Qiang and what he perceived to be the undue risks he'd taken, publicly the defense minister and the entire membership of the Politburo Standing Committee had extolled the virtues of Admiral Ma Qiang, the hero of what they had already enshrined as the Victory of the South China Sea.

Nothing like replacing a hero, thought Lin Bao, as the plane made its descent toward the flight deck. He could hear the familiar chatter of air traffic control through his headset as they held their glide path. Only two of the four arresting wires on the deck of the *Zheng He* were operational. The one-wire and four-wire had been damaged during the battle and still, more than a week later, had gone unrepaired, a deficiency Lin Bao made a note of as he imagined the work ahead when preparing this crew for the battles that surely awaited them.

Some low-level turbulence then caused their aircraft to pitch violently. As they descended below one thousand feet, Lin Bao noticed that the flight deck was crowded, or at least more crowded than usual, as off-duty members of the crew assembled to catch a glimpse of their new commander's landing. When their aircraft hit the deck, it touched down a little long. The pilots throttled the engine to give their aircraft the extra power for a second pass.

The pilot who had flubbed the landing turned toward Lin Bao in the jump seat and sheepishly apologized. “Very sorry, Admiral. That turbulence knocked us off our glide path. We'll get you in on the next pass.”

Lin Bao told the pilot not to worry about it, though privately he added this failure to the deficiencies he was cataloging at his new command.

As they gained altitude, perhaps the pilot could sense Lin Bao's disappointment, because he continued to prattle on as he lined up their aircraft for a second approach. “What I was saying before, sir,” the pilot continued, “about landing on the first pass being good luck for your command—I wouldn't put too much stock in that either.”

Another jolt of turbulence hit the aircraft.

“I remember when Admiral Ma Qiang took command,” the pilot added cheerfully. “Variable winds that day. His plane didn't land until the third pass.”

13:03 APRIL 28, 2034 (GMT+5:30)
NEW DELHI

If not for the Chinese government's decision to wait twenty-four hours before releasing the news of its victory in the South China Sea, Chowdhury never would have sprung Wedge from the Iranian embassy. In the days after that operation, Chowdhury had begun to see Wedge's detention as a first misstep in what had otherwise been a series of perfectly executed moves by the Chinese, beginning with the phone call from their M&M-eating defense attaché about the *Wén Rui* those weeks before.

The release of Major Mitchell had been a risky proposition. When Chowdhury first appeared in his room at the Iranian embassy, Wedge had looked decidedly disappointed. He later told Chowdhury that he'd been expecting a Red Cross nurse, not a string bean of a diplomat. This disappointment immediately dissipated when Chowdhury explained that the Indian government had that very morning negotiated with the Iranians for his release into their custody. Chowdhury added only one word: “Hurry.”

Chowdhury and Wedge were rushed out a back service entrance by two officers from India's Intelligence Bureau.

Later, when Wedge asked Chowdhury how his uncle had convinced the Iranian ambassador to release him into Indian custody, a move that certainly wasn't in the best interests of the Iranian government, Chowdhury had answered with a single Russian word: *kompromat*.

Catch Every Chapter in This Series

“Kompromat?” asked Wedge.

“Little boys,” Chowdhury answered, explaining that India's Intelligence Bureau made it a point to develop and cache bits of leverage over any foreigner, particularly one of ambassadorial rank. And it just so happened that this ambassador was a pederast. When Chowdhury's uncle had gone to the Iranian ambassador with the facts, the ambassador's calculation had been simple. He would face a lesser reprimand from his government for being duped by the Indians than he would if his sexual proclivities ever became known. “That's why they released you, Major Mitchell.”

“My friends call me Wedge,” he said, a wide grin stretching across his still-bruised face.

Chowdhury left Wedge at the hospital with the embassy staff, who would arrange his flight back to the US, or to wherever else the Marine Corps saw fit to send him. Chowdhury needed to return to Washington, to his duties, and to his daughter. From the hospital he was taken by car to the visitors' annex of the embassy, where he would collect his things and head to the airport. When he arrived at his quarters, he was in such a rush to pack that

he walked straight to the bedroom, right past his uncle, who was sitting on the living room sofa, waiting patiently.

“Sandeep, may I have a word?” Chowdhury jumped when he heard the baritone voice behind him. “Sorry to startle you.”

“How'd you get in here?”

The old admiral rolled his eyes, as if he were disappointed that his nephew would ask such a naive question. Patel had in a single morning used his connections within his country's intelligence services, diplomatic corps, and military to arrange the release of a downed American flyer from Iranian custody; if he could handle that, he could certainly handle one locked door. Nevertheless, Patel gave his nephew a proper answer: “A local member of your embassy staff let me in.” Then, as if sensing this explanation wasn't quite sufficient, he added, “Someone we've done some favors for in the past.” Patel left it at that.

Chowdhury agreed to have a drink with his uncle. The two of them stepped outside and into a waiting black Mercedes sedan. Chowdhury didn't ask where they were going and his uncle didn't tell him. They barely spoke on the drive, which was fine with Chowdhury. In the few days he'd been in New Delhi, he'd hardly left the embassy complex; now, for the first time in his life, he had an opportunity to absorb the city. He was struck by how much it differed from his mother's descriptions, and from the photos he'd seen growing up. Gone were the dust-choked streets. Gone were the ramshackle shanties overflowing into those same streets. And gone, too, were what his uncle once called “the inconvenient and combustible masses prone to rebellion.”

The streets were clean. The homes were new and beautiful.

The shift in India's urban demographics had begun two decades before, under President Modi, who along with the other nationalist leaders of that era had sloughed away the old India by investing in the country's infrastructure, finally bringing the Pakistani threat to heel through a decisive victory in the Ten-Day War of 2024, and using that victory to build out India's military.

Chowdhury could have gleaned the history simply by looking out the car window, at the streets without litter, at the proliferation of glass high-rises, at the packs of impeccably turned-out soldiers and sailors ambling down the freshly laid sidewalks, on leave from their tank divisions or on liberty from their ships. Modi and his acolytes had brushed away all resistance to their reforms, hiding the vast social wreckage. This makeover was hardly complete—much of the countryside still had a distance to go—but clearly the road ahead was smoothing as the century unfolded.

Finally, they arrived at their destination, which wasn't a step forward but rather a step backward in time: the Delhi Gymkhana, his uncle's club. A long, straight driveway led to its canopied entrance, while on the left and right teams of mowers kept the vast lawns perfectly cropped. Off in the distance Chowdhury could make out the grass tennis courts and shimmer of turquoise water in the swimming pool. After his uncle exchanged pleasantries with the staff, who all greeted him with obsequious bows, they were led to the veranda, which looked out on the elaborate gardens, another legacy from the club's founding at the height of the British Raj.

They ordered their drinks—gin and tonic for Patel, a club soda for Chowdhury, which evoked a disappointed sigh from the admiral. When the server left them, Patel asked, “How is my sister?” She was fine, Chowdhury answered. She enjoyed being a grandmother; his father's death had been very hard on her—but then he cut himself off, feeling suddenly as if he didn't quite possess the license to inform on his mother to her estranged brother. The conversation might have ended there were it not for a commotion inside the club, near the television above the bar. The well-turned-out patrons, most of whom wore tennis whites, along with the jacketed waiters and busboys, had gathered to listen to the news. The anchors were piecing together early reports of a massive naval engagement in the South China Sea, touching their earpieces and staring vacantly into the camera as some new fact trickled across the wire, all of which built to a single, astounding conclusion: The United States Navy had been soundly defeated.

Only Chowdhury and his uncle didn't feel the need to crowd around the television. They took the opportunity to sit, alone, on the now empty

veranda. “It will take people a while to understand what this all means,” Patel said to his nephew as he nodded toward the bar.

“We're at war; that's what it means.”

Patel nodded. He took a sip of his gin and tonic. “Yes,” he said, “but your country's defeat is just beginning. That's also what this means.”

“Our navy is as capable as theirs, even more so,” Chowdhury replied defensively. “Sure, we underestimated them, but it's a mistake we won't make again. If anything, they're the ones who've made the mistake.” Chowdhury paused and changed the inflection of his voice. “*I fear all we have done is to awaken a sleeping giant and fill him with a terrible resolve.*”

His uncle knew the quote. “Admiral Isoroku Yamamoto,” replied Patel. “But this isn't Pearl Harbor. This is a very different situation. Look around you. Look at this club. When empires overreach, that's when they crumble. This club, with its fusty Britishness, is a monument to overreach.”

Chowdhury reminded his uncle that his country had far from overreached; that it had suffered a single defeat, perhaps two if you counted the “ambush of our flotilla,” as Chowdhury referred to what had happened to the *John Paul Jones* and its sister ships. “Also,” he added, allowing his voice to enter a graver register, “we haven't even discussed our country's tactical and strategic nuclear capability.”

The old admiral crossed his arms over his chest. “Listen to yourself. *Tactical and strategic nukes.* Do you hear what you're saying? With those weapons, no one wins.”

Chowdhury glanced away, and then, speaking under his breath like a petulant teenager, he muttered, “Hiroshima … Nagasaki … we won that.”

“*We*? Who is this *we*?” His uncle was becoming increasingly annoyed. “Your family lived not three miles from here in those days. And why do you think America prospered after the Second World War?”

“Because we *won*,” answered Chowdhury.

Patel shook his head. “The British won too; so did the Soviets, and even the French.”

“I don't see what you're getting at.”

“In war, it's not that you win. It's *how* you win. America didn't used to start wars. It used to finish them. But now”—Patel dropped his chin to his chest and began to shake his head mournfully—“now it is the reverse; now you start wars and don't finish them.” Then he switched the subject and began to ask again about his sister. Chowdhury showed him a photograph of his daughter; he spoke a bit more about his divorce, his mother's antipathy toward his wife—the Ellen DeGeneres clone, as his mother called her, though Patel didn't get the reference. After listening to his nephew, his only response was a question: “Would you ever consider returning home?”

“America is my home,” answered Chowdhury. “Nowhere else on earth could I, the son of an immigrant, rise up to work in the White House. America is special. That's what I've been trying to tell you.”

Patel sat, respectfully listening to his nephew. “Do you know what I most enjoy about belonging to this club?” he asked.

Chowdhury returned a vacant gaze.

“Come,” said Patel, pushing back his chair, its legs stuttering across the tiled floor of the veranda. They stepped into a room immediately inside, which appeared to be a trophy room, the walls lined with glass-fronted cabinets that contained resplendent two-handled cups engraved with years that reached back into other centuries. Patel took Chowdhury to a framed photograph in the far corner. Three ranks of British army officers stood flanked by their turbaned sepoys. The date was nearly one hundred years ago, a decade before Indian independence. Patel explained that the photograph was of the Rajputana Rifles, whose British officers were members of this club, and that it was taken on the eve of the Second World War, before the regiment shipped out for the Pacific theater. “Most of the officers were killed in either Burma or Malaya,” said Patel. Their sepia-

toned expressions stared hauntingly back at Chowdhury. Then his uncle took a silver pen from his pocket, which he indexed on one face, that of a mustachioed orderly with a squat build and single chevron, who scowled at the camera. “Him, right there. You see the name?” Patel tapped his pen on the bottom of the photograph, where there was a roster. “Lance Naik Imran Sandeep Patel … your great-great-grandfather.”

Chowdhury stood silently in front of the photograph.

“It isn't only in America where people can change their fortunes,” his uncle said. “America is not so special.”

Chowdhury removed his phone from his pocket and snapped a photograph of his ancestor's face. “How do you think your government will respond?” he asked, gesturing toward the television and the breaking news about what seemed to be the certainty of an impending war.

“It's difficult to say,” his uncle told him. “But I believe we'll make out very well.”

“Why do you say that?”

“Because we have learned the lessons that you have forgotten.”

11:42 MAY 13, 2034 (GMT+9)
YOKOSUKA NAVAL BASE

First it was her flight home that was canceled.

Then her orders.

A medical evaluation was scheduled for her at the naval hospital.

This time she passed it.

A below-the-zone promotion came next, to rear admiral (lower half)—a one-star. A new set of orders followed. The assignment shocked her. The Navy was giving her command of the *Enterprise* Strike Group, which included the carrier itself as well as nearly twenty other ships. This all took

a week. In another week she'd meet the flotilla at Yokosuka. The night before the *Enterprise* arrived, Hunt had the first of the nightmares that would come to plague her.

In them, she is watching what is left of the *Ford* and *Miller* carrier strike groups limp into port, just three ships. She stands on the dock, where one of the ships, a destroyer, drops its gangplank. But the destroyer isn't part of the group that went out with the *Ford* and *Miller*; no, it's her old flagship, the *John Paul Jones*. Her crew files down the gangplank. She recognizes many of the young sailors. Among them is Commander Jane Morris. She is smoking a cigar, the same cigar they shared on the bridge of the *John Paul Jones* those weeks before. Which feel like a lifetime before. When Hunt approaches Morris, her former subordinate walks right past her, as if she doesn't exist. There's no malice in Morris' reaction; rather it is as though Hunt is the ghost and these ghosts are the living. Then, while Hunt is trying to gain Morris' attention, she glimpses a young petty officer coming down the gangplank and onto the dock. Hunt is drawn to him because unlike the other sailors he is wearing his dress whites, the wide bell-bottoms flaring out over his mirror-shined leather shoes. Two chevrons are sewn to his sleeve. His Dixie cup hat balances on his head at a jaunty angle. He can't be more than 25 years old. And although he's a young petty officer, he wears a dizzying array of medals and ribbons, such as the Navy Cross, lesser awards for valor, and several Purple Hearts, to include the one that got him killed. He's a SEAL. He crosses the dock, comes right up to Hunt, and takes her by the hand. He squeezes it three times—

I / LOVE / YOU—just as her father used to do. He looks at her, still holding her hand, still waiting. He is clean-shaven, strong; his torso angles toward his waist in a V. And his palm is soft. She can hardly recognize him. In her memory he is always older, worn down; she never remembered her father's medals and ribbons as shining. But they shine now, spectacularly so. His blue eyes are fixed on hers. She squeezes his hand four times—I / LOVE / YOU / TOO.

He looks at her and says, “You don't have to do this.” Then he drops her hand and walks away.

She calls after him, “Do what?” but he doesn't turn around.

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Illustration: Owen Freeman

This is where the dream always ends. Hunt had just woken from it on the morning the *Enterprise* pulled into port. She was still shaken by the question in the dream as she met her crew on the docks of Yokosuka. She caught herself looking around, as if she might see him, or even Morris, wandering among the other sailors as they descended the gangplank. Her crew was young. Most of the officers and enlisted filled positions that were one or two grades senior to their rank, a result of the Navy struggling to account for its most recent losses at sea as well as what in recent years had become perennial manpower shortages. Hunt consoled herself with the idea that if the crew was young, then it was also hungry, and she would take enthusiasm over experience.

The *Enterprise* was scheduled for a week in port after an arduous transit from Fifth Fleet and the Arabian Gulf. Its sister carrier, the *Bush*, had recently suffered the ignominy of losing a pilot over Iranian airspace, and the crew of the *Enterprise* seemed determined to avoid a similar humiliation in the performance of their mission. As to the specifics of that mission, they remained unclear. They knew the Chinese navy possessed an offensive cyber capability that they'd yet to effectively counter, and that this capability reduced their high-tech platforms—whether it be navigation, communications, or weapons guidance systems—to little more than a suite of glitching computers. Nevertheless, they understood that whatever their specific mission was, it would certainly include the more general objective of destroying, or at least neutralizing, the flotilla of Chinese vessels that threatened to destabilize the balance of power in the region.

First, however, they would need to find the Chinese fleet, specifically the *Zheng He* Carrier Battle Group. If the *Wén Rui* incident and the sinking of the *Ford* and *Miller* demonstrated anything, it was that China's cyber capability could effectively black out a vast swath of ocean. While Hunt was having her retirement canceled by Seventh Fleet Headquarters, that same headquarters had scrambled reconnaissance drones across the South China Sea and even the far reaches of the Pacific in an effort to map the disposition of Chinese naval forces and infer their next move. A variety of

drones were tasked, from the latest stealth variants of MQ-4C Tritons, to RQ-4 Global Hawks, to even the CIA's RQ-170 Sentinels, each fully integrated into America's network of satellites. However, as was the case with the F-35 at Bandar Abbas, the Chinese were able to take control of these drones once they came into a certain range, disabling their sensors and controls. The result was that all Hunt had from Seventh Fleet was a circular black hole with a radius of nearly eight hundred nautical miles. This included the waters around Japan, Vietnam, Taiwan, and the Philippines. Somewhere in that black hole was the *Zheng He* and the rest of the Chinese fleet. And she would be expected to find and destroy it.

She made a request to disable all of the avionics in one of her fighter squadrons, VMFA-323, the Death Rattlers, the only Marine squadron aboard the *Enterprise* and the only one that still used the antiquated F/A-18 Hornet airframe. She would be given two days to modify the aircraft in port, and then whatever extra time she could steal once she got underway. She would, in effect, be refashioning one of her squadrons as a "dumb squadron."

The squadron's commanding officer had stridently objected. He had told Hunt that he wasn't sure all of his pilots were up for this type of flying—without instruments, by the seat of their pants alone. She had dismissed his concerns, not because she didn't think they had merit but because she had little alternative. She knew that when they next fought, they would fight blind.

That was, of course, if she could find the *Zheng He*.

09:00 MAY 21, 2034 (GMT-4)
QUANTICO

Wedge just wanted to go home. Back to San Diego. Back to the beach. Back to 06:00 at the gym, to a 08:00 preflight, to a 09:00 first hop, then lunch, then a second hop at 13:30, then postflight and debrief, followed by drinks at the officers' club and a night spent in a bed that wasn't his own. He wanted to wear his Ray-Bans. He wanted to surf the point at Punta Miramar. He wanted to talk shit to his buddies in the squadron, and then

back that shit up when they did dogfight maneuvers at Fallon Naval Air Station.

What he didn't want?

He didn't want to be in Quantico. He didn't want the master sergeant whom Headquarters Marine Corps had assigned as his “escort while in the WDCMA” to keep following him around. “What the fuck is the WDCMA?” Wedge had asked the humorless master sergeant, who had shit for ribbons except a bunch of drill field commendations and about a dozen Good Conduct Medals.

“Washington, DC, Metro Area, sir,” the master sergeant had said.

“Are you shitting me?”

“Negative, sir.”

In the weeks since Wedge had arrived back in the States, or CONUS as the master sergeant insistently referred to it, the two had had this exchange numerous times. About Wedge's denied request to have dinner with an old college buddy who lived near Dupont Circle (“Are you shitting me?” “Negative, sir.”), or the master sergeant insisting on coming with him to the base theater when he wanted to see a movie (“Are you shitting me?” “Negative, sir.”), and, lastly—and perhaps most bitterly—each time his enforced stay in Quantico was extended by at first a day, then two, then a week, and then another (“Are you *motherfucking* shitting me?” “Negative, sir.”).

The reason, nominally, for Wedge's lengthening stay was a series of debriefings. Within the first week of coming home, he had breezed through meetings with officers from CIA, DIA, NSA, State, and even the National Geospatial-Intelligence Agency. He had explained to them in detail the malfunctions he'd had with the F-35, the series of troubleshooting procedures he'd employed (to include putting a bullet into the avionics —“When all systems became unresponsive, I disabled them manually”— which was met with skeptical looks by the career bureaucrats and defense

contractors), and he had gone on to explain his captivity. Or at least what he could remember of it.

“Tell us a bit more about this Iranian officer.”

“Guy had three fingers on his right hand, a short temper, and kicked the shit out of me. What more do you want to know?”

The bureaucrats scribbled studiously in their notepads.

Wedge was bored. That was the real problem. He spent most of his day sitting around, watching the news. “Thirty-seven ships,” he'd often say aloud, as if from nowhere. Each time he said it he hoped that someone—maybe the buttoned-down master sergeant—would refute him and tell him that none of it had happened; that the *Ford* and *Miller* with all their escorts were still afloat; that the whole thing was a dream, an illusion; that the only reality was American greatness. Wedge knew a number of the now-dead pilots from flight school in Pensacola a decade before. “We got our teeth kicked in,” Wedge would say of the battle, running his tongue over his own missing teeth. On his second week in Quantico, he had a four-hour dental appointment, and it was the dentist who revealed the real reason he was being held on base. After finishing her handiwork, a total of five replaced teeth, she held up the mirror so Wedge could take a look. “What do you think?” she asked. “You'll be in good shape for when they take you over to the White House.”

Another week passed.

So that's what he'd been waiting for, a debriefing at the White House.

The master sergeant explained to Wedge his brush with celebrity while behind bars, even showing him the *#FreeWedge* threads on social media. The president was, after all, a politician, so it seemed little wonder she wanted to have a photo op with Wedge. It was a box she needed to check. But their meeting kept getting delayed. All Wedge had to do was turn on the news to see why. The Chinese fleet had disappeared. Vanished. Vamoose. The SECDEF, the chairman of the joint chiefs, even the national security advisor—that chicken hawk Trent Wisecarver—all of them held press

conferences in which they made thinly veiled threats in response to “Sino aggression.”

The Chinese were watching. They didn't respond.

After weeks of saber rattling, the administration seemed as if it had tired itself out. The first day without a press conference was when Wedge finally received his summons to the White House. On the car ride north from Quantico, he kept checking and rechecking his service alpha uniform the Marine Shop had rush-tailored for him. The president, he was told, was going to present him with the Prisoner of War Medal. She would ask him a few questions, they'd have their picture taken, and he'd be done. As Wedge fiddled with the ribbons on his chest, he kept running his tongue over his new teeth.

“You look good, sir,” the master sergeant said. Wedge said thanks, and then stared out the window.

When they arrived at the West Wing visitor entrance, it seemed as though no one was expecting them. The Secret Service didn't have Wedge in the system for a visit that day. Wedge suggested to the master sergeant that maybe they should get a bite nearby; they could grab sliders and a couple of beers at the Old Ebbitt Grill or the Hay-Adams bar and then come back later. The master sergeant wasn't having it. He kept arguing with the Secret Service uniform division officer, who eventually called his supervisor. This went on for half an hour as phone calls were placed to the Pentagon and Headquarters Marine Corps.

Then Chowdhury walked past. He knew about Wedge's visit and volunteered to escort him inside. The master sergeant would have to wait, as Chowdhury was only authorized to escort one person at a time. While he and Wedge navigated through the cramped West Wing offices, Chowdhury apologetically explained, “Since the blackout none of our systems have come back online properly.” He then found Wedge a seat where he could wait. “I know you're on the schedule for today, but things are pretty fluid at the moment. Let me find out when we're going to get you in.” And then Chowdhury disappeared into a hive of activity. Wedge knew a crisis when he saw one. Staffers hurrying in one direction down the corridor, only to

turn around suddenly and head in the opposite direction. Heated conversations taking place in whispers.

Phones urgently answered. The men hadn't shaved. The women hadn't brushed their hair. People ate at their desks.

“So you're him?” said a man who had crept up next to Wedge, a red binder tucked beneath his arm, his frameless glasses balanced on the tip of his nose, evaluating Wedge as though he were a painting of dubious provenance.

Instinctively, Wedge stood, making a sir sandwich of this introduction. “Yes, sir, Major Chris Mitchell, sir,” he said, as though he was once again an officer candidate on the parade field in Quantico. Trent Wisecarver introduced himself not by name, but by his position, as in “I'm the president's national security advisor,” and then he weakly shook Wedge's hand as though he couldn't muster enough regard for a heartier grip. “Major Mitchell,” he continued, referring to the binder tucked beneath his arm, “you are on the schedule; however, this evening the president has an address to the nation that she's preparing for. So today has gotten a little busy. I must apologize, but I've been instructed to present you with your award instead.” Wisecarver then unceremoniously handed over the red binder, as well as a blue box that contained the medal itself. He paused for a moment, searching, it seemed, for the appropriate words, and mustered a paltry “Congratulations” before excusing himself as he rushed off to his next briefing.

Wedge wandered out of the West Wing to the visitor area, where the master sergeant dutifully waited for him. Neither spoke as they stepped out onto Pennsylvania Avenue and into the public garage where they'd left their government car. The master sergeant didn't ask for the details of Wedge's presidential visit. He seemed to intuit the unceremonious nature with which Wedge had been handled, and as if trying to cheer up the major, he reminded him that the next day they could cut his orders. He was now free to rejoin a squadron. Wedge smiled at this, and as they drove down to Quantico the two of them filled the silence with music from an oldies station. Until that station and every other was interrupted by a public service announcement followed by the president's remarks.

The master sergeant turned up the radio. Wedge stared out the window, into the night.

" My fellow Americans, hours ago our navy and intelligence services reported the appearance of a large Chinese fleet off the coast of Taiwan, an ally of the United States. In the context of recent hostilities with Beijing, this represents a clear and present danger not only to the independence of that island nation but also to our own. Recent military setbacks have limited our options for dealing with this threat. But, rest assured, those options remain ample. To quote the words of our thirty-fifth president, John F. Kennedy, ' Let every nation know, whether it wishes us well or ill, that we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe, in order to assure the survival and the success of liberty.' This statement proved true during the darkest hours of President Kennedy's administration, to include the Cuban Missile Crisis. And it proves true today.

"To the citizens and government of the People's Republic of China, I wish to speak to you directly: Through your cyber weapons you have degraded our ability to offer a more conventional, measured response. The path of war is not one we wish to travel, but if forced, travel it we will. We will honor our commitments to our allies. Turn your ships around, return them to port, respect the freedom of navigation of the seas, and catastrophe may still be avoided. However, a violation of Taiwan's sovereignty is a red line for the United States. A violation of that red line will be met with overwhelming force at a time and place of our choosing. To stand with our allies and to stand up for ourselves, I have preauthorized the employment of select tactical nuclear weapons to our commanders in the region."

Wedge turned off the radio.

Traffic was flitting by them on I-95. Here and there, cars had pulled over on the shoulder with their hazard lights flashing into the darkness. Inside, Wedge could see the silhouettes of drivers and passengers leaning forward, listening attentively to the address on the radio. Wedge didn't need to hear anything more. He understood what was coming.

The master sergeant muttered, “Jesus, tactical nukes,” and then, “I hope they've got their shit wired tight at the White House.”

Wedge only nodded.

They drove a bit more in silence.

Wedge glanced down on his lap, to where he held the red binder with the citation for his Prisoner of War Medal, as well as the blue box that contained the decoration itself.

“Let's see that medal of yours, sir,” said the master sergeant. Wedge opened the box.

It was empty.

Neither he nor the master sergeant knew quite what to say. The master sergeant sat up a little bit straighter in his seat. He affixed his hands firmly at ten and two o'clock on the steering wheel. “No big deal,” he muttered after a moment, glancing once more into the empty box that rested on Wedge's lap. “There must've been an oversight today at the White House. Tomorrow, we'll unfuck it.”

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