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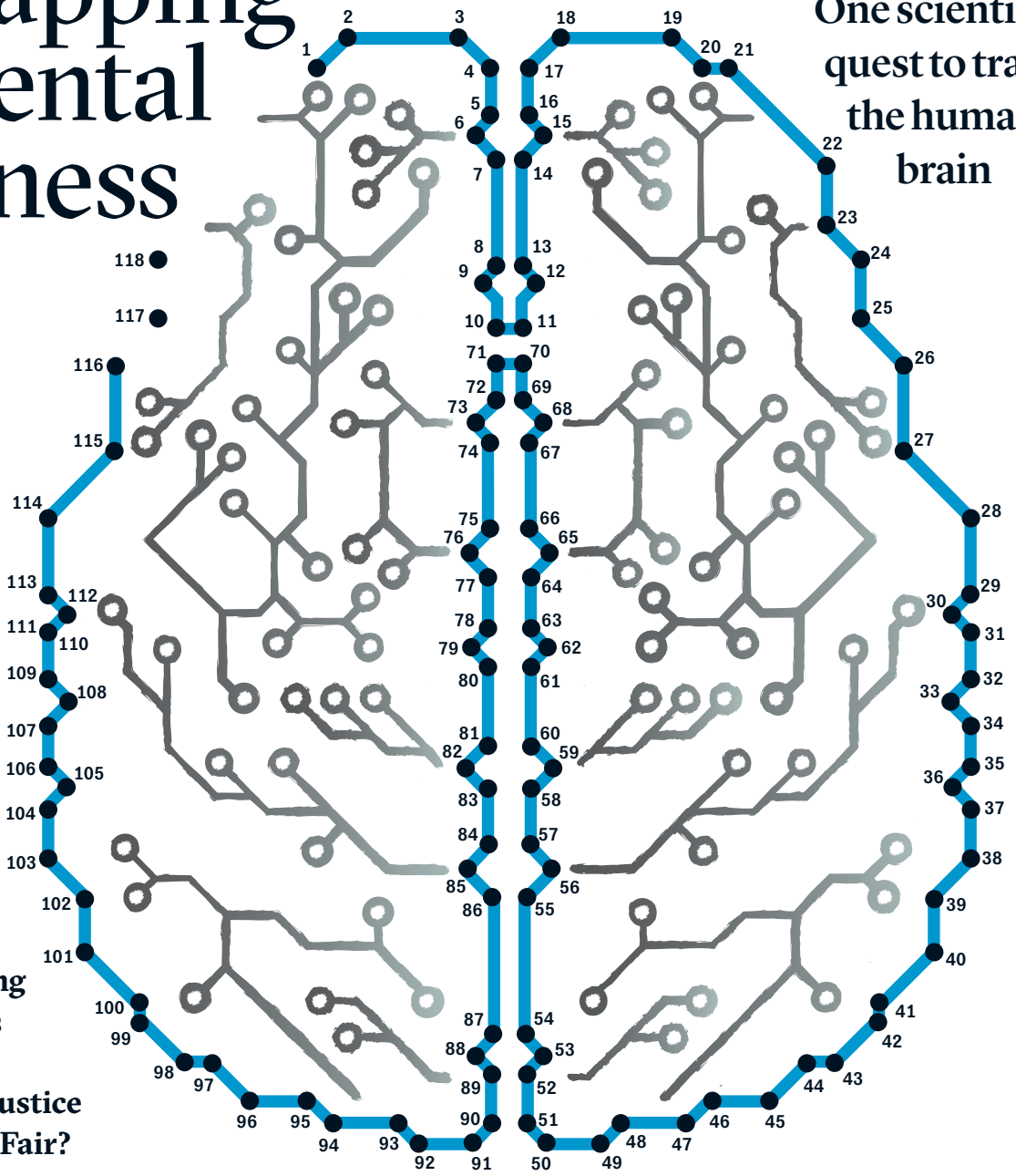


Listening to Trees

• • •

Is Our Justice System Fair?

Plus

Rethinking the Monarchy

Building Trust Builds Resilient Organizations

Canadians are warier than ever before. To navigate uncertainty, leaders need to make earning and maintaining trust a top priority

BY LEAH GOLOB

Since early 2020, the global news cycle has been decidedly negative. A worldwide pandemic, systemic social injustices, mass unemployment, and struggling small businesses are the topics that dominate our daily newsfeeds. One of the casualties of all this bad news—and the prevalence of disinformation—has been the public's trust in people and businesses.

Research from Proof Strategies, a public affairs and communications firm, suggests that trust levels, across the board, have declined steadily over the past five years. In May 2020, three months after the threat of the pandemic became a reality, Canadians demonstrated an overall trust score of 38 percent toward institutions such as charities, media, small and medium businesses, governments, and large corporations—a 7 percent drop from 2016.

The good news is that Canadian leaders can fix this gap and increase the trust that is essential to building resilient communities and organizations.

What is the Status of Trust in Canada?

Canada's institutions and public figures have considerable work to do when it comes to establishing and maintaining trust. Although 67 percent of Canadians believe most of the people they interact with are honest and trustworthy, faith in business institutions is strikingly low, according to the 2021 Proof Strategies CanTrust Index. The report found that just 27 percent of people said they felt they could trust corporations, while 28 percent said the same of management. Boards of directors rated just 26 percent, and business executives a mere 24 percent.

Worker confidence has been similarly hard hit in the past year. In that same report, employees gave their employers a near-failing grade of D for their capacity to build trust. Front line service workers, who have been exposed to greater health and safety risks during the pandemic, gave employers an even lower grade of D-minus. Both grades have fallen from a C-minus just one year ago.

Why Trust Matters

Kathleen McGinn, director of Trustlab, a research and consultancy firm created by Proof Strategies, defines trust as "the willingness to be vulnerable to the actions of others based on positive expectations of their intentions or behaviour." It is the key to well-functioning societies and economies.

For instance, companies can struggle to evolve and innovate without the trust of their employees. "Trust creates hope, energy, and positivity," McGinn says. "Distrust creates anxiety, vigilance, and self-protection behaviour." And with the pace of change organizations are currently facing, failure to innovate makes them more likely to lag behind the competition or, worse, wither and disappear—especially as technology makes it easier for competitors to vie for consumers' attention.

Companies benefit most when they create a trusting environment that elicits "prosocial behaviour," she adds, which fosters positive group dynamics that lead to cooperation, collaboration, creativity, and problem solving.

Trust also fosters high engagement, which reflects the well-being and satisfaction of a workforce. Engaged employees create resiliency to help businesses weather uncertainty, McGinn says. In the absence of trust, it's harder to get people to rally around the same vision.

What Leaders Can Do Today to Build and Protect Trust

Boards of directors, CEOs, and senior management need to adopt a long-term vision for their businesses. "A very simple short-term view is to enhance share price, raise more money, or create more profit," says Rahul K. Bhardwaj,

FIVE ACTIONS THAT PRESERVE TRUST

Leaders who put the following principles from Proof Strategies into practice can help their institutions emerge from the COVID-19 pandemic with continued trust from customers and employees, ensuring a renewed sense of engagement and well-being.

1

BE INCLUSIVE

Regularly consult with your employees and ensure they have a voice during the disruption—particularly over decisions that affect them.

2

PRIORITIZE PSYCHOLOGICAL SAFETY

Identify or create safe places where employees can work through emotions raised by disruption and change, and help leaders and staff members develop coping skills.

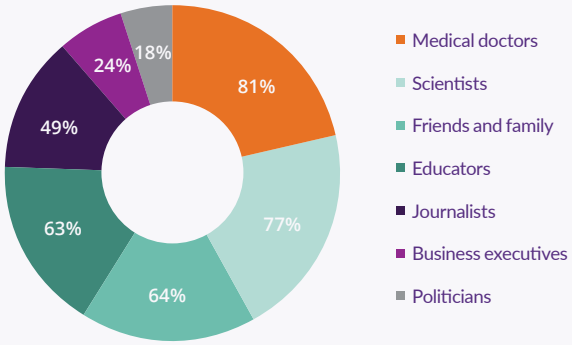
president and CEO of the Institute of Corporate Directors. Embracing a long-term view means connecting trust to the organization's sense of purpose, such as a collective commitment to a company's founding principles or serving a need in the community. When a deep sense of purpose permeates organizational culture, it brings out the best in everyone, Bhardwaj says.

Leaders should also consider whether they are rewarding the right types of behaviour, he adds. For example, if a company is truly committed to diversity, equity, and inclusion, they need to actively communicate that internally and externally. Transparency and follow-through are keys to earning and protecting trust among consumers, employees, investors, and society at large, and they complement values-based leadership. "Saying what you do and doing what you say are the fundamental building blocks of trust over time," McGinn says. People are inclined to trust whoever is looking out for their best interests, and customers are more likely to stick with companies that they feel reflect their values.

CANADA'S MOST-TRUSTED

To calculate its 2021 CanTrust Index, Proof Strategies asked Canadians which people—from friends and family to public figures—earned their confidence. Below are the percentages of people who ranked each category a seven, six, or five on the seven-point scale.

ON A SCALE OF ONE TO SEVEN, PLEASE INDICATE HOW MUCH YOU ARE WILLING TO TRUST EACH OF THE FOLLOWING CATEGORIES OF PEOPLE FOR RELIABLE INFORMATION.



ACTIONS THAT MAKE A COMPANY OR BRAND MORE TRUSTWORTHY

Who Do Canadians Trust?

Leaders seeking positive examples of trust building can look to the health professionals unexpectedly thrust into the spotlight during the pandemic. By January 2021, medical doctors and scientists (at 81 and 77 percent, respectively) had become the most trusted figures by far for reliable information in Canada–higher even than friends and family, at 64 percent –according to the 2021 CanTrust Index. On the opposite end of the spectrum were politicians, who, as a group, are trusted by only 18 percent of Canadians.

"People responded well to health professionals because they were credible, reliable, and offered timely information as the pandemic was unfolding," McGinn says. "Doctors and scientists were very honest about what they didn't know and, on some occasions, acknowledged the difficulty people were going through. That empathy makes us feel seen."

Honest, open communication was pivotal in encouraging Canadians to change their behaviours to curb the spread of COVID-19, while also providing a sense of reassurance and support. By following in health professionals' footsteps, leaders can similarly bolster employee and consumer confidence and make changes that benefit everyone. ■

3

COMMUNICATE CONTINUITY

Build bridges between past, present, and future visions of your organization. Connect any change agenda to the company's core values and purpose.

4

DEVELOP TRUST LITERACY

It's easier to preserve trust during difficult times if you understand how it was built and maintained in the first place. Create a common language and understanding of trust within your organization, and then develop specific skills that enable you to build on these foundations.

5

SAFEGUARD VALUES/PURPOSE

Evidence shows that managers who see their role during disruptions as guardians of the organization's purpose and core values are more likely to preserve trust than managers who perceive their role as "change agents" in the organization.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INNOVATIVE MEDICINES CANADA

p. 46

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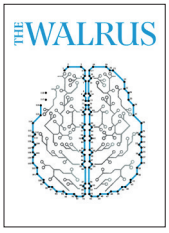

ON THE COVER
Illustration by Paul Kim

Paul Kim is the design director at The Walrus.

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PHOTOGRAPH (ABOVE) BY BRENDAN GEORGE KO

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THE WALRUS | CANADA'S CONVERSATION

Editor's Letter

Canada's Victoria Day does a lot of heavy lifting. Officially, May 24 marks the birthday of the monarch who reigned when this country was founded, as well as the ceremonial recognition of our current Queen. In the beer-commercial version, people gather for barbecues on the long weekend or to open up their vacation homes—unofficially kicking off the start of summer. This year, with parts of the country isolated by COVID-19 restrictions and a sober tinge to the air, Victoria Day has a special poignancy. What, exactly, are we celebrating?

The country has changed a lot since its founding. The recent headline-making rifts in the royal family, and the death of Prince Philip, have created the impression of the autumn of an empire—a generational shift, as it were. According to a recent Leger poll prompted by the departure of former governor general Julie Payette, 53 percent of Canadians think "the monarchy no longer has its place in the 21st century." This isn't the lowest point of support for the monarchy in Canada: the call to break up with the royal family is a long-standing Canadian tradition. But the rest of the poll, which hasn't received quite the same amount of public attention, struck me as revealing. Asked to choose from an exhaustive menu of liberal-democratic systems of governance, ranging from a US-style republic to a federation of provinces without a queen or governor general, 14 percent of respondents still chose "other." A relatively young country, Canada is sometimes held up as a model for others; the current climate tells us we're still determining what that example should look like.

Over the past few years, a series of milestones—including the Truth and Reconciliation Commission's final report, the Canada 150 events during the 2017 sesquicentennial, and even the rising tension between projects like the Keystone XL pipeline and the alarming evidence of climate change—have produced particularly direct discussions about what this country is and where it's going. Many of the major themes we've focused on at The Walrus—Canada's treatment of Indigenous people, the future of the economy, the tech sector, changing demographics, the climate crisis—point to a bigger story about how Canada is remaking itself.

This issue of The Walrus features dispatches from some of those ongoing conversations. In "Justice on Trial," Eva Holland covers the recent conviction of Brayden Bushby, who was found guilty of manslaughter for killing Barbara Kentner with a trailer hitch. In recent years, a number of high-profile criminal cases have resulted in verdicts less severe than expected—or outright acquittals—in the deaths of Indigenous people. One of the most pressing issues the country is grappling with is racism, and Holland's story tackles one of the places it lives in plain sight: the criminal justice system.

In "Doctors With Borders," Jagdeesh Mann reports on the large number of foreign-trained doctors who would love to help alleviate Canada's overburdened medical system but who can't find relevant work even during a pandemic. In another twenty-first century file, social media, Erica Lenti's memoir "A Dog's Likes" is, on its surface, about promoting a beloved pet online. But it's also about what the promise of accumulating social media followers and sponsors may represent to a young person today. Simon Lewsen's cover story, "Mapping Mental Illness," encapsulates some of the promise of the future: a researcher seeking to unlock the secrets of the human brain. As Lewsen writes, the approach could change our understanding of mental health—although, like any ambitious project, it will take an extraordinary amount of cooperation to get there.

And, on our back page, constitutional expert and law professor David Schneiderman addresses the question du jour: Beyond all the talk about ditching the monarchy, what are Canada's real options? As with so much of what has defined Canada in the past, the path toward change is complicated. But our present continues to stretch the idea of what Canada should be. Perhaps, this Victoria Day, rather than toasting the accomplishments of another time and place, we can celebrate our openness to evolving. ♛

—Jessica Johnson

ILLUSTRATION BY GRAHAM ROUMIEU

Contributors' Notes

SIMON LEWSEN
"Mapping Mental Illness," p. 28

"I've always wanted to write a story about brains because the topic strays into something that feels a little bit mystical—a place where hard science and abstract philosophy meet. We mostly understand how the heart and lungs work because they're comparatively simple machines. The brain, however, is infinitely more complex and mysterious. We still know surprisingly little about it."

Simon Lewsen has contributed to The Atlantic, Foreign Policy, enRoute, The Local, *and the* Globe and Mail. *Last year, his* PrecedentJD *feature "Articling Horror Stories" won a National Magazine Award. He teaches writing at the University of Toronto.*

JAGDEESH MANN
"Doctors With Borders," p. 23

"My mother doesn't speak English. When I was a kid, I would go to the doctor with her to translate. At the time, I thought to myself, 'This is technical stuff. Am I the right person to be doing this?' A lot of patients in Canada are elderly people from immigrant communities, and many of them don't speak English. It's hard enough for them to manage their pill intake, but it's even more difficult if they have to lean on someone else. This is why it's important that doctors speak the same language as their patients, and having more immigrant medical graduates certified in Canada would certainly help."

Jagdeesh Mann is a Vancouver-based entrepreneur and a founding partner of the Asian Pacific Post, *a Jack Webster Award–winning publication. His work has been published in the* Toronto Star, *the* Georgia Straight, *the* Globe and Mail, *the* CBC, *and* Canadaland.

EVA HOLLAND
"Justice on Trial," p. 36

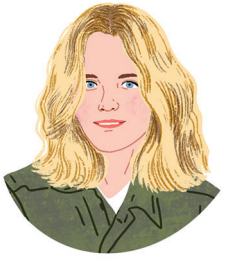
"Before writing this story, I hadn't done much crime reporting. My previous court coverage focused on land and resource issues. Now, having reported on Brayden Bushby's criminal trial in Thunder Bay, I don't think I'll ever be able to view the courtroom in a vacuum again: I'll always think about the forces that shape the arguments that the lawyers put forward, the ways the judge or jury receive them, and the context that shaped the actions of the accused and the victim. A trial takes place in an artificial bubble, but the bubble is an illusion."

Eva Holland is a frequent contributor to Outside *magazine and the author of* Nerve: A Personal Journey through the Science of Fear. *She lives in Whitehorse.*

DAN RUBINSTEIN
"Go to the Flow," p. 17

"My interest in blue space—the aquatic equivalent of green space—evolved out of my obsession with stand-up paddleboarding, which I've been doing for about six years. When I'm paddling, whether it's just a tame experience on a river near my house or an overnight trip by myself in the middle of nowhere, it really transports me to another place. The act of balancing on what's essentially a piece of wood (although it's usually an expensive piece of carbon fibre these days) physically and metaphorically puts your life in a much broader perspective."

Dan Rubinstein is a writer at Carleton University and the author of Born to Walk: The Transformative Power of a Pedestrian Act.



LAURA KAY KEELING
Photo illustration for "A Dog's Likes," p. 63

"I'm your classic introvert who considers posting on social media to be a lot of work. That's reflected in the collage I created for this essay, on the making of an Instagram pet celebrity. I incorporated some emojis as a nod to the pressure of the constant upkeep required. Some of my previous collage work has been about how we pick and choose the best pieces of ourselves to put out there."

Laura Kay Keeling is an analog photographer who produces video, collage, and installation-based work. Her latest exhibition, The Advantages of Tender Loving Care, *was featured in the Scotiabank Contact Photography Festival, in May.*

ILLUSTRATIONS BY SALINI PERERA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Letters

BARRIERS TO ENTRY

Kelly Toughill's story "How Immigration Really Works" (May) highlights Canada's increasingly decentralized immigrant-selection system—one of the most flexible in the world, nimble in adapting to changing economies and demographics. But, with little parliamentary oversight, that flexibility and nimbleness ride on the backs of the very immigrants we attract. Even as an immigration reporter for the *Toronto Star*, I have lost track of the myriad pathways to permanent residence. In a system so complex, it becomes much easier for those with precarious status to fall through the cracks while pursuing citizenship. Canadian immigration is largely driven by economics, and decentralization is arguably just about matching immigrants with jobs that need to be filled. Immigration is always about Canada; it's never about the immigrants. And, until we have robust checks and balances on our selection process, immigrants are the ones who are going to pay the price when something goes wrong.

Nicholas Keung
Toronto, ON

Toughill makes an effective case for the benefits of decentralizing immigration decisions, and she also discusses the many challenges stemming from the Canadian system's great complexity and lack of uniformity. But, as long as Canada accepts highly skilled immigrants into a country where their foreign credentials for professional positions are discounted, it will continue to perpetuate the deskilling of newcomer labour and the precarity that goes with this. The challenge of integrating foreign credentials has existed for a long time and continues without any solutions in sight.

Stephanie Bangarth
King's University College, Western University
Cambridge, ON

REALITY CHECK

In her article "After the Facts" (May), Viviane Fairbank dissects the limitations of modern fact-checking as a practice that has gained popularity over the last five years while losing much of its agreed-upon methodology and standards. Conducted properly, fact-checking has wider applications than just correcting misleading political memes or speeches. Reporting on disinformation for *Buzzfeed News*, I've seen first-hand how fact checkers are able to map out networks of disinformers and reconstruct virtual crime scenes to challenge harmful narratives. With these efforts, context is laid bare and we stand a chance of clarifying our polluted information environment.

Jane Lytvynenko
Toronto, ON

TALK THERAPY

Reading Lisa Whittington-Hill's "OCD Is Not a Joke" (*thewalrus.ca*), I was happy to see obsessive-compulsive disorder portrayed as a serious condition. I first noticed my OCD symptoms in high school. My episodes became more regular after 2019, and last year, I realized my symptoms had worsened because I was taking Singulair asthma medication. In 2020, after users of Singulair sued its manufacturer for failing to warn of potential adverse mental health side effects, the FDA mandated warning labels. Mental health is talked about a lot, but mental illness is still often considered a taboo subject. So let's talk about it!

Keannia Collins
Sedalia, MO

BODY LANGUAGE

In her essay "Will Beauty Change When the World Comes Back?" (*thewalrus.ca*), Amanda Scriver hopes the peace she has found with her body in quarantine will persist postpandemic. This resonates with me as I try to remind myself that our bodies map our life histories: I embrace my back and cancer surgery scars—they are badges of my survival. I accept those post-op pounds and try to be grateful for each day. Still, sometimes I want to scream, "I want my pre-surgery body back!"

Sara Esler McNulty
Brampton, ON

"The time has come," The Walrus said, "to talk of many things." Send us a letter, email (letters@thewalrus.ca), or tweet, or post on our Facebook page. Comments may be published in any medium and edited for length, clarity, and accuracy.

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ILLUSTRATION BY MYRIAM WARES

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The 2021 CanTrust Index survey explores the unique story of trust in Canada, including who Canadians turn to for reliable information.

Proof Strategies is proud to partner with The Walrus and continue this critical conversation.

VIEW THE FULL REPORT AT CANTRUSTINDEX.CA

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SCIENCE

Go to the Flow

Why being near bodies of water helps us feel good

BY DAN RUBINSTEIN
ILLUSTRATION BY SEAN LEWIS

Chad Guenter, a firefighter and rescue instructor in Canmore, Alberta, stands six-foot-three, weighs 250 pounds, and is covered in tattoos. He has seen a lot of troubling things while working: a seven-day-old baby who died of cardiac arrest, the bodies of three railroad engineers he helped recover from the crumpled wreck of a freight train. But, sometimes, it's the routine calls—like the elderly man who showed signs of stroke and reminded him of his father—that send him reeling. Over years of occupational stress, Guenter has talked to therapists about his flashbacks and heavy feelings. But, for immediate relief, he goes to the river. "When I'm on the water, there's nothing else that I have to worry about—nothing else," says Guenter, whose stand-up paddleboard has helped him cope with the trauma he experiences as a first responder. "Water demands all of my attention. It's really healing."

Guenter, who surfs in the rapids near his home, in the Rockies, and escapes on long-distance paddleboard journeys, launched a community group, Keep Calm and Paddle On, in 2012. Inspired by a 300-kilometre solo paddle along Lake Diefenbaker and the South Saskatchewan River to his hometown of Saskatoon, he has led annual multiday trips with dozens of participants. People push outside their comfort zones while reflecting on and talking about their inner struggles in a supportive atmosphere. "Our thoughts get pulled in so many different directions, but if you focus on what needs to be done, it can help you navigate your life," says Guenter. "Getting into the rhythm of a paddle stroke can be meditative, but it's much more than that. Maybe it's because we don't spend much time on the water anymore while past generations *needed* water. Maybe it's because water is so much bigger than us. I get choked up thinking about it, but that's okay. Calm seas never made a good sailor."

The restorative qualities of being in nature, or "green space," are well documented, but researchers have only recently begun to focus on what changes when water is part of the picture, when we spend time in or near aquatic environments. Taking in the sea air, strolling along a peninsula, or simply sitting beside a pond have long been considered good for our well-being, but evidence is emerging that "blue space" may have a more profound impact on our bodies and brains than other outdoor environments do.

Although he was born on an island off the south coast of England and loves surfing, Mat White followed a roundabout route to becoming perhaps the world's leading authority on blue space, expertise that evolved out of research into links between nature and well-being in the UK around a dozen years ago. As a young psychologist studying the environment's effects on human health, White investigated connections between mental health indicators and how people spent their days. Now based at the University of Vienna, he is researching what happens when we do anything (swim, surf, walk, sit) in, on, or near a body of water: an ocean, a lake, a river, even a fountain. From 2016 until it wrapped up last year, he helped lead BlueHealth, a pan-European research network that examined the nexus between urban blue spaces, climate, and health. BlueHealth projects used measures such as heart rate, blood pressure, surveys administered by trained interviewers, and self-reported wellness, with several

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studies involving virtual reality or subjects looking at photographs of water. For one paper, White crunched some big numbers—a UK census of approximately 48 million adults—and found that, the closer people live to the coast, the healthier and happier they are, a conclusion he and his collaborators attributed to increased opportunities for stress reduction and physical activity. "The crucial point about that research was that it was the poorest communities and individuals who got the benefits," he says, referring to both physiological and psychological well-being. "It didn't really matter where rich people lived; they were healthy anyway."

The quality of blue spaces affects their therapeutic properties, as does how we interact with them, variables influenced by geography as well as by cognitive and cultural differences. For example, people often prefer places they visited as children, according to White. But, on the whole, when we're near water, we tend to lose track of time and are more active, he says, and every extra minute of movement is good for our physical health. Moreover, "people benefit more mentally when they're visiting blue spaces than when they're visiting green spaces," adds White, although the ideal, he clarifies, is where the two spaces meet.

Natural areas often have some sort of aquatic element, from barely trickling streams in urban ravines to pounding waves below clifftop hiking trails. But not always. The lines between green and blue (and, in a Canadian winter, white) spaces are blurry, yet wellness surveys point to a hierarchy. In one study in the Netherlands, respondents used a smartphone app to record their level of happiness: those visiting natural coastal environments were roughly twice as happy as those in forests and three times happier than people in agricultural terrain. Manicured parks and grassy areas with low-lying vegetation typically score well, and mountains extremely well, but nothing beats water. A mountain lake, according to White, may be the ultimate happy place.

The reasons for these findings are complicated and involve evolution, biology, neuroscience, and concepts such as "flow"—a state in which people are so immersed in an activity that nothing else seems to matter. Essentially, blue space has four triggers that activate our parasympathetic nervous system, which controls body function while at rest, explains Jenny Roe, the director of the University of Virginia's Center for Design and Health. First, water instills a sense of being away. It can be either tranquil or dynamic, conditions that can make you introspective or attuned to your surroundings, both of which serve as escapes from your habitual behaviour. Second, it conjures a feeling of "extent," of being in a boundless environment (especially large bodies of water) where possibilities feel limitless. Although one can also experience these glimpses of a wider world while, say, hiking, they're amplified in blue space by acts like looking to the horizon or into the depths of a lake. Third, the sounds and sights of water—as it runs over rocks or dances in the sunlight—spark both "hard fascination," a concentration of our focus through stimulation, as well as "soft fascination," an unconscious capturing of our attention that requires little effort and frees the mind. And, fourth, water confers a sense of compatibility with our location, of comfort and belonging.

"Humans are hardwired to connect with water," says Roe, citing a phenomenon called biophilia, the idea that our intimate relationship with the natural world is rooted in genetics. This meshes with the "old friends" hypothesis: that time in nature puts us in contact with vital microbes we had been exposed to throughout human existence—until we began living in more sterile and mostly urban environments. When people are near turbulent waters, such as waves or a waterfall, they may be getting showered by microbiota that boost their immune systems. Although "the science isn't there yet" to make serious claims about this theory, White says, "people have been going to these places for thousands of years, and I don't think we should just dismiss that wisdom."

In 2019, Roe helped conduct a study in West Palm Beach, Florida, where a section of the downtown waterfront was modified with a few low-cost additions: tables and chairs, plants that provided shade and buffered traffic sound, and wooden "fascination frames" that encouraged people to stop and gaze out at the harbour. Study participants also walked along part of the waterfront that had not been improved. Using a mood scale to capture subjective well-being plus smart watches to track heart rate variability, the research team found that stress reduction was markedly higher in the modified scenario. It was a small study, Roe cautions, but it showed that a simple change can have a discernible impact. Urban planners and public health advocates, she writes, "can use the knowledge gleaned here to take full advantage of underused, underperforming, or otherwise neglected water spaces in a city." Roe is now doing an experiment that involves subjects looking at images of blue, green, and "grey" urban spaces while wearing headsets that capture cortical brain activity, signals that can be translated into alpha waves (which indicate relaxation) and beta waves (higher cognitive attention demands). But understanding what happens inside our brains when we see water is only the first step toward using that science to shape policy.

In the UK, one of the projects under the BlueHealth umbrella took place in Plymouth's Teats Hill, a low-income neighbourhood on a postindustrial waterfront where locals avoided the small beach because it was unkempt, neglected, and strewn with trash. City council secured a grant, commissioned landscape architects, and consulted the community to plan a redevelopment. It featured an open-air theatre, seating, an improved slipway to make it easy to launch personal watercraft, and a lawn with a view of the harbour. The cost was around $150,000, and surveys assessed the well-being of area residents before, during, and after construction. Psychological health increased, as did perceptions of community cohesion. Families played in the park, seniors sat on benches, and people took forays onto the sea. "The

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goodness isn't just the water," says White, mentioning another study, which found that people hang out at German rivers and lakes the same way they do at ocean beaches, spending quality time with one another because of the sense of belonging they feel. "It's a behavioural interaction that water encourages. This is one of the reasons we think blue spaces tackle health inequalities. They're social spaces that draw us into cross-generational play."

Although the payoffs in Plymouth appear to justify the redevelopment's relatively modest price tag, it's difficult to valuate this type of project. Instead, social return-on-investment analyses are increasingly used to measure the effectiveness of aquatic cleanup and accessibility efforts, and governments need these figures to make informed decisions. But, even though White sees the potential for blue-space research to improve urban planning, study results don't necessarily translate into prescriptions for change. "Every time we speak to policy makers," he says, "they ask us, 'How much is this worth? I don't deal with budgets of well-being. I deal with budgets of money. Where do I shift money to?'"

On the western shore of Lake Michigan, at the confluence of three rivers, Milwaukee, Wisconsin, has taken an omnibus approach to refocusing the city's gaze on water. In 2013, as part of its overarching sustainability plan, the municipal government began making it easier for local businesses, nonprofits, academics, and civic officials to collaborate on education and awareness efforts as well as on projects to improve access to blue spaces. Initiatives ranged from an accessible kayak launch in a dense area near downtown to a rain-capture system at a school, where water from the roof flows through a classroom in a clear pipe—an absorbing reminder to children about the role of this resource in their lives. "A lot of people in Milwaukee didn't think much about waterways or sewage systems before," says the city's sustainability program coordinator, Elizabeth Hittman. "We're doing a little bit of everything, from infrastructure to programming, to try to change that."

People who spend time in nature are more apt to display pro-environmental behaviour, such as buying local and cycling instead of driving. They feel a connection and, accordingly, a sense of stewardship. To Mark Mattson, president of Toronto-based watershed protection agency Lake Ontario Waterkeeper and its parent advocacy organization, Swim Drink Fish, this connection is the bridge between more widespread access to blue space and improved human and planetary health. Canada is a country of rivers and lakes and coastlines, but safe and equal access to blue space here is often limited, Mattson says. In large urban centres, waterways have been the domain of industry for decades, and residents haven't felt drawn to shorelines or lakefronts for leisure or exercise. During the COVID-19 pandemic, Swim Drink Fish set its sights on Toronto's forty-six kilometres of largely inaccessible lakefront, pushing for developments such as a new east-end revitalization plan that will feature boat launches, lakeside pools, an amphitheatre, and open-water swimming—a redesigned urban blue space. "We have a chance to come out of the pandemic feeling more connected to nature in our own backyards," says Mattson, "with a greater appreciation for the way water heals us."

DAN RUBINSTEIN is a writer at Carleton University and the author of *Born to Walk: The Transformative Power of a Pedestrian Act*. His work has been published in *enRoute*, the *Globe and Mail*, and the *Economist*.

After Life

BY JENNY BOYCHUK

I had no choice but to embody the lake.
My nailbeds anchored beneath stones, weeds.
To float or drown is the same ache.

Relentless, the revolving door: asleep/awake.
The paradox of an afterlife forced me deep;
I had no choice but to embody the lake.

Memory slithers, wicked. Its demands make
birds fly jagged into the false mouths of trees.
To float or drown is the same ache.

My mother is buried, but it thrills her to shake
a house until every jar falls out. Believe me,
I had no choice but to embody the lake.

A shy girl kneels at the shore, bakes a cake
of sand. Pebble sprinkles. A candle. A plea.
To float or drown, I worry, is the same ache.

Even the clearest dreams of her are opaque.
Even her mirrors are draped with white sheets.
I didn't have a choice. I embodied the lake.
To float or drown is the same ache.

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The Walrus has a long partnership with Adventure Canada, an award-winning, family-run adventure travel company. As the new executive director, I'll be joining their **small-ship expedition** *Newfoundland Circumnavigation*, July 4–15, 2022.

My family has roots in Newfoundland, and I'm excited to return. This trip will start in St. John's and cover the island's northeast coast, L'Anse aux Meadows, Red Bay, Gros Morne National Park, Miawpukek First Nation (Conne River), as well as other beautiful spots. I'm looking forward to the colourful homes, whale watching, and breathing in the fresh, coastal air!

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MEDICINE

Doctors With Borders

Physicians trained abroad have long struggled to find work in Canada. COVID-19 was supposed to change that

BY JAGDEESH MANN
ILLUSTRATION BY KUMÉ PATHER

At the start of 2020, Suvash Pokhrel was in danger of becoming a cliché. The thirty-eight-year-old had worked as an internal-medicine specialist in Nepal, but since becoming a Canadian permanent resident, in 2018, he hadn't been able to practise medicine. Instead, the physician spent his days taking online courses, so he could stay abreast of developments in his field, and caring for his kids.

The difficulty of practising medicine in Canada as a doctor trained outside the country is well known. Pokhrel was luckier than many others in his position: he was eligible for a loan to cover the thousands of dollars needed to take his two recertification exams. But that's just one step. The relicensing process for international medical graduates (or IMGs) involves verifying one's medical degree and previous practical experience, passing a language-proficiency test, and completing a Canadian medical residency or practicum. According to one researcher, all this can take up to a decade to complete and, accounting for factors like textbooks, commuting, and the study time that could have been spent earning income, can cost as much as $28,000.

In Canada, there are thousands of IMGs who will never practise here. Worse still, some international graduates have had their immigration applications expedited precisely because, as doctors, they qualify for Canadian immigration streams designed for skilled workers—but now find their careers stalled. Often, the biggest barrier is securing the required residency because few spots are allocated to IMGs. Vahid Nilforushan, for example, an anesthesiologist who trained in Iran but now lives in Vancouver, said his application for a residency was denied several times between 2010 and 2016, and he eventually gave up trying to get relicensed. Around half of the roughly 1,000 doctors who immigrate to Canada every year eventually abandon their medical careers.

Last spring, it seemed like these inveterate difficulties faced by IMGs would finally ease. The pandemic brought with it the fear that hospitals might become short staffed, and provincial governments realized they needed more hands on deck. Both BC and Ontario announced they would be issuing temporary licences for IMGs to practise under the supervision of other physicians. IMGs would no longer need to have completed a Canadian residency but only to have passed their Canadian medical exams or graduated from medical school in the past two years to participate.

Pokhrel looked forward to working in medicine again. "I have the skills to help, so I just want to do something," he said. It took a pandemic to offer a glimmer of hope that professionals like him might finally be able to practise again—and fill the widening gaps in Canada's health care system.

It should have been easy for a doctor like Pokhrel to find work in Canada. Approximately 5 million people in the country do not have a regular family doctor, and hospital wait times continue to grow. A 2018 study by the Fraser Institute found that Canada has fewer physicians per capita than comparable nations: 2.7 per 1,000 people, ranking twenty-sixth in the Organisation for Economic Co-operation and

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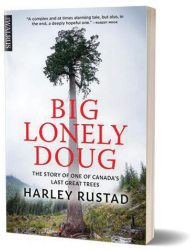

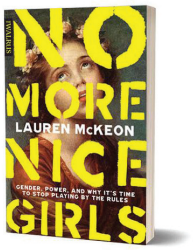

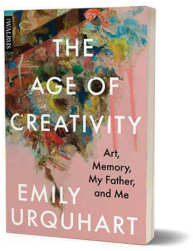

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CANADA'S CONVERSATION

Development (OECD). (The average is 3.4.) And, even though the number of doctors has been slowly increasing over the past several years, Canada is still dotted with health deserts, where access to family physicians and specialists is slim.

Pokhrel expected there to be plenty of opportunities, but in order to be approved for Ontario's thirty-day licence, there was a stipulation: applicants must have secured a position at a hospital, psychiatric facility, or Crown agency. In his enthusiasm, he rang up human resources at the Queensway Carleton Hospital and the University of Ottawa hospitals. According to Pokhrel, each facility he asked told him there weren't any openings for IMGs and that staff shortages due to the pandemic would be filled by retired physicians and fourth-year medical students. (The University of Ottawa did not respond to a request for comment on this story, but the Queensway Carleton Hospital confirmed it did not hire physicians under the short-term licences.)

Canada has fallen behind when it comes to working with foreign-trained doctors.

Last July, Reuters reported that Ontario had licensed only about two dozen IMGs in the past four months, a negligible sum in a province with 31,500 practising physicians. British Columbia had licensed zero.

For many IMGs, the greatest obstacle to practising medicine, even in non-pandemic times, has been securing a residency through the Canadian Resident Matching Service (CaRMS). Graduates or students from Canadian medical schools and IMGs rank their preference of residencies while hospitals rank their ideal candidates. A match is made if both candidate and hospital choose each other, similar to a dating app.

This system does not give these two groups equal opportunities: for every seven residencies allocated to Canadian graduates, it gives one to IMGs (though there are fewer IMG applicants). For some specialties, competition is incredibly fierce—last year, there were 124 anesthesiologist residency positions in the country, of which only nine were designated for IMGs. None of these were in BC, where Nilforushan currently resides. The process is designed to ensure that Canadian graduates are able to secure placements: last year, 99 percent of Canadian medical graduates were matched.

Of the spots that did go to IMGs, the lion's share went to doctors from Europe. CaRMS data reveals that 52 percent of IMG applicants from European countries successfully matched with residencies in 2020 while only 15 percent from Asia and 15 percent from Africa matched.

This seeming favouritism also allows some candidates to bypass the residency system altogether. Family doctors and specialists licensed to work in select countries—including Australia, New Zealand, South Africa, and Singapore—can be granted provisional licences (after a training assessment) to practise medicine in Canada on the basis of their previous experience abroad. This process in turn provides a pathway to a full licence.

Meanwhile, the already limited number of residency spots granted to IMGs has declined since 2013. According to a document by the Canadian Federation of Medical Students, "Provincial and territorial Ministries of Health determine the total number of residency positions available, the specialties in which they are available, and the proportion open to CMGs [Canadian medical graduates] versus IMGs." But attempting to understand how exactly quotas are calculated each year in BC, for example, proved to be Kafkaesque. Starting from the College of Physicians and Surgeons of BC, I was redirected to CaRMS and the University of British Columbia, then to the Association of Faculties of Medicine of Canada, and finally to BC's Ministry of Health.

Stephen May, a senior public affairs officer with the ministry, stated that, when it comes to IMGs, "BC has supported and implemented a number of revisions to reduce barriers over recent

years." He referred to the UBC medical program significantly increasing its number of IMG residency seats, from six to fifty-eight, as an example. (In contrast, Canadian and American medical graduates in BC have access to 288 residency seats.) But there still wasn't any clear answer on how the allocation for Canadian graduates versus IMGs is determined.

CANADA HAS lagged behind other Western countries when it comes to working with internationally trained doctors. According to a paper published by the University of Calgary's Robert Falconer, the UK health secretary recently promised to try to advance the qualification of refugee health care professionals. Meanwhile, the Irish Medical Council has turned to its medically trained refugees and asylum seekers for support during the pandemic. In the early stages of COVID-19, New York state issued directives allowing foreign-trained doctors to provide patient care.

Licensing more IMGs could address Canada's chronic doctor shortages as well as its aging physician population. (By 2026, 20 percent of Canada's doctors will be sixty-five or older, according to the Canadian Medical Association.) This policy move could also be key to better serving the country's diverse population. One study found that patients with a chronic disease and limited English were more likely to return to the emergency room or be readmitted to a hospital because discharge instructions were unclear. While medical graduates are certainly diverse, second-generation Canadians are less likely to speak as many languages as their first-generation counterparts.

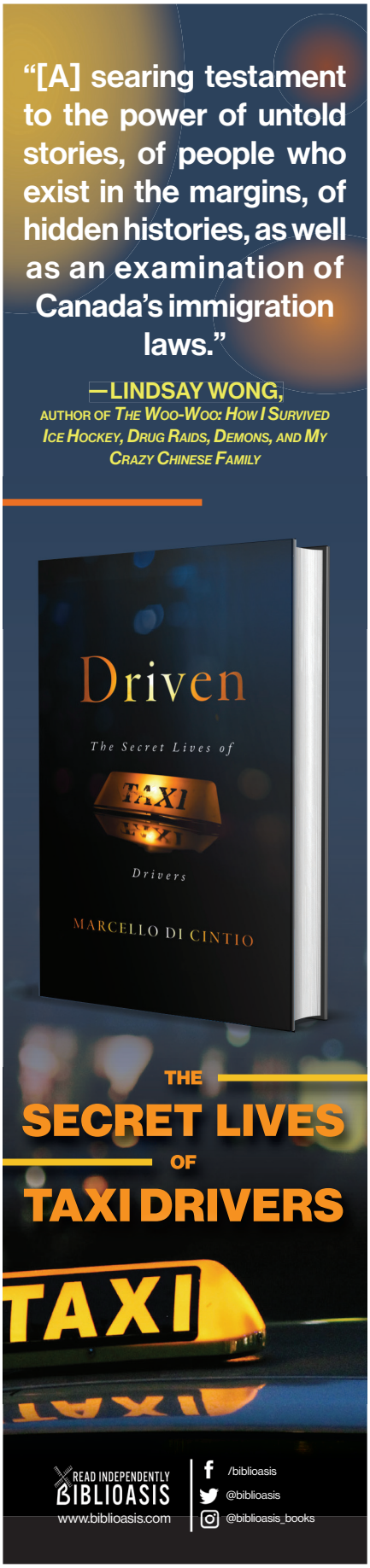
Despite the many problems, Canada's health care system has shown that changing how it integrates IMGs is possible. An alternative pathway to licensing, called the Practice Ready Assessment, is becoming an increasingly popular means for foreign doctors to relaunch their careers. PRAs make it possible to bypass the residency bottleneck by allowing physicians (particularly family doctors) who have completed their residencies and practised independently abroad to be tested through a supervised three-month assessment. If a candidate is successful, they are assigned to work in an underserviced rural area via a two- to four-year "return of service" contract. The program is now offered by seven provinces. Saskatchewan's PRA program is a significant source of physicians to its farming communities. Today, approximately 50 percent of the province's licensed doctors are IMGs. Expanding the PRA program to all provinces, especially Ontario, could be game changing.

Any recommendation that is serious about minimizing the so-called brain waste of Canada's IMGs will also require changes to our two-tier residency system. For experts like Falconer, who has written and spoken extensively on the issue, a substantive fix to the current system would be increasing the number of residency spots in the IMG pool to match the number offered to Canadian graduates. "We should just make them equal at 3,000 seats each," he said. It's a bold recommendation that could affect several parts of our health care system. But it could catapult Canada's ratio of doctors per capita to being on par with leading OECD countries.

Acting now could be crucial: Canada isn't guaranteed to remain a coveted destination for IMGs. Recently, the UK government introduced a new pathway to licensing for IMGs who have passed their Canadian medical exams. Pokhrel is exploring this new UK pathway; he's also studying for his US exams. "The system here is unwelcoming," he said. "We have fulfilled all the criteria, so why are there barriers to recruiting us into the field?"

This article was produced in collaboration with New Canadian Media.

JAGDEESH MANN is a Vancouver-based entrepreneur and a founding partner of the *Asian Pacific Post*, a Jack Webster Award–winning publication. His work has been published by the *Toronto Star*, the *Georgia Straight*, the *Globe and Mail*, the CBC, and *Canadaland*.



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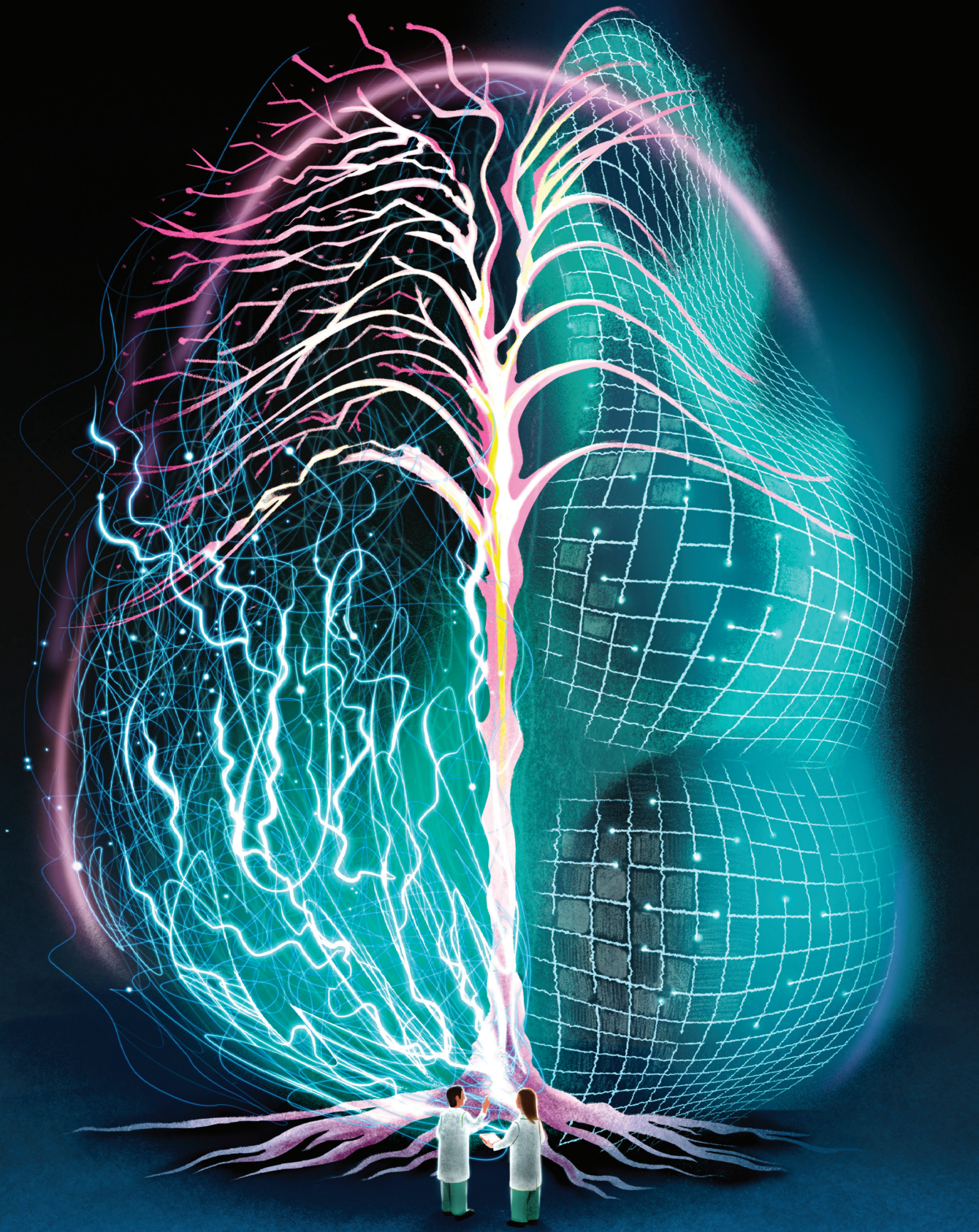


HEALTH

Mapping Mental Illness

One scientist's quest to demystify the human brain

BY SIMON LEWSEN
ILLUSTRATIONS BY JEREMY LEUNG

In the '90s, when he was a doctoral student at the University of Lausanne, in Switzerland, neuroscientist Sean Hill spent five years studying how cat brains respond to noise. At the time, researchers knew that two regions—the cerebral cortex, which is the outer layer of the brain, and the thalamus, a nut-like structure near the centre—did most of the work. But, when an auditory signal entered the brain through the ear, what happened, specifically? Which parts of the cortex and thalamus did the signal travel to? And in what order? The answers to such questions could help doctors treat hearing loss in humans. So, to learn more, Hill, along with his supervisor and a group of lab techs, anaesthetized cats and inserted electrodes into their brains to monitor what happened when the animals were exposed to sounds, which were piped into their ears via miniature headphones. Hill's probe then captured the brain signals the noises generated.

The last step was to euthanize the cats and dissect their brains, which was the only way for Hill to verify where he'd put his probes. It was not a part of the study he enjoyed. He'd grown up on a family farm in Maine and had developed a reverence for all sentient life. As an undergraduate student in New Hampshire, he'd experimented on pond snails, but only after ensuring that each was properly anaesthetized. "I particularly loved cats," he says, "but I also deeply believed in the need for animal data." (For obvious reasons, neuroscientists cannot euthanize and dissect human subjects.)

Over time, Hill came to wonder if his data was being put to the best possible use. In his cat experiments, he generated reels of magnetic tape—printouts that resembled player piano scrolls. Once he had finished analyzing the tapes, he would pack them up and store them in a basement. "It was just so tangible," he says. "You'd see all these data coming from the animals, but then what would happen with it? There were boxes and boxes that, in all likelihood, would never be looked at again." Most researchers wouldn't even know where to find them.

Hill was coming up against two interrelated problems in neuroscience: data scarcity and data wastage. Over the past five decades, brain research has advanced rapidly—we've developed treatments for Parkinson's and epilepsy and have figured out, if only in the roughest terms, which parts of the brain produce arousal, anger, sadness, and pain—but we're still at the beginning of the journey. Scientists are still some way, for instance, from knowing the size and shape of each type of neuron (i.e., brain cell), the RNA sequences that govern their behaviour, or the strength and frequency of the electrical signals that pass between them. The human brain has 86 billion neurons. That's a lot of data to collect and record.

But, while brain data is a precious resource, scientists tend to lock it away, like secretive art collectors. Labs the world over are conducting brain experiments using increasingly sophisticated technology, from hulking magnetic-imaging devices to microscopic probes. These experiments generate results, which then get published in journals. Once each new data set has served this limited purpose, it goes…somewhere, typically onto a secure hard drive only a few people can access.

Hill's graduate work in Lausanne was at times demoralizing. He reasoned that, for his research to be worth the costs to both the lab that conducted it and the cats who were its subjects, the resulting data—perhaps even *all* brain data—should live in the public domain. But scientists generally prefer not to share. Data, after all, is a kind of currency: it helps generate findings, which lead to jobs, money, and professional recognition. Researchers are loath to simply give away a commodity they worked hard to acquire. "There's an old joke," says Hill, "that neuroscientists would rather share toothbrushes than data."

He believes that, if they don't get over this aversion—and if they continue to stash data in basements and on encrypted hard drives—many profound questions about the brain will remain unanswered. This is not just a matter of academic curiosity: if we improve our understanding of the brain, we could develop treatments that have long eluded us for major mental illnesses.

In 2019, Hill became director of Toronto's Krembil Centre for Neuroinformatics (KCNI), an organization working at the intersection of neuroscience, information management, brain modelling, and psychiatry. The basic premise of neuroinformatics is this: the brain is big, and if humans are going to have a shot at understanding it, brain science must become big too. The KCNI's goal is to aggregate brain data and use it to build computerized models that, over time, become ever more complex—all to aid them in understanding the intricacy of a real brain. There are about thirty labs worldwide explicitly dedicated to such work, and they're governed by a central regulatory body, the International Neuroinformatics Coordinating Facility, in Sweden. But the KCNI stands out because it's embedded in a medical institution: the Centre for Addiction and Mental Health (CAMH), Canada's largest psychiatric hospital. While many other neuroinformatics labs study genetics or cognitive processing, the KCNI seeks to demystify conditions like schizophrenia, anxiety, and dementia. Its first area of focus is depression.

The disease affects more than 260 million people around the world, but we barely understand it. We know that the balance between the prefrontal cortex (at the front of the brain) and the anterior cingulate cortex (tucked just behind it) plays some role in regulating mood, as does the chemical serotonin. But what actually causes depression? Is there a tiny but important area of the brain that researchers should focus on? And does there even exist a singular disorder called depression, or is the label a catch-all denoting a bunch of distinct disorders with similar symptoms but different brain mechanisms? "Fundamentally," says Hill, "we don't have a biological understanding of depression or any other mental illness."

The problem, for Hill, requires an ambitious, participatory approach. If neuroscientists are to someday understand the biological mechanisms behind mental illness—that is, if they are to figure out what literally happens in the brain when a person is depressed, manic, or delusional—they will need to pool their resources. "There's not going to be a single person who figures it all out," he says. "There's never going to be an Einstein who solves a set of equations and shouts, 'I've got it!' The brain is not that kind of beast."

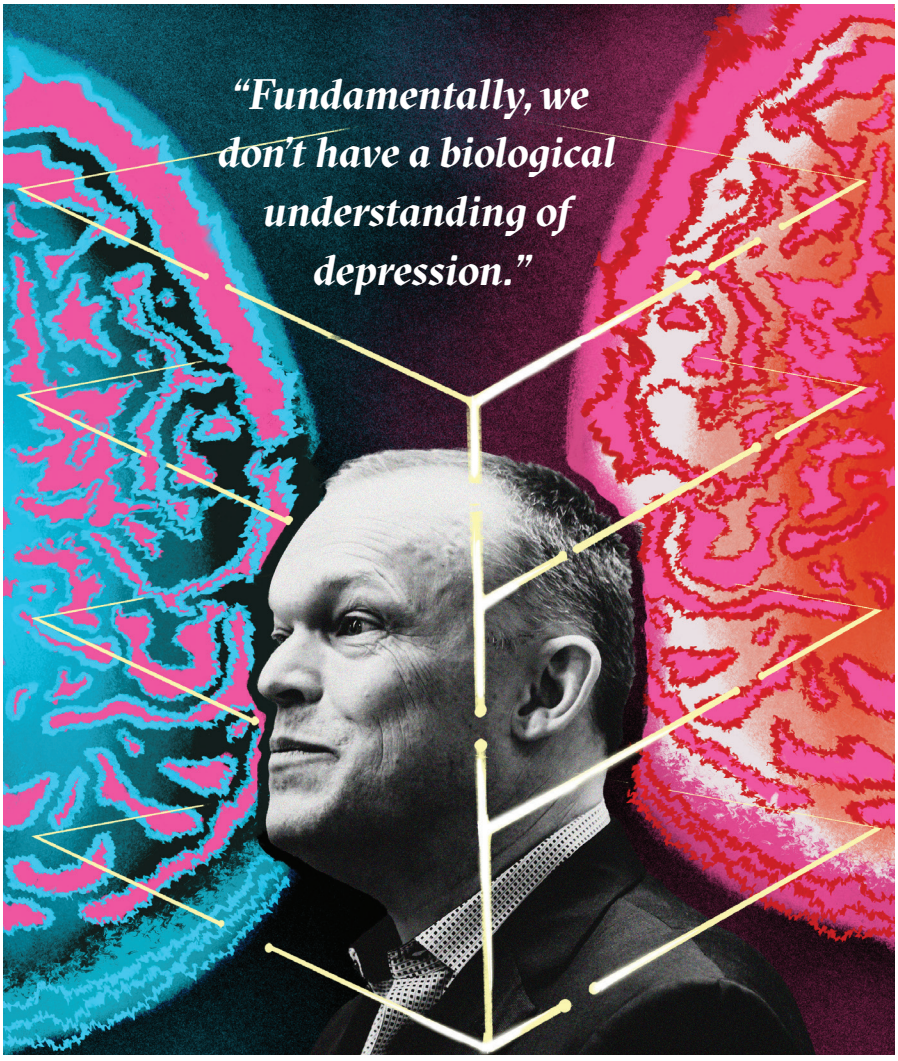
The KCNI lab has the feeling of a tech firm. It's an open-concept space with temporary workstations in lieu of offices, and its glassed-in meeting rooms have inspirational names, like "Tranquility" and "Perception." The KCNI is a "dry centre": it works with information and software rather than with biological tissue. To obtain data, researchers forge relationships with other scientists and try to convince them to share what they've got. The interior-design choices are a tactical part of this effort. "The space has to look nice," says Dan Felsky, a researcher at the centre. "Colleagues from elsewhere must want to come in and collaborate with us."

Yet it's hard to forget about the larger surroundings. During one interview in the "Clarity" room, Hill and I heard a code-blue alarm, broadcast across CAMH, to indicate a medical emergency elsewhere in the hospital. Hill's job doesn't involve front line care, so he doesn't personally work with patients, but these disruptions reinforce his sense of urgency. "I come from a discipline where scientists focus on theoretical subjects," he says. "It's important to be reminded that people are suffering and we have a responsibility to help them."

Today, the science of mental illness is based primarily on the study of symptoms. Patients receive a diagnosis when they report or exhibit maladaptive behaviours—despair, anxiety, disordered thinking—associated with a given condition. If a significant number of patients respond positively to a treatment, that treatment is deemed effective. But such data reveals nothing about what physically goes on within the brain. "When it comes to the various diseases of the brain," says Helena Ledmyr, co-director of the International Neuroinformatics Coordinating Facility, "we know astonishingly little." Shreejoy Tripathy, a KCNI researcher, gives modern civilization a bit more credit: "The ancient Egyptians would remove the brain when embalming people because they thought it was useless. In theory, we've learned a few things since then. In relation to how much we have left to learn, though, we're not that much further along."

Joe Herbert, a Cambridge University neuroscientist, offers a revealing comparison between the way mental versus physical maladies are diagnosed. If, in the nineteenth century, you walked into a doctor's office complaining of shortness of breath, the doctor would likely diagnose you with *dyspnea*, a word that basically means…shortness of breath. Today, of course, the doctor wouldn't stop there: they would take a blood sample to see if you were anemic, do an X-ray to search for a collapsed lung, or subject you to an echocardiogram to spot signs of heart disease. Instead of applying a Greek label to your symptoms, they'd run tests to figure out what was causing them.

Herbert argues that the way we currently diagnose depression is similar



to how we once diagnosed shortness of breath. The term *depression* is likely as useful now as *dyspnea* was 150 years ago: it probably denotes a range of wildly different maladies that just happen to have similar effects. "Psychiatrists recognize two types of depression—or three, if you count bipolar—but that's simply on the basis of symptoms," says Herbert. "Our history of medicine tells us that defining a disease by its symptoms is highly simplistic and inaccurate."

The advantage of working with models, as the KCNI researchers do, is that scientists can experiment in ways not possible with human subjects. They can shut off parts of the model brain or alter the electrical circuitry. The disadvantage is that models are not brains. A model is, ultimately, a kind of hypothesis—an illustration, analogy, or computer simulation that attempts to explain or replicate how a certain brain process works. Over the centuries, researchers have created brain models based on pianos, telephones, and computers. Each has some validity—the brain has multiple components working in concert, like the keys of a piano; it has different nodes that communicate with one another, like a telephone network; and it encodes and stores information, like a computer—but none perfectly describes how a real brain works. Models may be useful abstractions, but they are abstractions nevertheless. Yet, because the brain is vast and mysterious and hidden beneath the skull, we have no choice but to model it if we are to study it. Debates over how best to model it, and whether such modelling should be done at the micro or macro scale, are hotly contested in neuroscience. But Hill has spent most of his life preparing to answer these questions.

HILL GREW UP in the '70s and '80s, in an environment entirely unlike the one in which he works. His parents were adherents of the back-to-the-land movement, and his father was an occasional artisanal toymaker. On their farm, near the coast of Maine, the family grew vegetables and raised livestock using techniques not too different from those of nineteenth-century homesteaders. They pulled their plough with oxen and, to fuel their wood-burning stove, felled trees with a manual saw.

When Hill and his older brother found out that the local public school had acquired a TRS-80, an early desktop computer, they became obsessed. The math teacher, sensing their passion, decided to loan the machine to the family for Christmas. Over the holidays, the boys became amateur programmers. Their favourite application was Dancing Demon, in which a devilish figure taps its feet to an old swing tune. Pretty soon, the boys had hacked the program and turned the demon into a monster resembling Boris Karloff in *Frankenstein*. "In the dark winter of Maine," says Hill, "what else were we going to do?"

The experiments spurred conversation among the brothers, much of it the fevered speculation of young people who've read too much science fiction. They fantasized about the spaceships they would someday design. They also discussed the possibility of building a computerized brain. "I was probably ten or eleven years old," Hill recalls, "saying to my brother, 'Will we be able to simulate a neuron? Maybe that's what we need to get artificial intelligence.'" Roughly a decade later, as an undergraduate at the quirky liberal-arts university Hampshire College, Hill was drawn to computational neuroscience, a field whose practitioners were doing what he and his brother had talked about: building mathematical, and sometimes even computerized, brain models.

In 2006, after completing his PhD, along with postgraduate studies in San Diego and Wisconsin, Hill returned to Lausanne to co-direct the Blue Brain Project, a radical brain-modelling lab in the Swiss Alps. The initiative had been

PHOTOGRAPH OF SEAN HILL COURTESY OF CAMH

founded a year earlier by Henry Markram, a South African Israeli neuroscientist whose outsize ambitions had made him a revered and controversial figure.

In neuroscience today, there are robust debates as to how complex a brain model should be. Some researchers seek to design clean, elegant models. That's a fitting description of the Nobel Prize–winning work of Alan Hodgkin and Andrew Huxley, who, in 1952, drew handwritten equations and rudimentary illustrations—with lines, symbols, and arrows—describing how electrical signals exit a neuron and travel along a branch-like cable called an axon. Other practitioners seek to make computer-generated maps that incorporate hundreds of neurons and tens of thousands of connections, image fields so complicated that Michelangelo's Sistine Chapel ceiling looks minimalist by comparison. The clean, simple models demystify brain processes, making them understandable to humans. The complex models are impossible to comprehend: they offer too much information to take in, attempting to approximate the complexity of an actual brain.

Markram's inclinations are maximalist. In a 2009 TED Talk, he said that he aimed to build a computer model so comprehensive and biologically accurate that it would account for the location and activity of every human neuron. He likened this endeavour to mapping out a rainforest tree by tree. Skeptics wondered whether such a project was feasible. The problem isn't merely that there are numerous trees in a rainforest: it's also that each tree has its own configuration of boughs and limbs. The same is true of neurons. Each is a microscopic, blob-like structure with dense networks of protruding branches called axons and dendrites. Neurons use these branches to communicate. Electrical signals run along the axons of one neuron and then jump, over a space called a synapse, to the dendrites of another. The 86 billion neurons in the human brain each have an average of 10,000 synaptic connections. Surely, skeptics argued, it was impossible, using available technology, to make a realistic model from such a complicated, dynamic system.

In 2006, Markram and Hill got to work. The initial goal was to build a hyper-detailed, biologically faithful model of a "microcircuit" (i.e., a cluster of 31,000 neurons) found within the brain of a rat. With a glass probe called a patch clamp, technicians at the lab penetrated a slice of rat brain, connected to each individual neuron, and recorded the electrical signals it sent out. By injecting dye into the neurons, the team could visualize their shape and structure. Step by step, neuron by neuron, they mapped out the entire communication network. They then fed the data into a model so complex that it required Blue Gene, the IBM supercomputer, to run.

In 2015, they completed their rat microcircuit. If they gave their computerized model certain inputs (say, a virtual spark in one part of the circuit), it would predict an output (for instance, an electrical spark elsewhere) that corresponded to biological reality. The model wasn't doing any actual cognitive processing: it wasn't a virtual brain, and it certainly wasn't *thinking*. But, the researchers argued, it was predicting how electrical signals would move through a real circuit inside a real rat brain. "The digital brain tissue naturally behaves like the real brain tissue," reads a statement on the Blue Brain Project's website. "This means one can now study this digital tissue almost like one would study real brain tissue."

The breakthrough, however, drew fresh criticisms. Some neuroscientists questioned the expense of the undertaking. The team had built a multimillion-dollar computer program to simulate an already existing biological phenomenon, but so what? "The question of 'What are you trying to explain?' hadn't been answered," says Grace Lindsay, a computational neuroscientist and author of the book *Models of the Mind*. "A lot of money went into the Blue Brain Project, but without some guiding goal, the whole thing seemed too open-ended to be worth the resources."

Others argued that the experiment was not just profligate but needlessly convoluted. "There are ways to reduce a big system down to a smaller system," says Adrienne Fairhall, a computational neuroscientist at the University of Washington. "When Boeing was designing airplanes, they didn't build an entire plane just to figure out how air flows around the wings. They scaled things down because they understood that a small simulation could tell them what they needed to know." Why seek complexity, she argues, at the expense of clarity and elegance?

The harshest critics questioned whether the model even did what it was supposed to do. When building it, the team had used detailed information about the shape and electrical signals of each neuron. But, when designing the synaptic connections—that is, the specific locations where the branches communicate with one another—they didn't exactly mimic biological reality, since the technology for such detailed brain mapping didn't yet exist. (It does now, but it's a very recent development.) Instead, the team built an algorithm to predict, based on the structure of the neurons and the configuration of the branches, where the synaptic connections were likely to be. If you know the location and shape of the trees, they reasoned, you don't need to perfectly replicate how the branches intersect.

But Moritz Helmstaedter—a director at the Max Planck Institute for Brain Research, in Frankfurt, Germany, and an outspoken critic of the project—questions whether this supposition is true. "The Blue Brain model includes all kinds of assumptions about synaptic connectivity, but what if those assumptions are wrong?" he asks. The problem, for Helmstaedter, isn't just that the model could be inaccurate: it's that there's no way to fully assess its accuracy given how little we know about brain biology. If a living rat encounters a cat, its brain will generate a flight signal. But, if you present a virtual input representing a cat's fur to the Blue Brain model, will the model generate a virtual flight signal too? We can't tell, Helmstaedter argues, in part because we don't know, in sufficient detail, what a flight signal looks like inside a real rat brain.

Hill takes these comments in stride. To criticisms that the project was too

open-ended, he responds that the goal wasn't to demystify a specific brain process but to develop a new kind of brain modelling based in granular biological detail. The objective, in other words, was to demonstrate—to the world and to funders—that such an undertaking was possible. To criticisms that the model may not work, Hill contends that it has successfully reproduced thousands of experiments on actual rats. Those experiments hardly prove that the simulation is 100 percent accurate—no brain model is—but surely they give it credibility.

And, to criticisms that the model is needlessly complicated, he counters that the brain is complicated too. "We'd been hearing for decades that the brain is too complex to be modelled comprehensively," says Hill. "Markram put a flag in the ground and said, 'This is achievable in a finite amount of time.'" The specific length of time is a matter of some speculation. In his TED Talk, Markram implied that he might build a detailed human brain model by 2019, and he began raising money toward a new initiative, the Human Brain Project, meant to realize this goal. But funding dried up, and Markram's predictions came nowhere close to panning out.

The Blue Brain Project, however, remains ongoing. (The focus, now, is on modelling a full mouse brain.) For Hill, it offers proof of concept for the broader mission of neuroinformatics. It has demonstrated, he argues, that when you systemize huge amounts of data, you can build platforms that generate reliable insights about the brain. "We showed that you can do incredibly complex data integration," says Hill, "and the model will give rise to biologically realistic responses."

When Hill was approached by recruiters on behalf of CAMH to ask if he might consider leaving the Blue Brain Project to start a neuroinformatics lab in Toronto, he demurred. "I'd just become a Swiss citizen," he says, "and I didn't want to go." But the hospital gave him a rare opportunity: to practise cutting-edge neuroscience in a clinical setting. CAMH was formed, in 1998, through a merger of four health care and research institutions. It treats over 34,000 psychiatric patients each year and employs more than 140 scientists, many of whom study the brain. Its mission, therefore, is both psychiatric and neuroscientific—a combination that appealed to Hill. "I've spoken to psychiatrists who've told me, 'Neuroscience doesn't matter,'" he says. "In their work, they don't think about brain biology. They think about treating the patient in front of them." Such biases, he argues, reveal a profound gap between brain research and the illnesses that clinicians see daily. At the KCNI, he'd have a chance to bridge that gap.

A depressive brain is a noisy one. What if scientists could locate the neurons causing the problem?

THE BUSINESS of data-gathering and brain-modelling may seem dauntingly abstract, but the goal, ultimately, is to figure out what makes us human. The brain, after all, is the place where our emotional, sensory, and imaginative selves reside. To better understand how the modelling process works, I decided to shadow a researcher and trace an individual data point from its origins in a brain to its incorporation in a KCNI model.

Last February, I met Homeira Moradi, a neuroscientist at Toronto Western Hospital's Krembil Research Institute who shares data with the KCNI. Because of where she works, she has access to the rarest and most valuable resource in her field: human brain tissue. I joined her at 9 a.m., in her lab on the seventh floor. Below us, on the ground level, Taufik Valiante, a neurosurgeon, was operating on an epileptic patient. To treat epilepsy and brain cancer, surgeons sometimes cut out small portions of the brain. But, to access the damaged regions, they must also remove healthy tissue in the neocortex, the high-functioning outer layer of the brain.

Moradi gets her tissue samples from Valiante's operating room, and when I met her, she was hard at work weighing and mixing chemicals. The solution in which her tissue would sit would have to mimic, as closely as possible, the temperature and composition of an actual brain. "We have to trick the neurons into thinking they're still at home," she said. She moved at the frenetic pace of a line cook during a dinner rush. At some point that morning, Valiante's assistant would text her from the OR to indicate that the tissue was about to be extracted. When the message came through, she had to be ready. Once the brain sample had been removed from the patient's head, the neurons within it would begin to die. At best, Moradi would have twelve hours to study the sample before it expired.

The text arrived at noon, by which point we'd been sitting idly for an hour. Suddenly, we sprang into action. To comply with hospital policy, which forbids Moradi from using public hallways where a visitor may spot her carrying a beaker of brains, we approached the OR indirectly, via a warren of underground tunnels. The passages were lined with gurneys and illuminated, like catacombs in an Edgar Allan Poe story, by dim, inconsistent lighting. I hadn't received permission to witness the operation, so I waited for Moradi outside the OR and was able to see our chunk of brain only once we'd returned to the lab. It didn't look like much—a marble-size blob, gelatinous and slightly bloody, like gristle on a steak.

Under a microscope, though, the tissue was like nothing I'd ever seen. Moradi chopped the sample into thin pieces, like almond slices, which went into a small chemical bath called a recording chamber. She then brought the chamber into another room, where she kept her "rig": an infrared microscope attached to a manual arm. She put the bath beneath the lens and used the controls on either side of the rig to operate the arm, which held her patch clamp—a glass pipette

with a microscopic tip. On a TV monitor above us, we watched the pipette as it moved through layers of brain tissue resembling an ancient root system—tangled, fibrous, and impossibly dense.

Moradi needed to bring the clamp right up against the wall of a cell. The glass had to fuse with the neuron without puncturing the membrane. Positioning the clamp was maddeningly difficult, like threading the world's smallest needle. It took her the better part of an hour to connect to a pyramidal neuron, one of the largest and most common cell types in our brain sample. Once we'd made the connection, a filament inside the probe transmitted the electrical signals the neuron sent out. They went first into an amplifier and then into a software application that graphed the currents—strong pulses with intermittent weaker spikes between them—on an adjacent computer screen. "Is that coming from the neuron?" I asked, staring at the screen. "Yes," Moradi replied. "It's talking to us."

It had taken us most of the day, but we'd successfully produced a tiny data set—information that may be relevant to the study of mental illness. When neurons receive electrical signals, they often amplify or dampen them before passing them along to adjacent neurons. This function, called gating, enables the brain to select which stimuli to pay attention to. If successive neurons dampen a signal, the signal fades away. If they amplify it, the brain attends more closely. A popular theory of depression holds that the illness has something to do with gating. In depressive patients, neurons may be failing to dampen specific signals, thereby inducing the brain to ruminate unnecessarily on negative thoughts. A depressive brain, according to this theory, is a noisy one. It is failing to properly distinguish between salient and irrelevant stimuli. But what if scientists could locate and analyze a specific cluster of neurons (i.e., a circuit) that was causing the problem?

Etay Hay, an Israeli neuroscientist and one of Hill's early hires at the KCNI, is attempting to do just that. Using Moradi's data, he's building a model of a "canonical" circuit—that is, a circuit that appears thousands of times, with some variations, in the outer layer of the brain. He believes a malfunction in this circuit may underlie some types of treatment-resistant depression. The circuit contains pyramidal neurons, like the one Moradi recorded from, that communicate with smaller cells, called interneurons. The interneurons dampen the signals the pyramidal neurons send them. It's as if the interneurons are turning down the volume on unwanted thoughts. In a depressive brain, however, the interneurons may be failing to properly reduce the signals, causing the patient to get stuck in negative-thought loops.

Etienne Sibille, another CAMH neuroscientist, has designed a drug that increases communication between the interneurons and the pyramidal neurons in Hay's circuit. In theory, this drug should enable the interneurons to better do their job, tamp down on negative thoughts, and improve cognitive function. This direct intervention, which occurs at the cellular level, could be more effective than the current class of antidepressants, called SSRIs, which are much cruder. "They take a shotgun approach to depression," says Sibille, "by flooding the entire brain with serotonin." (That chemical, for reasons we don't fully understand, can reduce depressive symptoms, albeit only in some people.)

> ***"It's as if we're studying random stills from a movie but not seeing the entire thing."***

Sibille's drug, however, is more targeted. When he gives it to mice who seem listless or fearful, they perk up considerably. Before testing it on humans, Sibille hopes to further verify its efficacy. That's where Hay comes in. He has finished his virtual circuit and is now preparing to simulate Sibille's treatment. If the simulation reduces the overall amount of noise in the circuit, the drug can likely proceed to human trials, a potentially game-changing breakthrough.

Hill's other hires at the KCNI have different specialties from Hay's but similar goals. Shreejoy Tripathy is building computer models to predict how genes affect the shape and behaviour of neurons. Andreea Diaconescu is using video games to collect data that will allow her to better model early stage psychosis. This can be used to predict symptom severity and provide more effective treatment plans. Joanna Yu is building the BrainHealth Databank, a digital repository for anonymized data—on symptoms, metabolism, medications, and side effects—from over 1,000 CAMH patients with depression. Yu's team will employ AI to analyze the information and predict which treatment may offer the best outcome for each individual. Similarly, Dan Felsky is helping to run a five-year study on over 300 youth patients at CAMH, incorporating data from brain scans, cognitive tests, and doctors' assessments. "The purpose," he says, "is to identify signs that a young person may go on to develop early adult psychosis, one of the most severe manifestations of mental illness."

All of these researchers are trained scientists, but their work can feel more like engineering: they're each helping to build the digital infrastructure necessary to interpret the data they bring in.

Sibille's work, for instance, wouldn't have been possible without Hay's computer model, which in turn depends on Moradi's brain-tissue lab, in Toronto, and on data from hundreds of neuron recordings conducted in Seattle and Amsterdam. This collaborative approach, which is based in data-sharing agreements and trust-based relationships, is incredibly efficient. With a team of three trainees, Hay built his model in a mere twelve months. "If just one lab was generating my data," he says, "I'd have kept it busy for twenty years."

Scientific breakthroughs of the past are known to us in part because they lend themselves to storytelling. The tale, probably apocryphal,

of Galileo dropping cannonballs from the Tower of Pisa has a protagonist—a freethinker with an unfashionable idea about the world—and a plot twist, whereby an unorthodox theory is suddenly revealed to be true.

The history of neuroscience is filled with similar lore. When, in the 1880s, Santiago Ramón y Cajal, a Spanish researcher, injected dye into brain slices, he established, for once and for all, that brains are made up of neurons (although the term *neuron* wouldn't be coined for another few years). And, half a century later, when Wilder Penfield, a Montreal epilepsy surgeon, administered shocks to his patients' brains, conjuring physical sensations in their bodies (such as the famous burnt-toast discovery) and hallucinations in their minds, he demonstrated that sensory experiences arise from electrical stimuli. These simple narratives are themselves a kind of analogy, or model. We hear them, and suddenly, we better understand our world.

But the remaining neuroscientific questions, ones about the nature of consciousness or the molecular origins of mental illness, are so complex that they demand a depersonalized type of science with greater feats of digital engineering, fewer simple experiments, and only incremental changes in understanding. To this end, the KCNI aims to make all its models open so that other labs can combine them with models of their own, creating bigger, more comprehensive wholes. "Each lab can have its wins by building individual pieces," says Hill. "But, over the years, the entire project must become bigger than the sum of its parts."

This approach presents its share of challenges. One is getting scientists to work together despite the academic market's incentives to the contrary. The university system—where researchers hoard data for fear that it may fall into the hands of competitors—is a major obstacle to cooperation. So, too, is the academic publishing industry, which favours novel findings over raw data. Hill believes that data journals, a niche genre, should become every bit as prestigious as their most esteemed peers (like *The Lancet* or *The New England Journal of Medicine*) and that university hiring and tenure committees should reward applicants not only for the number of studies they publish but also for their contributions to the collective storehouse of knowledge. To get hired at the KCNI, candidates must demonstrate a commitment to collaborative science. Hill is working with colleagues at CAMH to instill similar standards hospital-wide, and he hopes, in time, to advise the University of Toronto on its hiring and promotion practices.

Encouragingly for Hill, funders are slowly getting on board with collaborative neuroscience—not just the Krembil Foundation, which backs the KCNI, but also the US National Institutes of Health, which has supported data-sharing platforms in neuroscience, and Seattle's Allen Institute for Brain Science, founded by deceased Microsoft cofounder Paul Allen, which is among the biggest producers of publicly available brain data. In support of such work, Hill is currently leading an international team to figure out common standards to describe data sets so they can be formatted and shared easily. Without such new incentives and new ways of practising science, we'll never be able to properly study mental illness. We know, for instance, that mental disorders can morph into one another—a bout of anxiety can become a depressive episode and then a psychotic break, each phase a step on a timeline—but we cannot understand this timeline unless we build models to simulate how illnesses mutate inside the brain. "Right now," says Hill, "it's as if we're studying random stills from a movie but not seeing the entire thing."

Seeing the entire thing is the point of neuroinformatics. But, Hill argues, this obsession with bigness also makes it different from much of the brain research that came before. "Science is about extracting information from reality," says Fairhall, of the University of Washington. "Reality has lots of parameters, but the goal of science is to boil it down to the bits that matter." It is, by definition, the process of distilling our complicated world to a set of comprehensible principles.

Yet this definition poses a problem for neuroscience. Because the brain remains largely unmapped and unexplored, researchers don't yet have access to the reality they're trying to distill. If they are to reduce the brain to a set of understandable rules, they must first engineer a better composite picture of the brain itself. That's why, for Hill, brain science must pursue bigness and complexity before it can derive the simple, elegant solutions that are its ultimate objective. Its goal, for now, shouldn't be to elevate individual scientists to celebrity status or to tell stories that rival those of Cajal or Penfield. Rather, it should be to build—over time and with the aid of a global community—a data machine so complex that it can help us model the equally formidable machines that reside within our heads.

Such ambitious work may seem abstract, but it can yield moments of profound poetry. One of Hill's favourite recent experiments came not from neuroscience but from astronomy—a discipline, popularized by '60s icons like Carl Sagan, that has a hippie ethos and has been more open, historically, to cooperative science. In 2019, a group of 200 researchers pooled enough data from telescopes in France, Chile, Mexico, Antarctica, and the United States to fill 1,000 hard drives and produce a composite photograph of Sagittarius A*, a black hole at the centre of our galaxy. It was an unprecedented achievement. Sagittarius A* is 26,000 light years from Earth, too far for any single telescope to capture. Yet the experimenters showed that, when members of a scientific community throw their collective weight against a single hard problem, they can push the boundaries of what's knowable. "They turned the planet into a telescope," Hill says admiringly. "Now, we must turn it into a brain."

SIMON LEWSEN has contributed to *The Atlantic*, *Foreign Policy*, *enRoute*, *The Local*, and the *Globe and Mail*. Last year, his *Precedent JD* feature "Articling Horror Stories" won a National Magazine Award. He teaches writing at the University of Toronto.

Barbara Kentner, August 21, 1982 – July 4, 2017

CRIME

Justice on Trial

When Brayden Bushby was charged with the death of Barbara Kentner, Indigenous communities' faith in Canada's legal system would once more be put to the test

BY EVA HOLLAND
ILLUSTRATION BY LAUREN CRAZYBULL

On November 2, 2020, Brayden Bushby walked into a makeshift courthouse wearing a dark suit and a matching dark mask. He was heavy-set, broad in shoulders and chest, but shorter than either of his lawyers, who bracketed him as they passed the media's cameras.

It was the first day of his trial. There had been months of delays, ranging from routine legal considerations to the surreal: a pandemic and then an electrical fire that shut down the Thunder Bay courthouse. Now, finally, in a repurposed hotel ballroom divided by sheets of Plexiglas, Bushby's case was called to order. The traditional phrases announcing the opening of a court of law ("Oyez! Oyez! Oyez!") sat strangely alongside justice Helen Pierce's apologies for any glitches in the technology zooming the trial to screens across the country. After the preliminaries, Bushby stepped out of his box to stand behind the defence table with his lawyers. A court official read out the two counts against him, to which Bushby was asked to plead guilty or not guilty. To the charge of manslaughter against an Anishinaabe woman named Barbara Kentner, Bushby responded, in a clear voice, "Not guilty." His response was recorded, and then the clerk read out the second charge: aggravated assault against Kentner. "Guilty," Bushby said.

"You have pleaded not guilty to count one and guilty to count two. Is this correct?"

Bushby agreed.

"Are you ready to proceed with your trial?"

"Yes," he said.

And that was it. Bushby wouldn't speak again on the record. His guilty plea to aggravated assault swept aside any disagreement over the basic events of January 29, 2017. By admitting his guilt, Bushby admitted that the crime involved a car full of teens and a night of aimless driving after a day that Bushby, for one, had spent drinking straight from a two-six of whisky. He admitted that, in the early hours of the morning in question, the vehicle had rolled down McKenzie Street, a quiet stretch of road in Thunder Bay. He admitted that he had climbed halfway out of the passenger window, clutching a trailer hitch he had stolen off a truck earlier that night. And that, as his friend had driven past two women walking on the road—Melissa Kentner first, followed by her sister Barbara—Bushby had hurled the trailer hitch, striking Barbara in the stomach. And finally that, as Barbara had doubled over in pain, she and her sister had heard him call out, "I got one."

None of these details were being disputed, so the prosecution would not have to prove the facts of the attack. Bushby's plea of not guilty to the charge of manslaughter, however, meant that the Crown *would* have to prove his role in what came afterward: Barbara Kentner's decline over the following five months and her eventual death, on July 4. In the Canadian Criminal Code, manslaughter is classified as a form of homicide, but its incarnations range widely, from what may be termed near-accidents to near-murders. Typically, it involves an unlawful act that plays a significant role in a person's death, where bodily harm from the act was foreseeable. It requires no planning or deliberation and no intent to kill. But it does require that a crime be committed. Accidentally hit and kill a pedestrian as you drive the speed limit, running no red lights? Not manslaughter. Punch someone in a bar brawl and their head strikes the edge of a table, sending them into a fatal coma? Textbook manslaughter.

Bushby and his legal team, however, didn't accept that his actions had played a significant role in Kentner's death. A criminal trial is about duelling narratives—the most convincing story wins. The story Bushby's lawyers wanted to tell went like this: yes, their client had committed a terrible, violent act, but Kentner had come through it and had been on track to recover before dying of liver disease, a diagnosis that predated the attack. The prosecutors, for their part, wanted to counter with a story about an assault with cascading medical consequences from which Kentner never recovered. She would have lived longer, they would argue, if she had never crossed paths with Bushby.

The trial would be a mirror held up to Canadian society. Staring back was not only the broader colonial system of law and its consistent failure to provide justice for Indigenous people but also the way racism operates on a dangerous continuum: from contempt and derision to violence and murder. But, while the issues in play would be broad, the field of debate would be narrow. The trial would not turn on eyewitness testimony or incriminating documents. Instead, it would hinge on the story told by Barbara Kentner's body.

Brayden Bushby's trial was the latest in a series of high-profile homicide cases featuring an Indigenous victim and a white defendant. The results—acquittal after acquittal—were devastating to many onlookers. In 2015, an Edmonton jury (described as "visibly white" by CBC News) found Bradley Barton not guilty of first-degree murder for the death of Cindy Gladue, a thirty-six-year-old Cree and Métis woman who had bled to death in Barton's hotel room. Jurors could instead have found him guilty of the lesser charge of manslaughter, but they chose not to.

Then there was Tina Fontaine, a fifteen-year-old girl from Sagkeeng First Nation whose body was found in the Red River in 2014, wrapped in a duvet cover and a plastic bag and weighed down with rocks. The suspect in her killing—Raymond Cormier, charged with second-degree murder—was also found not guilty. The fact that Fontaine was supposed to be in the custody of Manitoba's Child and Family Services when she died only drove home the inadequacy and abuse Indigenous children have too often received from Canadian institutions. Fontaine was, in fact, one of hundreds of missing and murdered Indigenous women and girls, and her death led to a national inquiry that toured the country collecting stories about cases that are too rarely fully investigated or vigorously prosecuted, stories of lives taken with impunity.

During the same week, in early 2018, that the Cormier trial began in Manitoba, yet another trial was underway one province west—a trial that would prove consequential for the prosecution of Barbara Kentner's death. In North Battleford, Saskatchewan, a white farmer named Gerald Stanley stood accused of second-degree murder in the shooting death of a Cree man named Colten Boushie. At the time of his death, the twenty-two-year-old was sitting in a vehicle one of his friends had driven onto Stanley's farm. That circumstance was explored in *Storying Violence: Unravelling Colonial Narratives in the Stanley Trial*. According to authors Gina Starblanket and Dallas Hunt, Boushie's presence on Stanley's property tapped into potent Prairie mythologies of soil and settlement, self-reliance and self-defence—the frontier notion of farmers defending "their" land against Indigenous incursion. Those mythologies fed public support for Stanley among white residents—and vitriol toward the victim. ("His only mistake was leaving three witnesses," wrote one Facebook user, who turned out to be a rural municipal councillor in Saskatchewan. Then-premier Brad Wall wound up making a public plea for an end to racist online comments about the case.)

Stanley admitted the bullet that had struck Boushie in the head and killed him was fired from a gun he held, but he claimed that the discharge had been an accident. If they were not convinced of his deadly intentions, Stanley's jurors,

like Barton's, had the option to convict him on the lesser charge of manslaughter. Instead, like Barton, Stanley walked free.

The result sparked anger across the country. Rallies were held in Saskatoon, Regina, Edmonton, and Toronto. Social media lit up with shock—even prime minister Justin Trudeau and then–justice minister Jody Wilson-Raybould tweeted their reactions to the verdict. In *Maclean's*, Stanley's acquittal was called "a great leap backward" for reconciliation and proof that "in the eyes of Canada's justice system it is okay to shoot and kill an unarmed Indigenous man." The uproar also increased the scrutiny of how Canadian juries are selected. Stanley's defence team had purged all visibly Indigenous potential jurors from the pool using a mechanism called a peremptory challenge, which required no reason or rationale to be given for the dismissal and which could not itself be challenged or appealed. It was, effectively, a veto. Prosecution and defence each had a maximum of fourteen peremptories at their disposal; Stanley's team needed only five to achieve an all-white jury.

The legal tool has been criticized in Canada for decades. In 1991, judges Murray Sinclair and Alvin Hamilton addressed the issue in the report of the Manitoba Aboriginal Justice Inquiry, which had been prompted, in part, by the discriminatory use of peremptory challenges during a 1987 trial for the brutal killing of a young Cree woman named Helen Betty Osborne (only one of the four men charged was ever convicted). "Unfortunately, the jury selection process designed in our Criminal Code and Jury Act allows such practices to occur," they wrote. "We believe that such practices should no longer be allowed." More than twenty years later, retired Supreme Court judge Frank Iacobucci compiled a report on the justice system's relationship to First Nations: what he found, he wrote, was "a crisis." Among his recommendations was amending the Criminal Code to "prevent the use of peremptory challenges to discriminate against First Nations people serving on juries." The pleas for change piled up, but no government acted on them.

Stanley's acquittal hung over the prospect of a Bushby trial. With Thunder Bay's growing national reputation for anti-Indigenous hate crimes and a series of reports that had found systemic discrimination in the police service, it was easy to imagine that Bushby might face a similarly monochromatic jury. Instead, in the weeks after Stanley walked out of court, the federal government introduced Bill C-75, which proposed an array of changes to the Criminal Code and to various other parts of the justice system. It included several changes to the jury-selection process; most notably, it abolished peremptory challenges, a move supported by organizations like Aboriginal Legal Services, a legal-aid clinic for Indigenous people living in Ontario, and the David Asper Centre for Constitutional Rights, an advocacy group.

In March, the Kentner family told the media that Barbara would never recover from her injuries — that she was dying.

Bill C-75 received royal assent on June 21, 2019, but was promptly challenged in court. The decision to remove peremptories was opposed by many defence attorneys, who object to any shrinking of an accused's rights in court. Groups representing Muslim, Black, and Asian lawyers argued that the removal would end up harming marginalized or racialized defendants in the end. The tool, they said, was necessary to allow their clients to weed out jurors with racial animus toward them. But law professor Kent Roach, who published a book about the Gerald Stanley and Colten Boushie case and argued for abolishing the peremptory challenge, thinks there are better ways to guard against prejudice on Canadian juries. For example, there's challenge for cause. This mechanism can be used to remove jurors who are found to be incapable of impartiality. Where peremptory challenges required no explanation or justification, challenge for cause requires jurors to answer a set of questions, agreed upon ahead of time by judge and lawyers, that are used to assess their impartiality.

It was the uncertainty over the fate of peremptory challenges that led to the postponement of Bushby's trial, originally scheduled for January 2020, as the lawyers waited to learn whether they could use peremptories or not. Last October, the Supreme Court of Canada upheld the change and ruled that it applied even to cases already underway.

By then, for Bushby, the point was moot. In September, the prosecutors in Thunder Bay announced that Bushby would now face a charge of manslaughter rather than of second-degree murder. And he would do so not in a jury trial, as planned, but in front of a judge alone.

The move was, as Bushby's senior defence counsel, George Joseph, explained in an interview months later, "a bit of a quid pro quo." Both sides wanted to avoid further delays and the risks of placing twelve jurors in close proximity to one another during a pandemic. And both sides were worried about media exposure in their prospective jury pool. The case had received extensive news coverage and had generated heated and often racist debate online. The Crown, says Joseph, was concerned "that we would get a certain type of jurist who would see the victim as less worthy of sympathy"; Joseph, for his part, was worried about jurors who would be determined to "make Brayden Bushby a scapegoat to atone for the sins of Thunder Bay." So, he says, they came to an agreement: Bushby would waive his right to a trial by jury and plead guilty to the initial charge of aggravated assault. In exchange, he would be tried on a charge of manslaughter instead of second-degree murder.

His guilty plea to aggravated assault guaranteed the Crown some form of conviction: even if he were acquitted of

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manslaughter, he would still be guilty of the attack itself, and he would face a maximum of fourteen years in prison for that crime. The Crown also now had a much lower legal threshold to secure a conviction because the bar is lower for manslaughter than for murder.

Reflecting the range of crimes it encompasses, manslaughter is the most serious violent charge not to carry a mandatory minimum sentence. Judges have the discretion to assign a defendant anything from simple probation to life in prison. Second-degree murder, in contrast, carries a mandatory minimum sentence of life, at least ten years of which are without the possibility of parole. So, while it was true that, by agreeing to the lesser charge of manslaughter, Bushby faced an increased chance of conviction, he also now faced a better shot at a shorter sentence.

To many onlookers, the change from second-degree murder to manslaughter felt like another sign of disrespect for Indigenous lives. To lawyers, it was just lawyering. "It's a common tactic for Crown attorneys to overcharge in murder cases," says Joseph. "And the reason for that is they get some bargaining power if it comes to plea time."

Andrew Sadler, the Thunder Bay Crown attorney who led the Bushby prosecution, acknowledged in court that he did not relish the prospect of proving Bushby's state of mind given the evidence of him puking before his attack on Kentner. A murder charge would have required that Sadler prove Bushby's "subjective foresight" of the outcome—that he either knew or should reasonably have known that his actions could cause death—a seemingly achievable feat given the cold, dense metal of the trailer hitch in his hands. But it also would have allowed the defence team to invoke Bushby's intoxication and marshal it as evidence to help relieve him of responsibility. Manslaughter is different, Sadler said. Level of intoxication is not a factor. In other words: there is no such thing as being too drunk to commit manslaughter.

"That's an example of the Crown doing their job," says Naomi Sayers, an Indigenous lawyer based in Sault Ste. Marie, of the shift to manslaughter. She seemed doubtful about second-degree murder making its way to conviction. "Would they have met the elements of a murder charge? Probably not. And then everybody would have been outraged."

On that first November morning in hotel-court, Sadler rose to make his case. And the case, he explained, was about causation. Under Canadian law, Bushby could be convicted of manslaughter if his unlawful act—the throwing of the trailer hitch—contributed significantly to Barbara Kentner's death. It did not have to represent her sole cause of death or even her primary cause of death. The act had to cross beyond what Sadler called the *de minimus* threshold—the Latin legal term for "insignificant." The Criminal Code doesn't draw the line between insignificance and significance. Instead, lawyers and judges rely on precedent to make that determination. Sadler would make his argument using the available scientific evidence about Kentner's cause of death and the available case law that suggested how a judge ought to interpret and apply that evidence in reaching a verdict.

Given the narrowness of the question at issue, the prosecution called just two witnesses. The first was Melissa, Barbara Kentner's sister. While she could not speak to medical causation, her testimony set the scene of the attack and helped bring a sense of Barbara—the living woman, not the body under scrutiny—into the courtroom.

Melissa, solemn and dressed all in black, described how, around 1 a.m. on January 29, 2017, she had noticed a dark vehicle roll by on McKenzie Street. How she heard a "clank-clank" and turned around to find Barbara doubled over, holding her stomach. How she backtracked to her sister and found the source of her pain: a trailer hitch lying in the street. How she gathered up the heavy object, carefully, with her sleeve (the sisters would eventually slip it into a plastic bag to bring to the police) and helped Barbara off the street and out of sight in case their attackers circled back. After she saw her uncle drive by, she called him on her cellphone to turn around and pick them up. He drove both sisters back to Barbara's place, nearby, where they tried to get a few hours of sleep. Later that morning, a third Kentner sister, Cheryl, drove them all to Thunder Bay's hospital, where staff diagnosed a perforation in Barbara's small intestine and she underwent emergency surgery.

From there, most people watching and listening knew the rest of the story. Barbara's hospital visits piled up. In March, the Kentner family told the media that Barbara would never recover from her injuries—that she was dying. Police paid Barbara a house call to record a video statement, anticipating that she would not be able to testify at her attacker's eventual trial. And, early that summer, Barbara entered hospice care. She died in the early morning of July 4. She was thirty-four years old and left behind a teenage daughter.

Toby Rose, a forensic pathologist, was up next. It was her testimony that would speak to medical-legal causation: the case hinged on what she had to say. At the time that she had conducted the autopsy on Kentner, Rose was Ontario's deputy chief forensic pathologist. She had decades of experience, having performed thousands of autopsies in her career. Her task was to determine a cause of death, and her finding, as she explained in court, was much more complex than it would have been in the case of, say, a gunshot wound to the head.

Rose told a story about consequences: the blunt force impact of the trailer hitch as the start of a chain reaction. Her testimony was densely technical. She had combed through a box of Kentner's medical records from before and after the attack. She had inspected Kentner's body, doing an external exam as well as the autopsy. Tissues and fluids had been examined. Over the course of several hours, Rose outlined the key points that had led to her conclusion, each one more intimate than the last. The injury and the surgery together had led to complications, to which Kentner had been particularly vulnerable given her pre-attack diagnosis of cirrhosis. She was, Rose acknowledged repeatedly, already "a very sick woman" when she was hit. But Rose's

investigation had led her to conclude that being hit with the trailer hitch had shortened Kentner's life still further.

In Rose's cross-examination, there were tense moments. The defence had no route to acquittal, after all, except to sow doubt around her findings. Wasn't the way Kentner had died, defence lawyer George Joseph argued, awfully similar to the way one dies from liver disease? Joseph entered into evidence the mental health records from her hospital stay after the attack, suggesting that notes from a psychiatric consultation showed her displaying "confused thinking," a symptom of end-stage liver disease. Wasn't this, he implied, a sign that she had already been close to death? In reply, Rose noted firmly that, on the very next page, the psychiatrist had attributed the "confused thinking" to other factors.

Yes, she agreed under Joseph's questioning, it was a complex case. But she had seen others as complex in her career. And, yes, she acknowledged, it was possible that some other pathologist would have reached some differing conclusion. She stood by her own findings.

Sadler pushed back against Joseph. Speculation, he argued, is not good enough; hypothetical alternative narratives, proffered without proof, are not good enough. The defence's counter-story needed evidence. He introduced another legal concept: the "thin skull rule," the idea that an assailant is liable for any injury they cause even if the victim had a preexisting condition that made them more vulnerable. For instance, if you stabbed someone whose blood didn't clot well, you would be just as responsible for their death as had you killed someone who bled more slowly. So, Sadler argued, Kentner's medical condition did nothing to alleviate Bushby's guilt in her death. "It matters not whether there were other causes unrelated to the injury, as long as the Court is satisfied that the injury played a role beyond *de minimus*," he said.

He urged the judge to accept Rose's finding of causation: *a* leads to *b* leads to *c*. But we can trace that line of causation even further back, to before the moment of impact, can't we?

One of Thunder Bay's cruelties is the practice of throwing makeshift missiles—beer bottles, pop cans, food wrappers, and other litter—at Indigenous pedestrians from a moving vehicle. The city of 127,000 on Lake Superior's northwestern shore is the urban hub for dozens of First Nations whose territories span northwestern Ontario. For decades, their citizens have reported the phenomenon. "We would get egged by white kids," one Indigenous youth told journalist Tanya Talaga in her book *Seven Fallen Feathers*, about the unexplained deaths of seven Indigenous students. (The students had attended high school in the city, far from their communities.)

When Melissa Kentner first wrote about the attack on Facebook, the post hummed from one screen to the next. Thunder Bay police caught wind of it, as did local media. The first news stories appeared online, from CBC Thunder Bay and APTN, and rapidly began to spread across the country, where the attack was received as an aberration—a strange, macabre crime that goes viral. In Thunder Bay, it was understood not as an outlier but as an escalation.

Bushby, whatever his state of mind, had not picked up that trailer hitch in

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a vacuum. His actions mirrored the society he was raised in, just as our court system so often reflects our failings back at us. In a city where missiles are thrown from vehicles, in a country where Indigenous women are disproportionately likely to be killed, an Indigenous woman was killed by a missile thrown from a vehicle. There's a cold, causal logic there. When activists say that "racism kills," this is, in part, what they mean—not a metaphor, not hyperbole. It's an ecosystem of stereotypes and bad jokes that evolve into slurs and taunts, then eggings and tossed trash, then worse. The Bushby case was, in a way, itself a dense object thrown from a moving vehicle: heavy with velocity and kinetic energy even before its release. Finally, in the trial, it reached the point of impact.

At the end of Brayden Bushby's four-day trial, the judge and the lawyers deliberated about which exhibits—the documents and other items entered as evidence throughout the proceedings—journalists covering the case would be permitted to see. Everything that is spoken out loud in court is transcribed and written into the public record, but access to exhibits can be limited. Justice Pierce noted that, while she was mindful of the principles of open courts, she wanted to hear from both legal teams about holding back some details for the sake of Barbara Kentner's dignity. She invoked a recent precedent: *R. v. Barton*.

Bradley Barton was the man charged with the first-degree murder of Cindy Gladue. Gladue had bled to death from an eleven-centimetre wound in her vaginal wall—a victim of some form of stabbing, the prosecution argued in Barton's first trial; his defence claimed he had inadvertently caused the injury with his hand and fingers during consensual "rough sex." That trial featured the ghoulish presentation of Gladue's vaginal tissue to the court and the jury—the prosecution's effort to drive home the extent of the wound and the improbability of it having been caused by a consensual accident. But even this violation was not enough, and Barton was acquitted.

The prosecution appealed, arguing that the judge had erred significantly and that Barton should be retried. The Criminal Code, for example, forbids the use of a victim's previous sexual history to suggest that consent was given; the judge, lawyers said, had failed to enforce that rule and had never instructed the jury to ignore those implications.

The appeal eventually went on to the Supreme Court of Canada, where the justices decided that the trial judge had indeed made errors and offered a series of guidelines to avoid those mistakes in the future. "Our criminal justice system and all participants within it," they wrote in their judgment, "should take reasonable steps to address systemic biases, prejudices, and stereotypes against Indigenous women and sex workers." The justices then ordered a new trial.

Barton now represented a sort of precedent in reverse: a manual on what not to do and a symbol of the legal system's new attempt to uphold, in the courtroom, the dignity of Indigenous women who were victims of crime.

The Barton judgment focused specifically on sexual assault cases, but Pierce wanted to bear the broader principle in

mind. She recognized a continuum from one woman's tissue to another's intimate medical details, and she was concerned that public access to Barbara Kentner's medical records might expose her to further racism and stereotyping. "It is hard to imagine more intrusive information," she noted. After the matter of the exhibits was dealt with and the lawyers had had their say, Pierce reserved her decision: she would offer a verdict, with detailed reasoning, on December 14.

Five weeks passed before the lawyers and other officials reconvened to hear the judge's verdict. She spoke for more than an hour. She accepted Rose's findings of causation and did not accept the various arguments the defence had put to her. She found Brayden Bushby guilty, beyond a reasonable doubt, of manslaughter in the death of Barbara Kentner.

At a sentencing hearing on February 17, prosecutors argued that Bushby should serve eight to twelve years in a federal penitentiary. His defence attorneys argued for a sentence of four years. (Had Bushby been convicted of second-degree murder, there would have been no argument: an automatic life sentence would have been applied.) The sentencing decision is scheduled for May.

It may be tempting to view Bushby's conviction as the start of a pattern, to plot it as one point on a graph. After all, in February, while lawyers argued over Bushby's sentence, Barton also faced a new trial in the death of Cindy Gladue. This time, her bodily tissue was not put on public display. This time, Barton, too, was convicted of manslaughter. Was this not part of a line trending up, a system improving itself? That's an easy narrative for Canadians to embrace. *We're getting better*. But there is little to celebrate in the bare minimum being achieved: in prosecutors doing their jobs; in a judge or jury finding their way to a verdict that appears to match the evidence arrayed before them. A story about improvement, about redemption, is too simple, too self-congratulatory.

Beverly Jacobs is the associate dean of law at the University of Windsor and a longtime advocate for missing and murdered Indigenous women and girls. The abolition of peremptory challenges was, she believes, cosmetic, and she argues that the criminal legal system needs to be reenvisioned in ways that are not inherently adversarial. "It's a game," she says, referring to the theatre of clashing narratives and cross-examination at play in Canadian courtrooms. "It's a game between the defence counsel and the Crown attorneys."

Bill C-75 may be of some help, she allows, but it doesn't address a colonial process that's been forced upon Indigenous people or the way the system can dehumanize victims. "The whole system," she says, "was designed to try to erase Indigenous people from the beginning." Jacobs teaches her students that it doesn't have to be that way, that it's possible to practise greater respect in the courtroom, not only for the dignity of Indigenous women but for everyone. There is room for compassion: we can build a system not so pulverizing of its participants. Just look at the training of criminal lawyers, she says. "There's a mentality in that profession of being able to win for your client. It's not about winning. It's supposed to be about justice."

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It can feel hard to reimagine a system so embedded in our society, though. And the stakes are high. In the closing hours of the Bushby trial, Joseph expressed regret for the argument he was about to advance: that Barbara Kentner might have lived longer if her sister Melissa had taken her to the hospital immediately after the attack instead of waiting until the next day. It was the kind of argument that landed cruelly for onlookers. Still, according to Joseph, it had to be made. "I'd be inhuman if I didn't know that this was a sister who was grieving the loss of her sister," he said recently. "To suggest that she played a role in that is a difficult suggestion to make but one that a diligent lawyer has to make." Ryan Green, Joseph's co-counsel, agrees that the process is tough. "It's hard on people; it's tough on witnesses; it's hard on us, quite frankly. But even the slightest shift away from that rigorous process—of cross-examination, for example—could result in an innocent person going to jail."

For Sayers, the Sault Ste. Marie lawyer, all attorneys have a duty to their clients. "It doesn't go away just because somebody doesn't like hearing something." She acknowledges the pain cross-examination can cause: "It feels like an attack, it does. It feels like, Why are you blaming the family?" But, to her, the emphasis should be on preventing crimes like Bushby's in the first place rather than on hemming in an accused's legal defenders. "I think that just calls out to the responsibility of everybody in helping to stop violence against Indigenous women."

But, for Jacobs, it remains possible—and essential—to tell a different story about the functioning of justice in this country. It starts with education, she says. Not just in law school but from childhood, to uproot harmful stereotypes about Indigenous people and to preempt the calcification of assumptions and attitudes. To build a culture that would never countenance decades of garbage launched from cars, that would value the lives of Indigenous women. "They call it a precedent," she says of the principle of case law built upon case law, stories upon stories, that shapes our system. "Precedent can be changed."

In the end, the Kentner family, the lawyers, and the judge agreed that the video exhibit, Kentner's statement, should not be made public. The transcript of the tape was enough: it was her words, not her image three months before her death, that mattered.

In the video, an exhausted Kentner described that night on McKenzie Street ("I felt something hard hit me") and the hours that followed ("I couldn't breathe, I couldn't sleep"). At the end of the clip, she began one final sentence, "It really sucks—" and was cut off, the video edited by prior agreement among the lawyers. In our system, witnesses are allowed to share statements of fact with the court, to tell the story of what occurred, but they are not permitted to air what may be termed an opinion. Before the cut was made, in the full version of the video, she finished the thought: "I'm gonna lose my life because of it."

EVA HOLLAND is a correspondent for *Outside* magazine and the author of *Nerve: A Personal Journey through the Science of Fear*. She lives in Whitehorse.

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ENVIRONMENT

Family Trees

How I tapped into the vast social network beneath the forest floor

BY SUZANNE SIMARD
PHOTOGRAPHY BY BRENDAN GEORGE KO

Suzanne Simard is a professor of forest ecology at the University of British Columbia. Her research into how trees cooperate, share resources, and communicate through underground fungal—or mycorrhizal—networks has reached global influence, from Peter Wohlleben's *The Hidden Life of Trees* to the film *Avatar*.

THE TREES by the creek were dense and plump, and the ones at the top of the slope looked sparser and smaller. The soil would be drier there, water shedding off the granite knoll like a toboggan sweeping downslope. By comparing the architecture of the network of the dry upper stand with this moist lower forest, I could see if the linkages up there, where water was more precious, were denser, more plentiful, more crucial to the establishment of a seedling.

At the first old tree, twenty metres in as I headed up the hill toward the crest, saplings skirting its crown like a hula hoop, I pulled out my T-shaped increment corer to check its age, thankful the handle was orange because the leaves of the thimbleberry shrubs were as big as dinner plates and could swallow anything that dropped. I fit the bit shoulder-high into a furrow of the tree's chunky bark and cored the tree to the pith, drawing out a small cross-section of its striped insides.

Examining the core, my pen dotting each decade, I slowly counted her years: 282. I cored another dozen trees around my first one, all different heights and girths, and they ranged in age from five years to the same couple of centuries as the first. These forests, in the interior of British Columbia, experienced fire every few decades or so, when the summers were dry and there was plenty of fine fuel—when twigs and needles from old trees gathered on the forest floor, blades from deep grasses senesced and dried, and thickets of new firs started to choke out the watery aspens and birches. With a single spark, patches of the forest would burn, the old trees usually surviving, the understory swept clean. If the fire scorched the floor in tandem with a good cone year, a new bunch of seeds germinated.

I stuffed the tree cores inside colourful straws, sealed the ends with masking tape, and labelled each one so I could double-check the ages and measure the annual radial growth increments under a microscope at my University of British Columbia lab. There, I could compare each year's growth with the corresponding annual rain and temperature records. I ran my thumb across the tip of my trowel to make sure it was sharp, followed a thick root running from the base of my first old tree to where it tapered to the width of a finger, and sliced open the forest floor in search of brown truffles, the scabby below-ground mushrooms of *Rhizopogon*. The trowel cut through the litter and fermentation layers and slit open the humus to reveal the dense grains of underlying minerals.

After half an hour, mosquitoes biting my forehead, my knees sore on twigs, I hit a truffle the size of a patisserie chocolate. It was resting smack between the humus layer and the mineral horizon, and I scraped away the organic crumbs and found a beard of black fungal strands running from one end of the truffle to the old tree's roots. I followed another pulpy skein in the other direction, and it led me to a cluster of root tips that looked like white translucent pussytoes. One root tip was especially welcoming, and I gently tugged it, like pulling a stray thread in a hem. A seedling a hand's length away shuddered slightly. I pulled again, harder, and the seedling leaned back in resistance. I looked at my old tree, then at the little seedling in the shadows. The fungus was linking them.

Suzanne Simard conducted much of her research in the forests of British Columbia's interior.

I tracked another root from the elder and found another truffle, and another. I raised each to my nose and breathed in its musty, earthy smell of spores and mushroom and birth. I traced the black pulpy whiskers from each truffle to the riggings of roots of seedlings of all ages, and saplings too. With each unearthing, the framework unfolded: this old tree was connected to every one of the younger trees around it. Later, one of my graduate students would return to this patch and sequence the DNA of almost every *Rhizopogon* truffle and tree—and find that most of the trees were linked together by the *Rhizopogon* mycelium, the network of fine underground filaments of a fungus, and that the biggest, oldest trees were connected to almost all of the younger ones in their neighbourhood. One tree was linked to forty-seven others, some of them twenty metres away. We figured the whole forest was connected by *Rhizopogon* alone.

We would publish these findings three years later, in 2010, followed by further details in two more papers. If we'd been able to map how the other sixty fungal species connected the firs, we surely would have found the weave much thicker, the layers deeper, the stitching even more intricate. Not to mention the arbuscular mycorrhizal fungi adding interstitial components to such a map as they possibly joined the grasses and herbs and shrubs in an independent web. And the ericoid mycorrhizal fungi linking the huckleberries in their own network, and the orchid mycorrhizas with their own too.

Through the corset of branches, I saw a hawk circle overhead. Solitude is rare in the forest, and I felt slightly uneasy. But the breeze lulled me, and I continued my work, using the finest tip of my Swiss Army knife to excavate a germinant no bigger than a daddy-long-legs. I pulled on the collar of the exposed stem, and a radical—one of the tiny primordial roots—slid out of the old-blood humus. This courageous root was vulnerable, and it survived by emitting biochemical signals to the fungal network hidden in the earth's mineral grains, its long threads joined to the talons of the giant trees.

Emerging from my drawing was a pattern like a neural network, like the neurons in our brains.

The mycelium of the old tree branched and signalled in response, coaxing the young roots to soften and grow in a herringbone and prepare for the ultimate union with it.

Squatting, I peered at the radical through my hand lens and fumbled to split open the fragile root with my dirt-caked fingernails, to steal a glimpse of the fungal mycelium that might have succeeded in encasing the cortical cells, finishing the courtship. My nails were so blunt! I twisted around to let the sun pour on my hands, and I scoured the ragged root for signs of tallow between the cells. On invasion, the fungus envelops the root cells, forming a latticework—a Hartig net. The fungus delivers nutrients, supplied by the vast mycelium of the old trees, to the seedling through this Hartig net. The seedling in return provides the fungus with its tiny but essential sum of photosynthetic carbon.

The roots of these little seedlings had been laid down well before I'd plucked them from their foundation. The old trees, rich in living, had shipped the germinants waterborne parcels of carbon and nitrogen, subsidizing the emerging radicals and cotyledons—primordial leaves—with energy and nitrogen and water. The cost of supplying the germinants

BOTTOM
Simard examines the thin white strands of mycorrhizal fungus that connect the roots of trees to create a cooperative network in the forest.

was imperceptible to the elders because of their wealth—they had plenty. The trees spoke of patience, of the slow but continuous way old and young share and endure and keep on.

Once the Hartig net was firmly embedded in the radical of the new sprouts and the old trees were dispatching sustenance, making up for the paltry rates of photosynthesis by the cotyledons, the fungus could then grow new hyphal threads to explore the soil for water and nutrients. As the miniature crowns of the seedlings spawned new needles, they would feed the mycelium with their own photosynthetic sugars so the fungus could travel to even more distant pores. Once on solid footing, life running smoothly, the growing root could then support a fungal mantle—a coating—as though donning a jacket of mycelium from which even more fledgling hyphae could grow into the soil. The thicker the mantle and the greater the number of fungal threads the root could feed, the more extensively the mycelium could laminate the soil minerals and the more nutrients it could acquire from the grains and transport back to the root in trade. Root begets fungus begets root begets fungus, the partners keeping a positive feedback loop until a tree is made and a cubic foot of soil is packed with a hundred miles of mycelium. A web of life like our own cardiovascular system of arteries, veins, and capillaries.

I CONTINUED through the trees, ducking under the crowns of thick-barked elders, striding through grassy gaps sprinkled with seedlings, swimming through thickets of spindly saplings, the data of my graduate students churning through my mind as if in a calculator. These young trees got their start in the shadow of the old by linking into their vast mycelium and receiving subsidies until they could build enough needles and roots to make it on their own. The Douglas fir seeds that another of my graduate students had sown around mature trees had a 26 percent increased survival rate where he'd allowed them to link into old-tree fungal networks compared with where he'd isolated them in bags with pores allowing only molecules of water to filter through. The seedlings in this forest were regenerating in the network of the old trees.

Resting on a stump, I took a long drink of water and noticed a cluster of seedlings no bigger than roofing nails. A below-ground network could explain why seedlings could survive for years, even decades, in the shadows. These old-growth forests were able to self-regenerate because the parents helped the young get on their own two feet. Eventually, the young ones would take over the tree line and reach out to others requiring a boost.

With the sun straight overhead, I checked my email on my BlackBerry. I marvelled at this little machine, how the internet made me feel so connected to the world. This forest was like the internet, but instead of computers linked by wires or radio waves, these trees were connected by mycorrhizal fungi. The forest seemed like a system of centres and satellites: the old trees were the biggest communication hubs and the smaller ones the less-busy nodes, with messages transmitting back and forth through the fungal links. Back in 1997, the journal *Nature* had published an article of mine and had called this network the "wood-wide web." That was turning out to be much more prescient than I'd imagined. All I had known back then was that birch and fir transmitted carbon back and forth through a simple weave of mycorrhizas. This forest, though, was showing me a fuller story. The old and young trees were hubs and nodes, interconnected by mycorrhizal fungi in a complex pattern that fuelled the regeneration of the entire forest.

The big old trees on this knoll were spaced farther apart, and the saplings were fewer and farther between, limited by drought. The thimbleberries and huckleberries had disappeared, replaced by the long bunched leaves of pinegrass, the bonnets of silky lupines, and the occasional red-dotted buffaloberry shrub. The lupine and buffaloberry were nitrogen fixers, adding nitrogen to this slow-growing stand. Though the south-facing slope was dry, the plant community was intact, with no invasive weeds like the ones creeping along the roadside where I'd parked.

This forest was at the northern edge of the arid Great Basin, but to the south, it was mainly too dry for trees, and bunchgrasses grew instead in native prairies. These native grasslands were under pressure from exotic weed invasions, and in this case, the mycorrhizal networks were sapping them of life. Knapweeds, spread by animals including cattle, tapped into the mycorrhizas of the grass tillers and stole phosphorus right out of their roots. Instead of the fungi of knapweed helping the grasses thrive, as they had with birch and fir, they were accelerating the decline that had begun with humans herding cattle. They did this possibly by sending the native grasses some poisons or an infection to finish the murder. Or by starving them, taking over their energy, and degrading the native prairie.

With my increment borer, I cored a handful of ancients on the knoll. The youngest was 227, the oldest 302—elders of the forest. Their thick bark was scarred by flames, more pronounced than the trees in the wetter area below because it was hotter and drier here, a magnet for lightning-caused fires. This explained the wide range of ages.

I scraped the soil with my trowel. Just like the old trees near the creek, those on this crest were decorated with truffles and *tubercules*—clusters of mycorrhizal roots covered in a fungal rind—and golden fungal strands that ran from them like shooting stars. Here, too, the trees and fungi were in an intimate web. Compared with the trees down below, there were even more connections where the soil was drier and the trees more stressed. This made sense! Here on the crest, the trees invested more in mycorrhizal fungi because they needed more from them in return.

I leaned against the oldest tree, at least twenty-five metres tall with branches like the ribs of a whale. Seedlings were germinating in a crescent along the northern dripline of the tree, their needles stretched like spider legs, and I excavated one with my knife. Fungal threads streamed off the end of its roots, and I felt intoxicated. I pressed the seedling

ABOVE Simard and her team tested the viability of the mycorrhizal networks in forests that contained various levels of logging.

and its woolen mycorrhizas between the pages of my notebook so I could look more closely at home. But I already knew that these little seedlings were linked into the network of the old trees, receiving enough water to get them through the driest days of summer. My students and I had already learned that the deep-rooted trees brought water up to the soil surface at night, by hydraulic lift, and shared it with shallow-rooted plants, helping the archipelago stay whole during prolonged drought.

Without such attachment, the deaths of seedlings on hot August days can be nearly immediate, their needles turning red and the collars of their stems wounded with burns, leaving not a trace by snowfall. For these young recruits, small resource gains in moments of vulnerability make the difference between life and death. But, once their roots and mycorrhizas reach the labyrinth of russet pores, where water clings in films to soil particles, they ratchet up their game and grow a foundation. A root system like that, unfettered in its opportunity, was far more resilient than the chunky pistons grown in Styrofoam tubes in the nursery, where the seedlings intended for plantations were so stuffed with water and nutrients they couldn't—didn't need to—sprout adequate roots to partner with fungi to connect with the soil. Their thick needles needed streams of water under the hot August sun, but their roots continued to grow as though imprisoned, unable to reach the old trees for help when the soil cracked in the dry clear-cuts.

I walked from the northern crescent of seedlings back to the old tree, the ground directly underneath its canopy bare even of grass. Not a seedling grew here. Its crown was so dense that it intercepted most of the precipitation and sun, and its roots were so thick that they took up most of the nutrients and water. We later found that there was a sweet zone, a donut around the dripline, the fringe of the crown, where the water dripped off the outermost needles and some seedlings flourished. Not too close to be starved by the needs of the old tree and not too far away for the grasses in the intervening meadows to rob them of what they required.

I ducked under the opposite edge of the old tree's crown—facing south, where the sun beat down—and gazed down the slope rolling into scree. It was

Revising the Will

BY BRIAN BARTLETT

A lawyer's office ten floors above the harbour
shines with the light of those heights, the windows
wide, facing two islands far below, between
downtown and the opening to the ocean.
Clients' eyes are often drawn to the expanse—
all those miniaturized tugboats, minesweepers,
frigates, and cruise ships, the waves like watery
corrugations leading to a last destination.

The lawyer near retirement, cheerful and relaxed—
but terse when the facts matter—looks at home
in his leather chair, by a table suited to a board meeting
but now supporting only the arms of a couple
near retirement too, tweaking their out-of-date wills.
The room is mostly emptiness and air, as if
the furniture of the past were boxed up and
transported down the glass-walled elevator
to a more inhabited floor. Do the details
of sickness, death and survival alternate with chat
like brooding symphony chords interrupted
by woodwinds' fanciful leaps? In fact the overall tone,
even for the hard legal stuff, is light, or at least
never sombre. The couple and the lawyer
often grin or chuckle as the documents are
summarized, quoted, discussed, initialled,
and signed. Well, that's done.
                The windows
remain wide and bright, unlike those
in the doctor's low-ceilinged basement office, cobwebs
and strands of dust crisscrossing the barred view,
the floor at a level deeper than a grave's.
Before they shake the lawyer's hand and leave
the stark, long-tabled room, the couple turn
once more to face the distance: that ocean
on the horizon, smudged by the light, expectant.

so hot and dry on this side that not even a network could save a seedling from burning up. In the extremes—such as a desert—even the fungus could fail to bring life to a tree. An old log lay on the angle of repose, poised to roll over broken stones, and chunks of heartwood were newly exposed, beetles and ants flowing in lines with white fungi in their clutches. Claw marks. Bear, I thought, from at least a few days before. Douglas fir seedlings cascaded off the north side of the log, where there was a sliver of shade along its length, and spilled onto the forest floor. The scrap of advantage from the shade meant a little less water lost, a slightly thicker film coating the soil pores, the difference between survival and not. I wondered if the white fans of mycelium were linked to the old tree and helped keep the wood moist. These seedlings were alive, I figured, only because the fungi were importing water from somewhere.

The old trees were the mothers of the forest. The hubs were *mother trees*. Well, mother *and* father trees, since each Douglas fir tree has male pollen cones and female seed cones. But it felt like mothering to me, with the elders tending to the young. Yes, that's it. *Mother trees. Mother trees connect the forest*.

This mother tree was the central hub that the saplings and seedlings nested around, with threads of different fungal species, of different colours and weights, linking them, layer upon layer, in a strong, complex web. I pulled out a pencil and notebook. I made a map: mother trees, saplings, seedlings. Lines sketched between them. Emerging from my drawing was a pattern like a neural network, like the neurons in our brains, with some nodes more highly linked than others.

My little trail joined another, like a frayed thread joining a rope. I knew the networks were complex, with thick cords like freeways amid a gauze of fine hyphae that behaved like secondary routes. The thick cords themselves consisted of many simple hyphae that had twined together, forming an outer rind around a space. Information chemicals could travel through these cords like water through a pipe. The main trail widened, and after a few more curves, the small road would lie ahead. The thick pipes of fungal species like *Rhizopogon* were designed for long-distance communication, and the fine mycelial fans of fungal species like *Wilcoxina* must be adept at rapid response, able to transmit chemicals swiftly to trigger fast growth and change. When my grandmother Winnie was diagnosed with Alzheimer's, I'd read about what makes our brains either plastic or rigid. Maybe the long-distance *Rhizopogon* were analogous to the strong links in our brains arising from repetition, pruning, and regression, giving us long-term memory. Maybe the finer *Wilcoxina* hyphae, which grew faster

and more abundantly, helped the mycorrhizal networks adapt to new opportunities, not unlike our own rapid, flexible responses to new situations, which Grannie was losing.

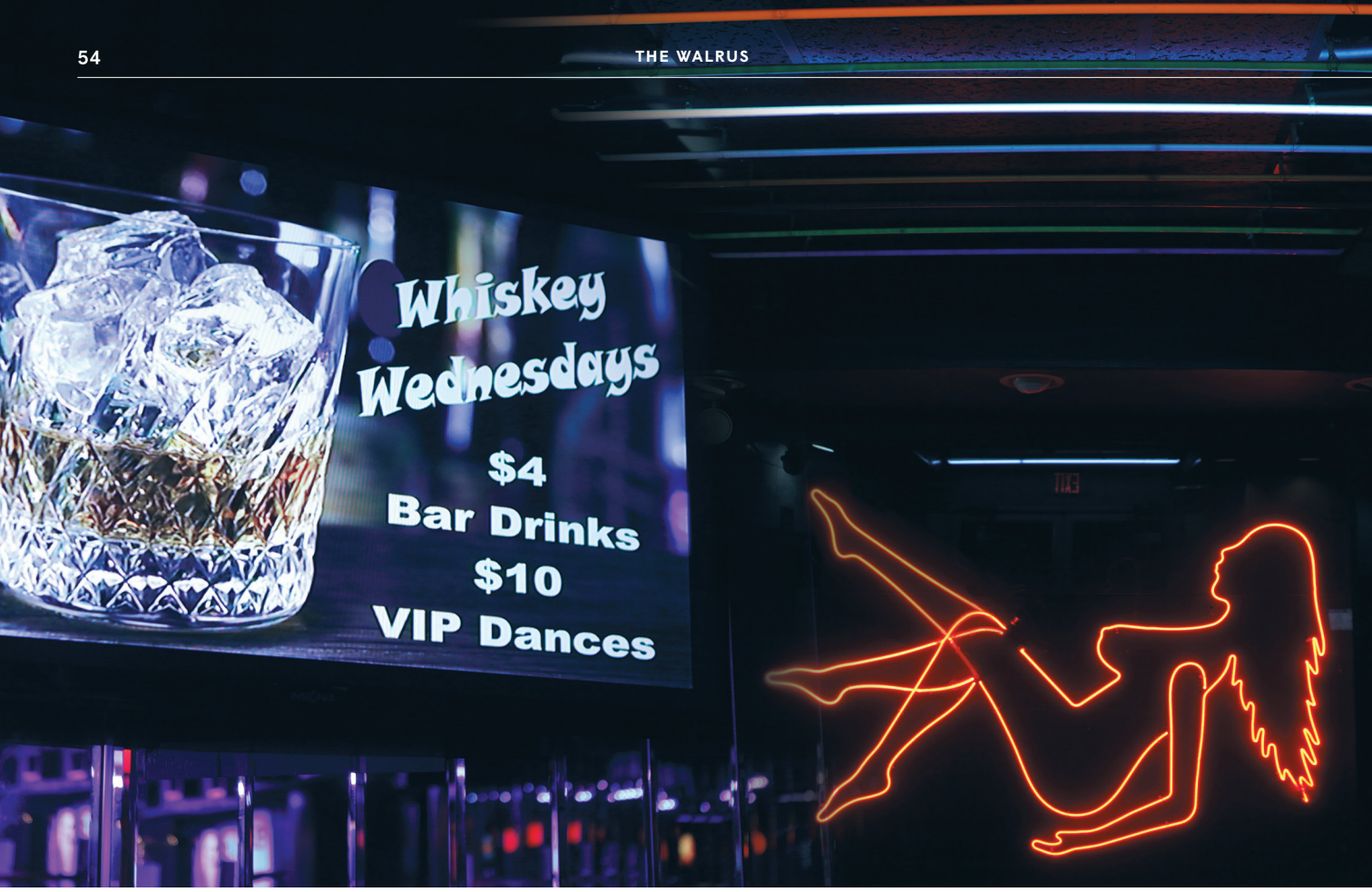
Grannie Winnie still had long-term memory. She knew she had to put on clothes; she just couldn't remember how many shirts to wear when it got hot or whether to clip her bra in front or behind. Just as *Rhizopogon* strands deal with long-distance transport of solutions, Grannie's memory about wearing clothes came from lifelong brain pathways. But her ability to adjust quickly and her short-term memory were dwindling with the loss of new synapses, as if she were losing connections analogous to the ones created by the mycelial *Wilcoxina* fans for trees.

The thick complex strands running out from the mother trees must be capable of efficient, high-volume transfer to the regenerating seedlings. The finer spreading mycelia must help the new germinants modify to accommodate pressing, rapid needs, such as how to find a new pool of water on a particularly hot day. Pulsing, active, adaptive in providing for the growing plants—like fluid intelligence.

The complex mycorrhizal network unravelled into chaos with clear-cutting. With the mother trees gone, a forest would lose its gravitas. But, within a few years, as seedlings grew into saplings, the new forest would slowly try to reorganize into another network. Without the pull of the mother trees, though, the new forest network might never be the same. Especially with widespread clear-cutting and climate change. The carbon in the trees, and the other half in the soil and mycelium and roots, might vaporize into thin air. Compounding climate change. Then what? Wasn't this the most important question of our lives?

I reached a colossal tree, a rampart, her branches thick right to the ground and as big as trees themselves. Her large size and old age were magnificent compared to her neighbours. She looked like the mother of all mother trees. What foresters call a "wolf tree"—far older, bigger, and with a much wider crown than the others, a lone survivor of previous calamities. She had lived through centuries of ground fires that others had—at one time or another—succumbed to. I waded through seedlings to get to the fringe of her crown and picked up a cone perhaps clipped by a squirrel, its bracts dusted in white spores. Her life had started when the Secwépemc people cared for this land, long before the Europeans came, when Indigenous people regularly lit fires to create habitat for game or to stimulate the growth of valuable native plants or to clear routes for trading with neighbouring nations, keeping the fuels low so the flames were never intense enough to have burned off her thick bark completely. I was sure that, if I cored her, her rings would be calloused with char every twenty years or so, like the stripes of a zebra. I was struck by her endurance, her rhythm that spanned centuries. It was a matter of survival, not a choice, not an indulgence. Light glanced off her bark, incandescent, the sun dropping. ⁂

Excerpted from Finding the Mother Tree: Discovering the Wisdom of the Forest *by Suzanne Simard, published by Allen Lane Canada. Copyright © 2021*



SOCIETY

Dancing on a Prayer

Why a struggling strip club opened its doors to God

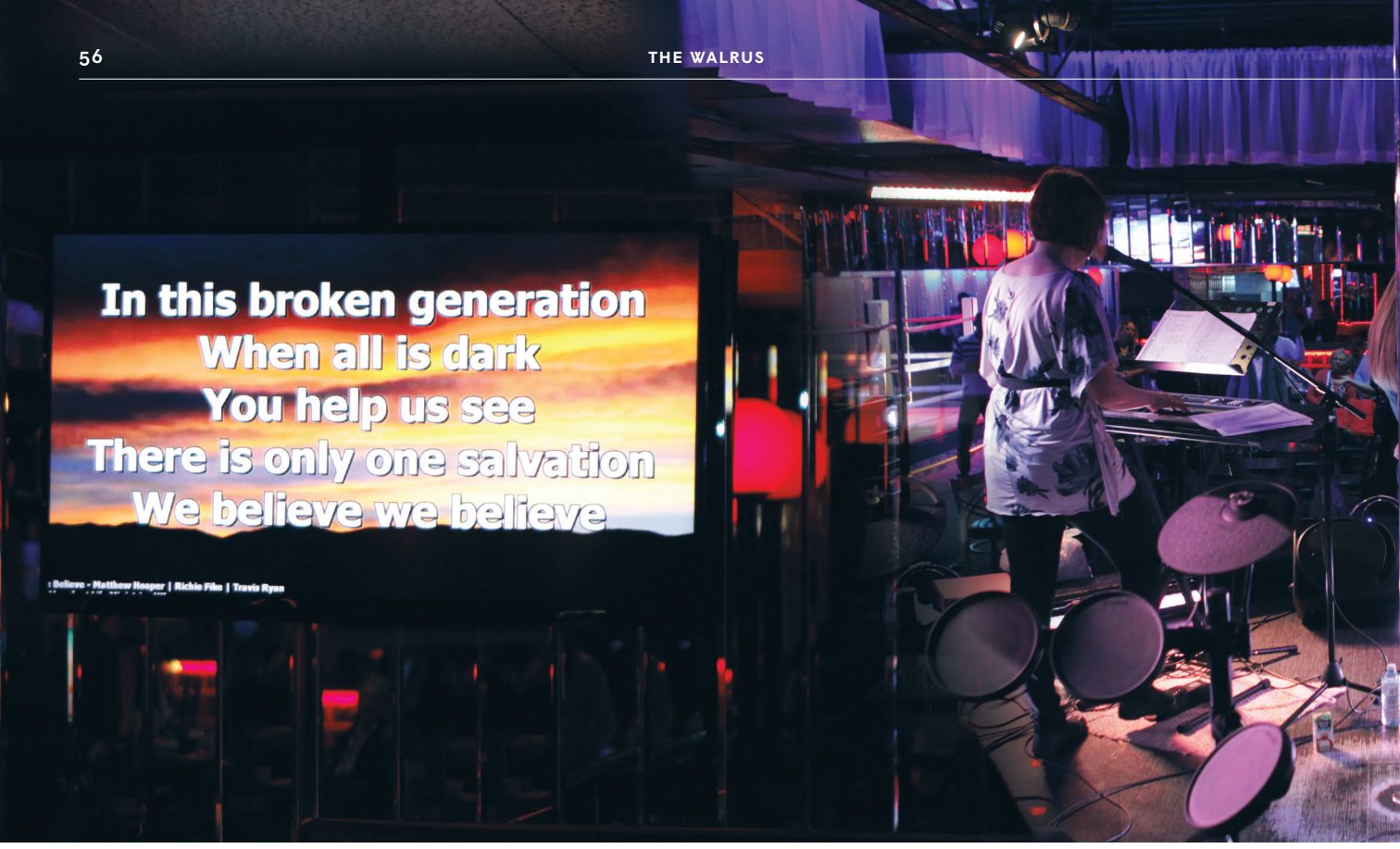
BY DREW NELLES
PHOTOGRAPHY BY BECCA LEMIRE

At the Manor Adult Entertainment Complex, the only strip club in Guelph, Ontario, you can feel the end coming. Some nights, the dancers outnumber the customers. The women perform pole-dance moves with evocative names—the Genie, the Hot Cherry, the Boomerang, the Hello Boys, the Static Chopper—to thin, scattered applause. The top forty that blasts from the speakers becomes a soundtrack of almost unfathomable loneliness: "Nothing lasts forever / but wouldn't it be nice to stay together for the night?" The ceiling is low and black, the lighting a gloomy throb of oranges and blues. There are no windows. Maybe you think strip clubs are fun; maybe you believe they're degrading; maybe you see them as just another workplace. The Manor doesn't feel like any of those things. Instead, the mood is mostly funereal.

Guelph, population 150,000, is a suburban university town about an hour's drive from Toronto. I grew up here, and the Manor is a local landmark, a source of both notoriety and wry civic pride. The club, once a stately Queen Anne–style mansion, is stranded in a bleak expanse of parking lot, bordered by the slash of the highway, on one side, and a residential neighbourhood, on the other. Above the front door looms a giant, glowing *M*, gripped by a suggestively silhouetted woman in high heels. Ugly concrete additions extend around the old house like the reclining corpus of a sphinx; neo-Gothic towers erupt incongruously heavenward. Attached to the club is a complex of apartments called the Manor Motel, whose tenants tend to be precariously employed, receiving government assistance, or struggling with addiction.

The Manor has had many lives. It was built, in 1891, as the residence of local politician and beer baron George Sleeman, complete with vermiculated amber limestone, stone cornices, stained-glass windows, verandas, fish ponds, and a footpath made from the bottoms of glass bottles. By the 1920s, after a failed investment in electric streetcars and the passage of the Ontario Temperance Act, the Sleeman family fortune disappeared, and the Bank of Montreal seized the house. According to *Historic Guelph: The Royal City*, the fallen clan was permitted to continue living there in exchange for a dollar a year in rent. In 1957, when the last of the Sleemans moved out, the Manor became a hotel and a family restaurant, then a honky-tonk. Three decades later, a man named Roger Cohen bought the building for $725,000 and turned it into a strip club.

But, now, strip clubs everywhere are dying. With unlimited hours of free pornography online, there isn't much incentive to shell out hundreds of dollars on lap dances. For people who prefer a more personal touch than porn offers, there are always webcam performers; for those who trawl strip clubs looking for sex, escort websites allow for a more straightforward transaction. Meanwhile, as downtown real estate booms and low-income neighbourhoods gentrify, municipal governments are making life difficult for strip-club owners. And COVID-19, of course, has decimated a



business whose entire model is anathema to social distancing.

In Guelph, local bylaws forbid any other adult-entertainment facilities. If the Manor closes its doors for good and becomes, say, a condo development, the city will never see another strip club. But the Manor, ever the chameleon, isn't finished changing. In 2014, it underwent its strangest iteration yet: every Sunday, a church service started meeting in the club, pole and all. When I first heard about Church at the Manor, it seemed so literal—sin and salvation, the sacred and the profane, side by side—that I decided I had to see it for myself. In the years since, I've come to know the remarkable community of outcasts who, in one way or another, call the Manor home. It isn't just a strip club to them—the Manor is a sanctuary. "I don't think it's going to last," one dancer admitted to me. "But hopefully it stays, because I honestly love this place."

One dancer at the Manor performs only to new country. "Let me put some country in you," the song went one night, a couple of years back, as she swung around the pole like Gene Kelly in *Singin' in the Rain*. On the television screens behind her, the Red Sox were walloping the Blue Jays. A customer remarked that this particular dancer was a graduate student in a prestigious field; strippers at the Manor include medical students, law students, nurses, marketing managers, single mothers, and full-time dancers. That evening, a woman in black lingerie hunched at the bar, picking at a plate of nachos, waiting for the night to get going. Another wondered loudly about scoring some coke. At a nearby table, a man protested the price of the soda he'd just ordered for a dancer. "Ice is expensive these days," the dancer deadpanned.

A few days later, on a Sunday afternoon, the Manor's emergency exit doors were thrown open, letting the light in. A vinyl poster of Jesus half-covered the glass shower stall where, normally, strippers would bathe before audiences of leering customers. In the red-white-and-blue foxy-boxing ring, intended for erotic fighting matches, children rocketed around, bouncing off the ropes like blips in a game of *Pong*. Most of the explicit signs had been temporarily taken down, but one behind the bar still advertised Amateur Tuesdays, and you could buy Genuine Horny Goat Weed and Big Boy Hard-On Tablets from an ancient vending machine in the men's restroom.

This was Church at the Manor. Lunch was laid out on the pool table: spaghetti with chicken, Greek salad, Nanaimo bars, Rice Krispies squares. A few members of the ministry team were strumming guitars and singing—"We believe in Jesus Christ / We believe in the Holy Spirit"—while the congregation ate.

"How's everybody doing?" a singer asked the crowd, hype-man style.

"Shitty!" someone yelled back.

On any given Sunday, the attendees at the Manor services were a mélange: middle-class Christians, mostly friends or associates of the church organizers; Manor Motel residents, there for a few hours of diversion; and those who lived elsewhere but had heard about the free food. Confused strip-club customers sauntered in, looking for an afternoon lap dance. There were occasional baptisms in the parking lot. Through all of this, a small team of dedicated volunteers sang, prayed with congregants, and discussed the Bible.

Today, at the front of the room, a short brunette woman named Jen Lewis was discussing David—the sinful king of Israel, who shed much blood and lusted after Bathsheba bathing on the roof, but whose son, Solomon, went on to build the First Temple. Lewis was trying to make the point that, despite his flaws, David was still a man of God. Amid all the chaos, though, I had a hard time following her lesson. Partway through, paramedics showed up because one churchgoer was having a minor heart attack. They loaded him onto a stretcher and hooked him up to an IV. Apparently, this man had cardiac episodes at church with some frequency, so it wasn't a big deal, but the congregation took a break to pray for him anyway.

Then Lewis picked up where she left off. "So, what is a temple? There's no right or wrong answer."

"God's house," someone said.

"God's house," Lewis repeated.

"A place you can pray," someone else called out.

"Yup," Lewis said. "So, is the strip club a temple?" There were scattered murmurs of assent. "Of course it is. Because we're here. And the Bible says that, where two or more people are gathered, there he is."

Jack and Sharon insisted that their ministerial approach was nonjudgmental: they think that lecturing people about sin is no way to bring them to God.

Sharon and Jack Ninaber, who started Church at the Manor, have been married for thirty years. They're in their early fifties and have four children. Jack is low-key and boyish looking with utilitarian wire-frame glasses and receding grey hair; Sharon is loud and gregarious with bright blue eyes and a wide-open face.

One day, in 2005, Sharon was in the shower when she felt a wave of emptiness wash over her. She had all the trappings of a good Christian life—church and prayer and family—but she didn't feel peace or joy or freedom. She sobbed and screamed at God, asking him what she was missing. A few days later, she began to hear God speak. It wasn't a voice in her head—more like a thought that would appear, unbidden. Sharon asked God questions, and he answered. Her revelation changed the way the Ninabers approached their ministry. They describe themselves as "Holy Spirit–led"; they believe that God speaks to and through the faithful, directly, and guides them by spiritual appointment.

In 2013, Jack was fired from his job as a pastor at a small church outside Guelph. Around that time, he and Sharon started to hold small gatherings in their home. Worshippers would bring food, sing songs, and talk about what they saw God doing in their lives. Sometimes they received prophetic visions and spoke in tongues. For the Ninabers,

it was exciting—more like the rawness of early Christianity, the church of Paul and Acts. As the congregation outgrew their living room, Jack and Sharon began to look into renting space elsewhere. One day, they were driving along the highway. When they passed the strip club, Sharon joked, "What about the Manor?"

But, the more the Ninabers thought about a church in a strip club, the less like a joke it seemed. They were drawn to the idea of ministering somewhere mainstream Christians wouldn't go, and after watching a poignant 2013 documentary called *The Manor*, they decided to reach out to the club's owner. When the Ninabers first met with Roger Cohen, though, he was skeptical. He asked if they were going to rehabilitate his dancers. He noted that he was considered the biggest sinner in town. He told them to rent a warehouse instead. Jack and Sharon insisted that they wanted to meet people where they were—to reach those who would never step inside a traditional church. They reminded Cohen that Jesus was known as a friend of drunks and sinners; he had allowed a prostitute to wash his feet and had requested water from a Samaritan woman. Finally, after an hour and a half, Cohen said, "Let me get this straight: You want to bring the light into a dark place?" They all shook hands.

One Tuesday morning, Cohen sat expansively in his office. He's mistrustful of journalists, but Jack and Sharon had asked him to talk with me, so he did, grudgingly. Cohen, sixty-seven, is heavyset with close-cropped grey hair and a taste for flashy jewellery—gold watch on one wrist, gold bracelet on the other, blocky Cazal-style frames. "Any normal person would see this as a house of sin, right?" he said.

Cohen is an unlikely vessel of Jesus. In addition to being the owner of a strip club, he is Jewish. He was born in Egypt and came to Canada with his family as a child, part of the Jewish exodus after the Suez Crisis. It's hard to say why he allowed a church to set up shop in his club. He is palpably fond of the Ninabers and seems to regard them as New Testament softies to his Old Testament hard-ass. Mostly, though, it came down to finances since, at the time, the church paid him a few hundred dollars per Sunday. "I just took a shot at it," he said. "Because, you know what? I'm a gambler. I'm a businessman. That's what comes first."

Around half of the Manor's revenue comes from the motel, which is connected to the strip club by a narrow mirrored hallway and a set of emergency exit doors. Most of the motel's thirty-one rooms, which rent for between $1,000 and $2,000 a month, are in the late-fifties addition on the back of the house, but some are on the upper floors of the mansion itself. (The room at the top of the tower, which is known as the Penthouse, still has mouldings, stained-glass windows, and a fireplace.) The Manor Motel used to function as a dormitory for the dancers. Then, in the early 2000s, Cohen started moving the dancers out and advertised the rooms as apartment-style rentals.

Cohen told me that the Welcome In Drop-In Centre—a soup kitchen and community space in downtown Guelph, run by a Catholic charity—began to refer clients in need of an apartment to the Manor Motel. (Each apartment has its own bathroom and kitchenette, which, despite its unusual location, makes the motel a better option than most single-room-occupancy hotels.) The founder of the drop-in centre is a nun named Christine Leyser, who has since left Guelph and didn't respond to my calls. Over the years, Cohen says, he and Leyser formed an improbable bond. "She would call me, she would say, 'Roger, I got Joe, he needs a place to stay,'" he told me. "And I wouldn't ask any questions." On a whiteboard outside Cohen's office, there's a message that's never been erased. "Roger," it reads, in handwritten script, "you are the best—so caring and concerned for people in need. You are living the Christmas message of 'Love and Peace.' Thank you." It's signed, "Sister Christine."

DURING THE eighties and nineties, running a strip club was like printing money. A corridor of clubs, stretching from Windsor to Montreal, drew bachelor parties, fraternities, and businessmen with lavish expense accounts, as well as American tourists lured by the favourable exchange rate and lax physical-contact laws. There were travelling shows, more like burlesque than like stripping, that had huge followings. The strip club itself was a cultural touchstone: *Flashdance, Showgirls, Blue Velvet*. "I used to shove people in with my feet," Cohen said. "Standing room only. People used to stand up on the pool tables!"

One morning, an old friend of Cohen's knocked on his office window. She was there to bring him a Tim Hortons coffee and bagel. "She used to be a dancer for me," Cohen said. "She used to make me money like you wouldn't believe."

Cohen's friend was in her mid-fifties, with glasses and bleach-blonde hair. "Yes, I was his money-maker," she said. "That was a hundred years ago."

"She used to make me *large* money," Cohen said.

"We had roadies who would carry all our props," the woman said of her old act. "We worked in a different bar every week. And they paid us amazing amounts of money."

"She used to cost me $20,000 a week," Cohen said. "I used to take them shopping for clothes at lunchtime. They didn't want to go to lunch? Let's go shopping. And, every time, I knew it'd cost me two, three thousand dollars, just for the afternoon."

"Could we do it again, Rog?" the woman asked, laughing.

When her former act came through the Manor, she said, they'd do between three and five shows a day, from noon till late. Afterward, they'd walk through the audience with a Polaroid camera and charge ten bucks a photograph. Once a year, she served as a judge at the Miss Nude Canada Pageant. "There used to be a lineup outside overnight," Cohen said. "The Beer Store used to bring me a tractor-trailer and just park it outside because I couldn't keep up. I was making five to ten thousand dollars an hour. On beer!"

"Times have really changed," the woman said.

CHURCH AT the Manor was not a lucrative ministry. Elora Road Christian Fellowship, a congregation on the outskirts of Guelph, provided financial support, paying for things

like the cost of renting the strip club and emergency funds for worshippers in need. The Ninabers both worked other jobs to make ends meet—Jack did roofing and Sharon ran an online craft shop. Sometimes, at Sunday services, they'd put out an empty beer pitcher and ask for donations, but usually they forgot. Even if they remembered, they were lucky to get twenty dollars; occasionally, they collected cash left onstage from the night before. Church at the Manor didn't attract the kind of worshippers who had money to spare.

In addition to running the Sunday services, members of the ministry team acted as informal social workers. They helped congregants navigate services, find new accommodations, go grocery shopping, and get out of trouble. I once accompanied them to a churchgoer's prison sentencing; another time, I watched them mediate a protracted housing dispute. On Friday mornings, Jack and Sharon made the rounds at the Manor Motel, checking in on the residents they knew and introducing themselves to those they didn't. "We do nutty things," Sharon said. "But God has never let us down. Follow us, and watch how God provides."

Most Thursdays, ministry volunteers went into the strip club to talk to the dancers. Only women could attend these outreach nights, since the church didn't like exposing male volunteers to the lust and temptation of the club, but I was allowed to come along as a journalist. One night, I met Jen Lewis in the Manor parking lot, and she invited me into her car for prayer. She prayed for the Manor, that it might become something different; for our safety as we went in; for Cohen to open his heart to Jesus; for the women there to know freedom. She prayed for me and thanked God for my interest in the church and the club. Above all, she said, we do this to honour God. "So awesome," she said when she'd finished.

We went inside. The club was nearly empty. A dancer took to the pole, wiping it first with a handkerchief, her lingerie phosphorescent under the black lights. Other women worked the floor, trying to hustle the few customers present into paying for private dances in the VIP room. From the speakers overhead came a song: "Oh, heaven let your light shine down. / Oh, heaven let your light shine down."

Lewis had brought chocolate-covered strawberries, salted-caramel brownies, and mints for the dancers and staff. We sat in a cluster of couches and chairs on a dais toward the back of the club, arranged the food on a table, and waited. At first, only bouncers and waitresses stopped by to chat—they were used to the team coming in on Thursday nights—but, eventually, a dancer made her way over to us. "You guys drinking tonight?" she asked, sizing us up.

When Lewis told her we were from a church, she said, in disbelief, "Get the fuck out of here!"

The dancer introduced herself and sat down. She was in her early twenties, she said, and had gotten into dancing when she left home as teenager and needed money. She chatted with Lewis for much longer than politeness required; she seemed to enjoy talking to someone who wasn't a customer or another dancer. After about twenty minutes, Lewis invited her to church. "I'd burn up if I ever walked into a church," the dancer answered, smiling.

Her phone rang and she ducked behind a post so the bouncers wouldn't see her answer it. It was her boyfriend, waiting in the parking lot. "I'll come to church," the dancer told Lewis on her way out. "I don't usually look like this, I promise."

Although the Thursday-night outreach team often left notes in the dancers' change room, brought bouquets of flowers, and handed out makeup kits, the strippers rarely came to church. Many lived outside of Guelph and worked a string of clubs throughout southern Ontario. Sometimes, if dancers needed a place to crash, they slept in one of the old party rooms in the basement of the club; occasionally, one would wander upstairs on a Sunday afternoon and stumble across the service. Others came once or twice out of sheer curiosity. At first, the Ninabers were disappointed by the lack of dancers in the congregation, but they made their peace with it. "The idea of going to church in the same place that you strip and take off your clothes and the whole nine yards—that's a giant leap," Jack said.

Some dancers told me they were offended by the church's presence—by the presumption that their work was different from other risky physical jobs simply because it was sexual. Others, though, said they appreciated having the ministry people around. I often saw dancers embrace the outreach team enthusiastically and talk to them at length. "Girls used to laugh," said one dancer who goes by the stage name Heidi. "And I'm like, You know what? I find it cute. They're actually caring about us girls."

A dancer who goes by Leyla told me she'd encountered Christian organizations at other clubs too. In fact, there are several groups—like the Strip Church Network, based in Las Vegas—that do this kind of outreach. (Church at the Manor, however, is the only ministry I know of to actually hold services in a strip club.) Leyla didn't mind these organizations. "It's very well-meaning," she said. "I don't need you to tell me Jesus loves me. I'm okay, thank you. But I know that there are probably some girls that would get that note and would feel like there's a little ray of hope." Leyla herself is Muslim. She attended a liberal mosque, she told me, and felt no religious qualms about her work.

The Manor outreach team never told the dancers that stripping was wrong or pressured them to quit. Most of the time, they simply chatted, offered snacks and gifts, and almost in passing, let the dancers know about Sunday services. Jack and Sharon insisted that their ministerial approach was nonjudgmental: they think that lecturing people about sin is no way to bring them to God. Still, the Ninabers were drawn to the Manor in the first place because they believed stripping was exploitative for everyone involved. They often talked about the evils of sex trafficking and told me that helping women get out of the industry was the ultimate aim of their Thursday-night outreach work. It seemed hard for them to imagine why

a woman might freely choose to become a dancer. "I think it is wrong in the sense that it objectifies women," Jack told me. "I hate how women are seen as objects and not as real people, and that's what this industry does."

I witnessed plenty of misery during my visits to the Manor—dancers who were intoxicated, customers who were cruel or predatory. But I also saw strippers take pleasure in their work on the pole, grinning as they hung upside-down or swung from the rafters; I saw men with physical disabilities find comfort in a woman's touch. Everyone at the club was seeking connection, even if it was as ethereal as the voice of God. Evening after evening, as I sat at the bar, overpriced Coors Light in hand, I watched Saturday night bleed into Sunday morning.

THE FUTURE OF the Manor is uncertain, and everyone involved has a competing vision for it. One of Cohen's sons manages the club's day-to-day operations and wants to keep it open. A city councillor told me she'd like the Manor to become a beer museum. A descendant of George Sleeman, the original owner, has considered buying it but has said that the cost of repairs would be prohibitive. Cohen, for his part, hopes to turn the property into condos. He doesn't care much for the strip-club lifestyle anymore and would rather work in real estate; he owns several other rental properties in Guelph and Toronto. But the Manor's historic status and need for renovations will make any transaction difficult.

Jack and Sharon hope that the Manor will someday become a house of God—not a church but a sort of training and community centre. The strip club would disappear. The motel would remain, but it would become subsidized low-income housing. The Manor's quasi-social mission would be made official: people could sober up, learn job and life skills, and find Jesus. A congregant once prophesized this would happen, and the Ninabers pray that Cohen will help them achieve it. They also pray that any changes made at the Manor will allow the motel's residents to continue living there. "I hope my friends at the Manor are part of it and aren't expelled out onto the street," Sharon said. "That would be the biggest heartbreak."

Left out of this discussion, though, was another important group of stakeholders: the dancers. If the club shuts down for good, they face a dwindling pool of options. Anyway, many of them enjoy working at the Manor. "I would come here any day, no matter how old I am, even if it's just to come in and say hi," Heidi told me. When I asked whether she'd be sad if the Manor closed, she replied, "I would, actually. I would be missing all my friends and all the people that I've grown to like here. Yeah, it would be sad to me. I wouldn't know what to do."

IN 2018, Church at the Manor began to run into trouble. A key member of the ministry team moved away. Others felt overwhelmed by their full-time jobs. Fewer people were volunteering to bring in food for Sunday services; more and more, Jack and Sharon wound up ordering pizza. Many of the motel

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tenants who came to church had moved out and told the Ninabers they didn't like coming back for services—there were too many bad memories. Sunday attendance dwindled. "It felt like it all fell apart," Sharon said. "I didn't know what God was doing."

At first, Jack and Sharon were despondent. They had accepted a command from God to plant a church in an unexpected place; they had worked so hard and sacrificed so much. Over time, though, they came to realize that Sunday services were the least important part of their ministry at the Manor. "If you ask people what was the most meaningful thing to them," Jack told me, "it's when someone came to the hospital to visit them, or we took them to an appointment, or took them to get groceries. It was all those times when we were able to be involved in their lives." On a bright hot Sunday in June 2018, Church at the Manor held its last service. The ministry team set up a barbecue in the parking lot to grill burgers and hot dogs. Someone brought an acoustic guitar. A handful of people showed up, and they all sat in a circle, singing and waxing nostalgic and reading from the Gospel of Mark.

Jack and Sharon began to call their operation the Manor Ministry rather than Church at the Manor. They held Sunday Bible study in a little apartment just up the street. A team continued going into the club a few Thursdays a month, to talk to the dancers, and kept making the rounds at the motel on Fridays. But the Manor, like all strip clubs in Ontario, was shuttered last year by the province's COVID-19 regulations, and no one knows when—or if—it will reopen.

Meanwhile, Cohen thinks a lot about his legacy. He became a grandfather shortly after I last visited, and he's had a couple of health scares. He has an ambivalent relationship with the Manor, simultaneously proud of it and ready to say goodbye. He'll describe himself, without irony, as an "artiste" taking pleasure in the beauty of the female form; then, a few minutes later, he'll bemoan the stress of running a club. Once, sitting in his office, he told me he was open to the idea of the Manor becoming a spiritual centre, as Sharon and Jack still hope it will. "It shouldn't be" a strip club, he said. "But, you know what? The time hasn't come yet. God has not given us the green light."

It was hard to know how seriously to take Cohen when he said things like this. I often felt like he embodied all of the Manor's biblical contradictions—the man who left Egypt and found the promised land; the sinner who helped build a temple. Once, I asked Jack why he thought Cohen let the church into the Manor. "I can't reconcile it," Jack said. "It doesn't make sense to me." But Cohen, he added, is an excellent compartmentalizer. In Cohen's mind, it's as if each part of his empire—the strip club, the motel, the church—is separate, even though they all share the same roof. †

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TECHNOLOGY

A Dog's Likes

The journey to turn my pet into an Instagram celebrity

BY ERICA LENTI
PHOTO ILLUSTRATION BY LAURA KAY KEELING

When we spotted the one-year-old blonde mutt, on page two of a Kijiji search for dog adoptions, we had no plans to transform her into an internet celebrity. My partner, Arielle, and I had been searching for the next member of our family, and we found the fourteen-pound, one-eyed dachshund mix after scrolling far past the catchy ads for fresh litters of puppies. The Toronto-area rescue that housed her told us we were the first to express interest. We adopted her within the week.

Belle, as we named her, was even cuter in person: her ears flopped in the wind, her face was stuck in an adorable perma-wink, and elevators confused her. Soon, every quirky move she made had us posting pictures of her on our Instagram accounts. Surely, we thought, our friends and family would love her just as much as we did. When it felt like our accounts were flooded with Belle photos, we created her own account, @1eyedbelle, a dedicated space for those interested in our pup's day-to-day life.

I'd come across many pets in my feed—some with modest followings, others more famous than certain world leaders and bestselling artists. Doug the Pug, a Nashville-based dog, for example, has more Instagram followers than Justin Trudeau and almost as many as Céline Dion. Videos of Maru, Japan's YouTube-famous cat, have been collectively viewed more than 450 million times, and Pumpkin the Raccoon, who was rescued by a family in the Bahamas after breaking her leg, even got a book deal.

At first, Arielle and I found the concept of pet promotion silly. Why would anyone place that much importance on our mutt? Yet, the more we saw accounts with small followings, the B- and C-list celebrities of the animal kingdom, secure brand deals for paraben-free dog shampoo, omega-3-enriched kibble, and plant-based wipes for puppy paws, the more convinced we became. Belle could do better, we thought. She's cuter, has more attitude, more pizzazz. I envisioned telling Belle's Cinderella story: a rescue puppy's rise to internet icon. The move couldn't hurt our wallets either.

Pet influencing is booming. A 2018 *Forbes* article pegs the average endorsement deal for some of the most famous "petfluencers" at more than $2,000 per post; some, like Doug the Pug, are estimated to earn hundreds of thousands a year. There are even industry events, including PetCon—dubbed "the Coachella for Pets" in the *New York Post*. It's not hard to see why: people love animals, so they've been used in all kinds of advertising for the past century, illustrating everything from the importance of family bonds after the Second World War to the humour of the 1980s and '90s (think: Taco Bell's anthropomorphic

PHOTOGRAPHS COURTESY OF ERICA LENTI

chihuahua or the Aflac insurance duck). And numerous scientific studies over the decades have proven that animals make us feel better—emotionally, physically, and mentally.

At the very least, we thought, an Instagram-famous dog might earn us some fun freebies: endless doggy sweaters, treats, toys, even poop bags. But my daydream went further. I pictured us packing up our belongings and heading to southern California, where every day is a beach day. We'd live in excess. Belle would have her own room in our oceanside home, where we'd set up elegant photo shoots for sponsored Instagram posts. When we weren't managing Belle's career, Arielle and I would spend our days working on passion projects.

As two millennials living in an overpriced Toronto apartment, often working until burnout, we might find the time to enjoy life in a way we never could before. It'd be like winning the lottery. Our scrappy little pup would become our breadwinner.

THE FIRST HINT that my get-Belle-famous-fast scheme would be harder to pull off than I thought came last summer. I caught her in an unprecedented position: sitting still. She'd tired herself out zipping around my parents' north Toronto backyard and had plopped down poolside, jaw agape in a crooked canine smile. No better photo opportunity had presented itself in the past two weeks; she was practically smizing.

I tried to be nimble, iPhone in hand, while my toes burned on the concrete deck. In portrait mode, I rapidly tapped the capture button on my screen, cooing at Belle to "look here, sweetie!" She up and ran away, off to grab her coveted Lamb Chop toy. I shot eight photos, most of them blurry. The candid is not Belle's forte, I quickly learned.

Cute dogs exist in abundance on the internet. To be an influential animal is something else. In the photos I take, Belle doesn't look natural all dressed up. She also doesn't hold a pose for long.

In the end, none of the poolside photos made the cut. Instead, I hastily posted a picture of her on a lounge chair, a wide-brimmed fedora atop her head. The photo is an outtake—I caught it while snapping shots of Arielle. In it, Belle is still smiling, her one eye glistening in the sunlight. I cobbled together a list of the most popular dog hashtags and pressed post, butterflies of hope dancing in my stomach. It elicited a grand total of twenty-one likes—a quarter of the number my last selfie received on my own account.

More people in their twenties and thirties own pets and treat them like their children, pampering them to excess.

I realized I might need some help. I googled "how to make my dog Instagram famous," and hundreds of guides popped up. One told me to find what makes Belle unique; another said I needed to harness the power of hashtags. The tips felt generic.

When I spoke with several people behind some of Canada's most influential dogs, agents and managers for pet influencers, and even researchers on canine-influencer culture, I began to understand. Whether they're couch potatoes partnering with your favourite snack-food company or highfalutin divas posing beside expensive cars and decked out in the latest couture, pet celebrities have one thing in common: they are symbols of inspiration. Even if Belle was a dog, she needed to portray a life that could be. To be famous, she'd have to convince others she was already living the carefree millennial dream.

OF THE DOG influencer owners I spoke with, many say fame came organically. "I'm a photographer, so I knew I was going to take a lot of photos of my dog and annoy my family and friends with them," Christie Vuong tells me. She created a dedicated account for her dog, and Helmut the Pug is now a Toronto celebrity with more than 33,000 followers. His first viral success was a fifteen-second parody of Drake's "Hotline Bling" video. (In a *BuzzFeed* poll, 90 percent of respondents concluded that Helmut's dance moves and puffer jacket were better than Drizzy's.) It was a cute joke, but not one she thought would blow up. Iggy Joey, an Italian greyhound with more than 80,000 followers, also found fame accidentally. Owner Lyndal Moody shot a photo of the dog sunbathing in the window of a Toronto shop where she worked, a string of pearls around Iggy's neck. Eventually, the photo got noticed. Iggy became known for her elegance, an Audrey Hepburn type; since then, she's done brand deals with Zara, Dyson, and even Mercedes Benz.

Jane Peh, who runs a pet social media marketing company, The Woof Agency, says pets are a safer bet than human influencers because they're less likely to get involved in controversial situations. A dog, for instance, can't choose to attend a crowded party in the middle of the COVID-19 pandemic, as did several teen influencers last summer.

Accounts like Helmut's and Iggy's are also notable because they represent a generational trend: more and more people in their twenties and thirties own pets and treat them like their children, Peh says, pampering them to excess. In fact, millennials love dogs so much that we've created an internet language around them—calling them *doggos*, *puppers*, *fluffers*, or *floofs*. We flock to Facebook groups to share photos of good boys spotted on the street and offer cuteness ratings for furry friends on Twitter. (Almost every pup rates an easy thirteen or fourteen out of ten.) These wholesome groups can be a salve during stressful times. (Dog-spotting groups could also be considered some of the only apolitical forums left on the internet.) Other theories suggest that being a dog parent is a more achievable dream for a generation stuck between an expensive

housing market and unstable jobs. A 2017 study by one business-solutions agency found that nearly half of millennials surveyed see their pet as practice for a child; for those who don't want children, dogs offer companionship with a much smaller price tag.

But, even with tens of thousands of followers, neither Vuong nor Moody are living that blue-sky LA-influencer life I'd dreamt of, and neither has quit their day job. At times, Moody tells me, she's made a living off of Iggy's account, but it was temporary, between jobs. Vuong, meanwhile, sees Helmut's account solely as a creative side project. That's the reality for most influencers: only those at the top can reap the greatest benefits. Vuong's and Moody's dogs may have significant followings, but it's not the numbers that keep them posting—it's the passion and devotion they have for their craft. It's perhaps what I'm missing when I post about Belle.

One researcher has found that reception to these accounts is fuelled by more than just the pet's character. In 2019, Menghan Zhang and two of her graduate-school classmates in an ethnography course at Carnegie Mellon University set out to better understand how Instagram operates as a platform for pet influencers. They headed to see some therapy dogs on campus, met a husky named Milo, and created an Instagram account for him, amassing followers and interacting with other influencers on the platform for three weeks. In their research, they found that the brand built by influencers is a kind of aggregate. "At first, we thought the influencer might be the human behind the pet," Zhang tells me. "But the human is hiding behind the pet. Instead, they are creating a brand that projects both their identities."

"So it's not about the person or the pet," Zhang concludes. "It's about both of them, combined."

Scrolling through Belle's Instagram account after hanging up with Zhang, I became increasingly aware that @1eyedbelle had become a composite sketch of me and my dog, as though we were a single entity. She, posed in a pink athleisure sweater; I, behind the camera in my own Adidas track pants. She, hanging out in the home office with a scowl; I, spending ten hours every weekday in front of a computer screen, resentful. The frisky, goofy Belle I describe to my friends and family is not in these photos. Just like everyone else on the internet, the Belle I sell on Instagram is not the real Belle.

By the end of last summer, Belle had slightly more than 100 followers, but I'd come to terms with my failings. I had started to procrastinate on my project—it felt too much like work. The experiment was a bust.

It wasn't Belle's fault. She isn't the one inadequate at influencer culture—I am. Without a charismatic, witty human behind the account, there's no hope. And charismatic, witty influencer, I now know, I am not. My own Instagram account is a boring space for anyone who doesn't already know me, a collection of memories no one but my loved ones would ever care about. Like owner, like dog; it just took an attempt to break the mould for me to see it.

It's clear that my California-influencer pipe dream will never come to fruition. This failure is mine. But I'm surprised by how disappointing it feels. Peeking behind the curtain, it's clear how labour intensive it is to keep an influencer account relevant and thriving—there's a need for constant creativity, an understanding of analytics and user data, and a desire to be online all the time. It's a fun job, but it *isn't* easy. As a millennial, I expect more of myself. I want to be able to do the taxing work for a big reward and eventually relax a little. Belle's life—and my own, I realize—will never make that fantasy a reality.

About a week after my months-long experiment, I sifted through dozens of outtakes in my phone: dizzying shots of Belle by the pool, rolling around on the living room carpet, yawning in bed next to me. They may not have made the cut on Instagram, but I couldn't bring myself to delete them. Instead, I backed them up on my computer in a private album—to be treasured, not shared. ☆

ERICA LENTI is a senior editor at *Xtra*.

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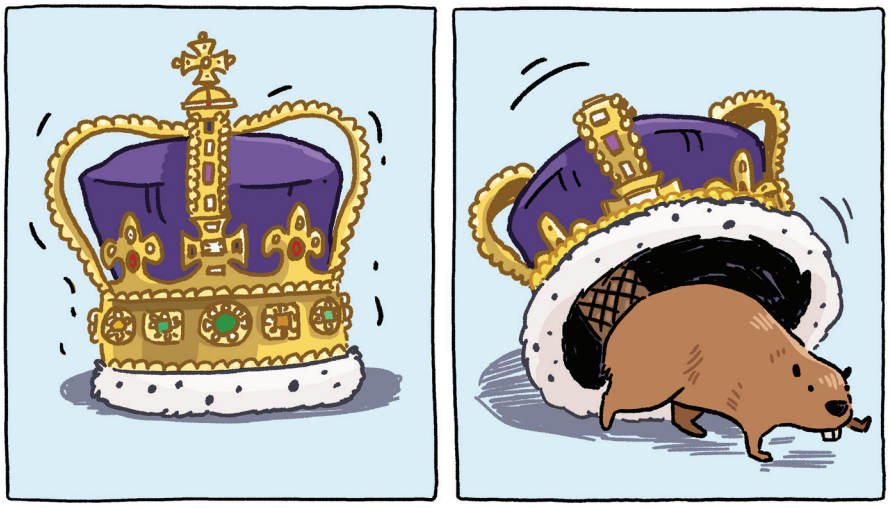

THE FACTS

Ask a Constitutional Expert

What would it take to leave the monarchy?

BY DAVID SCHNEIDERMAN, AS TOLD TO ARIELLA GARMAISE

The question of whether Canada has outgrown the monarchy has simmered on the political back burner for years. According to an online survey by Leger and the Association for Canadian Studies, published in March, 53 percent of respondents considered the monarchy outdated but were divided on what could replace it. We asked David Schneiderman, a constitutional law expert, about the feasibility of removing the Queen as head of state and what the government might look like if that happened.

Could Canada decouple itself from the Crown? Yes, but it wouldn't be easy. The real impediment to the abolition of the monarchy is the constitutional amending formula. When Canada patriated the constitution, in 1982,[1] it adopted a set of conditions for making changes to it. For most amendments, you need seven out of ten provinces and the federal government to agree. But the Constitution Act lays out a series of areas that require unanimity. Those include making changes to the office of the Queen.

Unanimity is the highest threshold to amend the constitution. I wouldn't say meeting it is impossible, but it would require an extraordinary amount of consensus. I think folks, when they agreed to this formula, probably were naive about how hard it would be to use. And, because of the precedent from the Charlottetown Accord,[2] it's likely that the people would have to be consulted via a referendum. You'll never get unanimity to abolish the monarchy without public opinion behind it. And public opinion seems to be nowhere near turning in large enough numbers against the Crown.

Would the way the federal government works change without the monarchy? Monarchy plays no role, functionally speaking, in our day-to-day politics. True, if you read the constitution, the Queen looks like she runs the show. But the prime minister and cabinet exercise most of the powers that the monarch used to have over matters of policy such as defence and foreign affairs. The few powers that remain with the Crown have to do with such things as proroguing Parliament, dissolving Parliament, and appointing the prime minister. These executive functions are performed by the governor general on behalf of the Crown.[3]

What would happen if the UK decided to dissolve the monarchy altogether? It's kind of a constitutional no man's land—Canada would have a constitution in which the head of state doesn't exist. I think it would be up to politicians and the courts to determine how to move forward. There might be room to appoint the descendants of Elvis as head of state—he was a king of a sort.

If Canada abolishes the monarchy, what happens to First Nations treaties? That's another impediment to removing the Queen—it's with the Crown that First Nations signed treaties. But it's already the case that the responsibility for living up to treaty obligations has devolved to Canadian governments. The Crown doesn't supervise the ways in which Canadians either follow or don't follow treaty obligations. It has washed its hands of all of that.

Do you think it's worthwhile to pursue abolishing the monarchy? It would take up a lot of political capital and could divide the country. But being governed by a hereditary monarchy is anachronistic and should be objectionable to citizens in a multicultural democracy. Some people hold fast to the idea of a British monarch, but we should be open to discussing a different head of state.

1 This is the year Canada wrested control of the constitution away from the UK Parliament.

2 The accord, which proposed constitutional amendments, was put to a referendum in October 1992 and was unsuccessful.

3 The governor general usually takes the prime minister's advice on these matters.

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