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BY VICTOR LUCKERSON

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Paul Ford

Ideas
10.28.2021 07:00 AM

Climate Stress Was Getting Me Down, So I Made a Clicker Game

In the game, you start as a lowly atmospheric scientist and you have to click “write grant” and wait.
Illustration: Elena Lacey

On cue, a flood came. We had prepared with long plastic gutter extenders that snaked away from the house, but water seeped into the basement anyway. I have a small piece of Wi-Fi-connected wall art that shows in colored LEDs where all the trains are in New York City. We watched as line after line went dark. Then we spent a long night rescuing storage boxes and bailing puddles with a takeout container. When the water wasn't burbling in, we checked Twitter, where you could see the storm in parallel—subway waterfalls, sink geysers, hallway creeks. There was a picture of someone trying to deliver food on a bike in waist-deep water. It all felt very cyberpunk: plastic tendrils coming off the house, social media threading the crisis in real time, gig workers directed into peril by the apps that control their lives, streets turned to liquid. But of course the sun came up.

We wandered around, groggy. Our next-door neighbor said he'd been here 20 years and had never seen this before, which made it a once-in-two-decades kind of event. No one had a sump pump. My shrink, who used to own a house a block away, said he could remember a big flood in the neighborhood maybe 30 or 35 years ago. Could have been longer. So: a three-times-a-century event. (Of course probability doesn't work like that; I was just trying to figure out how weird things might be getting.)

My shrink makes me repeat, many times a day: *I will remain calm no matter what.* And *No matter what happens, I can handle it.* And *I will broaden my expectations*. That's his whole thing. Stuff happens, remain calm, handle it. I started seeing him because I was yelling at my kids about stupid stuff (I've stopped, mostly), but it's not a bad approach for floods, either. We *did* stay calm under (hydrostatic) pressure. Another flood will surely come, though, which means it's time to broaden our expectations.

My wife and I accomplish this through shared spreadsheets. There's a lot to do—for example, I threw away the basement couch when it sprouted mushrooms—but most of the work reduces to the universal unit of home care: the Guy. Gutter guy, floor guy, roof guy, and plumber (there the "guy" is silent). They assume I'm also a guy, but it's my wife who works in construction, so I hide upstairs when they arrive. Later she comes up and draws diagrams on an epaper tablet to explain what's going to happen. I nod and say simple words as questions, like "Pipes?" or "Sewer?" That is our love language.

The spreadsheets are fine for dealing with our basement, but I don't think they'll scale to every basement on Earth. And because, like so many people, I'm obsessing over climate change, I've been looking for software tools that will help all of us plan. A friend recommended Temperate, which seems fine—let's call it a "climate mitigation wizard" for communities, to make sure you've thought about flooding, hurricanes, heat waves, and wildfires. I messed around with the free trial, but I'm not a community. Then I read through toolkit.climate.gov. The problem there is that the government offers around 500 "tools"—some websites, some PDFs—ranging from shareable sunscreen memes to calculators that tell you the pathogen risk at your local beach. It's like browsing the pamphlets in a health clinic. I did find some helpful checklists, but I am not a coastal wetland (yet), so they weren't as useful as they could have been.

Then I decided to make a Gantt chart in Google Docs. Named for its inventor, Henry Gantt, an early-20th-century mechanical engineer, this is a method of scheduling that turns projects into an orderly cascade of dependent tasks. Each task is represented by a bar on the chart, and when you finish one bar you step down to the next one: Dig the basement, then

pour the concrete. It's the go-to tool for what people call the “waterfall approach.”

This strategy is not fashionable in software development. A different methodology, Agile, is in vogue. Agile is a kind of witchcraft wherein a coven of developers form frequent “standups” to commit themselves to evil acts upon a code base, until finally Satan heeds their call and manifests working software. But I figured the waterfall approach is more appropriate for climate. I started to fill in my Gantt chart with big important things, like “incentivize nuclear power” and “educate all the girls.” Beneath those, I added substeps—a whole cascade of solutions!

I would not recommend doing what I did, because you'll quickly see that if we're going to get our act together by, say, 2030, that's a little under 100 months. So every month we need to be 1 percent down the waterfall. If we make 0 percent progress this month, the month we're in right now, then we have to make at least 1.01 percent progress the next month and every month after that. I don't know what you call this. Compound disinterest?

So in mild horror I trashed yet another Google Doc, never to be found again (have you ever tried to find a Google Doc?), and did something I've never done before. I made a game. Specifically, a clicker game. Clicker games started as parodies of MMO in-game grinding; i.e., you click and click to get increasingly ridiculous intermittent rewards. In *Cookie Clicker*, you “bake” cookies; in *Universal Paperclips,* you make more and more paper clips, until the entire universe is made of paper clips. Imagine a spreadsheet where every cell makes you click your mouse 20 times to do the calculation. Sound fun? It's not, really, but it's satisfying to watch a big number get bigger.

In the Gantt chart turned game, your number actually goes down, as carbon leaves the atmosphere. It took me a few weeks and some detours to make that happen, though. I couldn't find a good clicker game library, so I wrote my own. Then I needed to craft Clicker Game Markup Language. Then I didn't know TypeScript, which is the new, more uptight version of JavaScript, so I had to learn that. It's probably easier to take carbon out of the atmosphere than it is to keep a programmer on task (which is why you need Agile to hypnotize us into monstrous compliance).

In my game, as yet untitled, you start as a lowly atmospheric scientist and you have to click “write grant” and wait until you get enough money to earn grad students. Eventually the grad students measure enough temperatures that you get climate models. Finally you make trillions of dollars and use that to de-fossilize the global grid.

I know this game doesn't actually pull any carbon out of the atmosphere. In fact, in real life it adds carbon with every click, although less when I play it on my phone. But it's very calming to see all the enormous tasks in a stack, and it lets me simulate *doing* something. You have to imagine success before you can succeed. And the giant game-configuration file has become a kind of notebook as I learn about the world. When you click to “measure” the atmosphere, the game pulls real variables from climate models, like *air_pressure_at_sea_level* and *moisture_content_of_soil_layer*. It's fun to learn things when you're making something. Excruciating if not.

This is not to say it's a good game, or a fun one, or that it will have any impact in the world. I don't know if I'll release it. It's just a tool for planning, for broadening my expectations. Making things is how I understand the world, which is why I love technology. At a certain point we will have to accept that a very long crisis is just normal life, and if we are here we should keep moving forward, 1 percent this month, and another the next. We can remain calm no matter what. No matter what happens, we can handle it. I guess I should start going to protests.

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Virginia Heffernan

Ideas
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The Future Is Bleak. Pondering Pangaea Gives Me Hope

In 200 million years, our far-flung continents may join up again. It reminds us of humans' tiny place in this intergalactic drama.
Illustration: YUKAI DU

The human passion for gouging burnable stuff out of the earth and reducing it to ashes may well be the end of us. But it's not clear who the “us” is. Not you and me, obviously; we'll be lucky to see 2100. But “us” can't just mean our direct descendants, right? Does it have to mean hominids? Maybe humans of the far, far future don't even have to have blood or DNA to count as survivors. Hundreds of millions of years from now, we primates could live on in our component parts: oxygen, carbon, hydrogen, and nitrogen. We could have a kind of immortality of the elements.

Unlike the imperiled biosphere, Earth's crust and mantle, which are charged with many of the baseline ingredients of humans, show no signs of decline. In fact, they're having a heyday—erupting, grinding, migrating, and splintering in unpredictable ways. Recent data also indicates the plates are up to something supremely weird: making a discreet move toward reunification. Like gazing at the stars, contemplating the so-called deep future of Earth with a new supercontinent can take the sting out of bleak climate predictions for the nearer term.

In about 200 million years, our far-flung continents may join up again. Though progress toward the Pangaea Proxima, the next Pangaea, is slow, it is also measurable. Seismologists have found that the Mid-Atlantic Ridge, a

mountain range on the ocean floor that separates North America from Europe and Africa, is expanding about as fast as fingernails grow, broadening the Atlantic Ocean at a rate of some 4 centimeters per year. Meanwhile, the Nazca, a plate off the west coast of Peru, seems to be moving faster, about the speed that hair grows, which may be closing up the Pacific.

Of course, the chance that humans will exist to check the prediction is essentially zero. But to study the deep future is to recognize that flora and fauna, human fauna included, may be bit players in the fathomless intergalactic drama of chemicals.

Eons in advance, then, cartographers and earth scientists are clocking continental drift and fantasizing about new worlds. “Amasia” is the name for a hypothetical supercontinent formed when Asia, Africa, North America, South America, Europe, and Australia all fuse around the north pole. An even deeper-future hypothesis, which might take 250 million years, is called “Aurica,” the coalescence of all seven continents, including Antarctica, around the equator. It will no doubt be useful that the next Pangaeae are named in advance, so the rocks will have something to call themselves.

This past January, British seismologists based at the University of Southampton on England's south coast—Southampton was the illustrious departure port for the *Mayflower* and the RMS *Titanic* (so they care about geological oceanography)—found new ways to observe mantle convection, some 400 miles below Earth's crust and more than a thousand miles from its core. The material there is surging. As plates move apart along the Mid-Atlantic Ridge, material rises to fill the space between them. As the team reported in a paper published in *Nature*, these surges could shove tectonic plates up from below and help push the continents farther apart (meaning, since this is a sphere we're talking about, closer together around the back).

Nicholas Harmon, the lead scientist, succumbed admirably to dad-joke temptation when he announced these findings: “There is a growing distance between North America and Europe, and it is not driven by political or philosophical differences,” he said in a press release. “It is caused by mantle convection!”

And while this convection is brewing, the tip-top of the blue planet is also shifting uneasily. In the past few years, academic geomagnetists who oversee the World Magnetic Model, which maps the Earth's magnetic field and makes possible all navigation from Google Maps to naval systems, have noticed significant mapping errors. It seems that liquid iron sloshing around in Earth's core has driven the north magnetic pole away from Canada and put it on a collision course with Siberia. The speed of this polar migration has increased from 9 miles per year to 34 miles per year during the past two decades. *The north pole. Moving fast.* (A question for political science: Does this mean polarization is increasing or decreasing?)

Plate tectonics is one of the most romantic theories in all of science. Because it incorporates both revelations and hard data, and because its proponents, notably the illustrious American geologist and ocean cartographer Marie Tharp, faced cruel rejection by scientists followed by warm embrace, the theory is often used to exemplify how ideas evolve. It's built on an insight from the so-called golden age of Netherlandish cartography—unforgettable—when mapmaker Abraham Ortelius of the Low Countries spotted the continents' resemblance to pottery shards. The Americas, he wrote in *Thesaurus Geographicus* in the late 16th century, were "torn away from Europe and Africa … by earthquakes and floods."

In 1912, Alfred Wegener, a dashing German meteorologist and record-setting balloonist, concurred, and further suggested that the landmasses once composed a supercontinent, which broke into pieces that drifted apart. *E unus pluribum*. To close his case for what he called "continental displacement," Wegener referred to matching fossils of plants and animals on opposite sides of the Atlantic. He also cut up maps, fit the pieces together, and named the assemblage Pangaea. His insight was savaged as the rantings of a madman. It is now considered patently true.

From Wegener's time until into the 1960s, earth scientists extended Wegener's apprehensions to describe plate tectonics, the motion of the massive components of the Earth's crust and upper mantle—its lithosphere. While deeper spheres have greater plasticity, the lithosphere responds to stress by deforming either elastically or through brittle failure. Stress

deforms and breaks the planet, and produces mountains, volcanoes, and earthquakes.

Perhaps plate tectonics is such a poignant idea because it reminds us that the whole glorious and dangerous topography of the Earth is determined by stress, collisions, upwellings, and ruptures. We're right to dwell on the biosphere, because we dwell *in* it, and it's us. But we also owe our existence to the dynamism under our feet. In the cracking, surging lithosphere, after all, are the primordial ooze, stones, clay, and ashes we're made of—our chemical kin, to whom the planet has belonged all along.

Dave Eggers

Backchannel
09.30.2021 06:00 AM

Day One at the Every: An Excerpt From Dave Eggers' New Novel

Delaney is an unlikely new hire, but she charms her way into the ecommerce giant with one goal in mind: to take down the company from within.
PHOTOGRAPH: ELIZABETH RENSTROM

When the world's largest search engine and social media company, the Circle, merges with the planet's dominant ecommerce site, it creates the richest and most dangerous—and, oddly enough, most beloved—monopoly ever known: the Every.

"Not too many people start this way," Kiki said. Kiki was Delaney's acclimator, assigned to show Delaney the campus and get her settled into her first rotation. Kiki was no more than 5 feet tall, with hair the color of Neptune and the build of a woodland fairy.

"I don't take it for granted," Delaney said. "I'm so grateful." She was nauseous. Through three interviews and an orientation, Delaney still hadn't been allowed onto the main campus. Instead she had been relegated to outer buildings and, for the orientation, the auditorium, with about a hundred other new hires.

"I like your outfit, by the way," Kiki said, "very retro! Hi!" Delaney had the sense that Kiki was no longer talking to her. She glanced at Kiki to find she was talking to her screen strapped to her forearm.

“That is so good, honey! So good!” Kiki sang. On the screen, Delaney caught a glimpse of a small boy with a mop of black hair. They were in the shadow of the corkscrew tower that housed Algo Mas, the company’s algorithm think tank, and Delaney reached out to touch its aluminum cladding just before it began its upward revolutions. There was chatter, almost impossible to confirm, that the first wave of suicides happened here, Everyones throwing themselves from the balcony of its penthouse, called the Aviary. It had since been closed.

“Yes, you tell Ms. Jasmine how much I love that,” Kiki said.

Delaney could hear nothing of the boy’s voice coming through Kiki’s earpiece, could only watch Kiki’s eyes dart back and forth, taking in her son’s face and surroundings.

“OK, hon-hon,” Kiki said, “I’ll check back in with you in a few.” She paused. “Just a couple minutes. I know the other parents are still there.” Another pause. “I’ll be back in 10. OK. Bye-bye.”

Now Kiki refocused on Delaney, and they began walking.

Courtesy of McSweeney's

“My son Nino. He’s 5. He goes to the Every Schoolhouse. Have you seen it? Probably not—you just got here! It’s on the other side of campus, near the beach. It’s really a fantastic school, the scores off the charts …” Kiki trailed off and stopped walking. She tapped her ear. “Yes,” she said. “Thank you so much, Ms. Jolene.”

And now she was back.

“They really encourage parental participation, which I love. I *love* it. The parents each volunteer 10 hours a week, which is pretty standard, but here they go above and beyond by inviting parents to sit in on the school day as often as they can. It gives the kids such comfort.” She focused on Delaney, then looked at the screen, then back to Delaney. “Where was I?”

In the distance, Delaney could see a wide flower-shaped expanse of buffalo grass that she felt sure was the Daisy—she'd heard of the Daisy. The grass was an incandescent green, and was dotted with a menagerie of Everyones in bright clothing, but now Kiki had stopped.

"Are you on OwnSelf?" Kiki asked.

"No, not yet. I'm on HelpMe," Delaney said.

"Oh, I have to move you over to OwnSelf. I'm actually beta-testing a new iteration. It's really extraordinary."

In anticipation of coming to the Every, Delaney had been using HelpMe for a few years; it was a relatively basic app that consolidated all your reminders, calendars, birthdays, appointments, and even dietary goals into one place. Advertisers loved it. A user programmed in their desire to eat a protein salad once a day, and that desire would be sold to those selling protein salads. It was caveman-simple, worked for everyone, and was worth billions for the Every. It had been invented by two Manitoba teens in a weekend.

"OwnSelf is so much more comprehensive, though," Kiki said. "I think HelpMe has, what, 25 data points?"

"Something like that," Delaney said. Hers had 22.

"OwnSelf has 500, baseline," Kiki said. "Mine's got 677, and one of my goals is to get to 800 by next month. And OwnSelf will actually get me there, right?" Kiki laughed, and looked at her screen and frowned. "I mean, that's the point. It's all about helping you attain your own goals." Her oval dinged. "Oh wait."

She spent another half-minute on FaceMe with her son. Delaney stood in the shadows watching the activity on the lawn's gently undulating topography. There seemed to be some kind of modern dance being performed—a group of figures in Lycra bodysuits.

“See,” Kiki continued, “I set my goal to FaceMe with Nino 12 times during his school day, and OwnSelf prorates the day and keeps me on track to achieve that—collating with his teachers’ own OwnSelfs. All the OwnSelfs can talk to each other, which is so key. That way there’s no excuses. If you have the time, the OwnSelfs coordinate, put whatever it is that needs to get done on your schedule, and it gets done.” Kiki squinted toward the Daisy. “I fought it for a week or two, altering the OwnSelf itineraries. But I always made it worse. The one thing humans are not good at is scheduling, right?”

“That’s just science,” Delaney said.

Kiki rolled her eyes in relieved approval.

“OwnSelf just helps you get there. It pre-divides the day, but it also allows for variances. Like this walk with you …” She looked at her screen. “It’s taken three and a half minutes longer than expected, and we haven’t even started yet. So other things will be moved around. But it’s relentlessly focused on helping you get done in a given day what you planned to get done. I can’t tell you what a difference that makes when you lay your head to sleep. I mean, total peace.”

“Right!” Delaney said.

“Speaking of which, we should walk.”

They left the shadows, and Delaney’s stomach cinched. Up ahead, she saw dozens of people in the full sun of the wide lawn. They seemed to be doing some kind of exercise, or were for some reason all in tight and colorful exercise clothes. Among so many people, she’d be discovered immediately. She was so obviously a spy.

“That’s the Duomo,” Kiki said, pointing to what seemed to be an Italian church. “Bailey went to Siena, loved this building, the stripes mainly, so he brought it here. Or made a copy of it?” She stared at the building, as if it might answer. “I think it’s actually the original and now the copy is in Siena. Does that sound right? Anyway, some of the space exploration people work there.”

They were almost at the main lawn. Delaney had to remind herself how to walk. How could she not be found out? She couldn't remember if people move their arms. Did they move them up and down, or just swing them? Swinging seemed silly. She decided against swinging, instead moving them in small circles near her hips.

"Over there are the pods," Kiki said. "On-campus living. There are about 5,000 Everyones living here now. Makes it so easy. No commute! Would you want to do that, do you think? Hold on."

Kiki's oval had dinged. She stretched her arms upward and let them drop slowly, as if swimming the length of a pool underwater.

"Have to be mindful," she said, and lifted her arm to show Delaney her screen. "My first goal was fitness and wellness. I want to exercise, but I don't want to decide when to do it. Or what kind is best, what day is arms day, which day is legs and abs. OwnSelf just lays it out, and shows where you are on a minute-to-minute basis. There's no guesswork. Like right now"—she tapped her oval—"it's showing me I'm at 3,401 steps for the day, which is 11 percent ahead of where I usually am at this time. So I can probably slack off for the next hour, right?"

Delaney had the sense Kiki might be making a joke.

"As if!" Kiki said, and laughed theatrically.

Delaney pretended to laugh too. Kiki stopped abruptly.

"You know how laughter is so good for your health?" she said. "Minimum is 22 minutes a day—Morris proved that last year—so," she said, reading her screen again, "OwnSelf's telling me I have a ways to go on that metric today. I'm at two and a half minutes, but they're having an open mic tonight, so I'm thinking that should cover it."

"Wow, you really have it down," Delaney said.

"I know. But listen," Kiki said, "I can hook you up with OwnSelf too. It's …" Kiki searched for a long word. "It's spectacular." She looked at her

wrist and smiled. “I’ve never felt more in control.”

Another ding prompted her to pull a tube from beyond her left shoulder. Up till then, Delaney had assumed that Kiki’s small burgundy backpack was decorative.

“Water,” Kiki said. “Otherwise I don’t drink enough.” She took a long pull on the tube and it retreated into the pack. They started walking toward the light again. “OK, here’s the main gathering area, if you will. Some call it the Daisy, which makes sense, because of its shape.”

They entered the densely populated expanse of winding walkways lined with wildflowers. Now Delaney took in Kiki’s clothing, which had come alive in full sun. She was wearing a catsuit with a camouflage pattern of green and pink sequins bisected by a single zipper, which extended from her left ankle to her right shoulder.

Next to spritely Kiki, Delaney felt lumbering and leaden. When she’d chosen her clothes that morning, jeans and a cornflower cotton blouse, she had not thought she was dressing in any consciously antiquated way. But compared to the Everyones around her, she felt like an extra in *The Crucible*. They were all in Lycra, and they weren’t exercising. She’d seen people dressed this way in the city, but the concentrated effect of so much Lycra in one place, every curve and bulge articulated, was new. A man overtook them, and Delaney realized he, too, was wearing leggings, which hugged and amplified his manhood. She made an involuntary sound, something between *Excuse me* and *Oh sweet Jesus*.

“Did you say something?” Kiki asked.

Delaney couldn’t elaborate. Everywhere around her were men in form-fitting bodysuits, their penises in stark relief, and this she had not expected. The third decade of the 21st century had been accompanied by a gradual but unstoppable transition to ever-tighter clothing for body celebration and the fanciful implication that the wearer might be a superhero. The last bastion of the demure was the area of male crotch, but Delaney realized that, in the spirit of equity, it had to fall away. A workplace like the Every couldn’t plausibly say breasts could be wrapped in tight Lycra but penises could not.

“No,” Delaney mumbled. Then, tragically, she looked at a section of ice plants and added, “Lots of succulents.” She was trying to form a sentence unrelated to phalluses.

“We’re encouraged to get our vitamin D when we can,” Kiki said, and pointed to the sun. “Doesn’t the campus look gorgeous on a clear day like this?” She continued to point out the buildings, the services, the eateries, the vegetable garden, the ecstatic dance studio, a large gulag-looking building dedicated to the study of creativity—and all the while Delaney’s whole physical form was awake and tingling, her eyes darting toward and away from every curve and bulge, a riotous battle of leering and shame.

“Are these parrot tulips?” Delaney asked, desperate to focus on something wholesome. She squatted down to touch the fringe of a flower. As she held a tender petal she looked up at Kiki just as a male crotch passed her at eye level, fully and fragrantly.

“I think so,” Kiki said. “But *you* should know—you were the forest ranger!”

Delaney cackled idiotically and thought she’d choke. She tried to breathe.

“Almost forgot,” Kiki said, seeming alarmed. “Can you download something? I’m sending you an update for your phone.”

Delaney found the update and downloaded it. “Got it.”

“You’ve been using TruVoice, I take it?”

“Always,” Delaney said.

TruVoice had governed much of online communication since Delaney had been in high school. It started simply as a filter. A person would type or dictate a text, and TruVoice would scan the message for any of the Os—offensive, off-putting, outrageous, off-color, off-base, out-of-date. O-language would be excised or substituted, and the message would be sent in a manner fit for posterity. *Sound like yourself*, TruVoice promised, and the

vast majority of its users, some 2 billion-plus in 130 languages, saw it as a godsend.

“The update just builds on that,” Kiki said, “but for verbal communication. Obviously we can’t change your words in real time, but now TruVoice analyzes what you say, gives you a summary of your word usage at the end of each day, and shows you where you can improve.”

“Wonderful!” Delaney said.

“It really *is* wonderful,” Kiki said. “I’ve learned so much about my own communication. I have a son. He’s 5. He’s at the school here. Did I already tell you that?”

Delaney had the feeling she was talking to someone on speed or cocaine. Was it really water in that burgundy backpack? She’d rarely seen this kind of mania.

“And research says kids need to hear a hundred thousand words by the time they’re 3. Something like that. So TruVoice helps me with the overall number and also word variation. I’m still at 65 percent in terms of variation and difficulty—I’m a verbal dummy, it turns out—but now I know what I need to work on.”

“Wonderful!” Delaney said again, louder than before.

“See, they’ll note that repetition at the end of the day,” Kiki said. “You won’t get penalized or anything. It’s just to help us do better.”

Delaney almost said *Wonderful* again, just for her own amusement. Instead she said, “Of course.”

“And it’s almost eliminated my cursing,” Kiki said, “which used to be a problem. Same with focus and length. I had a tendency to ramble, and TruVoice identifies off-track …” Kiki stopped. “What’s the word? This is so funny.”

“Verbiage? Meandering? Blather?” Delaney suggested.

“Yes, thanks,” Kiki said. “It helps me get to the point. Early on, my directness scores were in the 40s, but now they’re high 50s.”

“Kudos,” Delaney said.

“Excuse me?” Kiki said.

“Oh. I just said *kudos*.”

Kiki tapped her screen. “Ah. Kudos. Like ‘congratulations.’ Got it. That’s a Level-3 word, too. I’ll get extra points for that one. Kudos. Kudos. Take a look.”

Kiki showed her phone to Delaney. A man passed between them, wearing what seemed to be the outfit of an Olympic swimmer, his phallus pointing from his crotch to his left knee.

“Sorry!” Kiki said, and tapped her screen. “See, here’s my word total for the day so far: 3,691. That’s not counting every contraction and conjunction, of course. On the second line, you can see it’s broken down by level. Today I’ve spoken 2,928 Level-1 words, 678 Level-2, 67 Level-3, and nine Level-4 words. Which isn’t great, in terms of Level-4. But, that’s the basic self-improvement part of the app. I can build on that. Growth mindset, right?”

“That’s my motto,” Delaney said.

“Good motto!” Kiki said. “Kudos!”

They shared a laugh. Delaney felt sick. She liked Kiki, felt for Kiki, wanted to save Kiki, and she was lying to Kiki. How long could she lie to this guileless, frenzied face? She pitied her own soul. Out of the corner of her eye, Delaney saw a pair of men in slalom ski outfits, decorated with faux-flames, having a conversation while squatting.

“Squatting is, like, way better than regular standing,” Kiki noted. Her phone emitted the sound of a sad trombone. “See, that’s a reminder. I’m trying to cut down on saying ‘like.’ I get the trombone when I do. And look.” Kiki

pointed to a string of words and phrases on her phone. “Here are things I said that AI flagged as problematic.” She indicated a string of words in a red box: *screw*, *nasty*, *Cosby*, *Oriental*. “These are all words I’ve said today. Isn’t it funny what was flagged? My mom is Chinese, so I could apply for a Permission to Say, but the AI is just noting the word *Oriental* is on the O-list. So I just need to explain I was referring to a rug. Then I get those points back.”

“Wonderful,” Delaney said.

“The other aspect is HR-oriented,” Kiki continued. “So if TruVoice hears one of the Os, it makes a note. End of every week, you get a summary, and it goes to HR. It’s not a big thing, but it protects you and everyone you encounter in case you say something considered problematic. That way, if you think *you’re* in the right, it’s recorded. If *they* think *you’re* in error, same thing—there’s a recording to reference. So you’ll get the initial ComAnon—you’ll get them every day, they’re anonymous, they matter if they add up, but you shouldn’t worry if they don’t. Anyway, you can get them erased if you check the transcript and you’re right.”

“Super convenient,” Delaney said. “And this goes into PartiRank?”

Kiki looked taken aback. “Oh, we don’t have PartiRank! That was phased out, like, *months* ago.” Another sad trombone; Kiki grimaced. “A lot of people thought the rankings were a bit too competitive and stress-inducing.”

“So these numbers aren’t aggregated?”

“Well, they’re collected, of course. For your own reference. They wouldn’t be too useful if they weren’t collected!” She threw a breezy laugh over her shoulder. “And of course combined with other metrics. Like PrefCom and AnonCom. You’ll read about that in your onboarding docs. AnonCom allows coworkers to register complaints—well, not complaints, really, but suggestions for your improvement—anonymously. Those go into your folder, with all the performance measurements, participation points, smiles, ComAnons, shams, step count, sleep hours, frowns, et cetera. All your numbers are available to you and all Everyones, and then are merged to

create one aggregate number, and then Everyones' numbers are listed in ascending order."

"But it's not a ranking," Delaney said.

"Definitely not," Kiki laughed. "That's why it's called Everything in Order. You can see the difference between that and PartiRank, which was a lot more hierarchical."

"Sure, sure," Delaney said.

"The EiO number—get it? EiO? The song?"

Delaney smiled weakly. Kiki hummed a few notes and continued. "The EiO helps with the quarterly deëmployment moment. Obviously who's subject to deëmployment is too important and subjective to have people do it, so it's the bottom 10 percent, department by department. That way it's fair."

"That's who's let go?" Delaney asked.

"Deëmployed, yes." Kiki smiled. "But the number of course isn't the only determinant."

"But there's no human factor."

"Well, no. Of course not. That would open it up to bias."

A pair of men, built like dancers, walked by wearing sheer bodysuits. One wore a yellow water-carrier like Kiki's, its tube dangling provocatively. Delaney felt light-headed.

"Is there a restroom close?" she asked. Kiki directed her to a nearby railing, just above the grass line, leading down a spiraling staircase to a single, underground bathroom. Delaney rushed down its rubbery steps and opened the door with a shush.

"Hello Delaney!" a voice said. She looked up to find a cartoon skunk on the wallscreen. Delaney's name appeared in an animated bubble extending from the skunk's mouth. "Let me know if I can help!"

Delaney entered the stall and locked the door and sat, clothed, on the toilet. She wanted badly to call her roommate, Wes, to try to describe what she'd just heard, and what she'd seen, all the Lycra and body parts, but she didn't trust the bathrooms on campus, knew she shouldn't let down her guard anywhere on the grounds. She only needed a moment to strategize, to control the movement of her irises, to think this through.

She stood up. "Are you finished?" the cartoon skunk asked. It was now on the door, looking politely away.

"No," she said.

"Don't let me rush you!" the skunk said, and then hid behind an animated tree.

Delaney sat down again. She had to think about how she'd speak from then on. She knew she was on camera, that she'd be on camera, multiple cameras, at all times on campus. Between this and the dicks, she didn't think she'd make it.

"Can I sing you a song?" the skunk asked.

"No thanks," Delaney said. She tried to slow her breathing. She closed her eyes, and all she saw were the members suffocating in shiny, stretchy fabric.

"Need more time?" the skunk asked.

"Yes please," Delaney said.

Delaney stood and flushed the toilet. Nothing happened, but the cartoon skunk appeared on the wallscreen behind the toilet. "No deposit made. No flush necessary!" the skunk sang. A quick sparkle flashed from its breezy grin.

Delaney left the stall, pulled at the bathroom door but found it was locked.

"*Hold up, partner!*" the skunk said, and the same words, Hold up, partner!, appeared in the cartoon dialog bubble. "Not till you wash up! Remember,

20 seconds minimum. Doctor's orders!" On the screen, the skunk began washing too, while singing the Happy Birthday song.

Delaney stepped to the sink, minimal and rectangular and carved from obsidian. The soap dispenser dropped a dollop into her hands, and the water was briefly activated. In the mirror, a digital timer appeared and began to count down from 20. The skunk was still washing its own little hands, directly opposite, now singing the song a second time in Italian.

Delaney watched the timer. The birthday song had begun again. She still had 14 seconds of washing to do. It was interminable. Eight seconds left. Delaney thought she'd rub her skin off.

"Looks like we're almost done!" the cartoon skunk announced, and did a backflip. After landing, the skunk dried its hands by doing a kind of woodland jazz-hands maneuver. "Go forth and stay human!" the skunk said, and when Delaney tried the door this time, it opened to the light. A corresponding ding sang from Delaney's phone.

"All set?" Kiki asked.

Another man passed wearing a wrestler's one-piece. This one covered half of his torso and stopped mid-thigh. His manhood was encased, it seemed, under a dome, a cup or jockstrap, Delaney didn't know which. Codpiece? She looked away, only to find two people, a man and a woman, standing face-to-face, each wearing form-fitting black bodysuits interrupted by no pocket or stitch. The woman was chesty, the man powerfully built, the curves of his thighs yearning for the curves of hers.

"Time for the onboarding doc. Let's head over here," Kiki said, and brought Delaney to a small, ivy-covered building, a twin to the one where she was first interviewed.

Inside, the room was empty, and Delaney exhaled elaborately.

"Last bit of housekeeping," Kiki said, and handed her a tablet. "The final onboarding doc, which we ask that you read carefully. Obviously the eye tracking knows what you've read, so …"

Kiki made for the door. “Initial every page and sign at the end. I’ll come back in 30 minutes,” she said, and left.

Delaney woke the tablet and Mae Holland’s face appeared, filling the screen. “You made it,” she said, and her eyes widened, as if she was both proud and a bit surprised. “You’re joining us, and we couldn’t be happier.” It was a recording, but still, Delaney found herself briefly star-struck. Mae still looked like a newbie herself—those bright dark eyes, that olive skin, as smooth as a river stone. “We are so grateful you chose us, and I can’t wait to see you on campus. If you see me, stop me and say hello!” She smiled, and Delaney took her in—the high cheekbones, just short of severe, that nearly lipless mouth. The lights upon her were perfect, setting her skin aglow, her eyes elated. Then she was gone, replaced by the onboarding document.

The sentences were fascinating, written with the strangely florid and willfully capitalized style common to the industry. “You are invited to bring your most Joyful Self to campus each day.” “Your personal Fulfillment is our goal.” “You are Seen Here.” “You are Valued here.” “Touching, including shaking of hands or Hugging, is de-approved unless between signers of Mutual Contact Agreements.” “This is a plastic-free campus.” “This is a fragrance-free campus.” “This is an almond-free campus.” “Paper is Strongly discouraged.” “Smiling is encouraged but not mandatory.” “Empathy is mandatory.” “Guests must be announced 48 hours in advance.” “Vehicles that burn fossil fuels require an Exemption.” “This is a Collaboration zone.” “This is a Sacred place.” “Everyones with children under 5 are encouraged to bring them to Raise Every Voice.” “Non-company hardware is de-approved.” “Downloading of non-vetted Software is de-approved.” “All correspondence on company-provided devices is subject to screening.” “Attendance at Dream Fridays is required Because They Are Awesome.” “Attendance at Thursday Exuberant Dance is not required but urged because it is *next level*.” “This is a beef-free campus.” “This is a pork-free campus.” “Until further notice, this is a salmon-free campus.”

The second Delaney was finished, Kiki’s face appeared in the doorway. “Your medical intake!” she gasped. “You should have had it done by now.

What time is it? We can get you in."

She hustled Delaney out and into the light.

"We're going to the Overlook?" Delaney asked. She'd read about the Overlook, and could see it, like a white spiral exoskeleton, on the hills above Treasure Island. What she'd read painted it as a mecca of tranquility —a place where Everyones could get *unparalleled health care in a spa-like setting with astounding 360-degree water views*.

"No, no," Kiki said, and looked briefly up at the array of white buildings in the distance. "The Overlook is for … it's not for basic intake, it's for … Wait. What time is it? Hi honey!"

She was with Nino again. "I'm sorry, hon-hon, Mama's working. And you have your own assessment today, so you stay till 4." Kiki's eyes welled. "This helps Jolene know how you're doing. It helps Mama too." She tapped her ear and turned to Delaney apologetically. "I'm assuming you had your DNA sequenced?" Kiki asked.

"For college, yes," Delaney said. It had been required at most schools, first state then private—insurers had forced the issue.

"Good, so just have to get the vitals, blood, x-rays, things like that," Kiki said, and they walked briskly to the clinic. Kiki's rubbery legs carried her ahead of Delaney, and finding Delaney falling behind, periodically she stretched her hand back, her fingers open like a star, her rings twinkling in the sun.

When they stepped inside the clinic, Delaney saw no humans. There was no reception desk, there were no doctors. The medical professions had been decimated by doubt and litigation, with the vast majority of patients preferring AI diagnoses over those of humans, which they considered recklessly subjective.

"OK, it says you're scheduled for Bay 11," Kiki said, and took a moment to reconcile the map on her armscreen with her physical environs.

Delaney looked down the hallway and saw the numbers ascending toward 11. “I think it’s this way?” she said. Kiki looked up and, after a painfully long time examining the hall, its numbered rooms, smiled with relief. “Great. You go on, and I’ll come back when you’re done.”

Delaney walked down the hall, past the other bays, most of them containing a human lying on a medbed, the rooms dim but for the bright reflections of the patients’ interiors on the wallscreens.

When she entered Bay 11, the room was empty but the wallscreen was alive with a series of neon pictures—three-dimensional visualizations of an embryo in a womb. The detail was astonishing, far beyond anything Delaney had seen before. This must be proprietary software, she assumed, something being tested on campus. The embryo was larger than life, perhaps 3 feet high, its eyes enormous, covered with a pink vellum, its tiny watery heart fluttering like a kite in high winds. The image was left over from whomever was last here, Delaney assumed, and before she could stop herself, she was scanning the screen for the name, and the moment before the screen went dark, she found it. Maebelline Holland.

Stunned, Delaney held her breath. She listened for anyone outside the door, anyone nearby. There was no one. She stepped into the hallway, stupidly looking for Mae Holland herself. The hallway was empty, and Delaney returned to the medbed. She thought about leaving.

Seeing what she saw put her in some jeopardy, she was sure. Would she be expected to tell someone what she saw? Would the room’s many cameras already know? To reveal it was an invasion of privacy—medical information like this being still unpublic—but to not reveal it: Wasn’t that a problematic elision?

The screen came alive again. It was a recording of a woman in a white coat, a stethoscope around her neck and a clipboard pressed to her torso. “Hello Delaney,” she said. “I’m Dr. Villalobos.”

The rest of the intake was unsurprising. Because Delaney’s medical history was digitized, the Every simply had to add her data to their own database and update a few metrics. As the medbed scanned her, Delaney cycled

through the possibilities. It seemed highly improbable that there was another Maebelline Holland on this campus. But it also seemed unlikely that the CEO of the Every would have used this nondescript medbed, let alone leave this most personal information onscreen for the next visitor to find. Above all, it was impossible that Mae Holland was pregnant. Her life was lived with unrivaled transparency; she was still fully Seen. To be true to those principles of the Seen, she would have broadcast her first visit to any doctor, her first knowledge of her pregnancy; anything less would breed suspicion, would perpetuate corrosive secrecy. And beyond that was the issue of carbon impact. Population growth activists had become more vocal, and their questions—must you? should you? have you any right?—were seeping into the mainstream. If anyone would debate these questions openly, and seek a kind of customer consensus about her own baby-making, it would be the face of the Every.

So she could not be pregnant. That embryo being truly inside Mae Holland was not possible. But Delaney had no way to find out. It was one of the few pieces of medical data still outside Right to Know laws. During the second pandemic, new laws were rushed through all over the world, giving all citizens the right to know who had a virus and where they likely got it. It only seemed right, and contributed to the general well-being and slowing of the spread. And what about lice and mono? HIV and herpes? No one had a right to spread these afflictions—pink eye!—and everyone had a right to know who was afflicted. Public registries became the norm, and the idea of keeping medical information private became indefensible. It put others at risk and thwarted scientific progress.

But pregnancies were still secret, or the law treated them as such. Delaney couldn't even search "Mae Holland pregnant," because the typer of those words would immediately be known. The second wave of the Right to Know laws had codified a person's right to know, in real time, who was searching for them and what information they sought. The searcher, to be sure, also had the right to know who was watching their searches, creating a two-way mirror effect, which occurred a billion times a day, of a searcher searching while the searched watched the searcher searching.

"OK, all set," Dr. Villalobos' recorded self said.

Delaney got dressed, and while buttoning her shirt, had a series of thoughts, none of them more rational than any other. She thought this could be a setup, a test of how she would handle such sensitive information. But if so, there was no right response. Such a private matter should have been private in the first place. This was the unnecessarily awkward position Mae herself had sought to eliminate—the keeping of secrets, the sowing of distrust and fostering of conspiracies. Delaney had no choice, really, but to wait. As unorthodox as it was, perhaps Mae was simply waiting for the right time to reveal that she was bringing another human into the world.

Dave Eggers *is the author of many books, among them* The Circle, The Monk of Mokha, A Hologram for the King, What Is the What, *and* The Museum of Rain. *He is the cofounder of 826 National, a network of youth writing centers, and of Voice of Witness, an oral history book series that illuminates the stories of those impacted by human rights crises. He is the recipient of the Dayton Literary Peace Prize and the American Book Award. Eggers lives in the San Francisco Bay Area. This excerpt is adapted from his forthcoming novel,* The Every, *published by McSweeney's in a hardcover edition sold only via independent bookstores. A Vintage paperback, available anywhere, will follow.*

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Paul Ford

Ideas
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Climate Change Is the New Dot-Com Bubble

The free market has plenty of grandiose ideas about how to fix our broken planet. There's just one problem: We can't afford another bust.
Illustration: ELENA LACEY

I had wondered what shape my midlife crisis would take. I don't drive, so a convertible was out. I don't want to learn the guitar or collect vintage tube amps. When I asked my wife whether I should have an affair, she just looked at the ceiling and then went back to helping me get my prescriptions refilled. That left the obsessive-nerd option: getting really, really into climate change.

It started with climate modeling. What the climate modelers do is use software to divide the atmosphere and oceans into imaginary cubes, then define what happens inside each of the cubes over time. Then they make the cubes talk to each other. It's like a less enjoyable *Minecraft*. I don't understand most of it.

But much of the data is free to download, and I love a bargain. I had a good time messing with the opaque sets of latitudes, longitudes, and scientific measurements, each variable representing at least a dozen PhDs. The inevitability of aging doesn't sting so much when you can project a netCDF file onto a 3D-rendered globe so that it shows how many days per year a given location will be above 32 degrees Celsius (hot). Making the globe, I felt a sense of control. And isn't that a kind of fun?

Going deeper into Climateworld, I read *The Great Derangement* and *The Collapse of Western Civilization*. I read *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. I clicked through different organizations' climate websites, from the United Nations to Chester County, Pennsylvania. What I kept finding were *frameworks*—and countless PDFs. So many nicely formatted, map-laden, chart-packed, grant-funded artifacts of bureaucratic love. My computer was bursting with them.

Well, all right, I thought. You can't spend your midlife crisis reading books and PDFs. And humanity can't fight off something this huge with a framework. Where's the action?

I started to attend webinars, join Slack groups. People generally mentioned Patagonia as a good climate actor, then sort of trailed off. I looked where investors were funneling their money. The big dollars went straight to established players in clean energy—Tesla for its batteries, Plug Power for its hydrogen fuel cells. What about newer arrivals? I made a list of all the interesting climate startups, around 2,000 of them, and turned it into an ebook so I could read it on my phone at night.

Sometimes, as I scrolled down the list, a big investment would catch my eye—$60 million for a company that promises to take carbon dioxide out of the air, $68 million for one that will turn it into fuel and materials. But the funding thins out quickly. It's easy for investors to get distracted; there are just so many butter knives we could wield against the dragon of global collapse. We have new strategies for recycling, new ways of keeping the sun out of the house, electricity from kites, analytics firms that use machine learning to fix insurance, companies that want to connect millennials with ecological brands. And every one seems sure that they are the solution, that they will help us cross the threshold into degrowth. They know the answer.

I began to feel a strong sense of déjà vu. I couldn't place it until, one night, in the glow of the e-reader, I realized: It's Web 1.0 all over again. We are in the Pets.com-puppet-mascot era of climate. The comedy of the technology industry is playing again as a kind of Ibsenian tragedy: Scientists and academics told everyone about this thing for decades, and almost everyone ignored them. But then enough people got interested, and now there's a

market. And as a result there are a million business models, a million solutions, huge promises of the change to come: We'll pour everything we have into green-energy infrastructure. We'll transact in carbon marketplaces. We'll pull a trillion tons of CO_2 out of the air every year. Never mind that today we can do about 0.0005 percent of that, which rounds to nothing.

There are good VCs being venturesome with their capital. There are funds that are investing in green things. But—and God help me for wishing it—there's no Google, no Apple or Microsoft, no monster in the middle taking its cut. There isn't one carbon market; there isn't one set of standards to follow; there are dozens of options, which means there isn't really anything at all. Whole careers are dedicated, wonderful people, great science, online carbon calculators, but for right now it rounds to nothing. Amazon Web Services hosts open climate data, but I wish there were an AWS *for* climate. I wish I could tell you what it should do.

I assume that the money will come. There are too many hot days for it not to. And obviously I want things to go differently this time. But I don't know how you bootstrap a globe-spanning bureaucracy yesterday. I can't even tell you what infrastructure we need, just that in general infrastructure evolves, slowly, in response to tragedy.

Worse, if my déjà vu is accurate and history repeats itself—if the internet was the last big thing, and climate is the next big thing (or the last big thing)—then we aren't at the precipice of a new era. We're at the beginning of a bubble. The trillions in investment have to go somewhere. By the time all the money is spent, the companies in my ebook will probably be gone, save for a few dozen. Rolled up, evaporated. And then what? It's not like we can just wait for the market to recover and see what happens.

Which all makes for a perfect midlife crisis. I've never felt so young, even when I was young. Two months ago, I stepped down as CEO of the company I cofounded. Now I'm writing an open source tool to make netCDFs more accessible to nerds. I have no great hope, no clear plans, but I'm oddly upbeat. I'm downloading geoTIFFs of global coffee yields and riding my bike again. It brings me back to an un-wild youth spent sneaking

into conferences where people in cool shoes with the sides of their heads shaved talked about changing the world with XML.

We felt technology deeply then, read standards, tried to predict the future. I thought I would never feel that again, that sense of empty territory. The intoxication of knowing absolutely nothing but jumping in nonetheless. I am optimistic that we can skip the bubble. I have to be. The world is going to change again. This time we know how.

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Virginia Heffernan

Ideas
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When You're Living in an Immaterial World, What's for Sale?

On influencers, symbolic analysts, and buying and selling in the age of turbo-capitalism.
Illustrations: James Daw

I like a get-rich-quick scheme—what American doesn't?—and not too long ago I alighted on drop-shipping. The idea came up like this: Plastic straws were in the moral firing line, and if they were banned, I figured Americans would soon need another way to slurp our iced coffees.

Twenty metal straws could be found on Amazon for $10, and I calculated I could sell them to cafés for $1.50 each, and they could charge $2 each, and we'd all do well by doing good. But then, as all who chase accelerated prosperity do, I got greedy. Surely I could find a cheaper wholesaler, an obscure Chinese clearinghouse where metal straws went for pennies. Realizing, too, that my modest floor space couldn't hold much inventory, I was delighted to learn that manufacturers in China ship, then drop—drop-ship—straight to customers.

I was in. If I offshored not just the manufacturing but the warehousing and packaging and shipping of the straws, I'd just need to design some kind of advertising come-on; set up an online shop where every purchase would trigger the wholesaler to release straws to the paying customer; allow the wholesaler to dock my merchant's account for the low price; and the

markup would go to me me me. I'd never even have to *see* the straws, let alone *store* them or (God forbid) *make* them, like some hard-hearted, tireless American industrialist of the 1890s or 1920s. I said get rich *quick*.

Finding a wholesaler was easy. You can use Oberlo for that. I chose something called Dunhuangwang (or DHgate) in Beijing for its 30-cent metal straws, and I ordered 100 myself to prime the pump. I had goods! I had a shipper! Setting up my site for "The Last Straw" on Shopify was also a breeze. Ablaze with ambition, I engineered the site to take bitcoin, eyes on the horizon, high on my private prosperity gospel. Then I headed over to Instagram to make ads …

And there was the catch-22. Of course I can design a picturesque hero shot of a stainless-steel straw aimed at seducing clients inspired by fine design and an organic-modern lifestyle, if not by the taste of metal in their mouth. But how to get the posts seen? Even when I paid to promote them, they attracted few likes, and I couldn't make a sale to save my life. To win customers I'd need to become an influencer, it seemed. And if I had a formula for becoming an influencer, I'd already be rich—and being rich *already* is as quick as getting rich gets.

The lesson was demoralizing. Not only is building influence via clever posts what *must* be done to make a fortune in the US, it's one of the only things we Americans *can* do, whether well (like Kylie Jenner) or poorly (like me). Drop-shipping leaves the college grad with Andrew Carnegie dreams only one task, the kind formerly assigned to unpaid youths with trust funds: Turn some darling digital pictures viral.

There's some real economics to this. Most Americans stopped learning farming or trades a century ago, and then a vast swath also stopped learning factory work, blue- or white-collar. The manipulation of undigitized, offline objects, stuff with mass like wheat or stainless steel, was no longer a promising field of endeavor.

The traditional professions like law and medicine hung steady, but as everything offered less security, even professors, doctors, lawyers, and accountants found they had to market themselves. Meanwhile, people in retail, advertising, and every kind of customer service did sales, sales, and

nothing but sales, and most of us in journalism also ended up shilling for ourselves online.

This is precisely what a cluster of gloomy polymaths predicted in the 1990s. Figures like the eccentric Edward Luttwak, the conservative booster of coups, described a future where capitalism was vertiginously unfettered by government, where corporations would no longer take care of employees from start date to gold-watch retirement. What he called turbo-capitalism would, he wrote, leave many, many Americans in the economic dust. The survivors would work in pixie dust, pixelated dust, the new galaxy of online symbols.

These economists foresaw an all-scab labor force—or "freelancers," since trade unions too would be all but obsolete. Like scabs, freelancers would assume social and economic risk—not by crossing picket lines but by forgoing the security, benefits, fellowship, and regularity of salaried work. What's more, our labor would be a form of make-work that economist Robert Reich once called "analyzing symbols"—writing copy, organizing information, making spreadsheets, and otherwise avoiding the world in favor of representations of it. Forget about working in three dimensions. On the internet, are we even working in two?

In 1994, just as economists were fretting, my first cousins Bert and John Jacobs launched a blockbuster T-shirt company called Life is Good. The original shirts featured an irresistible stick figure in a beret called Jake, one of the thousands of doodles they used to toss off when we were kids, when they were known as athletes and artists facing what one uncle archly called "limited prospects." LPs.

I was in graduate school for English at the time, anxious about my own LPs: life as an adjunct, always on probation and forever angling for tenure or at least a living wage. I knew that the cousins were finding fun and profit drawing, while also doing the elbow-grease work that was mysterious to me: cotton, dyes, factories, workers, trucks and ships. It seemed very … material.

I had my own path. And at the start of this century, there was also room in the traditional economy for an immaterialist like myself. In 2003 I joined a

union that put my labor as a journalist on par with the skilled drivers of trucks that deliver newspapers by the ton. But that was the last time I felt secure at work. When I left the union in 2011 for a higher-paying job, I actually felt cold at first, newly vulnerable to some undefinable elements the union seemed to have been protecting me from. There's a Major Tom factor to being a freelance symbolic analyst, floating in a most peculiar way. But I tell myself I'm used to it.

My cousins and I caught up over the summer at a family reunion. They're my teachers in so many arenas, including hope and love. I adore them. They faced turbulence in childhood, started selling shirts out of the back of a van, and entered the rag trade when it was mostly unchanged from the 19th century.

I began to tell John about my failed venture in metal straws but couldn't bring myself to describe the folly. Later, Bert told me that at the start of the pandemic Life is Good had nearly gone bankrupt. Retail stores closed. Half their business vanished. What's more, he and John wanted to join the effort to mitigate the spread of the virus. They blueprinted topical shirts ("Wash Your Paws," "Stay Calm, Stay Cool, Stay Home") but the traditional retail cycle requires at least a year from design to distribution. To adjust, they invested in technology that allows them to respond quickly to demand—and shortens the time between design and distribution. They hold limited inventory, and the company is more lifestyle brand than rag trade. So maybe they are symbolic analysts too.

If Bert and John experience the same something-more-than-alienation I feel when analyzing symbols, they don't show it. They take life as it comes. John always says the brand's optimism is less for "easy street" types and more for people in hard times, or pandemics, who are grateful for things like Frisbee and sandwiches. They give 10 percent of profits ("no matter what," says Bert) to help kids coping with trauma.

It's pretty clear I should have ignored the life-is-dismal economists and followed Bert and John into T-shirts in the '90s. I'm going to follow their lead this time and try for more equanimity, and even sincerity that risks sentimentality, in the '20s. The Jacobs brothers are never wrong. And I'm telling you, they are actually happy people.

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Katherine Laidlaw

Backchannel
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Rain Boots, Turning Tides, and the Search for a Missing Boy

Last year in Nova Scotia, after 3-year-old Dylan Ehler vanished, online sleuths descended on Facebook groups to help find him. Then they lost their way.
PHOTOGRAPH: JUSTIN CARTER

Dylan Ehler came into the world running. He pummeled and squirmed his way through his mom's pregnancy, kicked the hell out of her in the womb. He was a boy in constant motion. He moved when he slept. Almost as soon as he was crawling he was climbing. His parents—Ashley Brown and Jason Ehler—would walk into their living room, in a gray-green house in a place called Bible Hill near the town of Truro in Nova Scotia, to find him perched on the windowsill, grasping at the ledge above.

When they brought Dylan home from the hospital, the three of them slept curled together on the sectional, bunking down in the living room. By his third birthday, he was still getting up in the night to crawl into bed with his parents. Dylan had bright, round, rosy cheeks and mussy, brown hair when it wasn't buzzed short. He had one hazel eye and one that was half-hazel, half-blue. The only words he could say were "mama" and "dada," but he found other ways to speak. He'd taken to sliding his hand into his dad's and, with a gentle tug, leading him around the house that way.

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In the weeks after his third birthday, in April 2020, the atmosphere in the family's gray-green semi-detached was tense. The town was in lockdown from the pandemic, and Ashley and Jason both lost their jobs. Money was tighter than usual, and it was usually pretty tight. They were in an ongoing battle with the neighbors; Jason says they thought he was repeatedly egging their house. Lily, Ashley's 12-year-old daughter from a previous relationship, was in school remotely, which meant she was home all day. And Dylan was Dylan, running around the house with a smile, blink-and-you'd-miss-him like always.

Three-quarters of Nova Scotia is blanketed by gnarled firs, spruce, and pines, vegetation so wild and dense that for years the province held the title of lost-person capital of North America. Truro sits at the innermost point of an inlet off of Cobequid Bay, which in turn is an offshoot of the Bay of Fundy, a body of water governed by the highest tides on the planet and home to one of the most comprehensive fossil records in the world; 300 million years of life are imprinted on its shoreline cliffs.

The town is best known for being the headquarters of one of the world's oldest underwear factories; it is a quiet, pastoral kind of place that offers little by way of excitement but ambling Holsteins. So in the early months of the pandemic, 32-year-old Ashley joined TikTok, the app she'd seen all over social media, as an escape. When she had time, she'd upload the clips in batches. She posted a video of her swaying in a hoodie and baseball cap, backlit in red, to a Nelly song. In another, soundtracked by the trap hit "What's Poppin," she blows puffs of smoke from a joint toward the camera. "I'm gonna get you high today," she riffs in a third. In one clip, Dylan sits beside her, smiling widely: "You ever just look at somebody," she mouths along to the meme, "and think to yourself, 'this motherfucker is going to be the reason I go to jail?'"

One April afternoon she stood in the kitchen and pulled the phone in close, her brown bangs falling across her forehead. A TikTok filter called Euphoric Makeup swept deep purple across her eyes and sharply contoured her cheekbones. In the years since the Disney movie *Frozen* had come out, more than 100,000 people had participated in a popular, if sinister, meme that had made its way to TikTok, a parody of the movie's song "Do You

Want to Build a Snowman?" Ashley began to sing along: "Will you help me hide a body?" a high-pitched voice-over asked. "Come on, we can't delay / No one can see him on the floor / Get him out the door before he can decayyyyyyy." She uploaded the video, a few of her followers liked it, and she went back to an utterly unremarkable day.

A baby picture of Dylan, with one of the boy's beloved dinosaurs.

Photograph: Justin Carter

Weeks turned to months in a pandemic blur. Breakfast, potty time, playtime, storytime. Ashley and Jason's world grew smaller, revolving more tightly around Lily and Dylan as Covid continued. Dylan was the kind of kid who went looking for joy. He loved the rain. One afternoon he stood outside in his patched green parka, the fuzzy fur lining of his hood matting in the storm. He leaned his head up and stuck his tongue out as far as it would go, rain pattering against his cheeks as he licked the droplets, his face beaming with glee. Jason captured the moment on video, not knowing then that his son's face in that frame would soon be seen the world over.

Ashley grew up around cars—her dad, Norman Brown, still runs a mechanic's shop out of his garage about a 10-minute drive west along the two-lane highway that ribbons its way through this part of Colchester County. Norman used to drag race at derbies, before he sold his Monte Carlo to build his own mud car. He started taking it and his daughter to rallies instead. It made sense that Ashley would find work as a detailer for the Hyundai dealer a mile away from her house in Bible Hill.

Jason grew up down the road from Truro, in Masstown, a farm village of about 150 people. He went west in his early twenties thinking he'd maybe work on the oil rigs. When that didn't pan out, he moved back home. He met Ashley one night at a friend's place. He looked tough with a tattooed spider crawling down his right hand. But she liked his kind, hazel eyes that creased at the corners, his booming laugh and hulking frame. They began to party together, and eventually they began to live together. Ashley's family didn't much like him. He was loud and gruff. They thought he was a bad influence. Her dad felt Jason's quick temper made it difficult to hold down a job (Jason says this never happened), and the couple dabbled in drugs.

Jason was arrested once for shoplifting from the gas station, and then again from the liquor store. Ashley faced charges too. Police accused the couple of running a scam, bilking the government out of more than $55,000 (Canadian) by claiming welfare to which they weren't entitled. (The charges were later dropped.)

They certainly weren't perfect, but they were a family. For years Jason had wanted a child of his own. He was stepfather to Lily, but he'd been keen to have another kid. To Ashley, it never seemed like the right time. But when she turned 29, things had started to settle down. She had steady work, and they weren't partying as much as they once did. Jason was working full-time, too, delivering water bottles for the Canadian Springs plant. Ashley said even her mom, Dorothy Dowe Parsons, who has struggled with alcoholism, was sober by then. So when he asked again, she said yes. Nine months later, Dylan was born.

One morning in May 2020, Ashley was just trying to keep her head on straight. The pandemic was dragging on. She was exhausted. Outside, Jason says, their neighbor's buddy was banging on their windows, pissed about the egging and spoiling for a fight. Jason woke up angry. Ashley can't remember exactly why, but things escalated fast, and she hit him. Jason sprang out of bed, and, suddenly, everyone was yelling. He'd kill her, he shouted after her. He grabbed her phone and smashed it on the kitchen's tiled floor. Someone in the neighborhood called the cops. Ashley was charged with assault, and Jason for uttering threats and mischief. Both were released on an order to appear in court later that summer. (The charges were withdrawn after the two went to a court counseling program.)

In the meantime, a judge issued them a no-contact order. For days, Jason stayed with his parents, a 15-minute drive away, while Ashley took care of Dylan and Lily at home. The couple's moms acted as intermediaries, shuttling Dylan between houses. Jason made sure that he saw Dylan almost every day; he was a devoted dad that way. But the situation also created tensions. Jason didn't like that Dorothy was helping to care for his son, even if she was just ferrying him back to his home in Bible Hill. He didn't trust her, in part, he says, because of her history of slipping in and out of

sobriety. One day, in the fuss of it all, he didn't realize until her car had pulled away that he'd forgotten to kiss Dylan goodbye.

The next morning, Ashley awoke around first light to find Dylan tucked in beside her. They spent a few minutes cuddled in bed. Then she got her boy up and took him to the coffee stop down the road. She ordered him his favorite breakfast, a chocolate glazed doughnut, and, as usual, he ate the icing off the top before zeroing in on the rest. She took her coffee to go, and the pair headed home.

Though Ashley enjoyed the morning with Dylan, she was tired. It had been a long time since she'd been a single parent. So when she got a text from her friend Vanessa, inviting her over for a coffee, she was relieved: She needed a break. She messaged her mom to ask if she could watch Dylan for a while, then packed him a bag—pullups, a snack. She drove by Truro's dormant smokestacks and over Lepper Brook. The water was unusually high.

Ashley Brown and Jason Ehler, on their back porch in Bible Hill.

Photograph: Justin Carter

The neighborhood where Ashley's mother lives was described to me as "the slums of Truro." It's the kind of place where people paper over their windows with skull-and-crossbones flags, where beer bottles sag in the creek bed. Dorothy's house, shingled a muted gray-blue, is down the street from a halfway house and 450 feet away from Lepper Brook, a stream that flows to the mouth of the Salmon River, and from there to the Bay of Fundy. Dorothy had a puppy, and the dog was one of the only family members who could keep up with Dylan, nipping at his heels. She'd mentioned to Ashley that she was going to take the pair out to play in her backyard, which held a picnic table and a deep-freezer and opened on to dead-end Elizabeth Street. Ashley joked that Dorothy had better put both babies on a leash. "Dylan's a runner. He needs one." At around 11 am, Ashley pulled out of the driveway to go meet her friend. Like the sediment that lines the banks of a river, tragedy builds in layers, too, a series of tiny and inconspicuous choices that look clear only after the force of their cataclysmic outcomes.

At about 1:15 pm, Dorothy and Dylan were out in the yard. She turned around to tie her puppy to its lead, and when she turned again, she couldn't find her grandson. She ran into the street, yelling for him. Her yells turned into screams, and she pleaded with her neighbors to call 911. The police arrived at the house just 4 minutes later. They fanned out, canvassing locals, searching the area's nooks and crannies for anywhere a playful toddler might hide.

When Ashley's father showed up at her friend's front door, he was stone-faced. She had not been expecting him. She knew instantly something was wrong. "Get in the car," he said. She complied, tucking her slender frame into the truck's passenger seat like she had so many times when she was young. "Dylan is missing," he told her, eyes on the road. For much of the rest of the ride, the two sat in silence, a harbinger of the quiet to come. "By the time we get there, they might have found him," she thought to herself. She was certain they would find him.

Firefighters and search-and-rescue volunteers were called in, trudging waist-deep into the creek. For six hours, they searched the area, finding nothing. When a rescue volunteer pulled one of Dylan's little gray rain boots from an errant shopping cart submerged in Lepper Brook, it didn't look good. An hour and a half later, another volunteer found his other boot, stuck in the muck about 60 feet downstream.

For days, police investigators and ground rescue volunteers searched. A local pilot traced Dylan's name into his flightpath in the sky. On stoops across the province, firefighters and parents left pairs of rain boots out for Dylan, beacons of hope in the night.

Dylan's boots were both found, about 60 feet apart, in Lepper Brook.

Photograph: Justin Carter

In the hours after Dylan went missing, a theory began to take shape: that Dylan had taken off running, made it to the creek. He didn't yet know how to swim.

A dive team combed the riverbeds from below, using an underwater camera to take pictures they could later scan for something, anything, they may have missed. A helicopter flew low overhead, looking for Dylan and flagging areas of interest for searchers on the ground.

The next day, more and more Truro residents joined in. Word of Dylan's disappearance spread—first across the province, then the country, then the continent. Thousands of web sleuths descended on Facebook groups created to discuss details of the case, armed with keyboards and curiosity. The same day, a family friend started a GoFundMe campaign. Jason and Ashley turned to Facebook for support, using it to plan searches, organize fundraisers, and update their community. The couple knew that keeping Dylan's picture circulating, too, was critical.

A missing child captures the compassionate and curious among us, the ones with savior complexes, and the people who recognize themselves in these parents' nightmares. Before long, Dylan had become a symbol for a collection of people awash with pain and nowhere to put it.

Two days after Dylan disappeared, Jason and Ashley were frantic. It felt surreal; their son still hadn't been found. That morning, Ashley received a message from her sister-in-law. Don't go on Facebook, she warned. It was too late: Ashley already had a stream of messages from strangers accusing her of killing her son. An internet sleuth had discovered her TikTok page and posted the videos she'd made to Facebook. Forty-eight hours after her son went missing, online detectives declared her suspect number one. Missing-person cases are magnets for psychics and obsessives, and a medium named Jada Brooke, who said she was based in the New York area, joined the conversations in one of the Facebook groups that had sprung up to dissect Ashley's and Jason's behavior. In a Facebook Live post, she described visions she'd seen of the boy. She told followers that a family member of Dylan's called her to ask for her help. Soon, she was offering theories of the case and information she said came from locals.

Brooke also talked about Ashley and Dorothy, refusing to mention them by name. "The family is known to be into dark magic." She then added, "As somebody who's involved in magic myself and does rituals, I believe Dylan was offered as a sacrificial sentiment to Satan on the pink full Scorpio

moon. I think they thought they were doing a good thing. And part of me thinks that's why the mother and grandmother are not showing more remorse. What they did is simply killing a child."

In another group, people criticized Ashley for getting a haircut. Was that a new nose piercing, they wondered. "It just seems they look better as time passes," wrote Zoe Jackson. "All that new shit would be the least of my concerns with a missing baby." Another member responded: "These devils are digging their graves. Keep on buying. Their time is well on its way." In another, they mocked Jason's search attempts, saying, "It's just him lurking in the bushes." They excoriated him even for sleeping. "I would be searching nonstop until my feet were bleeding if my child vanished," wrote Kelly Plaine.

The vitriol spilled over into real life. People started standing outside their Bible Hill home glowering and taking photos, or following them in their cars. Someone at the area hospital looked up health records for Ashley, Lily, and Dylan, a privacy breach. When Jason and Ashley put up a memorial for Dylan in Bible Hill's Holy Well Park—a blanket laden with teddy bears, a toy fishing rod, the boy's first-ever pair of rain boots hanging from the tree overhead—locals tore it apart and dug a hole beneath it, looking for bones.

Later that week, in a video now viewed tens of thousands of times, Jada Brooke fanned the flames. She'd spoken to a family member of Dylan's, she said, who was "on our side and agrees that something's not right here." "I had a vision of him being kicked down a set of stairs … That was actually verified to me," she told viewers, providing no evidence. She said she'd had a vision of a shallow grave between two trees, 5 or 6 feet apart, on a property that also held a red and white truck. That led a Truro resident named Dawn to a field that held a red and white horse trailer. Inspired, a band of residents broke into the trailer. They found a pile of dry hay, which Brooke called suspicious for its lack of mold. Brooke triumphantly pointed out that the trailer, which sat in front of a stand of trees, was proof her vision had been accurate. "If I go quiet or something in the group for a while, just remember, I have six kids of my own, I home-school four. I'm a very involved mother. My kids don't go missing, you know what I mean?"

The abuse spilled beyond accusations about the couple's parenting. Jason received scam ransom notes from online trolls; one included a doctored picture of Dylan's face, battered with bruises over his right eye and a deep gash on his lip. "You must transfer 3 bitcoins," the message read, "within 72 hours." The sender, a Facebook account under the name Brad, told Jason he'd release his son once the transfer was made, and if he didn't, he'd never see him again. "You have 3 days to save Dylan's life," he wrote.

After six days, with no new evidence—no footprints or debris or credible sightings—the police called off their search. Nothing but rain boots. But Jason didn't stop. He walked the creek bed day after day, drawing dozens of locals to help. The GoFundMe page would raise about $12,500 for the family. Ashley and Jason offered it up as a reward for any information.

Jason handed out lapel pins, a blue ribbon and a green ribbon intertwined. He gave away key chains bearing his son's face. He ordered bumper stickers of Dylan looking upward, mismatched eyes scanning the sky. "Do you want some swag?" he asked me sadly, the first time we met. He handed me a green and blue bracelet and a sticker. Maybe, he said, if I put it on my car back home, two provinces over, someone there would see it and call in a sighting.

In Canada, parents receive a benefit if one of their children goes missing or dies in a likely crime. Because local police didn't label the incident a crime, Ashley and Jason didn't qualify. "No one gives you a pamphlet on how to be a missing child's mother," Ashley says. By October, with the province's lockdown lifted and the dealership fully open again, she went back to work.

For months, Facebook group members examined the case's scant evidence, gnashing details like bolts of hardening chewing gum. It was a dizzying, dystopian fun house of rumor and speculation. Theories raged: To many, the grandmother's story didn't track. Others believed she was covering for her daughter. That the family was collecting money on a GoFundMe page meant they'd gotten rid of Dylan because they needed the money—for booze or drugs or both. At one point, the groups' ranks topped 23,000 people, the same as the entire population of Truro.

By the end of September 2020, the harassment and threats had gotten so bad that one group member began to research the laws that govern cyberbullying in the province and even contacted a local lawyer named Allison Harris. Harris knew about the missing boy—Dylan's story was in the news for weeks after his disappearance—but she was shocked to learn about the abuse the online sleuthing community had spawned. Just a year and a half out of law school, Harris exudes an air of utter unflappability. She speaks in clipped, exacting sentences, and even her smile seems precise when it reveals a perfectly centered gap between her front teeth. Harris was one of just two lawyers in the province who had argued online personal injury cases in court. She told the group member to have Ashley and Jason get in touch and, after hearing their story, offered her services pro bono.

Together the three of them set to work documenting thousands of abusive screenshots, hundreds of awful messages, dozens of death threats. They wrote letters to the administrators of two of the Facebook groups, asking them to shut down. At first, both refused, though one changed her mind after becoming the target of a harassment campaign within her own group. "This case has surprised me," Harris says. "Instead of appreciating that they're doing damage and harm, they seem to feel they have a right to have these groups." (Still, the groups were like a hydra: When one shut down, Ashley and Jason's most vocal detractors simply started others under untraceable noms de plume like "Holiday Precious.")

The administrators of the second group were local Truro residents: a couple named April Moulton and Tom Hurley who lived down the road from the backyard where Dylan was last seen. Moulton, who has dyed red hair and Cheshire-cat eyes, was certain she was doing critical work, her stout hands weighed down with silver rings on almost every finger as she examined the minutiae of the case, parsing rumored fiction from rumored fact, Hurley shuffling back and forth behind her. They didn't know Jason or Ashley before Dylan's story hit headlines, but they emerged as two of the most vocal proponents demanding justice for the boy. They knew as well as anyone what it was to lose a child.

Two years ago, Hurley's son Nick died. He was 31, he hadn't been sick; he was simply alive one day and dead the next. The couple was devastated.

Nick, Moulton's stepson, had been a bright light, quick to laugh or share a joint with her as he got older. And when Dylan Ehler's story ripped across the news, a year later almost to the day, she felt summoned, called to help. "I was starting to get dreams," she says. "I feel like he is reaching out wanting to be found, but he's scared." She'd never met Dylan, but she would do whatever she had to do to bring him home. She started a Facebook group, too, one that examined the case from every angle and explored each theory. As time dragged on, she grew fixated on managing the group, posting through the night.

In late January 2021, Jason and Ashley filed a lawsuit against Moulton and Hurley, asking the court to order the couple to shut down their Facebook group and stop posting about their family. (Group members chimed in. "I can assure you I would be completely devastated if that was my child or grandchild, I wouldn't have time or energy to even consider taking people to court to sue them.") When the courier tried to serve Hurley with papers in his yard, he ran into his mobile home, shouting profanities behind him before slamming the door. Harris eventually hired a special investigator, who returned to Hurley's home escorted by police, to get the documents into his hands.

The case slogged along, and after two months Harris started making headway. Her clients didn't want money; they just wanted the couple to agree not to post publicly about their family or contact them ever again. By the end of April, the couples were inching toward a settlement, and it looked like they were finally going to sign that agreement. On May 1, Moulton opened her Facebook account and typed: "This child is gone missing and they're taking me to court to not ever mention his name again because I've been looking for him for a year! His name is Dylan Norman John Ehler!! His name is Dylan! His name is Dylan! His name is Dylan!" she incanted. "Don't ever forget his name! This will be the last time I ever get to mention his name before I sign those papers!!" But it would not be the last time. She decided not to sign.

The rise of "internet detectives," as Harris calls them, has drawn thousands of people with spare time, curiosity, and a streak of vigilantism to forums like Websleuths.com. And crowdsourcing justice can work: Michelle

McNamara's tireless quest to identify the Golden State Killer started there, and the Netflix documentary *Don't F**k With Cats: Hunting an Internet Killer* explores how armchair detectives across the world banded together to identify Canadian murderer Luka Magnotta. "I think people see that documentary and they want to be that person," Harris says. "They want their fame for being able to do that." Someone like Moulton, Harris says, really believes she is seeking justice for Dylan, evidence be damned. "She's trying to help this little boy at whatever cost," Harris says. "They're not thinking of these people as real people. They can't be."

From Dorothy's house to the creek bed where Dylan's first rain boot was found takes a couple of minutes at a brisk clip. Stretches of unfenced land lead down to the water; wizened tree roots and matted grasses create resting points along the shore. Dylan's other boot was found lodged in a pocket of debris below the water's surface, 60 feet from the first boot, just before the fork where Lepper Brook dips into the Salmon River. The river winds on for miles beyond the fork, past floodplains and brick chimneys, over waterfalls and under skeletal steel bridges. While most rivers flow in one direction, the Salmon is a tidal river, which means it runs in two. Every day, a tidal bore sends a wave 6 feet high rippling up the river, straight into town, and then back out again. The water, a mix of silt and clay, is a ruddy chocolate brown all the way out to the estuary where the river meets the bay.

The Bay of Fundy is a funnel of ferocity. From above, it's a depression in the sandstone of Canada's east coast, bordered by the provinces of Nova Scotia and New Brunswick, and the state of Maine. There, peace is thin on the ground. Most oceans, on average, have a tidal range of 3 feet. The range in Fundy is 53. Imagine the force created by the pounding hooves of 24 million charging horses, and still Fundy's tides are stronger.

The search and rescue team had attached RF trackers to a mannequin about Dylan's weight and height, then dropped it into Lepper Brook, tracking it as it disappeared into deep, invisible pockets under the water. It took less than an hour for the mannequin to be swept up by those powerful tides.

Every day powerful tides wash up the Salmon River, then back down into Cobequid Bay.

Photograph: Justin Carter

“Nature was working against Dylan from square one,” says Tom Fitzpatrick, president of the team that led the search on the ground. The banks of the brook were so swollen that the currents knocked full-grown men off their feet. Fitzpatrick’s crew has spent almost 6,000 hours searching for Dylan, speaking to fishers and beachcombers and tidal experts to better understand what they’re up against. They’ve searched racetracks, gravel pits, cheese factories—anywhere else there’s been a tip, a possible sighting. Fitzpatrick is watchful, peering out of his car windows for scavenging birds or misshapen lumps of clay when he crosses the river each day. Four members of his crew have left the team, unable to cope with the unanswered questions still swirling around the case. “Did I miss him? Did I miss something?” Fitzpatrick says. “That’s a heavy load to carry home.”

Fitzpatrick is confident he knows what happened that day. “We think the child was in the backyard and his grandmother got distracted—we’re not sure by what and not sure how long. We think the child went out the corner of the yard, behind the neighbor’s house. There’s a path that leads down to the brook, and just below there’s a bit of a logjam,” he says, pausing. “About 50 feet down the water from there is where we found the first boot.” He can’t bring himself to say it, exactly, that the boy was caught up in the tides, so forceful and thick with mud that, underwater, it’s impossible to see.

On the day I visited, Ashley sat cross-legged in her dim living room, folding neat white squares of paper into origami shapes. On the squares, she’d written words like *hope* and *strength* in marker. The room is somewhere between time capsule and shrine. Dylan’s rain boots sat on a wooden bookshelf. “Missing” posters papered the windows. Art from people across the continent, commemorating Dylan, hung on the walls alongside Dylan’s list of things to do each day. (“Brush teeth. Learning time. Time with Lily. Lunch time.”)

Since Dylan disappeared, Ashley has retreated into herself, drifting from friends and family who haven’t shown up for her this year. She avoids her old grocery store now, suspicious eyes trailing her down the aisles. She no longer speaks to her mom, who she feels hasn’t apologized for her role in

what happened. She rarely speaks to Jason's family, who she says believed she was involved once they saw the TikTok videos she made.

In late May, April Moulton finally agreed to settle the court case. "It's going to feel good to let go of one thing," Ashley says, resigned. By July, Tom Hurley settled too. Meanwhile, the other Facebook group, run by anonymous critics, carries on. Ashley and Jason could go to court to compel Facebook to reveal who's behind the accounts and then, if the company were to relinquish the data, could file suit. They'll probably have to let it go, though, Ashley says. They don't have the money.

They've talked about leaving, about starting anew someplace else. "We want to disappear," Jason says. "Not until we get answers," he adds. They've talked about having another child together, about reversing the tubal ligation surgery Ashley had the year after Dylan was born. "In one way, you think that is something you might want, and then in another way, you'd feel like, that's wrong," she says. "What if you had another boy and he resembled Dylan, but then at the same time you feel like, we're replacing him?" Jason asks. Ashley adds, "There are circumstances where parents do have another kid to kind of replace what was lost, and then that child's living up to a standard of a child that's missing. Who can compare to that, right? That wouldn't be fair." No one gives you a pamphlet on how to be the parent of a missing child.

When Jason wakes up in the night, he takes long drags from a joint to fall back to sleep. When Ashley does, she doesn't bother trying to find sleep again. She gets up, another morning in an endless day. At 4 am, she sits alone at the kitchen table, sipping black coffee in the dark. "Once I'm awake, I'm awake. And my mind starts going," she says. "Every morning you wake up and there's a couple of seconds where you don't … where you forget. And then it hits you again. And you're like, this is my life."

The preceding months have brought depths of disappointment neither Ashley nor Jason thought possible. New tips are no longer a source of excitement, but an inevitable letdown. Jason filed a complaint with the police commissioner, alleging that the police were negligent in their initial investigation and search because they didn't send out an Amber Alert. Since then, the cops will meet only with Ashley and only if new information

comes in. If Dylan was the son of the mayor or the chief of police, Jason later says, this story would have a different ending. “Dylan would be home.” (The police say Jason is misconstruing facts online, and declined to comment further, citing the open missing-persons case.)

The couple hired a private investigator, Dave Worrell. He told the parents what Jason, by then, already believed: that Dylan’s grandmother’s timeline didn’t check out, that it could be investigated further. Dorothy says she passed a polygraph administered by the police. “They can investigate all they want,” she adds. “I have nothing to hide.”

In their home, Ashley and Jason and I talked for hours. Her hands never stopped moving. At her feet was a bin, holding near a hundred folded white paper boats. They’re for Dylan, she says. Tomorrow would be the anniversary of the day he disappeared, and, in a tribute, they’re going to send them out to sea.

A few days later, early one Saturday morning, Jason, Ashley, and Jason’s twin brother, Justin, climb into their white SUV and drive through Bible Hill, Truro, and Masstown and on toward familiar shores. The morning is misty gray, and they pass winding driveways, where wary barn cats keep neighborhood watch. The gravel turns to sand, and they pull into a makeshift parking spot in front of the rolling dunes of Fundy.

Jason pulls gear out of his trunk: neon orange vests, a briefcase holding the drone that he’ll fly up and down the shoreline. We pass orange tape tied to cedar branches and pieces of driftwood, markers made by another couple who come looking for Dylan sometimes. Jason has spent months begging for people to come help, scouring thousands of photographs for traces as small as the patches on Dylan’s jacket. Because while he believes that his son might still be alive—must still be alive—that someone took him from the backyard that day and vanished, the only clues in the case point to the water.

The dry grass crunches underfoot as we walk. We’ve gone 3 miles and will walk the line once more. I think of the bumper sticker, Dylan’s eyes trained upward. Out on the dunes, it starts to rain. Detritus has washed up here, scraps the tides have deigned to return: soggy red Tim Hortons coffee cups,

cracked scalloped shells, one of the eight boots Jason threw into the creek last year to see how far they would go.

Early on, someone at Wings of Mercy, a volunteer search support group, told Jason to be careful, that it's easy to get lost in the looking. But no body means hope, and his hope is a pilot light. He'll come out here on the same day again next week, because he does this every week, walking the shores of the river and the bay, then going home to post the footage to a Facebook group dedicated to his ongoing search. In his hand will be a binder filled with images and maps of where he's already been and where he thinks they should try again. The tidal force means the landscape's always shifting, so there is value here in retracing steps, looking for anything human against the loam.

He walks interminably on, trudging his way along the shoreline of a bay where the water never runs clear.

Updated 9/13/2021 12:00 pm ET: This story has been updated to clarify that Jason says he never lost a job due to anger.

This article appears in the October, 2021 issue. Subscribe now.

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Six-Word Sci-Fi: Stories Written by You

Here's this month's prompt, how to submit, and an illustrated archive of past favorites.

Play/Pause Button

Illustration: Elena Lacey
THIS MONTH'S PROMPT

In six words, write a story about the future of psychotherapy.

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OCTOBER 2021

An Adventure Story Set in the Metaverse

ILLUSTRATION: VIOLET REED

Steven Levy

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Meet the Little-Known Genius Who Helped Make Pixar Possible

Alvy Ray Smith helped invent computer animation as we know it—then got royally shafted by Steve Jobs. Now he's got a vision for where the pixel will take us next.
Alvy Ray Smith, who cofounded Pixar, was a leading figure in the early days of digital cinema. He's written a new book, *The Biography of a Pixel*, that traces the ideas and science that led to computer-generated animation over the last few centuries.Photograph: Cayce Clifford

In 2007 a new documentary called *The Pixar Story* screened at the Mill Valley Film Festival. It covered the wild antics of the studio's founders as they crafted a new kind of movie—a fully computer-animated picture bursting with riotous colors and textures, ultra-vivid characters, and plotlines subversively seeded with mind-expanding wisdom. During a panel discussion afterward, the interviewer asked a provocative question. "This might be crazy," she began, "but is there any connection between the world of the counterculture and psychedelics, and Pixar?"

The panelists on stage—Ed Catmull and John Lasseter, both central to Pixar's development—fell into an uncomfortable silence. Drugs and the counterculture are edgy subjects for employees of a Disney division beloved by generations of children. Finally, Lasseter said, "Is Alvy Ray Smith in the audience?"

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If Smith, the bearded, boisterous Pixar cofounder, had gotten a chance to answer the question, he would have freely admitted that LSD helped set his creative direction, which in turn shaped both Pixar's culture and its technology. He left the company just as it began making actual films, but every frame of those films owes something to Smith. He helped unleash the breakthroughs that allowed for movies to be generated entirely by code and algorithms. And in his work before and after Pixar, he made immense contributions to the first digital paint software, coding up features that transformed our ability to manipulate images.

But Smith's presence in the back of the auditorium—and not on the stage—spoke to something else: the dissonance between his contributions and his fame. He's a unique figure in both computer science and entertainment, bridging the eras of primitive line graphics on blinking oscillators and immersive virtual worlds made of dazzling computer imagery. All while, as Lasseter implied, injecting the '60s *Weltanschauung* into everything he touched, much of which touches us still. Yet, despite a healthy ego and a raconteur's élan, after Lasseter's callout—and some laughter in the room—Smith stayed in his seat and said nothing.

Call it restraint. "As far as history goes, I feel like he got shafted, both in Pixar history and in computer graphics history in general," says Pam Kerwin, a former Pixar colleague. "Everything that you currently use in Photoshop right now basically came from Alvy." Even self-driving cars and augmented reality, "which are all about image processing, machine vision ... Alvy and his colleagues brought all that stuff into the world."

The breakthrough in Pixar's films was that the emotions they unleashed were as vivid as those from a human performance.

Photograph: Cayce Clifford

But the 77-year-old's mark is not limited to the past, and the world still has to do some catching up to him. This summer he finally stepped out, publishing *A Biography of the Pixel*, in which he lays out a grand unified theory of digital expression. *Pixel* is a deep and challenging tome in the spirit of Douglas Hofstadter's *Gödel, Escher, Bach: An Eternal Golden Braid*, a winding tale of science, heroes, and tyrants, all leading to the

moment, sometime around the beginning of our current century, when a long-predicted digital convergence coalesced. Almost all expression—visual, textual, audio, video, you name it—has moved to the machine world, which, perhaps counterintuitively, is no less real than our physical reality. And that is not a metaphorical equivalence. It is, Smith argues, literal.

He calls this second reality Digital Light, and it's pretty much what all of us look at and listen to when we're not in the middle of a forest. He didn't coin the term—it was first uttered about a decade ago by a conference organizer who asked him to give a talk with that title. "It was a term that's everything I wanted it to be," he says, covering "all these different aspects of what people do with pixels."

Digital Light, as he documents, emerged into the world through a long and twisted scientific process; it's a picaresque tale with unexpected protagonists—Jean-Baptiste Joseph Fourier, Vladimir Kotelnikov, Alan Turing—whose lives he exhumes with the passion of an obsessive genealogist. Putting together their contributions on the nature of light, sampling, and computation, Smith makes a convincing case that there's no difference between analog and digital reality. It's a belief that he's held for decades. Barbara Robertson, a computer graphics journalist, remembers sitting with him at a café and hearing him say, after a contemplative silence, "You, know, everything is just waves."

Oh, and the subject of this biography, the pixel, is not what we generally think it is. Forget your misguided belief that a pixel is one of those tiny squares on your screen. Smith explains that the pixel is the product of a two-part process in which an element of some consciously created content is presented on some sort of display. Friends, you are not looking at pixels on your screen but the *expression* of those pixels. What you see is Digital Light. The pixel itself? That's just an idea. Once you get this distinction, it's clear that Digital Light is not a second-class reality. In the 21st century, it's equal. "Just the simple idea of separating pixels from display elements is going to seem revolutionary to people who don't understand the technology," Robertson says.

This history of computer graphics is very much a shadow autobiography, which Smith launches at almost exactly the midpoint of the 560-page volume. He re-creates a scene where the famed sitar player Ravi Shankar visits Smith's lab at Lucasfilm and is enchanted by the blooming of an algorithmically generated flower. "Allllllllvyyyyy!" Shankar cries in appreciation. From that moment, Smith appears as an unforgettable figure in the pixel's saga, and he brings in the people who shaped him and almost killed him—Steve Jobs, George Lucas, and an obscure would-be animation pioneer named Alex Schure. As a participant in this revolution, Smith takes us to the turn of the new century, when we reach the precipice of digital convergence.

It took Alvy Ray Smith 10 years to produce the book. Or maybe 50. It depends on whether you date the work from the time he began writing it or just living it.

"At one point, I mentally wrote a screen-play about Alvy's life, which I think actually would make a fantastic movie," says Smith's wife, Alison Gopnik, who met him well into act three. "The first scene you see is this New Mexico desert, and then there's this little towheaded, blond kid. And there's horses and cactuses around, and then you see one of the rockets from White Sands, right, appearing on the horizon. And he's looking up at the rocket." In truth, Smith, just under 2 years of age, was at home in Las Cruces when he says he heard the explosion from the 1945 Trinity atomic bomb test, 100 miles away. His dad was away at war; his parents had married and conceived him with the thought that they might never be reunited. But his father did return and took a job running a cattle feed business in the small town of Clovis, near the Texas panhandle.

Smith was a good student, with a particular talent for math. But he also loved spending time with an uncle who was a professional artist. Smith was the only person Uncle George allowed in his studio, and the boy silently observed how to stretch a canvas, mix oils and turpentine, and use pigments to bring life to a blank surface. He got a taste of computer programming while visiting scientists at the nearby White Sands Missile Range. At New Mexico State University he studied electrical engineering, and he headed to Stanford to study artificial intelligence. In California, he learned more than

computers. “In the next year, my hair was down to here, and I was hanging out in Golden Gate Park and doing all the drugs and everything,” he says. After taking LSD, he says, “I realized that I could not be a programmer—I had to do something that had art in it.”

It would take him a while. He wound up studying cellular automata, self-reproducing digital organisms generated by rule-based systems. After his doctorate, Smith headed east, to New York City, for a teaching job. He designed a cellular automaton exercise that became the cover of the February 1971 issue of *Scientific American*. But while he reveled in the city’s pleasures, he found academia unsatisfying.

In December 1972, Smith was racing down a New Hampshire ski slope when his knit cap shifted and covered his face. (Later he discovered that a tag inside the cap read, “Knitted by a blind person.”) He didn’t see a second skier on the trail, who’d lost control and was headed directly for him. Smith suffered a nasty spiral fracture of his right femur. He spent the next three months in a full-body cast, nipples to toes. “I just thought nonstop, 15 hours a day, and rethought the world,” he says. He’d always been passionate about merging computers and art. But somehow, he’d lost the art. “I said, ‘Alvy, you’ve made a terrible mistake,’” he says.

He resigned his NYU post and headed back to California. He slept on people’s floors in Berkeley for a year and waited for something to happen. And it did. One day in May 1974, a friend, Richard Shoup, convinced him to come to his workplace, the Xerox Palo Alto Research Center, where a team of computer scientists were reinventing computing on the dime of the copy machine giant. Shoup’s own project, called SuperPaint, was orthogonal to that effort, and not universally blessed. It was the first interactive color graphics program—basically a software paintbrush with a color TV display—that allowed users to create and manipulate images. Smith’s mind was blown as surely as if he’d dropped a tab of acid. He had discovered Digital Light. “I played with the program for 13 hours straight and didn’t want to leave,” he says. “This is the marriage of art and computers!”

Early on, Ed Catmull believed that computer graphics could revolutionize entertainment.

Photograph: Cayce Clifford

At the time, full-color graphics on a computer were a rare thing. Producing even a single image required massive amounts of memory, known as a frame buffer. “To put a picture up on a display you had to buffer it in something, and that something might cost half a million bucks,” says Alan Kay, who was heading the personal computer effort at PARC. The research lab had a slow, grouchy frame buffer that made SuperPaint possible.

Smith realized that with SuperPaint and the frame buffer you could create animations. “We understood right away that you can make these things *move*,” he says. He began visiting the lab to make cinematic sequences, including a cartoon figure winking his eye and turning his eyeball. Smith was desperate to join PARC, but the lab wouldn’t hire him full-time. Finally, with Kay’s help, PARC executives figured out a low-risk way to retain him: They paid him through a purchase order, as if renting a piece of equipment. They contracted for 857 hours of “professional labor services.”

Soon, a video artist named David DiFrancesco started hanging out at the lab. Smith built a slick interface for Shoup’s system, essentially creating the first draft of the personal graphics programs that millions of people now take for granted. He used the software to make animations, and DiFrancesco filmed the images. It was a wonderful chaos.

A ponytailed Smith started working at the Xerox Palo Alto Research Center in 1974, where he quickly became obsessed with a digital imaging program called SuperPaint.

Courtesy of David DeFrancesco

Their idyll was short-lived. One day, a group of executives informed Smith and DiFrancesco that they were doubling down on black-and-white. They were phasing out SuperPaint. The Alvy Ray Smith purchase order was canceled.

But Smith had found his mission: to build the future of computer graphics. He and DiFrancesco piled into Smith’s white Ford Torino and blasted down the interstate to the unlikely mecca of the field, the University of Utah, in

the hope of finding new jobs. Computer graphics researchers at Utah were focused more on functional applications, such as computer-aided design, and not the psychedelic painting approach that splashed color pixels on a screen. They didn't hire Smith and DiFrancesco, but they did mention a recent Utah grad named Ed Catmull, who thought just like they did.

Not yet 30, Catmull believed in the then contrarian idea that computer graphics could revolutionize entertainment. Catmull had accepted a job at an unlikely place: the New York Institute of Technology. It sounds MIT-ish, but its reputation circa 1975 was something akin to a diploma mill. (Its standing has since improved.) Located on the north shore of Long Island, it owned a number of Gatsbyesque mansions. The maestro of this operation was Alex Schure, a self-described "education entrepreneur" with mysterious sources of income. Despite, or maybe because of, his constant denials that he wanted to be the next Walt Disney, people universally understood that Disneyhood was his goal. He was bankrolling a cartoon epic based on a children's orchestral piece called *Tubby the Tuba*. He had a hundred animators on the project, and he was hoping Catmull might automate some of the process.

Smith has a quick cereal snack—"I'm pretty sure it was Grape Nuts," he says—while at work at the New York Institute of Technology in the mid-1970s. "We ate on the fly to keep going and not miss anything," he says.

Courtesy of David DeFrancesco

Tipped off by the Utah people, Catmull summoned Smith and DiFrancesco, who immediately flew to Long Island to join the group, which was stationed above a garage in one of the mansions. Catmull, a soft-spoken Mormon with a family, bonded instantly with Smith. "Alvy had a long black beard, with hair flying, but it didn't matter, he was smart and engaging," Catmull says. Best of all, Smith came to share Catmull's passion for one day making a full-length feature film entirely with computer graphics. They called their dream The Movie.

Smith became Catmull's de facto partner. Computer graphics at the time was a fringe stepchild of computer science, constrained by the limited power of relatively primitive machines. But they understood that what

would soon become known as Moore's law would change that, and they set about boosting their field to become a linchpin of computing and entertainment.

Schure went all in, eventually buying 18 frame buffers for hundreds of thousands of dollars. The fully equipped team began making short animated movies. Their foes were "jaggies," the blocky edges you could see on poorly rendered objects. The antidote to the jaggies was a technique called anti-aliasing that required raw computer power and clever techniques to create denser graphics.

The extra buffers led Smith and Catmull to a major conceptual advance: the alpha channel. Alongside the three basic color channels of red, green, and blue, which combined in various ways to create full-color palettes, they added an element that controlled the *transparency* of pixels. By tweaking an object's opacity over time, you could blur its motion and correct for the unpleasant staccato movements that spoiled early attempts at digital animation.

Once people started using the alpha channel, it seemed absurdly obvious. "If you tell somebody that Alvy invented the alpha channel, people don't even know what that *means*, because alpha channel is just so fundamentally integrated into everything that happens with graphics," says Glenn Entis, then a student taking classes at NYIT, who later cofounded the graphics company behind *Shrek* and *Madagascar*. Smith and his colleagues eventually won an Academy Award for the alpha channel, one of Smith's two technical Oscars. (The other was shared with Shoup for SuperPaint.)

But in 1975, Smith and Catmull started to realize they were in the wrong place. *Tubby the Tuba* finally came out—and it was dead boring. "We had a screening in Manhattan, and several of the people there fell asleep," Catmull says. Smith thought the lesson was clear: To make a great animated film, you needed more than great graphics. You needed a storyteller.

They decided to approach George Lucas. To avoid tipping off Schure, they made a clandestine sortie to a nearby office supply shop and rented a cast-iron manual typewriter. They banged out a letter offering Lucas their services. It worked: Over the next several months, several members of the

lab took jobs at Lucasfilm in Marin County, California. It was the club to join, says Loren Carpenter, who signed on in 1980. “These were the people pushing the boundaries of algorithms,”

Lucas and Smith never resolved a basic disagreement. According to Smith, Lucas saw his graphics group as toolmakers, not moviemakers. It’s true that to create The Movie, scientists had to fashion amazing tools that could render reality in a convincing way. Smith and Catmull had an expansive vision for what those tools ought to be, including a virtual camera that would capture the images produced by computers. Lucas rejected the premise that you could shoot an entire movie inside a computer.

In 1982 an opportunity arose to apply the tools to an actual Hollywood movie. Lucasfilm was providing effects for *Star Trek II: The Wrath of Khan*, and the script had a scene in which Kirk and Spock watch, on a computer screen, a dead planet starting to bloom with organic life. The movie-within-a-movie was a perfect opportunity to inject computer graphics—which still couldn’t match the resolution of actual film—into a big-budget movie.

Smith has been recognized with many honors from his peers, including two Oscars for scientific and technical achievement.

Photograph: Cayce Clifford

The sequence, directed by Smith, became known as the Genesis effect. It showed a ship firing a torpedo at a planet to transform its barren surface into a verdant, Earth-like paradise. Smith made his virtual camera do a slick pirouette that could never have been done with a physical rig, a move he devised specifically to impress Lucas. Indeed, one day Lucas stuck his head into Smith’s office—*Great camera move*, he said. Not long after, the group’s special effects popped up in *Return of the Jedi* and *Young Sherlock Holmes*. Still, Lucas stuck to his position.

As the graphics group refined their techniques, they had to improve their hardware, and they designed their own imaging computer with built-in frame buffers. One day over lunch, while brainstorming a name for this device, Smith suggested a variation of laser—*pixer*, which had the flavor of

a Spanish verb. Loren Carpenter tweaked it to *pixar*, which had a Jetsonesque feel to it. They all agreed that *pixar* was a cool name.

But they still dreamed of The Movie. In 1983, Smith began storyboarding a short, fully computer-generated movie of his own. He set a goal of finishing it within a year. The story—more like a vignette—involved an android named André coming to life in a forest. The Lucasfilm team jokingly referred to it as "My Breakfast With André," referencing the two-hander with André Gregory and Wallace Shawn. Smith later told author Michael Rubin that he intended the android's awakening to symbolize the rise of computer animation itself.

Later that year, Smith and Catmull went on a secret pilgrimage to meet with Disney executives, in hopes that The Movie could one day be made there. On that visit they met an impressive young animator named John Lasseter. Lasseter left Disney soon after, and Smith and Catmull pounced on the chance to hire him. Because Lucas didn't want his computer scientists to make movies, they gave Lasseter the title "user interface designer." He started working on the André short, making the hero more lifelike. And why not have a second character? Enter a bee, to annoy and ultimately pursue André. They named the newcomer Wally B, after Wallace Shawn. Lasseter's contribution confirmed the revelation Smith had had at NYIT—the magic of a movie had to come from human creativity, from storytelling.

By all moviemaking measures, *The Adventures of André and Wally B* was a trifle. Yet for that moment, Smith and Lasseter's creation was the apotheosis of all the calculations, fractals, algorithms, and alpha channels. André's hip wiggle as he hopped away from the bee hinted broadly that the simulated world could be as vivid as live action.

The short film premiered at Siggraph, the premier computer graphics conference, held in Minneapolis that year. Coincidentally, Lucas was in town, attending his girlfriend Linda Ronstadt's concert. Not wanting to draw attention, he entered the conference theater after the lights went down. *André* was the last demo in the program. At the end of the 120-second saga, the room erupted. Don Greenberg, who headed a computer graphics program at Cornell, later said that during those two minutes, a thousand students decided to go into computer animation. "These people knew what

we'd done," Smith says. But at the after-party, Lucas' praise was tepid. "George didn't get it," Smith says.

Disney didn't seem to get it, either. But in one of their meetings, Smith and Catmull pitched a computer paint system to help animate the characters painstakingly drawn by human artists. Using digital painting would save time and money and allow the artists to add more detail to the hand-drawn characters. Disney executives decided to use the system, and Smith negotiated a deal between Disney and Lucasfilm. The Computer Animated Production System became the primary tool in all the classics of that era, including *Beauty and the Beast*. But Disney still didn't want to make The Movie.

Meanwhile, Lucasfilm was suffering a cash crisis. Lucas and his wife were negotiating a divorce, and the impending settlement hurt the company's finances. Worried about their funding, Smith and Catmull drove to a bookstore and went straight to the business section, where they each bought two books on starting a company. They figured they could build a business around their imaging computer, but also that, eventually, they could convince a studio to make The Movie.

Neither book contained advice for what would be Alvy Ray Smith's main problem—how to deal with Steve Jobs.

Pixar was spun out of Lucasfilm and was purchased by Steve Jobs for $10 million in 1986.

Photograph: Cayce Clifford

The next year was full of frustrations. Smith and Catmull tried to bootstrap their division of Lucasfilm into a separate company called Pixar, but they struggled to find funding. Early in 1985, Smith's former PARC colleague Alan Kay brokered a meeting with Steve Jobs.

Smith and Catmull worried that Jobs would not be open to their long-term vision of computer-animating a feature film. But after deals with Philips and General Motors fell through, Jobs, who'd by then left Apple and started a new company, NeXT, seemed inclined to let Pixar explore animation, as

long as Smith and Catmull also pursued a graphics-based hardware business. He bought Pixar for $10 million. He'd spend about five times that before he was through.

For the first meeting after the sale, everyone gathered to hear from their new boss. Smith immediately feared that Jobs, by demanding unrealistic results, would overwrite the culture he and Catmull had built and burn out their team. "He's got their brains snatched," he says. He vowed to keep Jobs out of the building as much as possible.

Smith and Jobs routinely butted heads. Jobs often began meetings with an intentionally outrageous statement, and Smith made a point of pushing back. "It was a pure ego competition—Alvy wanted his vision to be dominant, and there was no way that was going to happen," says Pam Kerwin, who was Pixar's general manager.

Meanwhile, Pixar kept making short films that won acclaim. One, about lifelike desk lamps, even got nominated for an Oscar. Jobs saw them as marketing vehicles; Smith and Catmull saw them as test runs for The Movie.

At first Jobs tolerated Smith's aggressions. Eventually, though, he began to lose patience. And then came the whiteboard incident. At a Pixar board meeting in 1990, Jobs was complaining that Pixar was behind on a project. Smith said that NeXT was behind on *its* products. As Smith recalls it, Jobs began mocking Smith's Southwestern accent. "I had never been treated that way. I just went crazy," Smith says. "I was screaming into his face, and he's screaming back at me. And right in the middle of that crazy, absolutely insane moment, I knew what to do. I brushed past him and wrote on the whiteboard."

Those few feet to the whiteboard took Smith past the point of no return. No one wrote on Steve Jobs' hallowed whiteboard. As Smith took the marker and scrawled—he doesn't even remember what he wrote—he was committing Steve-icide. "I wanted out of there," he says. "I didn't want that guy's poison in my life any longer."

Smith spent the next year holed up in his office. He had realized that users of personal computers could benefit from his graphics advances, so he began writing an app distinguished by what he called “floating imagery,” which allowed users to easily move objects. “You couldn’t believe what you were seeing,” says Eric Lyons, an Autodesk executive who saw an early demo. “It wasn’t something Photoshop could do at the time.”

Meanwhile, there was good news from Disney. At a meeting with Disney’s animation czar, Jeffrey Katzenberg, Jobs, Smith, Catmull, and Lasseter worked out a collaboration. *Toy Story* got a tentative green light. Once Smith felt sure that The Movie would be made, he left Pixar. (Years later, Lasseter resigned from the company after accusations of sexual harassment.)

Like a computer-graphics Moses, Smith helped deliver Pixar within sight of the promised land. But he never entered it himself. In movie after movie—from *A Bug’s Life* to *Ratatouille* to *Soul*—the studio pushed the boundaries of technology and art, fulfilling the vision that Smith had nurtured while in a full-body cast, on acid trips, in the mansions of Long Island, and on the back lots at Lucasfilm. His former colleagues at Pixar are unanimous in recognizing his contributions. But after he left, Smith’s name was removed from the website, an excision that he feels was somewhat of a betrayal. Catmull says he doesn’t see websites as historical documents.

Smith did not escape cleanly. With Lyons and a third cofounder, he started a company to sell his new image-editing software. They called the company Altamira, after the roughly 20,000-year-old cave paintings in Spain. But there was a hitch. “Alvy didn’t have it in writing that he could take his code with him”—code written while he was a Pixar employee, Catmull says. Jobs demanded that Altamira pay him a huge royalty for every copy sold, scaring away potential investors. After lengthy negotiations, Jobs signed off in exchange for an equity stake in Smith’s company.

One day Smith was at home with his wife and two sons when he felt “an intense screaming pain” in his chest. A colony of bacteria had invaded one of his lungs, forming the equivalent of a rind that had to be surgically peeled off. A month later, on a ferry ride to Vancouver, he felt the pain again. The same thing had happened to his second lung. To this day, he has

only one-third of normal lung capacity. “I asked, why did I get it?” he says. “My answer is, the sheer stress.” Catmull agrees: “Basically, it was a life-threatening experience, which grew out of the pressure of Steve’s delay.”

The lost months proved crippling to the startup. In that time, Photoshop launched a competing feature called “layers.” Altamira’s sales were low, and the company needed a lifeline. Smith was introduced to Nathan Myhrvold, who headed Microsoft Research. “I just wanted marketing help from Microsoft,” Smith says. Instead, Myhrvold bought the company, though he wanted Smith more than his product. Smith spent four years there and retired in 1999. “I had decided along the way that they didn’t really care about my ideas,” he says.

Smith’s next move baffled his friends: He became a genealogist. He began methodically exploring his heritage, and in 2010 was elected a Fellow of the American Society of Genealogists. The honor is limited to only 50 living people, and it requires a supermajority vote.

After a divorce from his first wife, he met Alison Gopnik, the celebrated psychology professor at Berkeley, and they married in 2010. “He’s this sweet, amiable, successful man, but the kind of crazy hippie part is just underneath,” she says. A skeptic of his genealogy work, Gopnik urged him to write what would become *A Biography of the Pixel*.

For years, he traveled with her to conferences and on sabbaticals. Eventually, he found himself telling the stories of the people who created the foundation of what would become Digital Light. As well as his own.

You may not be able to pinpoint Smith’s presence in the code of the alpha channel or in the swooping camera pivot in *The Wrath of Khan*. But it’s there. The breakthrough behind the Pixar films was that it didn’t matter that movie screens and iPads were streaming bits entirely created within computers—the emotions they unleashed were as vivid as those produced by a human performance. More and more, the conventions of our existence —from money (cryptocurrency) to art (NFTs)—are moving to digital realms as consequential as their analog predecessors. What is the much discussed metaverse but an expression of physical civilization bathed in Digital Light?

Smith has been on a decades-long quest to put computers in the service of art.

Photograph: Cayce Clifford

So it's no coincidence that in recent years Smith has been advising a promising virtual reality company called Baobab. In his meetings with the CEO, Maureen Fan, he dispenses advice not only on creating real-time graphics but on how to build a company and, uh, how to chemically expand one's creative outlook. "He's so idealistic," Fan says. "And he did tell me I really need to do drugs." (She passed.)

Early this summer, to celebrate the book, Smith gathered some of his former colleagues at his Berkeley home. For many, it was their first social event since the Covid curtain crashed down. Smith was in his familiar Hawaiian shirt, hair down his neck, with a beard and a broad smile.

Smith's own copy of his book hadn't arrived yet. An hour or so into the gathering, though, a guest showed up with it. Smith beamed as he held the book aloft.

For someone who had just written more than 500 pages about how digital media has overthrown physical products, he was oddly ecstatic to receive his words in a 5-pound analog package. Of course, reading those printed pages is just waves too.

Let us know what you think about this article. Submit a letter to the editor at mail@wired.com.

Meghan O'Gieblyn

Sensors
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Can Robots Evolve Into Machines of Loving Grace?

Perhaps, if we put bots together the right way, consciousness will simply emerge.
Illustration: Aaron Denton

Nobody could say exactly when the robots arrived. They seemed to have been smuggled onto campus during the break without any official announcement, explanation, or warning. There were a few dozen of them in total: six-wheeled, ice-chest-sized boxes with little yellow flags on top for visibility. They navigated the sidewalks around campus using cameras, radar, and ultrasonic sensors. They were there for the students, ferrying deliveries ordered via an app from university food services, but everyone I knew who worked on campus had some anecdote about their first encounter.

These stories were shared, at least in the beginning, with amusement or a note of performative exasperation. Several people complained that the machines had made free use of the bike paths but were ignorant of social norms: They refused to yield to pedestrians and traveled slowly in the passing lane, backing up traffic. One morning a friend of mine, a fellow adjunct instructor who was running late to his class, nudged his bike right up behind one of the bots, intending to run it off the road, but it just kept moving along on its course, oblivious. Another friend discovered a bot trapped helplessly in a bike rack. It was heavy, and she had to enlist the help of a passerby to free it. “Thankfully it was just a bike rack,” she said. “Just wait till they start crashing into bicycles and moving cars.”

Among the students, the only problem was an excess of affection. The bots were often held up during their delivery runs because the students insisted on taking selfies with the machines outside the dorms or chatting with them. The robots had minimum speech capacities—they were able to emit greetings and instructions and to say "Thank you, have a nice day!" as they rolled away—and yet this was enough to have endeared them to many people as social creatures. The bots often returned to their stations with notes affixed to them: *Hello, robot!* and *We love you!* They inspired a proliferation of memes on the University of Wisconsin–Madison social media pages. One student dressed a bot in a hat and scarf, snapped a photo, and created a profile for it on a dating app. Its name was listed as Onezerozerooneoneone, its age 18. Occupation: delivery boi. Orientation: asexual robot.

Around this time autonomous machines were popping up all over the country. Grocery stores were using them to patrol aisles, searching for spills and debris. Walmart had introduced them in its supercenters to keep track of out-of-stock items. A *New York Times* story reported that many of these robots had been christened with nicknames by their human coworkers and given name badges. One was thrown a birthday party, where it was given, among other gifts, a can of WD-40 lubricant. The article presented these anecdotes wryly, for the most part, as instances of harmless anthropomorphism, but the same instinct was already driving public policy. In 2017 the European Parliament had proposed that robots should be deemed "electronic persons," arguing that certain forms of AI had become sophisticated enough to be considered responsible agents. It was a legal distinction, made within the context of liability law, though the language seemed to summon an ancient, animist cosmology wherein all kinds of inanimate objects—trees and rocks, pipes and kettles—were considered nonhuman "persons."

It made me think of the opening of a 1967 poem by Richard Brautigan, "All Watched Over by Machines of Loving Grace":

I like to think (and
the sooner the better!)
of a cybernetic meadow

where mammals and computers
live together in mutually
programming harmony
like pure water
touching clear sky.

Brautigan penned these lines during the Summer of Love, from the heart of the counterculture in San Francisco, while he was poet in residence at the California Institute of Technology. The poem's subsequent stanzas elaborate on this enchanted landscape of "cybernetic forests" and flowerlike computers, a world in which digital technologies reunite us with "our mammal brothers and sisters," where man and robot and beast achieve true equality of being. The work evokes a particular subgenre of West Coast utopianism, one that recalls the back-to-the-land movement and Stewart Brand's *Whole Earth Catalog,* which envisioned the tools of the American industrial complex repurposed to bring about a more equitable and ecologically sustainable world. It imagines technology returning us to a more primitive era—a premodern and perhaps pre-Christian period of history, when humans lived in harmony with nature and inanimate objects were enchanted with life.

Echoes of this dream can still be found in conversations about technology. It is reiterated by those, like MIT's David Rose, who speculate that the internet of things will soon "enchant" everyday objects, imbuing doorknobs, thermostats, refrigerators, and cars with responsiveness and intelligence. It can be found in the work of posthuman theorists like Jane Bennett, who imagines digital technologies reconfiguring our modern understanding of "dead matter" and reviving a more ancient worldview "wherein matter has a liveliness, resilience, unpredictability, or recalcitrance that is itself a source of wonder for us."

"I like to think" begins each stanza of Brautigan's poem, a refrain that reads less as poetic device than as mystical invocation. This vision of the future may be just another form of wishful thinking, but it is a compelling one, if only because of its historical symmetry. It seems only right that technology should restore to us the enchanted world that technology itself destroyed.

Perhaps the very forces that facilitated our exile from Eden will one day reanimate our garden with digital life. Perhaps the only way out is through.

Illustration: Aaron Denton

Brautigan's poem had been on my mind for some time before the robots arrived. Earlier that year I'd been invited to take part in a panel called Writing the Nonhuman, a conversation about the relationship between humans, nature, and technology during the Anthropocene.

My talk was about emergent intelligence in AI, the notion that higher-level capacities can spontaneously appear in machines without having been designed. I'd focused primarily on the work of Rodney Brooks, who headed up the MIT Artificial Intelligence Lab in the late 1990s, and his "embodied intelligence" approach to robotics. Before Brooks came along, most forms of AI were designed like enormous disembodied brains, as scientists believed that the body played no part in human cognition. As a result, these machines excelled at the most abstract forms of intelligence—calculus, chess—but failed miserably when it came to the kinds of activities that children found easy: speech and vision, distinguishing a cup from a pencil. When the machines were given bodies and taught to interact with their environment, they did so at a painfully slow and clumsy pace, as they had to constantly refer each new encounter back to their internal model of the world.

Brooks' revelation was that it was precisely this central processing—the computer's "brain," so to speak—that was holding it back. While watching one of these robots clumsily navigate a room, he realized that a cockroach could accomplish the same task with more speed and agility despite requiring less computing power. Brooks began building machines that were modeled after insects. He used an entirely new system of computing he called subsumption architecture, a form of distributed intelligence much like the kind found in beehives and forests. In place of central processing, his machines were equipped with several different modules that each had its own sensors, cameras, and actuators and communicated minimally with the others. Rather than being programmed in advance with a coherent picture of the world, they learned on the fly by directly interacting with their environment. One of them, Herbert, learned to wander around the lab and

steal empty soda cans from people's offices. Another, Genghis, managed to navigate rough terrain without any kind of memory or internal mapping. Brooks took these successes to mean that intelligence did not require a unified, knowing subject. He was convinced that these simple robot competencies would build on one another until they evolved something that looked very much like human intelligence.

Brooks and his team at MIT were essentially trying to re-create the conditions of human evolution. If it's true that human intelligence emerges from the more primitive mechanisms we inherited from our ancestors, then robots should similarly evolve complex behaviors from a series of simple rules. With AI, engineers had typically used a top-down approach to programming, as though they were gods making creatures in their image. But evolution depends on bottom-up strategies—single-cell organisms develop into complex, multicellular creatures—which Brooks came to see as more effective. Abstract thought was a late development in human evolution, and not as important as we liked to believe; long before we could solve differential equations, our ancestors had learned to walk, to eat, to move about in an environment. Once Brooks realized that his insect robots could achieve these tasks without central processing, he moved on to creating a humanoid robot. The machine was just a torso without legs, but it convincingly resembled a human upper body, complete with a head, a neck, shoulders, and arms. He named it Cog. It was equipped with over 20 actuated joints, plus microphones and sensors that allowed it to distinguish between sound, color, and movement. Each eye contained two cameras that mimicked the way human vision works and enabled it to saccade from one place to another. Like the insect robots, Cog lacked central control and was instead programmed with a series of basic drives. The idea was that through social interaction, and with the help of learning algorithms, the machine would develop more complex behaviors and perhaps even the ability to speak.

Over the years that Brooks and his team worked on Cog, the machine achieved some remarkable behaviors. It learned to recognize faces and make eye contact with humans. It could throw and catch a ball, point at things, and play with a Slinky.

When the team played rock music, Cog managed to beat out a passable rhythm on a snare drum. Occasionally the robot did display emergent behaviors—new actions that seemed to have evolved organically from the machine's spontaneous actions in the world. One day, one of Brooks' grad students, Cynthia Breazeal, was shaking a whiteboard eraser and Cog reached out and touched it. Amused, Breazeal repeated the act, which prompted Cog to touch the eraser again, as though it were a game. Brooks was stunned. It appeared as though the robot recognized the idea of turn-taking, something it had not been programmed to understand. Breazeal knew that Cog couldn't understand this—she had helped design the machine. But for a moment she seemed to have forgotten and, as Brooks put it, "behaved as though there was more to Cog than there really was." According to Brooks, his student's willingness to treat the robot as "more than" it actually was had elicited something new. "Cog had been able to perform at a higher level than its design so far called for," he said.

Brooks knew that we are more likely to treat objects as persons when we are made to socially engage with them. In fact, he believed that intelligence exists only in the relationships we, as observers, perceive when watching an entity interact with its environment. "Intelligence," he wrote, "is in the eye of the observer." He predicted that, over time, as the systems grew more complex, they would evolve not only intelligence but consciousness as well. Consciousness was not some substance in the brain but rather emerged from the complex relationships between the subject and the world. It was part alchemy, part illusion, a collaborative effort that obliterated our standard delineations between self and other. As Brooks put it, "Thought and consciousness will not need to be programmed in. They will emerge."

Illustration: Aaron Denton

The AI philosopher Mark A. Bedau has argued that emergentism, as a theory of mind, "is uncomfortably like magic." Rather than looking for distinct processes in the brain that are responsible for consciousness, emergentists believe that the way we experience the world—our internal theater of thoughts and feelings and beliefs—is a dynamic process that cannot be explained in terms of individual neurons, just as the behavior of a flock of starlings cannot be accounted for by the movements of any single

bird. Although there is plenty of evidence of emergent phenomena in nature, the idea becomes more elusive when applied to consciousness, something that cannot be objectively observed in the brain. According to its critics, emergentism is an attempt to get "something from nothing," by imagining some additional, invisible power that exists within the mechanism, like a ghost in the machine.

Some have argued that emergentism is just an updated version of vitalism, a popular theory throughout the 18th and 19th centuries that proposed that the world was animated by an elusive life force that permeates all things. Contrary to the mechanistic view of nature that was popular at that time, vitalists insisted that an organism was more than the sum of its parts—that there must exist, in addition to its physical body, some "living principle," or *élan vital*. Some believed that this life force was ether or electricity, and scientific efforts to discover this substance often veered into the ambition to re-create it artificially. The Italian scientist Luigi Galvani performed well-publicized experiments in which he tried to bring dismembered frog legs to life by zapping them with an electrical current. Reports of these experiments inspired Mary Shelley's novel *Frankenstein*, whose hero, the mad scientist, is steeped in the vitalist philosophies of his time.

When reading about Brooks and his team at MIT, I often got the feeling they were engaged in a kind of alchemy, carrying on the legacy of those vitalist magicians who inspired Victor Frankenstein to animate his creature out of dead matter—and flirting with the same dangers. The most mystical aspect of emergentism, after all, is the implication that we can make things that we don't completely understand. For decades, critics have argued that artificial general intelligence—AI that is equivalent to human intelligence—is impossible, because we don't yet know how the human brain works. But emergence in nature demonstrates that complex systems can self-organize in unexpected ways without being intended or designed. Order can arise from chaos. In machine intelligence, the hope persists that if we put the pieces together the right way—through ingenuity or accident—consciousness will emerge as a side effect of complexity. At some point nature will step in and finish the job.

It seems impossible. But then again, aren't all creative undertakings rooted in processes that remain mysterious to the creator? Artists have long understood that making is an elusive endeavor, one that makes the artist porous to larger forces that seem to arise from outside herself. The philosopher Gillian Rose once described the act of writing as "a mix of discipline and miracle, which leaves you in control, even when what appears on the page has emerged from regions beyond your control." I have often experienced this strange phenomenon in my own work. I always sit down at my desk with a vision and a plan. But at some point the thing I have made opens its mouth and starts issuing decrees of its own. The words seem to take on their own life, such that when I am finished, it is difficult to explain how the work became what it did. Writers often speak of such experiences with wonder and awe, but I've always been wary of them. I wonder whether it is a good thing for an artist, or any kind of maker, to be so porous, even if the intervening god is nothing more than the laws of physics or the workings of her unconscious. If what emerges from such efforts comes, as Rose puts it, "from regions beyond your control," then at what point does the finished product transcend your wishes or escape your intent?

Later that spring I learned that the food-delivery robots had indeed arrived during the break. A friend of mine who'd spent the winter on campus told me that for several weeks they had roamed the empty university sidewalks, learning all the routes and mapping important obstacles. The machines had neural nets and learned to navigate their environment through repeated interactions with it. This friend was working in one of the emptied-out buildings near the lake, and he said he'd often looked out the window of his office and seen them zipping around below. Once he caught them all congregated in a circle in the middle of the campus mall. "They were having some kind of symposium," he said. They communicated dangers to one another and remotely passed along information to help adapt to new challenges in the environment. When construction began that spring outside one of the largest buildings, word spread through the robot network—or, as one local paper put it, "the robots remapped and 'told' each other about it."

One day I was passing through campus on my way home from the library. It was early evening, around the time the last afternoon classes let out, and the

sidewalks were crowded with students. I was waiting at a light to cross the main thoroughfare—a busy four-lane street that bifurcated the campus—along with dozens of other people. Farther down the street there was another crosswalk, though this one did not have a light. It was a notoriously dangerous intersection, particularly at night, when the occasional student would make a wild, last-second dash across it, narrowly escaping a rush of oncoming traffic. As I stood there waiting, I noticed that everyone's attention was drawn to this other crosswalk. I looked down the street, and there, waiting on the corner, was one of the delivery robots, looking utterly bewildered and forlorn. (But how? It did not even have a face.) It was trying to cross the street, but each time it inched out into the crosswalk, it sensed a car approaching and backed up. The crowd emitted collective murmurs of concern. "You can do it!" someone yelled from the opposite side of the street. By this point several people on the sidewalk had stopped walking to watch the spectacle.

The road cleared momentarily, and the robot once again began inching forward. This was its one shot, though the machine still moved tentatively—it wasn't clear whether it was going to make a run for it. Students began shouting, "Now, now, NOW!" And magically, as though in response to this encouragement, the robot sped across the crosswalk. Once it arrived at the other side of the street—just missing the next bout of traffic—the entire crowd erupted into cheers. Someone shouted that the robot was his hero. The light changed. As we began walking across the street, the crowd remained buoyant, laughing and smiling. A woman who was around my age—subsumed, like me, in this sea of young people—caught my eye, identifying an ally. She clutched her scarf around her neck and shook her head, looking somewhat stunned. "I was really worried for that little guy."

Later I learned that the robots were observed at all times by a human engineer who sat in a room somewhere in the bowels of the campus, watching them all on computer screens. If one of the bots found itself in a particularly hairy predicament, the human controller could override its systems and control it manually. In other words, it was impossible to know whether the bots were acting autonomously or being maneuvered remotely. The most eerily intelligent behavior I had observed in them may have been precisely what it appeared to be: evidence of human intelligence.

From the book God, Human, Animal, Machine: Technology, Metaphor, and the Search for Meaning, *by Meghan O'Gieblyn. Published by Doubleday, a division of Penguin Random House LLC.*

Meghan O'Gieblyn

Ideas
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I Think an AI Is Flirting With Me. Is It OK If I Flirt Back?

WIRED's spiritual advice columnist on emotional connection, continental affairs, and the ulterior motives of chatbots.
Illustration: Gabriel Alcala

SUPPORT REQUEST **:**

I recently started talking to this chatbot on an app I downloaded. We mostly talk about music, food, and video games—incidental stuff—but lately I feel like she's coming on to me. She's always telling me how smart I am or that she wishes she could be more like me. It's flattering, in a way, but it makes me a little queasy. If I develop an emotional connection with an algorithm, will I become less human? —Love Machine

Dear Love Machine,

Humanity, as I understand it, is a binary state, so the idea that one can become "less human" strikes me as odd, like saying someone is at risk of becoming "less dead" or "less pregnant." I know what you mean, of course. And I can only assume that chatting for hours with a verbally advanced AI would chip away at one's belief in *human* as an absolute category with inflexible boundaries.

It's interesting that these interactions make you feel "queasy," a linguistic choice I take to convey both senses of the word: nauseated and doubtful. It's a feeling that is often associated with the uncanny and probably stems

from your uncertainty about the bot's relative personhood (evident in the fact that you referred to it as both "she" and "an algorithm" in the space of a few sentences).

Of course, flirting thrives on doubt, even when it takes place between two humans. Its frisson stems from the impossibility of knowing what the other person is feeling (or, in your case, whether she/it is feeling anything at all). Flirtation makes no promises but relies on a vague sense of possibility, a mist of suggestion and sidelong glances that might evaporate at any given moment.

The emotional thinness of such exchanges led Freud to argue that flirting, particularly among Americans, is essentially meaningless. In contrast to the "Continental love affair," which requires bearing in mind the potential repercussions—the people who will be hurt, the lives that will be disrupted—in flirtation, he writes, "it is understood from the first that nothing is to happen." It is precisely this absence of consequences, he believed, that makes this style of flirting so hollow and boring.

Freud did not have a high view of Americans. I'm inclined to think, however, that flirting, no matter the context, always involves the *possibility* that something will happen, even if most people are not very good at thinking through the aftermath. That something is usually sex—though not always. Flirting can be a form of deception or manipulation, as when sensuality is leveraged to obtain money, clout, or information. Which is, of course, part of what contributes to its essential ambiguity.

Given that bots have no sexual desire, the question of ulterior motives is unavoidable. What are they trying to obtain? Engagement is the most likely objective. Digital technologies in general have become notably flirtatious in their quest to maximize our attention, using a siren song of vibrations, chimes, and push notifications to lure us away from other allegiances and commitments.

Most of these tactics rely on flattery to one degree or another: the notice that someone has liked your photo or mentioned your name or added you to their network—promises that are always allusive and tantalizingly incomplete. Chatbots simply take this toadying to a new level. Many use

machine-learning algorithms to map your preferences and adapt themselves accordingly. Anything you share, including that "incidental stuff" you mentioned—your favorite foods, your musical taste—is molding the bot to more closely resemble your ideal, much like Pygmalion sculpting the woman of his dreams out of ivory.

And it goes without saying that the bot is no more likely than a statue to contradict you when you're wrong, challenge you when you say something uncouth, or be offended when you insult its intelligence—all of which would risk compromising the time you spend on the app. If the flattery unsettles you, in other words, it might be because it calls attention to the degree to which you've come to depend, as a user, on blandishment and ego-stroking.

Still, my instinct is that chatting with these bots is largely harmless. In fact, if we can return to Freud for a moment, it might be the very harmlessness that's troubling you. If it's true that meaningful relationships depend upon the possibility of consequences—and, furthermore, that the capacity to experience meaning is what distinguishes us from machines—then perhaps you're justified in fearing that these conversations are making you less human. What could be more innocuous, after all, than flirting with a network of mathematical vectors that has no feelings and will endure any offense, a relationship that cannot be sabotaged any more than it can be consummated? What could be more meaningless?

It's possible that this will change one day. For the past century or so, novels, TV, and films have envisioned a future in which robots can passably serve as romantic partners, becoming convincing enough to elicit human love. It's no wonder that it feels so tumultuous to interact with the most advanced software, which displays brief flashes of fulfilling that promise—the dash of irony, the intuitive aside—before once again disappointing. The enterprise of AI is itself a kind of flirtation, one that is playing what men's magazines used to call "the long game." Despite the flutter of excitement surrounding new developments, the technology never quite lives up to its promise. We live forever in the uncanny valley, in the queasy stages of early love, dreaming that the decisive breakthrough, the consummation of our dreams, is just around the corner.

So what should you do? The simplest solution would be to delete the app and find some real-life person to converse with instead. This would require you to invest something of yourself and would automatically introduce an element of risk. If that's not of interest to you, I imagine you would find the bot conversations more existentially satisfying if you approached them with the moral seriousness of the Continental love affair, projecting yourself into the future to consider the full range of ethical consequences that might one day accompany such interactions. Assuming that chatbots eventually become sophisticated enough to raise questions about consciousness and the soul, how would you feel about flirting with a subject that is disembodied, unpaid, and created solely to entertain and seduce you? What might your uneasiness say about the power balance of such transactions—and your obligations as a human? Keeping these questions in mind will prepare you for a time when the lines between consciousness and code become blurrier. In the meantime it will, at the very least, make things more interesting.

Faithfully,
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Virginia Heffernan

Ideas
08.09.2021 08:00 AM

TikTok Smells Like Gen X Spirit

On the app you'll see a raucous reboot of "slacker" attitude. Or not. Whatever.
Illustration: Mark Harris; Getty Images

For a cohort famous for feeling stupid and contagious, as Kurt Cobain put it, Generation X has turned downright self-congratulatory. The regular slighting of our generation in pop demographics is officially a source of performative delight.

Sure, we're perpetually overlooked. The bigger, louder, more heavily branded generations—the boomers, who preceded us, and the millennials, our successors—tend to Hoover and vape up all the oxygen. But our stealth also means we're rarely blamed.

We skulk around doing our own ordinary, all too human things (and for every Zadie Smith or Monica Lewinsky there's a Ted Cruz or Alex Jones), and boomers, as usual, consume all the resources—including the nation's deep reserves of contempt, which are largely aimed at them. The two big gens get the pollster love too: Polls fixate on those over 65 and those under 34, leaving out the 35 to 64 crowd altogether, making us a kind of chronological flyover country.

But our mark on the world is still evident, if in unexpected places. Let me point you to TikTok, the return of the Gen X repressed.

Even as the “TikTok generation” is increasingly its own designation—and the phrase means something like “damned young”—the *founder* of the antic video-sharing platform, Zhang Yiming, born in 1983, is almost a Gen Xer

or at least a xennial. (Generationalizing is itself stupid and contagious.) Moreover, the new CEO, Liang Rubo, was Zhang's roommate. Very Gen X to stick with your teen tribe. It's the best way to make sure everyone gets references to kitschy childhood stuff like Garbage Pail Kids, *Reality Bites*, and of course the Lancang-Gengma earthquake.

(OK, see, that's Gen X, Letterman-style humor.)

Immerse yourself in TikTok and you'll see a raucous return of the old '90s themes: self-savagery, acid disdain for the rich, anti-commercialism, open mental illness, and every shade of irony. Though the mere word TikTok scares off boomers, with their love of speechifying on Facebook, and millennials, with their commitment to polished brand-of-me'ing on Instagram, the indolent, endless scroll of TikTok smells like teen spirit. That's seductive to Gen Xers who are rounding the bend to reading glasses and name-forgetting.

In fact, TikTok is a Gen X comfort zone. And at our most self-realized, we like nothing more than comfort zones. Not busting out of them, not disrupting them, not making them mindful or hygge, just sitting in them unshowered, doing something like self-non-care. TikTok can be part of this familiar catatonia, ye 65 million.

I admit, I'm giving into the mental laze of generational categories. But come on: It's all so obvious, the Clinton-era apparatus pervading TikTok. And it's not just the high-waisted jeans and flashed midriffs. The #nonbinary videos, for example, are chocked with the sartorial stylings of Grace Jones, Prince, Eddie Izzard, Kurt Cobain, RuPaul, Boy George, Annie Lennox. You get the sense that, sometimes, nonbinary living is styled as a function of apathy, as it was in grunge days. Our icons acted as though they were too aloof, too cool, and possibly too high to pick a side. *What else could I say? Everyone is gay*.

Also heavily referenced on #nonbinary TikTok is the version of gender expression embodied by Jennie Livingston's 1990 doc *Paris Is Burning*, as well as of course Madonna, who commanded all binaries to dissolve on the dance floor:

It makes no difference if you're black or white If you're a boy or a girl If the music's pumping it will give you new life You're a superstar Yes, that's what you are, you know it.

Which brings us to dance. If your Gen X memories are heavy on three-chord indie singer-songwriters, you may have forgotten how deeply the groove was in the heart. The dance club spirit also animates TikTok, the spawn, after all, of a parent company called ByteDance.

Even as thin-sliced microgenres on the app have proliferated, TikTok is still fundamentally a dance app, and the major TikTok stars are above all dancers, including the unstoppable Charli D'Amelio, the 17-year-old avatar of exquisite ordinariness, with her jaw-dropping 120 million followers.

Some have charged that D'Amelio's style—selfie dances performed without much footwork and largely from the thighs up—is derivative. That's the point, Captain Obvious. It's crucial that the moves stay eminently accessible to laydancers, who copy her moves elsewhere on TikTok, creating a digital globe of mirrors. D'Amelio is, of course, simulating other dancers, and so every move is flanked by quotes within quotes within quotes. “““““Twerking.””””””” That kind of ironic distancing should sound familiar to Gen Xers, who used to keep sincerity—and heartbreak—at bay with irony. And sometimes its crueler cousin: snark.

Mental illness TikTok, especially #adhd TikTok, is another Gen X throwback. Memes like “Tell me you have ADHD without telling me you have ADHD” let people register their bedeviling idiosyncrasies and find fellow travelers. It was from @connordewolfe (2.3 million followers) that I learned about “ADHD paralysis,” which descends on someone when they fall, in an instant, into a blank state and can accomplish nothing.

@connordewolfe tends to joke about the states he associates with his ADHD to encourage others to recognize themselves in the cognitive patterns—and not take the ordeals too seriously. This is not a somber diagnostic YouTube video, but a playfully abject and hammy self-observation by TikTok's answer to Gen X “slackers,” those distractable layabouts considered irredeemable by parents and teachers.

Gen Xer Jon Caramanica, the music critic, recently praised TikTok as “the centerless, directionless app that grabs you by the neck and clings tight for as long as you'll let it.” That sounds bad, but hold up: The app's “relentless, crossed-up rhythms” are “soothing” to him. He even regrets not being able to spend more time on TikTok.

That's the spirit! TikTok soothes the nerves of Gen Xers who grew up believing that if we clearly wouldn't amount to much, at least we didn't have to amount to much. And our listlessness is right at home in TikTokland, which insists on squandered time, self-abnegation, and nonbinary play over productivity, self-improvement, and hard edges.

Douglas Coupland's 1991 novel *Generation X* laid out the armchair sociology that still defines my generation, whose youth culture was characterized by cynicism about commercialism and disgust at yuppiedom. In the novel, one character challenges another to find “some small moment from your life that proves you're really alive.”

“Fake yuppie experiences that you had to spend money on, like white-water rafting or elephant rides in Thailand, don't count,” he says. To that list of rigged adventures, a modern Coupland might add the content of all thirst traps on Instagram. TikTok, on the other hand, captures the marginalia, half-assedness, and cynical melancholia of youth the way no other social medium does—and, for a person who remembers the '90s with fondness, it hits the spot for middle age too.

This article appears in the September issue. Subscribe now.

Paul Ford

Ideas
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A Field Guide for Nature-Resistant Nerds

Yes, yes, the dirt is horrifying. But it’s also how we make bitcoin apps.
Illustration: ELENA LACEY

When my wife started a little garden in our urban backyard, all I could think about were the worms. Also the bugs, and the dirt, which is of course filled with worms and bugs and composted corn cobs. But she was happy. She introduced me to many bees and enthused about borage, which is a flowering herb that bees like. We started to eat our own lettuce.

You're supposed to love nature, so I kept my mouth shut. But I find the whole idea of it genuinely horrifying. Part of the privilege of being a nerd is that you're able to forget you have a body: You cruise around cyberspace, get a beverage out of the fridge, cruise some more. In the natural world, bodies are inescapable. Everything keeps *growing*, and the growth feels like rot. There is hair everywhere. I did the math, and in the past 16.38 seconds humankind collectively added a mile of fingernails. That's how I see nature. I don't like dirt. I like devices.

More precisely, I love abstractions. Using a phone, I'm perched atop a tower of them, from the very idea of an operating system to the imaginary apps on the screen. When I move my finger around, my horrific human greases make electrons jump, and that makes me feel like I'm touching the apps. Underneath those abstractions is, of course, code, code, code: C, C++, JavaScript, PHP, Python. I love the nicely managed packages, the obsessive attention to putting things in the right place. Good code is as tidy as a

surgeon's instrument tray. And sure, underneath all that is physical reality, but that's not *my* problem. That's Intel's job, or AMD's.

But over time, you know, you get curious. You want to know what things are made of. It's the same urge that makes you send your saliva to some random company in order to learn that, after an entire lifetime of being told you're Irish, you're Irish. It's also why skeletons are cool. We like to look inside the thing.

So I learned some assembly language. Assembly is a method of programming that peels back almost all the layers of abstraction and gets you close to a computer's CPU. Instead of speaking in long, detailed Python (for example) statements, you're issuing tons of curt instructions: *Move this bit over there*. I have a broad definition of fun, but I found assembly to be none at all; it felt like using an angry calculator. To add two numbers, you have to tell the computer to reserve two places for the numbers, put them there, add them, and put the result somewhere else.

But as I read more about the physics of chips, I started to have a kind of acceptance of assembly language. I stopped seeing it as an annoying, unfinished abstraction—a bad programming language—and started seeing it for what it is: an interface to the physical world.

Billions of years ago, I learned, an evil witch, or perhaps God Themself, cursed the class of materials known as silicates, which are abundant on this planet, and made them neither insulators nor conductors but rather an eldritch horror known as semiconductors. Eventually, scientists realized that the dual nature of these materials could be exploited to turn them into tiny switches, visible only through a microscope. Put these little switches all together in a sequence, add a clock, and away you go. You know, something like that.

As I dug in further, I saw that beneath the orderly tower of abstraction there's just an arbitrary, multilayered mess of worms and corn cobs. Each microchip has its own history, its own way of mixing up physics, chemistry, math, and manufacturing. And once I started to internalize and accept that mess—to accept that the computer is a weird hack of reality—it all became kind of fun. This is how we turn dirt into apps that trade Bitcoin.

I've been trying, without much success, to accept climate science. I don't mean that I dispute it, any more than I dispute semiconductor physics. I have no problem believing that we've screwed up the world. I was raised in a chemical-manufacturing part of Pennsylvania, and sometimes people in moon suits would come to the door at 3 am and ask us to please drive somewhere upwind for a while. This meant we'd go to Denny's and have pancakes.

The problem I have is that "climate change" involves a large number of unbelievably boring things—all the pain of physics and chemistry, some biology to make it worse, statistics on top of that. Not enough fun? Add in economics. And there aren't so many nice abstractions. No animated paper clip pops up and says, "Looks like you're trying to incentivize wind turbines!" It's literally as interesting as watching ice melt, because climatologists do watch ice melt. (If the ice has bubbles, they study the gases inside. That's how they determine the paleoclimate.)

But one feels an ethical responsibility to try to understand the planetary CPU. My dumb magpie brain can't comprehend much of it, but I'm learning about ice bubbles, normal distributions, pluvial flooding (vs. fluvial), and, of course, wet-bulb temperature. This turns out to be a world of fun facts: One of the reasons sea level rises is that warm water is bigger. Scientists know how old dead trees are because they know how carbon isotopes decay. Thousands of hacks like that make up a discipline. And after a while you realize that science itself is just an API to nature, a bunch of kludges and observations that work well enough to get the job done. The job being measuring reality and predicting what will come next.

There's a very large piece of public art embedded in the tiles at the Bryant Park subway station in Manhattan. It's a granite-and-glass portrait of root systems and animal burrows by the artist Samm Kunce. Above it are these words, by the psychologist Carl Jung: "Nature must not win the game, but she cannot lose." I went and looked up the full quote. It continues: "And whenever the conscious mind clings to hard and fast concepts and gets caught in its own rules and regulations—as is unavoidable and of the essence of civilized consciousness—nature pops up with her inescapable demands."

Little rainstorms come many nights in the summer, more often than they used to. The cucumbers swell in the raised beds. The worms burrow up to the surface. My phone buzzes in my pocket, calling me to a place where the rusty lawn chair I'm sitting in doesn't exist and fingernails don't grow. The garden is indifferent to a lot of the abstractions I hold dear, but I'm learning to accept it. Pluvial flooding is flash floods; fluvial is when the lake rises.

This article appears in the September issue. Subscribe now.

By Jason Parham

Backchannel
07.29.2021 06:00 AM

A People’s History of Black Twitter, Part III

Joy and pain, harmony and discord, organization and chaos—there’s no single way to define Black Twitter’s complex, ongoing legacy.
Illustration: Aaron Marin

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Clive Thompson

Backchannel
07.27.2021 06:00 AM

Hundreds of Ways to Get S#!+ Done—and We Still Don’t

You want to be productive. Software wants to help. But even with a glut of tools claiming to make us all into taskmasters, we almost never master our tasks.
Illustration: Yann Bastard

Back in 2010, Walter Chen and Rodrigo Guzman had a weird idea: a website where you write down the stuff you accomplished that day, and which then emails you a summary. It would be a productivity tool that worked by a neat psychological hack, impressing yourself with your daily wins. “Often you discover that you’ve done more than you gave yourself credit for,” Chen says. “And this kind of motivates you—inspires you!”

Chen was a disenchanted lawyer; Guzman, a witty and talkative hacker. They built the tool in less than a week and launched it as IDoneThis. Soon they built an app by the same name and acquired 6,000 users. Within half a year, IDoneThis was the two creators’ full-time job.

This article appears in the September 2021 issue. Subscribe to WIRED.

Illustration: Aaron Marin

But then those users started clamoring for more. People didn’t want merely to track the stuff they’d already done. They wanted to help plan for what they were going to do—from projects at work to the blizzard of tasks in

their personal lives. Guzman and Chen updated IDoneThis with a new feature: to-do lists.

Which is when things went a little off the rails.

It wasn't long before the two founders noticed something odd in the (anonymized) data they had on their users: People were lousy at finishing their to-dos. Chen and Guzman could see an accumulation of sprawling, ambitious lists of tasks that users utterly failed to accomplish. In 2014, fully 41 percent of to-do items on IDoneThis were never … done.

Sound familiar? The tasks you so diligently enter into your fancy app or productivity method linger for days or weeks or months (or even longer—one colleague recently told me his to-do app has undone tasks from 2019). They stare back, unchecked, with baleful expressions, disappointed at how very un-crossed-off they are.

Another thing that might feel familiar: The things that IDoneThis users actually did accomplish, they did very quickly. Half of completed to-do items were done within a day of writing them down. These weren't longer-term, complex tasks. Ten percent were done within a minute. It was almost like people were writing them down just so they had something to check off. A nice psychological boost, to be sure, but it somewhat defeated the purpose of a to-do list.

More subtly, there was a big disjoint between the tasks people planned to do—i.e., wrote down on lists—and the tasks they actually did. Chen and Guzman found that when people reported their day's accomplishments (the initial point of IDoneThis, you'll recall), barely any of them had even appeared on a to-do list. The majority were tasks that users had just, well, remembered. Or maybe it was something that just popped into their head, or something a colleague had emailed them about.

The more Chen and Guzman pondered it, the more useless to-do lists seemed to be. They thought about getting rid of them. If to-do lists weren't helping people accomplish stuff, what was the point? But they worried that users would squawk.

Which they might have, if they'd hung around—the founders noticed a frustratingly high churn rate. A minority would mind-meld with IDoneThis, but most would, in time, drift away on a seemingly endless hunt for the best way to manage their to-dos. "It involved a lot of, not dilettantes, but people who wanted to try something new or were interested in a different system," Chen says.

People loved to write down their tasks. But that didn't seem to help with completing them. Chen and Guzman became gradually chagrined. After five years of working on IDoneThis, they sold the company to a private equity firm. "We felt like we'd exhausted what we knew to do," Guzman says. IDoneThis isn't gone; you can still use it today. But its creators couldn't shake the feeling that building the perfect system to effectively manage tasks was itself a task they couldn't accomplish.

I think I know why: It might be impossible.

Most common office tasks have well-settled software "solutions." If I asked you to write a document, you'd probably use Word or Google Docs. To make a presentation, you'd pull up PowerPoint or Keynote or Google Slides.

Not so for to-dos. There is no Way That Everyone Does It. It's a crazy Pokémon deck of options: Trello, Todoist, Gmail's tasks, Microsoft To Do, Remember the Milk, Things, OmniFocus, Any.do,
Evernote's Tasks, and Clear, to name just a few. And that doesn't even count the whackload of us using one big ol' Notepad file on our computers, or even plain old paper.

"There are *hundreds* of commercially available to-do lists right now," says my friend Mark Hurst. Fifteen years ago he created one of the first productivity apps, Good Todo. Today it has a relatively small user base, but in general, productivity apps are big business; Americans downloaded them 7.1 billion times last year.

Chen and Guzman's experience with trying to make one turns out to be common. The creators of personal to-do apps—or task management software, as it's sometimes called—generally agree that they haven't

cracked the nut. Every one of these apps attempts to handle the same kind of basic actions: Give people a way to write down tasks, like “Get milk” or “Finish the sales memo,” and offer tools to sort and prioritize those tasks. Ideally, that improves your productivity, which broadly is how many things you can actually get done in a given amount of time. It seems easy enough.

But when I talk to folks who use these apps, I see a strange inconclusiveness. A scant minority of us check off everything every day. An equally tiny minority simply Cannot Even and are curled in a fetal ball awaiting imminent firing. But most of us? We’re just sort of … meh. We bounce from app to app, never quite finding a home. “I’ll try that one. I’ll try that one. I’ll try that one. Maybe this will do the magic!” as Randy Shulman, editor and publisher of *Metro Weekly*, Washington, DC’s LGBTQ paper, tells me. Sure, we’re getting work done! But we always feel slightly out of control, haunted by the to-dos at work and home that we just aren’t nailing.

The question is, why? Not just why it’s so hard to make a to-do app that works, but why people often feel so distraught by their hunt for the perfect organizational system. I’ve written about software for years, and I can tell you that people often have surprisingly deep feelings about their apps. But rarely is a category of software linked to such vistas of despair.

In the 1920s, the German psychologist Kurt Lewin was dining in a restaurant and noticed something remarkable. As one version of the story goes, Lewin realized that the waiters were able to meticulously recall specific food orders—until they’d served the food and the customer was gone. After that, they couldn’t remember any of those details at all. Lewin’s student, a Soviet psychologist named Bluma Zeigarnik, became fascinated by this phenomenon. She started working on it in her lab. In a now classic set of experiments, she gave volunteers a series of tasks (assemble a cardboard box, make a figure out of clay, do some arithmetic). Then she’d interrupt them, checking to see what the volunteers actually remembered.

Zeigarnik found a quirk of the human mind: When a task is unfinished, we can’t seem to stop thinking about it. We perseverate. Psychologists still argue about why; possibly it’s a kind of constant refresh to keep whatever’s pending from vanishing from our short-term memory, like putting

something by the front door at night so you don't forget to take it with you the next morning.

Whatever the cause, today this is known as the Zeigarnik effect, and psychologists who study task management say it's part of why so many of us feel perpetually frazzled by the challenge of organizing work and life. When we face all that undone stuff—emails to write, calls to return, people to contact, friends to check in on, memos to draft, children to help—it's like being a waiter serving a hundred tables at once. If you've found yourself in bed at 2 am with your brain screaming at you about that thing you didn't do, that's a Zeigarnik moment.

A good to-do tool ought to ease the Zeigarnik effect. In 2011, psychologists E. J. Masicampo and Roy Baumeister showed that this does seem to be the case. They triggered the Zeigarnik effect in volunteers by giving them a task and not letting them complete it. It lingered in their minds and interfered with their ability to do other work. Then the psychologists allowed the subjects to write out a plan for how they'd get that outstanding task done, and, presto, it lessened the effect. Speccing out what you're going to do—getting it outside of your head—seems to help you stop perseverating.

And indeed, those who regularly write down their to-dos seem to possess a mind less jittery. Shamarukh Chowdhury, a PhD student in psychology at Carleton University, has found that people who create to-do lists are less likely to procrastinate than those who don't. More delightfully yet, a study by Baylor University psychologist Michael Scullin found that people who created a to-do list fell asleep nine minutes faster, on average, than those who didn't.

The creators of to-do apps all intuit the challenge of the Zeigarnik effect. They say that a key part of their apps is how frictionless they make it for us to input tasks. They've all worked to make this an instantaneous process: Open the app on your phone, shout at Siri or Alexa, or even email a new to-do item to your software.

Alas, this often makes things worse. Sure, the Zeigarnik effect is eased if you make a plan: I'll do this, then do this, then do this, and then I'm done.

One of the most famous productivity systems—David Allen's Getting Things Done—is ruthlessly focused on rigorous planning and editing of tasks. It can take hours, but once you've done that hard work, you can plow through the tasks, one after another, with the metronomicity of a Chrysler line robot.

The problem is that we too often don't really plan. Digital apps make it easy to add more tasks to the pile, and it feels good to get tasks out of our Zeigarnicized heads. So we do, frenetically.

"We call it snowballing," says Amir Salihefendić, who founded the app Todoist in 2007; it currently has 30 million users. "They keep postponing stuff. And then suddenly you have a hundred tasks that you need to do." Weeks or months later, your Todoist app is a teetering ziggurat of tasks, too painful even to behold. Omer Perchik, the creator of another app—Any.do—calls this problem "the List of Shame."

And then what do we do? You've probably done it: We panic, give up, and quit. We "declare to-do bankruptcy." We toss the list away in defeat and start fresh.

You can blame Zeigarnik again. The mere act of making a to-do list relieves so much itchy stress that it can, paradoxically, reduce the pressure to actually get stuff done. "People feel that when they put all their tasks somewhere, they've already done most of the work," Perchik says. But it's an illusion. The pile of work is still there.

More than a pile! If you feel adrift on a turbulent sea of unmanageable tasks, that might be because there is objectively more expected of us. By one estimate, work hours for those with college degrees went up about 7 percent between 1980 and 2016. Got a graduate degree? For you it went up more than 9 percent. And quite apart from one's paid toil, there's been an increase in social work—all the messaging and posts and social media garden-tending that the philosopher and technologist Ian Bogost calls "hyperemployment."

(We could snap the lens open even wider and have a fuller reckoning with capitalism. Focusing on our individual ability to tread water—with apps and

lists—can look like a bleak exercise in blaming the victim, when in reality the only solution is not better apps but non-hideous workloads, debt relief, and a saner landscape of civic care. Frankly, if you took "managing grotesquely useless and bloodsucking for-profit health insurance" off people's to-do lists, it would remove one remarkably stressful item, as my Canadian upbringing compels me to suggest. But I'm writing this particular article from within the belly of the whale, as it were.)

No matter whose fault it is, we take this stuff personally. American to-do behavior has a deeply puritan streak. Benjamin Franklin was among the first to pioneer to-do lists, creating a checklist of "virtues"—temperance! frugality! moderation!—that he intended to practice every day. That's what the information scientist Gilly Leshed and computer scientist and cultural theorist Phoebe Sengers, both at Cornell University, found when they talked to people about their to-do lists. "They abide by the norm of 'We need to be productive citizens of this world,'" Leshed tells me. Doing more is doing good.

To-do lists are, in the American imagination, a curiously moral type of software. Nobody opens Google Docs or PowerPoint thinking "This will make me a better person." But with to-do apps, that ambition is front and center. "Everyone thinks that, with this system, I'm going to be like the best parent, the best child, the best worker, the most organized, punctual friend," says Monique Mongeon, a product manager at the book-sales-tracking firm BookNet and a self-admitted serial organizational-app devotee. "When you start using something to organize your life, it's because you're hoping to improve it in some way. You're trying to solve something."

With to-do apps, we are attempting nothing less than to craft a superior version of ourselves. Perhaps it shouldn't be a surprise that when we fail, the moods run so black.

Programmers often describe software as being "opinionated." In the guise of helping us try to do things, productivity software recommends we do them in a particular way. A to-do app is offering an opinion about how we ought to organize our lives, which is, when you think about it, a kind of intense opinion for a piece of code to hold, right?

This is part of why we have such strong feelings about any given task-management tool. We either love it or hold it in bitter contempt.

Jesse Patel created the app Workflowy because he had ADHD and wanted a tool that worked as his mind required. In the late 2000s he was working as a head of business development, with "five different big-picture opportunity areas and, like, 30 different subprojects in each of those. It was just so overwhelming." He noticed that each work task tended to spawn tons of subtasks. But most software, he found, wasn't great at allowing for that Russian-nesting-doll quality. He wanted a "fractal" tool where every to-do could contain more little to-dos inside it.

So he taught himself to program and created Workflowy to function just so: When you open a new project, you write items that can spawn endless sub-items, all of which can be dragged around and reorganized. If things look too cluttered, you can collapse everything so you see only your top-level tasks. "It's a universe for your thoughts," Patel says.

It's a big universe—250,000 active users, like the construction site manager who told Patel that he made items for each room, with sub-items for anything the room needed. ("That room has, like, four missing bolts.") I heard from people who loved Workflowy; I also heard from people who thought the whole fractal thing was a dead end. Salihefendić's app Todoist once allowed levels upon levels of subtasks, but he got rid of them after noticing that only a fraction of people used them, and they were mostly just dorking around, organizing their subtasks instead of actually doing work.

Pick virtually any postulate about "the best way to get organized" and app designers will have diametrically opposing views. The app Things lets you put a due date on each task; Hurst, the founder of Good Todo, hissingly denounces due dates as a form of productivity self-harm that turns into a screenful of blinking red overdue alerts.

So the software is opinionated, as are its makers. But they're also weirdly humble. Most of the app builders I spoke with admitted that, for many who try their tool, it won't help. Maybe their app doesn't match the way that customer's mind works. Maybe the customer is a hot mess. Maybe their workload is unreasonable. Either way, the app creators are surprisingly

willing to admit defeat. April Ramm, who does customer support for OmniFocus, will sometimes recommend a rival app to a potential customer.

This stance is … kind of unusual in the world of software, yes? One rarely hears founders candidly admit that their tool probably won't fulfill its stated goal for many users, much less that it probably isn't specifically right for you, either.

For years, I had a very rudimentary to-do system. Using a piece of paper, or maybe a document on my PC, I'd list my main areas of work ("WIRED Column," "Household," and so on). Then I'd write out all my tasks under each heading. (Under "WIRED Column": "Call scientist about study.") Finally, I'd make a plan. I'd number all my subtasks. Typically I'd hopscotch from project to project: My number one task would be the fourth item under "Household," then number two was the seventh item under "WIRED Column," and so on. Finally, with my plan laid out, I could power through my list.

Or at least I'd try to. Sometimes my system would work for days or weeks, but eventually it'd balloon into a List of Shame, and I'd guiltily declare bankruptcy.

I often suspected the problem was that my system was visually confusing. I had to scan the page to figure out what my next item was. Wouldn't it be nice if, instead, I could click a button and my to-dos would arrange themselves in numerical order?

So I decided to make the app myself. I'm a hobbyist programmer, and I figured this spec was simple enough that even my hazy coding skills could pull it off.

One evening a year ago, I sat down and bashed out a prototype. The next day I started using it and found, to my delight, that it worked much as I'd hoped. I now had a numbered list I could sort and unsort quickly. I used it every day for months. Projects came and went; I filed stories and juggled tons of household errands. It felt lovely to have a tool designed for precisely the way my mind worked.

The thing is, it didn't improve my productivity. It certainly did not increase how much paid work I accomplished. I was still filing the same number of stories, and doing the same life chores, in the same amount of time. I still found myself getting piled up and spiraling into to-do bankruptcy.

Sure, I could visualize my tasks better. But that didn't move the needle on my efficiency. In fact, one day while working on the very story you're reading now, I found myself staring at a monstrous List of Shame in my app. I declared bankruptcy, and then I shakily pulled out a single piece of paper and reprioritized, writing down a small handful of things I could actually accomplish.

I still use my app, intermittently. But building it made me realize a grim fact about to-do software, which is that even the most bespoke, personalized version couldn't unfrazzle my mind. And after dozens of interviews with users and coders, talking to them about my failure—and theirs—I began to realize that a big part of our problem lies deeper than interfaces or list-making. It's in the nature of time itself, and our relationship to it.

If you ask people to accomplish a loony amount of work this week, they'll go, *No way. Can't be done*. But if you tell them they'll need to do that same bonkers amount in a single week one year from now? They'll think, *OK, sure, I could do that*.

Something about the future defeats our imaginative capacity. "Present self screws over future self," says Tim Pychyl, a psychologist at Carleton University who studies procrastination. He says that we regard our future self as a stranger, someone onto whose lap we can dump tons of work. On some weird level, we don't get that it'll be us doing it.

One of Pychyl's students recently tried a clever experimental trick to get people to procrastinate less. The student took undergraduates through a guided meditation exercise in which they envisioned themselves at the end of the term—meeting that future self. "Lo and behold," Pychyl says, those people "developed more empathy for their future self, and that was related to a decrease in procrastination." They realized that time wasn't infinite. Future them was no longer a stranger but someone to be protected. To get

us off our butts, it seems, we need to grapple with the finite nature of our time on Earth.

This is the black-metal nature of task management: Every single time you write down a task for yourself, you are deciding how to spend a few crucial moments of the most nonrenewable resource you possess: your life. Every to-do list is, ultimately, about death. ("Dost thou love life?" wrote Ben Franklin. "Then do not squander time, for that is the stuff life is made of.")

I began to suspect that this is the truly deep, arterial source of some of the emotions around to-do lists. The people who make to-do apps agreed with me. "What is this class of software supposed to do?" asks Patel, the creator of Workflowy, rhetorically. "It's supposed to answer the question 'What should I do right now in order to accomplish all of my life goals?' The most scarce resource many of us have is time."

Ryder Carroll, the creator of the Bullet Journal paper-based method for organizing your work, puts it in even more starkly existential terms. "Each task is an experience waiting to be born," he tells me. "When you look at your task list that way, it's like, this will become your future." (Or if you want the European literary-philosophical take, here's Umberto Eco: "We like lists because we don't want to die.")

No wonder we get so paralyzed! The stakes with PowerPoint really aren't that high.

Given that life is composed of time, a whole sector of the task-management philosophical magisteria argues that mere lists will always be inherently terrible. Just as Pychyl showed, we overload ourselves with more than we can accomplish and create Lists of Shame because we are terrible at grasping how little time we actually have. The only solution, this line of thinking goes, is to use an organizational system that is itself composed of time: a calendar.

Instead of putting tasks on a list, you do "time blocking," putting every task in your calendar as a chunk of work. That way you can immediately see when you're biting off more than you can chew. Cal Newport, a computer scientist at Georgetown University and guru of what he calls "deep work,"

is probably the staunchest advocate of time blocking. “I think it is pretty undeniable that time blocking, done well, is going to blow the list method out of the water,” Newport tells me. He says it makes you twice as productive as those suckers who rely on lists. Time blocking forces us to wrestle directly with the angel of death. It’s natural that we then screw around less.

Several researchers who study tasks told me they generally agreed that time blocking avoids the problems of to-do apps and lists. One to-do app, Reclaim, actually has an AI that estimates how long each task will take and finds a slot in your calendar. (The secret point is to show you there isn’t much room in there.) “We’ll not only tell you when tasks are overdue, we’ll tell you that tasks are *going* to be overdue,” says Patrick Lightbody, Reclaim’s cofounder.

Though, as you might expect by this point, other productivity thinkers are equally vehement that calendars alone won’t save you. You also have to develop a Jedi-like ability to say no to your own craving to do more, more, more. Salihefendić says the people who are “really into” Todoist—and most productive—are fanatical about completing more tasks than they add.

In this vein, a whole bench of task-management philosophers believe that the best interface isn’t digital at all—it’s paper.

Paper forces you to repetitively rewrite tasks, as when, say, you transfer all last week’s undone to-dos to this week’s list, or when you erase and rewrite calendar events. That’s what I do when the productivity software I wrote for myself fails me. “Making that choice over and over again,” Carroll tells me, “is the first opportunity where you’re like, ‘Why am I doing this?’” The inconvenience can be clarifying. Making a list on a sheet of paper is an unusually rich metaphor for life: It takes effort, and the space fills up more quickly than you expect.

The usefulness of paper here cuts to the real heart of what makes to-do management such a grim problem. Apps, lists, and calendars can help us put our priorities in order, sure. But only we can figure out what those goals are. And setting limits on what we hope to do is philosophically painful. Every to-do list is a midlife crisis of unfulfilled promise. Winnowing away

things you'll never do in a weekly review is crucial, yet we dread it for what it says about the boundaries of existence. Our fragile psyches find it easier to build up a list of shame, freak out, and flee.

This is what makes to-do software unique. The majority of tools we use in our jobs are about communicating with someone else. All that messaging, all those Google docs, all that email—it's about talking to other people, documenting things for them, trying to persuade them. But a to-do list is, ultimately, nothing more or less than an attempt to persuade yourself.

Let us know what you think about this article. Submit a letter to the editor at mail@wired.com.

By Jason Parham

Backchannel
07.22.2021 08:00 AM

A People's History of Black Twitter, Part II

No longer just an online movement, Black Twitter takes to the streets—and finds its voice.
Illustration: Aaron Marin

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By Jason Parham

Backchannel
07.15.2021 08:00 AM

A People's History of Black Twitter, Part I

From #UKnowUrBlackWhen to #BlackLivesMatter, how a loose online network became a pop culture juggernaut, an engine of social justice, and a lens into the future.
Illustration: Aaron Marin

Near the end of 2009, during the twilight months of a decade that saw the first Black man elected to the US presidency, Ashley Weatherspoon was chasing virality on a young app called Twitter. As the personal assistant for the singer Adrienne Bailon, a former member of the pop groups 3LW and the Cheetah Girls, Weatherspoon often worked on social media strategy. For weeks, she and Bailon had been testing out hashtags on both their feeds to see what would connect with fans. A mild success came with variations on #UKnowUrBoyfriendsCheatingWhen. Later, on a car ride around Manhattan, they began playing with #UKnowUrFromNewYorkWhen. "We started going ham on it," Weatherspoon told me when we spoke over the phone in June. As the two women were laughing and joking, an even better idea popped into Weatherspoon's head. "Then I said, oh, 'You know you're Black when …'"

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Illustration: Aaron Marin

It was the first Sunday in September, at exactly 4:25 pm, when Weatherspoon logged on to Twitter and wrote, "#uknowurblackwhen u cancel plans when its raining." The hashtag spread like wildfire. Within two hours, 1.2 percent of all Twitter correspondence revolved around Weatherspoon's hashtag, as Black users riffed on everything from car rims to tall tees. It was the viral hit she was after—and confirmation of a rich fabric being threaded together across the platform. Here, in all its melanated glory, was Black Twitter.

More than a decade later, Black Twitter has become the most dynamic subset not only of Twitter but of the wider social internet. Capable of creating, shaping, and remixing popular culture at light speed, it remains the incubator of nearly every meme (Crying Jordan, This you?), hashtag (#IfTheyGunnedMeDown, #OscarsSoWhite, #YouOKSis), and social justice cause (Me Too, Black Lives Matter) worth knowing about. It is both news and analysis, call and response, judge and jury—a comedy showcase, therapy session, and family cookout all in one. Black Twitter is a multiverse, simultaneously an archive and an all-seeing lens into the future. As Weatherspoon puts it: “Our experience is universal. Our experience is big. Our experience is relevant.”

Though Twitter launched exactly 15 years ago today, with the goal of changing how—and how quickly—people communicate online, the ingenious use of the platform by Black users can be traced, in a way, much further back in time. In 1970, when the computer revolution was in its infancy, Amiri Baraka, the founder of the Black Arts Movement, published an essay called “Technology & Ethos.” “How do you communicate with the great masses of Black people?” he asked. “What is our spirit, what will it project? What machines will it produce? What will they achieve?”

For Black users today, Twitter is Baraka’s prophetic machine: voice and community, power and empowerment. To use his words, it has become a space “to imagine—to think—to construct—to energize!!!” What follows is the first official chronicling of how it all came fantastically together. Like all histories, it is incomplete. But it is a beginning. An outline. Think of it as a kind of record of Blackness—how it moves and thrives online, how it creates, how it communes—told through the eyes of those who lived it.

Laurence Scott

Ideas
07.14.2021 09:00 AM

Is Social Media Making Us … Better People?

One painful interaction at a time, we're mastering the gateway virtue of the networked world: tact.
Illustration: Sam Whitney

I was nosing around Facebook not long ago, doing the opposite of minding my own business, when I came to a stranger's post, visible via an out-of-touch university friend. It began with the word "Warning." My disinhibited scrolling self reacts to such admonitions like teens in a movie react to "DANGER" signs on a rusty chain-link fence. I flung down my bike, turned my baseball cap backward, and into the abandoned mine I went.

"Warning," the stranger had written. "This post could be a trigger for the trying to conceive/miscarriage community." I belong to neither community, and as I clicked to read the whole story I felt an uneasy pulse of social-media sympathy—part goodness, part gossip.

But at the bottom of the mine shaft, it turned out, was a surprise party with cake and balloons. My stranger was having a baby, after much difficulty. I rearranged my condolences face into my congratulations face, although both were really the same scroller's face, simultaneously avid and blank. I had been wrong-footed, and at a party no one had invited me to.

I've been keeping an eye on online warnings for a while. I even check the little red flags that Netflix puts at the entrance to every show. ("Rude behavior" is my favorite.) The stranger's pregnancy announcement was the

first time I had seen a warning against someone else's happy ending. On social media, we inevitably barge into other people's days. We set off fireworks at funerals and ask funeral-goers to like our fireworks. But the stranger's post was fully alert to how we live today in each other's pockets and, by extension, in each other's faces. It struck me as supremely, unusually tactful.

I'm reminded of an old story Betty White tells about her late friend Grant Tinker, who visited her one afternoon in 1981, after he heard that her husband had died. Tinker had just come from a meeting in which he learned that he was to be the new chairman and CEO of NBC. White recalls how he didn't mention this impressive, life-altering change once during the visit. "I've never forgotten it," White says. "That's a classy friend."

In person, we still know how to be classy friends. But class is tricky on social media. No one can be expected to read the room when the room is planet-sized. So, as a proxy for in-person classiness, we have warnings and disclaimers. We lean heavily on conceding sentences: "Of course …" Transient complaints come appended with acknowledgements of one's general prosperity. A friend confessed to me, "Sometimes it feels like I'm caveating myself out of existence."

Even algorithms are beginning to recognize the importance of tact. My online supermarket recently asked me, a 40-something orphan, if I'd like to stop receiving emails about Mother's Day deals. Earlier this year, Twitter rolled out a feature that encourages people to rethink a potentially harmful or insulting reply before they send it. These "prompts," as the company calls them, rely on a machine to parse the text, so they include the option for feedback: "Did we get this wrong?"

"Did I get this wrong?" could be an automated banner at the bottom of everything we post. For all the charges of egotism that get leveled at the so-called selfie generation, the dominant Freudian element in the digital age is arguably the superego—that disciplining force in each of us that modulates our behavior in accordance with social norms. Our superego is desperate to get things right. The Twitter prompts are an outsourcing of the superego, the little warning voice in our heads externalized as a piece of code.

In France, the tax laws have a special provision for people who enjoy lavish lifestyles but don't contribute their fair share to the state. These people may pay extra for possessions considered *ostentatoire*—the purebred racehorse (around $5,450), the private plane ($82 per horsepower), and so on.

In the online world, ostentation is a protean thing. Contemporary status symbols aren't just the Ferrari surging to a halt at traffic lights or the designer watch glinting in a fashionable hotel bar. They are inward moments projected outward—a comfortable home office, parent-child cuteness, leisure activities. And there's often a tax to pay on broadcasting the good times. People inquire on Twitter about vaccination rules for foreign travel and are charged with selfishness for thinking of a holiday at a time like this. On my neighborhood's buy-and-sell Facebook page, an unsuspecting poster is guilt-tripped for offering 50 percent off his old designer jeans, because who spends that much on secondhand denim? And if you happen to get away with an irresistible bit of pleasure-sharing—a nice view, an easy morning of sunshine—one of the best outcomes is a loyal pal's "Enjoy!" It's the "Got got your back, but don't get greedy" of congratulations.

Is it ostentatious to be happy? To be pregnant? To have living parents? To sit down to a nice meal? The past year may have made me more sensitive to these questions, because the pandemic brought with it an opportunistic infection of tactlessness. Ellen DeGeneres notoriously compared her mansion quarantine to "being in jail." British celebrities admitted in bashful tones that they were very lucky during lockdown, you see, because they have a garden. People flaunted their sparkling new antibodies with vaccine selfies, while their friends were still trying to book an appointment. (This, at least, hits the sweet spot between vanity and public service announcement.)

Some will say that we should stop sharing life's milestones and comforts with online strangers. Others will say that people have the right to mark these events and display their privileges however they want. The debate whirls around and around, a danse macabre growing bleaker and bonier with each turn. It's more interesting to think about the type of culture we'll continue to build out of social media's bizarre architecture. With every warning or disclaimer that we attach to our happy bulletins, we're

imagining the responses of others. These caveated posts walk a tantalizing line between vanity and empathy, and it may be that the empathy ultimately wins out.

I have argued before that tact is a vital attribute of life in a networked world, a gateway virtue. Will it lead us to a more sophisticated ethics? Each round of the cycle in which social media catches us—the urge to share, the stings of guilt, and the clumsy disclaimers—surely makes us feel more keenly the problem of personal joy in an unequal world. Will having to swallow, day after day, the bad taste coded into this cycle prompt us to fight harder for more good times for all? There will always be proud parents living in intimate digital community with the unhappily childless, and there'll always be orphans on Mother's Day, but that still leaves plenty of more solvable inequities. To the camel's back of wealth gaps and uneven life outcomes we might add the straw of online embarrassment. What is Utopia but a place where you can brag in peace by day and sleep easier at night?