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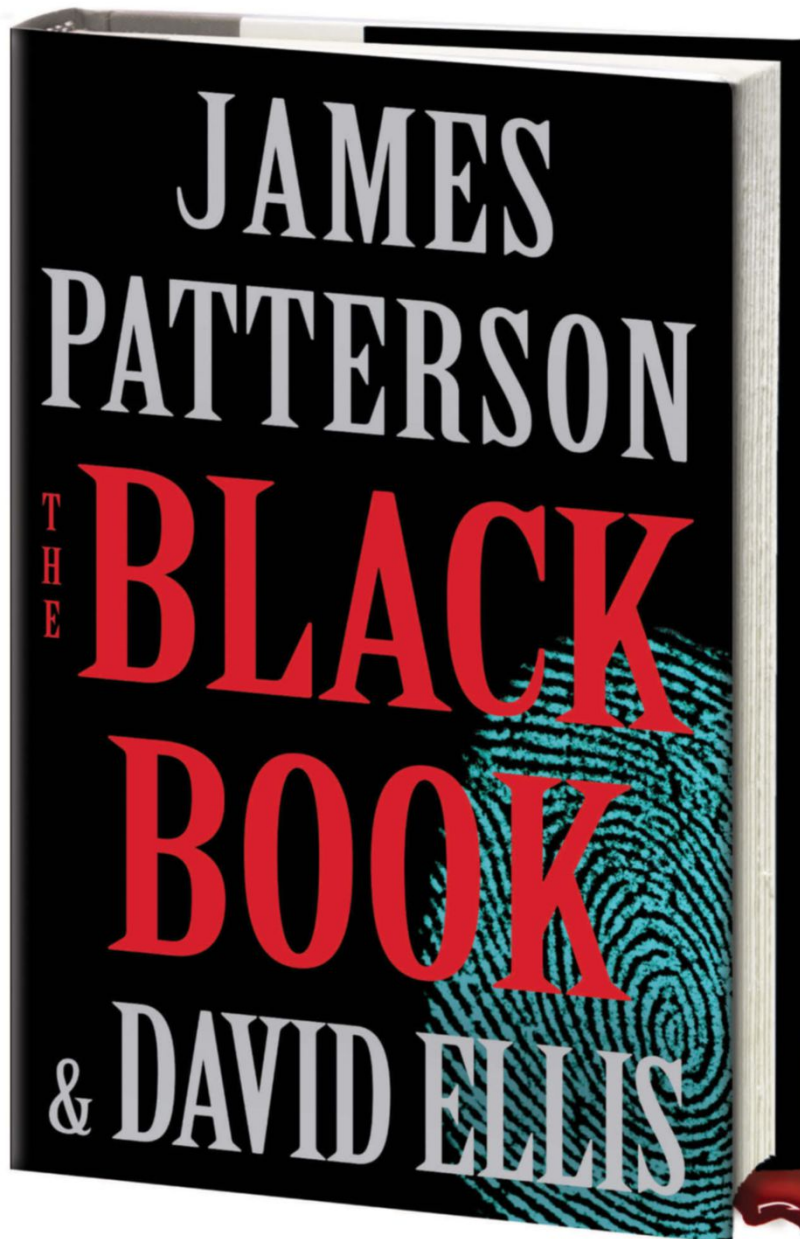
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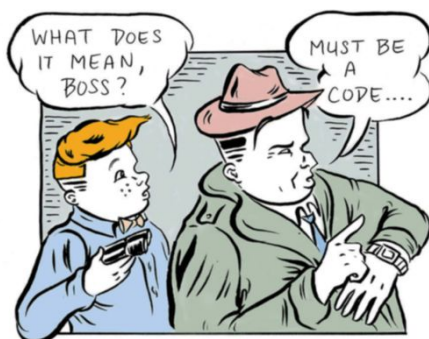
**Jill Bialosky** (*Poem,* p. 60) is the author of the poetry collection "The Players." Her memoir "Poetry Will Save Your Life" will be published in July.

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### DAILY SHOUTS

A hardboiled detective and his sidekick take on an odd criminal. Her offense? A hangover.



### VIDEO

The Met has installed the closet of Maira Kalman's mother, a Jewish émigré, into its collection.

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# THE MAIL

## UNENLIGHTENED

In Adam Gopnik's review of recent works on the crisis in liberalism, he discusses Joel Mokyr's theory, laid out in his book "A Culture of Change," that the successful exchanges between scientists and artisans are often what propel the growth of a civilization (Books, March 20th). But Mokyr's true concern is a more fundamental cultural question: Why did some sixteenth-century Europeans start thinking that they could materially improve their lives? He concludes that, in the course of the previous two hundred years, Europeans came to believe that progress was possible, and thus became willing to discard the intellectual heritage of earlier eras. This huge cultural shift allowed them to overcome what Mokyr calls Cardwell's Law: the fact that technological innovation, historically, tends to fizzle out—and with it goes economic growth. Overcoming Cardwell's Law, Mokyr writes, requires "a community that combines pluralism and competition with a coordination mechanism that allows knowledge to be distributed and shared, and hence challenged, corrected, and supplemented." The intellectual attack on the legacy of the Enlightenment has been going on for some time, but it should now be clear that specific policies put forward by the Trump Administration and many members of the Republican Party are a direct assault on everything that has prevented Cardwell's Law from overtaking us.

Mark A. Wolfram  
Ottawa, Ont.

## LISTENING TO JACK WHITE

Thanks to Alec Wilkinson for his Profile of Jack White, the obsessive restorer, rehabilitator, and all-around antiquarian chameleon dandy ("The Polymath," March 13th). As I read the article, it struck me that White's polymorphous musical style—from McCartney-esque ballads to giant rock anthems and wailing blues homages—is refreshing for so many listeners because he isn't just mining the musical

canon; he's writing new songs out of the past. The first time I heard Jack White, I thought I'd woken up in 1968, lovingly reupholstered, and I almost reached for the mescaline. Rather remarkable, given that White was not born until 1975.

Sara Miller  
Chicago, Ill.

## FAMILY TIME

Gary Shteyngart's article about his year as a watch obsessive brought to mind my own father's love of five-dollar wristwatches ("Time Out," March 20th). My father would make regular trips to Canal Street, in New York, always coming home with yet another watch; he had a drawer full of them. This was inexplicable, because he was a skinflint in all other respects, a child of the Great Depression. In the piece, Shteyngart alludes to the comfort that his first watch brought him—how, as a child, it helped him acclimate to a new country. When my father was six years old, he immigrated to America from Sicily. His childhood was primarily about assimilation, and about earning extra money to send home to his mother. He believed that if you were not advancing yourself intellectually, professionally, or monetarily, you were wasting time. Perhaps, to him, owning a watch did not merely mean that you had enough money to buy one; maybe the fact that you needed one meant that you had plans. You had a schedule to keep: places to go, people to see, and things to do. You were a person of consequence. My father was not prone to self-reflection, and I'm sure that if he were alive today he would wave his hand dismissively at my revelation. But I am thrilled to have an insight into this family mystery.

Laura Di Trapani  
Portland, Ore.

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Frank Viva, May 4, 2015

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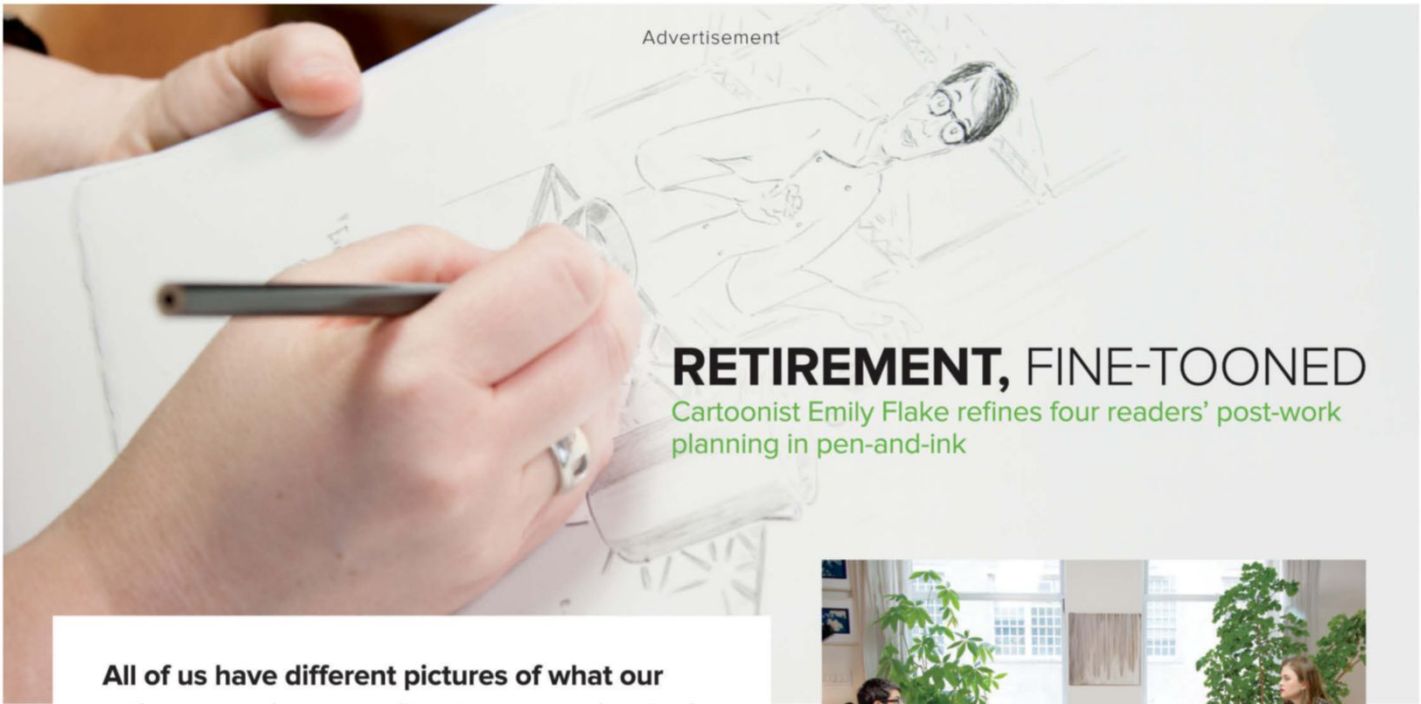
MARCH 29 - APRIL 4, 2017

# GOINGS ON ABOUT TOWN



**Vince Staples** and **Kilo Kish** are brainy rappers who record primarily to de-thorn their sharp thoughts. Staples, from Long Beach, California, dishes angular stanzas about family, friends, and the ills of fame with a back-of-the-classroom cool, and Kish, from Orlando, saunters through airy half-raps, weaving tales of quarter-life crises. Their pairing on a tour, including a stop at Terminal 5 on March 30, is just as intriguing as their lyrics: two vivid personalities who sidestep common pop tropes, and who stoke young devotees aspiring to a similar tone.

PHOTOGRAPH BY AWOL ERIZKU



## RETIREMENT, FINE-TOONED

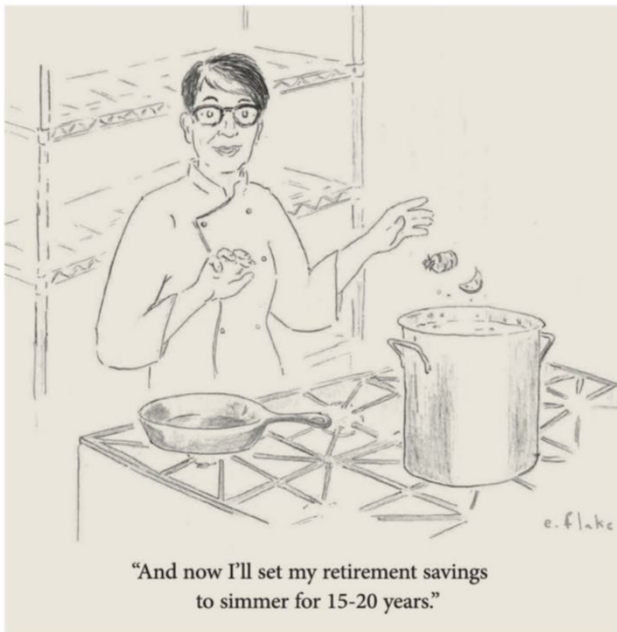
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# ART

## MUSEUMS AND LIBRARIES

### Metropolitan Museum

"The Mysterious Landscapes of Hercules Segers"

The museum owns only one print by the seventeenth-century Dutch printmaker, but it has borrowed the Rijksmuseum's entire Segers collection for this thrillingly comprehensive show. Segers was a master of precision in his black-and-white medium—looking at a giant oak you can almost hear the rustle of its leaves. But, unlike most of his contemporaries, Segers also printed in color, often altering the etching plates in the process. Seven versions of "The Enclosed Valley" illustrate how the artist could change day into night, or choose one detail to catch the viewer's eye, like a magician playing a card trick. Segers invented the etching technique known alternately as "lift-ground" or "sugar-lift," which enabled him to paint directly on the printing plate instead of using a needle. Several examples here have the delicate, soul-piercing clarity of a fine Chinese ink painting. *Through May 21.*

### Guggenheim Museum

"Visionaries: Creating a Modern Guggenheim"

This exhilarating tour of the six great collections that became the Solomon R. Guggenheim Museum is so judiciously laid out that the complex germs of early abstraction, the dry but secretly seething state of late-nineteenth-century painting, and the canon-defining tastes and interests of the businessman Solomon, his niece Peggy, the artist Hilla Rebay (who bought her own work, and also introduced the elder Guggenheim to the nonobjective art of Kandinsky), and three other major collectors all become enticingly transparent. Jewels of J. K. Thannhauser's collection, on display, fittingly enough, in one of the building's Thannhauser Galleries, include van Gogh's magnificently eccentric ink drawing "The Zouave" and Cézanne's "Man with Crossed Arms." A bravura sequence running up the museum's central ramp, from Picasso's 1911 "Accordionist" through pieces by Robert Delaunay, Fernand Léger, Marc Chagall, and Franz Marc, captures, in just a dozen canvases, the emergence of Cubism, its overlap with Expressionism, and its far-reaching echoes. *Through Sept. 6.*

### Whitney Museum

"2017 Whitney Biennial"

The first Biennial at the museum's two-year-old downtown digs (owing to the move, it comes a year late), which is earnestly attentive to political moods and themes, already feels nostalgic. Most of the works were chosen before last year's Presidential election. Remember back then? Worry, but not yet alarm, permeated the cosmopolitan archipelago of new art's creators, functionaries, and fans. Now there's a storm. The Age of Trump erodes assumptions about art's role as a barometer—and sometime engine—of social change. The show is winningly theatrical in its use of the Whitney's majestic spaces. The curators Christopher Y. Lew and Mia Locks have opted for depth over breadth, affording many of the sixty-three artists, duos, and collectives

what amounts to pocket solo shows. The criteria seem to be technical skill and engaging subject matter, with formal aesthetics taking third place. Most substantial, on all counts, are the works by several painters, in a striking comeback for a medium that was often sidelined in the Biennials of the past two decades. The revival may reflect a market that is ever avid for things to adorn walls, but it also fulfills a desire for relief from our pixelated ambience. Dana Schutz is a new master, with subjects that are frankly goofy—people and giant insects piled together in an elevator, for instance—but which she renders with powerfully volumetric, big-brushed forms that are at once lyrical and monumental. Jo Baer, famous half a century ago for her minimalist abstractions, astonishes with perfectly scaled, sensitive paintings, on gray fields, of mingled artifacts, buildings, and landscapes that are redolent of cultures ancient, medieval, and modern. *Through June 11.*

### Japan Society

"A Third Gender: Beautiful Youths in Japanese Prints"

The term *wakashu*, or "beautiful youth," refers to a temporary gender, a sexually subordinate or apprenticeship role bestowed on male-born adolescents in Japan, during the Edo period (1603-1868). As this exhibition illuminates, through an array of prints and artifacts, these young men embodied a culturally prized, androgynous loveliness, ruled by a distinct set of conventions. Identifiable by hair style—a shaved pate and forelocks—*wakashu* are shown in mundane as well as poetic circumstances. In one illustrated book from the period, a well-to-do youth appears amid a bustling household, releasing a trapped mouse to a pouncing kitten; in another, more romantic, image, a samurai *wakashu* plays a small drum, while sitting in a plum tree. A number of sexually explicit prints, or *shunga*, demonstrate the era's diversity of accepted erotic practices, and the flexibility, if not the freedom, of the *wakashu*'s place in them. A color woodblock print of a brothel scene shows two couples—an adult man tended to by a young female prostitute, and a "beautiful youth" hesitant in the arms of an older woman. *Through June 11.*

### Neue Galerie

"Alexei Jawlensky"

A flavorsome retrospective of the Russian-born artist, often associated with a group of painters that included, most notably, Wassily Kandinsky, Paul Klee, and Franz Marc, who met in Munich around the turn of the twentieth century. Jawlensky was more a follower than an innovator, having had a relatively late start as an artist; an air of catch-up marks his derivations, from such styles as Henri Matisse's Fauvism and Kandinsky's proto-abstraction. One might see Jawlensky's passion as being more about art than as being fully engaged in it: poignant rather than powerful. But the show ends with the kicker of a room of small, even tiny, paintings of an abstracted face. A black stripe serves for the nose, horizontal bands for the eyes and mouth. The nose and eyes present as a cruciform, against grounds of vertical strokes in thinned colors that glow like stained

glass. Jawlensky made about a thousand of these paintings, titled "Meditations," between 1934 and 1937, in Wiesbaden. The Third Reich had banned exhibitions of his work as "degenerate," and he was crippled with severe arthritis, which obliged him to use both hands to wield a brush. The pictures meld his innate talents, chiefly for color, with a yearning for transcendence, which comes across as forced or sentimental in earlier work. *Through May 29.*

### New Museum

"Raymond Pettibon: A Pen of All Work"

The American artist has intrigued and befuddled a growing audience since the late nineteen-seventies, when he emerged, in Hermosa Beach, California, as a bookish surfer who made flyers and album covers for the punk band Black Flag (his older brother Greg Ginn was the founder and guitarist) and a flurry of zines. His fame took hold slowly, and it remains confined largely to fine-art circles. Seeing this show of some seven hundred creations, mostly drawings with text, is like being lost in a foreign but strangely familiar city, where polyphonic disembodied voices whisper, yell, or sputter wit and wisdom that you're rarely sure that you heard quite right. The show's title is from Byron's "The Vision of Judgement," in which the mediocre poet Robert Southey proposes to ghostwrite a memoir for Satan and, upon being rebuffed, extends the same offer to the archangel Michael. This befits Pettibon, who says that roughly a third of his texts are lifted, or rephrased, from cherished writers: a pantheon in which St. Augustine consorts with Henry James and Mickey Spillane. Pettibon loves baseball, with a mystic's intensity; surfing, too. In a favorite motif, a tiny surfer rides a monstrous wave, as philosophical thoughts attend: "The sand and water to which we are reducible are as a rock to me" or "Don't complicate the moral world." Pettibon's way with words, somewhat like the poetry of John Ashbery, instills a conviction of cogency untethered to understanding. *Through April 9.*

## GALLERIES—UPTOWN

### Mimmo Rotella

In the nineteen-fifties, having given up abstract painting, the Italian artist began commandeering advertising posters around Rome. Some of them he glued together in layers, as seen here in "Divertitevi a Dare" ("Fun to Give"), in which a ripped piece of a red poster showing a woman's elegantly gesturing hand is mounted onto another poster, this one deep blue. Rotella called these pieces *décollages*. He used a more straightforward strategy in a series he dubbed *retros d'affiches*, which includes "Ruvido e Delicato" ("Rough and Delicate"), in which he simply turned over a poster to reveal a ready-made abstraction in its patterns of paper pulp, dust, and glue. What makes all the works in this show so sensational is not simply Rotella's extraordinary eye—it's his unimpeachable judgment. Take "Scotch Brand," in which stains and rips combine with a modest dash of exposed brown canvas, topped off by the distinctive red star of a San Pellegrino ad. *Through June 17. (Gladstone 64, 130 E. 64th St. 212-753-2200.)*

### Agnès Varda

The filmmaker's 1956 début, "La Pointe Courte," which depicts a troubled marriage against the backdrop of a struggling fishing vil-

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lage, was a brilliant precursor to French New Wave cinema, with its stripped-down elegance and merging of narrative and documentary techniques. In this exhibition, Varda is seen exploring her signature themes in other media, over six decades. Breaking waves and elliptical stories figure in nearly every work here. Among the striking black-and-white photographs on view from her first show, in 1954: a mysterious beach shot in which a child gazes at a dead goat in the gravelly foreground, while a man looks out to sea. "Le Triptyque de Noirmoutier," from 2008, an absorbing three-channel video, uses an expanse of sand and water as a foil to the tense silence of a kitchen scene. The installation "Bord de Mer," conceived in 2009, pairs still and moving images with actual sand, bringing the beach—or at least the sense of a beach—indoors. *Through April 15.* (Blum & Poe, 19 E. 66th St. 212-249-2249.)

#### Lawrence Weiner

Installed in each otherwise empty room of the gallery, as well as in its long hallway, is a single text piece by the great American conceptualist, spanning three decades of his career. (Language is Weiner's medium, but he consid-

ers himself to be a sculptor.) "Inherent Innate Tension" takes possession of the front room, as sans-serif vinyl letters advance across the floor until the final word is stretched in two parts as it proceeds up the wall, the very picture of "tension's" meaning. "The Boulders on Top Rent & Split" has a more stately air in its location between two windows in the back room. Each work here is an incandescent reminder of Weiner's radical gift for rendering thought into form. *Through April 22.* (Marian Goodman, 24 W. 57th St. 212-977-7160.)

### GALLERIES—CHELSEA

#### Roe Ethridge

The American photographer continues to take the measure of visual culture with a sharp but coolly neutral eye. Ethridge also shoots for commercial clients, and his outtakes here—models staring into space, a snow-capped mountain—translate the manipulative pleasures of advertising into something more honest. A low-res picture of a Jasper Johns flag painting manages to register the disembodied effect of digital photography without attach-

ing critique, suggesting that Ethridge's equanimity is a conviction in its own right. But an image of "Sesame Street's" Cookie Monster grinning at a spread of chocolate-chip cookies expresses a knowingness that's just short of cynicism. *Through April 8.* (Kreps, 535 W. 22nd St. 212-741-8849.)

#### Albert Oehlen

Two distinct groups of very large abstract paintings face off in the German artist's new show. "Tree Paintings," from 2015-16, feature stark geometric or propulsive black forms, more like power lines than branches, on sparkling white backgrounds broken up by carefully rendered, red-gradient blocks. In contrast, the "Elevator Paintings," which were dashed off earlier this year, are multicolored, gestural works, bearing no resemblance at all to the lifts their title suggests. They are wild, sometimes wildly ugly, all-over compositions: brushy, blurry messes in fiery autumnal or spring-meadow palettes. The show's duelling series demonstrate Oehlen's savvy ability to take the piss out of painting via his non-allegiance to style. His project is more playful than cynical, though, since he has such an uncommon facility for his chosen medium. Each painting here succeeds on its own weird terms. *Through April 15.* (Gagosian, 522 W. 21st St. 212-741-1717.)

### GALLERIES—DOWNTOWN

#### Umar Rashid (Frohawk Two Feathers)

Riotous drawings depict the fictitious eighteenth-century Kingdom of Harlem to get at the dense web of influences and traumas underlying black American culture. Working frenetically on letter-size paper, Rashid throws down references to everything from Yoruba gods and quantum mechanics to Marvel superheroes and the Roman poet Catullus. His drawings have the brisk functionality of a cocktail-napkin diagram inflected with the arch self-consciousness of a comic strip: a bar of gold is surrounded by white dashes to indicate that it shines; a melting white cube is labelled "JUST ICE." But, when tiled together on canvas, the sketches create stunning large compositions. In one, Harlem's royal couple, wearing the crowns of Upper and Lower Egypt, shoot lasers from their eyes to free two kneeling slaves, whose manacles bear the words "BREAK!" and "POP!" *Through March 30.* (Vogt, 55 Chrystie St. 212-226-6966.)

### GALLERIES—QUEENS

#### "Unseen Hand"

Works by fifteen artists in this sprawling, entertaining group show, curated by Nikita Vishnevskiy, suggest the bait-and-switch disappointments of our consumerist techno-utopia. The standout is Tom Butter's sculpture, "Rope Trick," a nine-foot length of paint-stained rope, attached to rotating motors by two steel poles. Press a foot pedal, and the horizon line shimmies—the effect is absurdly pathetic. Providing a warmly nostalgic counterpoint is William McMillin's series of photographs "Migration Found Nesting in Nikon," which he discovered undeveloped in his late father's camera. The pictures themselves are humdrum, but their eerily beautiful violet discoloration suggests the mystery lurking in the mundane. *Through April 9.* (Knockdown Center, 52-19 Flushing Ave., Maspeth. 347-915-5615.)



In 1979, Romare Bearden made twenty-one collages (including "Bayou Fever: The Buzzard and the Snake," above) hoping to inspire Alvin Ailey to conceive a ballet, which was never realized. The works are at DC Moore gallery through April 29.



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# THE THEATRE



The singer-songwriter and composer of "Waitress" takes over the title role March 31-June 11.

## Sugar, Butter, Flour

Sara Bareilles picks up a shift in "Waitress."

THE SINGER-SONGWRITER Sara Bareilles has one of those silvery voices that can bring intimacy to a large stage. Born in Eureka, California, Bareilles played in bars in Los Angeles before breaking out with her 2007 album, "Little Voice," which showcased her introspective, gently ironic pop balladry. Theatregoers now know her as the composer of "Waitress," the effervescent musical that opened last spring, at the Brooks Atkinson, based on the 2007 film by Adrienne Shelly. A cinnamon-dusted parable of sisterhood and self-reliance, the show has lured sizable audiences with the mouthwatering pie scent that suffuses the lobby and the lush harmonies of Bareilles's score. For the past year, Jessie Mueller has starred as Jenna, a put-upon diner waitress dealing with an unexpected pregnancy and a jerky husband. Now that Mueller is moving on, Bareilles herself will take over, for a ten-week stint starting March 31.

"I think of myself as a storyteller when I'm on tour, but this is an amped-up version of that," Bareilles, who is thirty-seven, said during rehearsals. She's not the first Broadway

composer to step into her own creation (Sting acted in "The Last Ship," shortly before it closed, in 2015) and won't be the last (in May, Dave Malloy replaces Josh Groban for certain performances in "Natasha, Pierre & the Great Comet of 1812"). And in 2015 she recorded a concept album, "What's Inside: Songs from Waitress." Still, her admirers will be eager to see her strap on an apron and lend her vocal acrobatics to songs like "She Used to Be Mine," the show's eleven-o'clock anthem.

Bareilles may not have much acting experience, but she's an old hand at waitressing. While at U.C.L.A., she worked at a Santa Monica pub called the Library Alehouse, using her tip money to pay her bandmates. Once, she had to shoo out a couple who were getting hot and heavy on the patio. "They were doing things they should have been doing in a bedroom," she recalled. Soon after, she worked at a nearby breakfast café, but had to quit when her wrists got sore from carrying heavy plates. Like waitressing, acting in a Broadway musical requires both emotional and physical multitasking. "I was texting with Jessie last night and I was saying, 'Girl, my head is exploding!'" Bareilles said. "This show is a prop nightmare."

—Michael Schulman

### Amélie

Phillipa Soo ("Hamilton") stars in a musical adaptation of the 2001 film, by Craig Lucas, Daniel Messé, and Nathan Tysen, about a young woman who spreads joy in Montmartre. (*Walter Kerr, 219 W. 48th St. 212-239-6200. In previews. Opens April 3.*)

### The Antipodes

The playwright Annie Baker ("The Flick") returns, with a piece about storytelling, directed by Lila Neugebauer and featuring Josh Charles, Phillip James Brannon, and Josh Hamilton. (*Pershing Square Signature Center, 480 W. 42nd St. 212-244-7529. Previews begin April 4.*)

### Bandstand

Corey Cott and Laura Osnes play a war veteran and a widow who team up to compete in a radio contest in 1945, in this swing musical by Robert Taylor and Richard Oberacker, directed by Andy Blankenbuehler. (*Jacobs, 242 W. 45th St. 212-239-6200. Previews begin March 31.*)

### Charlie and the Chocolate Factory

Christian Borle plays Willy Wonka in this musical version of the Roald Dahl book, featuring new songs by Marc Shaiman and Scott Wittman and a book by David Greig. (*Lunt-Fontanne, 205 W. 46th St. 877-250-2929. In previews.*)

### Daniel's Husband

Primary Stages presents a new play by Michael McKeever, directed by Joe Brancato, about a seemingly happy gay couple who disagree about whether to get married. (*Cherry Lane, 38 Commerce St. 866-811-4111. In previews. Opens April 4.*)

### A Doll's House, Part 2

Lucas Hnath's play, starring Laurie Metcalf, Chris Cooper, Jayne Houdyshell, and Condola Rashad, picks up years after Ibsen's classic leaves off, with the return of its heroine, Nora. Sam Gold directs. (*Golden, 252 W. 45th St. 212-239-6200. Previews begin March 30.*)

### Groundhog Day

Tim Minchin and Danny Rubin wrote this musical version of the 1993 Bill Murray comedy, about a misanthropic weatherman (Andy Karl) forced to repeat the same day over and over. Matthew Warchus directs. (*August Wilson, 245 W. 52nd St. 212-239-6200. In previews.*)

### The Hairy Ape

Richard Jones directs Eugene O'Neill's expressionist drama from 1922, starring Bobby Cannavale as a ship laborer who feels lost in Manhattan society. (*Park Avenue Armory, Park Ave. at 66th St. 212-933-5812. In previews. Opens March 30.*)

### Hello, Dolly!

Bette Midler stars as the turn-of-the-century matchmaker Dolly Levi in the Jerry Herman musical from 1964, directed by Jerry Zaks and featuring David Hyde Pierce. (*Shubert, 225 W. 44th St. 212-239-6200. In previews.*)

### Indecent

Rebecca Taichman directs Paula Vogel's play, a transfer from the Vineyard, which tells the story of the controversial 1923 Broadway production of Sholem Asch's Yiddish drama "God

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of Vengeance.” (Cort, 138 W. 48th St. 212-239-6200. *Previews begin April 4.*)

### The Little Foxes

Laura Linney and Cynthia Nixon trade off roles night to night in Manhattan Theatre Club’s revival of the 1939 Lillian Hellman drama, directed by Daniel Sullivan. (Samuel J. Friedman, 261 W. 47th St. 212-239-6200. *In previews.*)

### Oslo

A Broadway transfer of J. T. Rogers’s play, directed by Bartlett Sher, which explores how a Norwegian diplomat (Jennifer Ehle) and her husband (Jefferson Mays) secretly help orchestrate the 1993 Oslo Accords. (Vivian Beaumont, 150 W. 65th St. 212-239-6200. *In previews.*)

### The Play That Goes Wrong

England’s Mischief Theatre imports this backstage comedy, about a hapless drama society whose production of a nineteen-twenties murder mystery descends into chaos. (Lyceum, 149 W. 45th St. 212-239-6200. *In previews. Opens April 2.*)

### Present Laughter

Kevin Kline plays a narcissistic actor having a midlife crisis, in Moritz von Stuelpnagel’s revival of the 1939 Noël Coward comedy. (St. James, 246 W. 44th St. 212-239-6200. *In previews.*)

### Samara

Soho Rep’s Sarah Benson directs Richard Maxwell’s piece, with music by Steve Earle (who is also in the cast), in which a man braves a frontier to collect a debt from a stranger. (A.R.T./New York Theatres, 502 W. 53rd St. 212-352-3101. *Previews begin April 4.*)

### Vanity Fair

The Pearl stages the William Makepeace Thackeray novel anatomizing nineteenth-century British society, adapted by Kate Hamill and directed by Eric Tucker. (Pearl, 555 W. 42nd St. 212-563-9261. *In previews. Opens April 2.*)

## NOW PLAYING

### Come from Away

Canadian hospitality doesn’t seem like grist for drama, but this gem of a musical, by Irene Sankoff and David Hein, makes kindness sing and soar. On 9/11, thousands of airline passengers were rerouted to the tiny Newfoundland town of Gander, population nine thousand. The Ganderites opened their doors—and fetched sandwiches, underwear, and kosher meals—while the “plane people,” trapped in a five-day limbo, reckoned with a changed world. A splendid twelve-person cast plays dozens of characters, but Sankoff and Hein deftly spotlight a few, including an American Airlines pilot (Jenn Colella) trying to maintain control of her charges and an Egyptian chef (Caesar Samayoa) coping with the first glimmers of post-9/11 Islamophobia. Christopher Ashley’s production doesn’t dwell on inspirational messaging, instead letting the story, along with some fine fiddle playing, put the wind in its sails. (Schoenfeld, 236 W. 45th St. 212-239-6200.)

### Cry Havoc!

After seven years in the Army, Stephan Wolfert saw “Richard III” and had an epiphany: theatre could be a salve, even for an infantryman from La Crosse, Wisconsin. His solo show recounts that moment and more, using lines from Shakespeare plays to illuminate personal reminiscences and

reflections on what it means to be a soldier. The production, directed by Eric Tucker for the Bedlam company, could ease off the gas pedal more often: Wolfert goes from zero to sixty in a second and pretty much stays there. This intensity gives the show energy but prevents differentiation between moods and scenes, as well as between Wolfert and other characters. The therapeutic angle is expanded after intermission, when Wolfert invites the audience to sit in a circle onstage and leads a sharing session. (New Ohio, 154 Christopher St. 866-811-4111.)

### Linda

The lights come up on Penelope Skinner’s play mid-PowerPoint presentation. Linda, an award-winning marketing executive, is pitching her latest idea to the board of her cosmetics company, a campaign firmly and positively aimed at women older than fifty, a tribe to which Linda belongs. As embodied in a wide-ranging and masterly performance by Janie Dee, Linda is a figure of immense authority and charismatic solidity. Almost immediately, though, events at the office and at home start eroding that stability. By the end, the ground beneath her high heels has become so shaky that she needs help standing on her own two feet. A lot happens in a short time, perhaps a bit too much, but Lynne Meadow directs a fine cast with verve and fluidity, and Skinner’s scenes, brought to life on Walt Spangler’s terrific revolving set, are consistently arresting. (City Center Stage I, 131 W. 55th St. 212-581-1212. *Through April 2.*)

### Miss Saigon

Here’s a musical that always goes for broke. Ballads aren’t intimate but belted to the rafters; characters don’t just walk off the stage but are whisked away on a life-size helicopter; emotions aren’t muted but operatic—which is natural, since the plot transposes key elements from “Madama Butterfly” to mid-nineteen-seventies Vietnam. Yet this 1989 colossus, about the doomed affair between a G.I. (Alistair Brammer) and a Vietnamese girl (Eva Noblezada), moves with remarkable fleetness, especially in Laurence Connor’s dynamite Broadway revival. Richard Maltby, Jr., Claude-Michel Schönberg, and Alain Boublil’s blockbuster has been accused of being exploitative, but it’s clear-eyed and unsentimental about the impact of colonialism. Embodying the show’s critical attitude toward the U.S. is the m.c.-like Engineer, a pimp who dreams of America. Jon Jon Briones plays him with the cunning wink of Sammy Davis, Jr., simultaneously charming and sharklike. (Broadway Theatre, Broadway at 53rd St. 212-239-6200.)

### 946: The Amazing Story of Adolphus Tips

A play about a girl, her cat, and (occasionally) the Second World War, Kneehigh’s discombobulating show adapts Michael Morpurgo’s children’s book for the stage. In rural England in the early nineteen-forties, the pert and naughty Lily (Katy Owen) keeps losing her beloved tabby, while finding friendship with Barry, a shy evacuee, and Adi and Harry, a pair of African-American privates. The story culminates in a scrap of discarded history, a disastrous naval exercise that needlessly sacrificed nearly a thousand lives. But that tragedy is almost eclipsed by the precious digressions and jolly jazz numbers that precede it. If the script and its emphases perplex, the joyous staging consoles. The director, Emma Rice, has always had a way with visual metaphor, and her depiction of a calamitous battle—rendered with

washtubs, toy boats, bright lights, and blood-red ribbons—is a thing of hope and glory. (St. Ann’s Warehouse, 45 Water St., Brooklyn. 718-254-8779.)

### The Price

In Arthur Miller’s 1968 play, Victor Franz (Mark Ruffalo) is a fiftyish police sergeant whose body and handsome face sag a little with regret. He has returned to a brownstone in Manhattan—it sags, too—that’s about to be demolished; it was his childhood home, where he lived with his brother Walter (Tony Shalhoub) and their now dead parents. A furniture dealer (Danny DeVito) will give Victor eleven hundred dollars for all the stuff, but first Victor wants to clear it with Walter, the “successful” mirror image of his working-class brother: a bitter river of recrimination and remorse separates the two. Terry Kinney doesn’t so much direct this Roundabout revival as organize traffic (the cast also includes Jessica Hecht, as Victor’s wife), and the script doesn’t seem to matter much to the actors. Their passion is passionless: they’re merely giving voice to their speeches, while failing to live inside their characters’ voices. (American Airlines Theatre, 227 W. 42nd St. 212-719-1300.)

### Significant Other

Loneliness, heartache, and terror of permanent failure in love: given how incessantly these feelings have been plumbed on stage and screen, it’s a wonder the playwright Joshua Harmon succeeds at making them so vividly painful in this comedy, about a young gay man standing on the sidelines as his three closest friends, all women, get married one by one. Gideon Glick is endlessly charming yet credibly hapless as Jordan Berman, who approaches a rare date with the grim apprehension of a convict awaiting sentencing for a capital crime; in his mind, the opposite of love is not its absence but death. It’s all much more enjoyable than it sounds: Harmon (“Bad Jews”) has a superb ear for dialogue, Glick is a fine physical comedian, and the supporting cast is delightful. But the story resonates because Trip Cullman’s direction never shies from taking Jordan’s crisis seriously. (Booth, 222 W. 45th St. 212-239-6200.)

### Sweeney Todd: The Demon Barber of Fleet Street

In this Tooting Arts Club production of Stephen Sondheim’s 1979 mid-career masterpiece, the director, Bill Buckhurst, has reinforced the show’s depiction of English class distinctions by creating a pinched, claustrophobic, dimly lit environment. The stage is no more than a runway that surrounds, on all four sides, rows of benches and tables—a dining room in the pie shop of Mrs. Lovett (Siobhán McCarthy, an honest and first-rate artist). Visited by the murderous title character (Jeremy Secomb), she has an idea: Is it possible that the world could be her (edible) oyster if she and Sweeney went into business together? Buckhurst treats the show as a storybook tale, full of sudden shocks of pain, visual surprise, and devilish laughter. Actors, rather than an outsized set or a thumping orchestra, make the show, and they open Sondheim’s brilliant lyrics up to a new freshness. (Reviewed in our issue of 3/13/17.) (Barrow Street Theatre, 27 Barrow St. 212-352-3101.)

### The Terrifying

An enormous unseen monster is killing townspeople in this new play by Julia Jarcho, which feels approximately like an absurdist downtown pastiche of the M. Night Shyamalan movie “The Village”—only the big twist is a delightful meta-theatrical reveal of expanded performance

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space. Half of the six central roles are played by the invaluable Pete Simpson, who has a way of making every character he portrays seem like it was written for him. In the play's centerpiece, Simpson's schoolteacher character delivers an uproariously disastrous lecture that begins as the show's most preposterously funny scene, ends as its most horrifying, and more or less justifies the whole thing. Too bad the script never reaches such heights and depths elsewhere; it's clearly intended to cultivate thought about horror stories, but its most promising ideas die on the vine. (*Abrons Arts Center, 466 Grand St. 212-352-3101. Through April 2.*)

### Wakey, Wakey

Immediately upon waking from a face-down nap on a floor cluttered with cardboard boxes, a dying man (Michael Emerson) delivers a long, wry, discursive monologue to the audience, with the aid of a disorganized array of media: audio tones, YouTube videos, note cards. Topics include screaming animals and the iron content of figs, and, despite his deliberate lack of focus, he makes for engaging and funny company. Eventually, he is joined by Lisa (January LaVoy), who seems to throw him off; he continues, but it is as if her arrival has caused the fourth wall to go up. These theatrical games come courtesy of the writer and director Will Eno ("The Realistic Joneses"), and for a long while his script's perfect unpredictability is thrilling. But, as the protagonist's energy flags, so does the show's. (*Pershing Square Signature Center, 480 W. 42nd St. 212-244-7529. Through April 2.*)

### White Guy on the Bus

The playwright Bruce Graham has an uncompromising ear for all the appalling ways white liberals talk about race when people of color aren't around, and listening to this play's four white characters argue with one another about black people is as fascinating as examining a gruesome wound. But why is Ray, the patriarch of the group—whom Robert Cuccioli plays with an intriguingly doleful confidence that recalls Ralph Nader—riding a bus next to the same black woman (Danielle Leneé) every Sunday? The end of the first act explains, and upends, everything we've seen so far, with a wild plot twist; what follows is undoubtedly contrived, but tightly so, and no more than in film noir, the genre that the play flirts with in its second act. The trouble is that it's all too determinedly pedantic to make the emotional connection it needs. (*59E59, at 59 E. 59th St. 212-279-4200.*)

## ALSO NOTABLE

**Anastasia** Broadhurst. • **Bull in a China Shop** Claire Tow. *Through April 2.* • **C. S. Lewis Onstage: The Most Reluctant Convert** Acorn. • **Dear Evan Hansen** Music Box. • **The Emperor Jones** Irish Repertory. • **Gently Down the Stream** Public. • **The Glass Menagerie** Belasco. • **How to Transcend a Happy Marriage** Mitzi E. Newhouse. • **If I Forget** Laura Pels. • **Joan of Arc: Into the Fire** Public. • **Latin History for Morons** Public. • **The Light Years** Playwrights Horizons. *Through April 2.* • **The Outer Space** Joe's Pub. • **The Profane** Playwrights Horizons. • **Sunday in the Park with George** Hudson. • **Sundown, Yellow Moon** McGinn/Cazale. *Through April 1.* • **Sunset Boulevard** Palace. • **Sweat** Studio 54. • **The View UpStairs** Lynn Redgrave. • **War Paint** Nederlander.

# DANCE

### Stephen Petronio Company

In his "Bloodlines" project, Petronio has been fruitfully examining his lineage as a postmodernist, reviving classic works by Trisha Brown and Merce Cunningham. This season, he adds Yvonne Rainer, presenting a few seminal exercises from the nineteen-sixties: "Diagonal" and "Chair/Pillow," plus her canonical "Trio A," in its 1970 protest version, "Trio A with Flags," with dancers wearing nothing but American flags tied around their necks. Also exciting and rare is an excerpt from Steve Paxton's mercurial improvisations to the Goldberg Variations. Petronio himself plays an aging woman in Anna Halprin's 1999 performance piece "The Courtesan and the Crone," and the company débuts his latest work, "Untitled Touch," a complex composition involving physical contact and hand gestures that are conversational in the Italian sense. (*Joyce Theatre, 175 Eighth Ave., at 19th St. 212-242-0800. March 28-April 2.*)

### Doug Varone and Dancers

Thirty years is an eternity in the gruelling world of modern dance; the choreographer Varone is a survivor. Even after three decades on the scene, energy continues to course through his dances like an eddying stream, undiminished by time. The oldest item in this program, "Possession," dates back more than twenty years. The loose-limbed, fast-moving meditation on love is inspired by A. S. Byatt's eponymous novel and set to Philip Glass's "Concerto for Violin and Orchestra." The more recent "ReComposed" looks to the Abstract Expressionist pastels of Joan Mitchell; looping and whirling bodies suggest Mitchell's colorful compositions. A new duet, "Folded," completes the program. (*BAM Harvey Theatre, 651 Fulton St., Brooklyn. 718-636-4100. March 29-April 1.*)

### Ailey II

This troupe, the younger counterpart to Alvin Ailey American Dance Theatre, is always packed with beautiful dancers blossoming. Many of them graduate to the main company, and some of those return to try out choreographing on the next generation. This season's "All New" program of premières includes "Stream of Consciousness," a highly gestural piece about the inner workings of the mind, complete with simulated sleepwalking, by the former Ailey member Marcus Jarrell Willis. A highlight of the "Contemporary Favorites" program of recent pieces is "Gêmeos," a duet of sibling strife and reconciliation by the current Ailey star Jamar Roberts. (*N.Y.U. Skirball Center, 566 LaGuardia Pl. 212-998-4941. March 29-April 2.*)

### Anne Teresa De Keersmaecker / "Work/Travail/Arbeid"

The Museum of Modern Art asks: How do you turn a dance into a museum installation? The prominent Belgian choreographer De Keersmaecker responds: by unfolding a one-hour work into a nine-hour cycle, in which sections of music and choreography are continually recombined. The original work, "Vortex Temporum," was built in parts; some included dance, some didn't, and at certain points the musicians and

dancers co-mingled. The new format multiplies the options available to the six musicians and seven dancers. The rolling "exhibit" takes place on the second floor of the museum, in the Marron Atrium. (*11 W. 53rd St. 212-708-9400. March 29-April 2.*)

### The Joffrey Ballet

In 1995, the esteemed company, then based in New York, decamped for Chicago, and it hasn't looked back. In the years since, the Joffrey has survived rocky finances and remade its image in a less maverick, more international mold. (This was the company that brought us "Billboards," an evening-length ballet set to Prince.) Most of the New York run is devoted to a full-length version of "Romeo and Juliet"—always a favorite with audiences—created in 2008 by the Polish-born choreographer Krzysztof Pastor, a regular at the Dutch National Ballet. The story has been updated, with the help of projections and chic designs, from Renaissance Verona to the twentieth century. (The first act is set in the Fascist period, the second in the *Dolce Vita* of the fifties, and the third in the nineties, with overtones of corruption and war.) A one-off program on March 30 includes works by Christopher Wheeldon, Yuri Possokhov, and the young choreographer Myles Thatcher. (*David H. Koch, Lincoln Center. 212-496-0600. March 29-April 2.*)

### Ursula Eagly

Eagly can be a strange, compelling performer, but her choreography is often thin. It's probably good that she has help for her new "Piece with Gaps for Each Other." Created in close collaboration with the Mexican choreographer Martín Lanz Landázuri and the Japanese composer Kohji Setoh, both of whom appear in the work, "Piece" is designed to allow for the coexistence of different points of view, including those of the additional dancers, Mina Nishimura and Kathy Westwater. (*The Chocolate Factory, 5-49 49th Ave., Long Island City. 866-811-4111. March 29-April 2.*)

### "Rhythm in Motion"

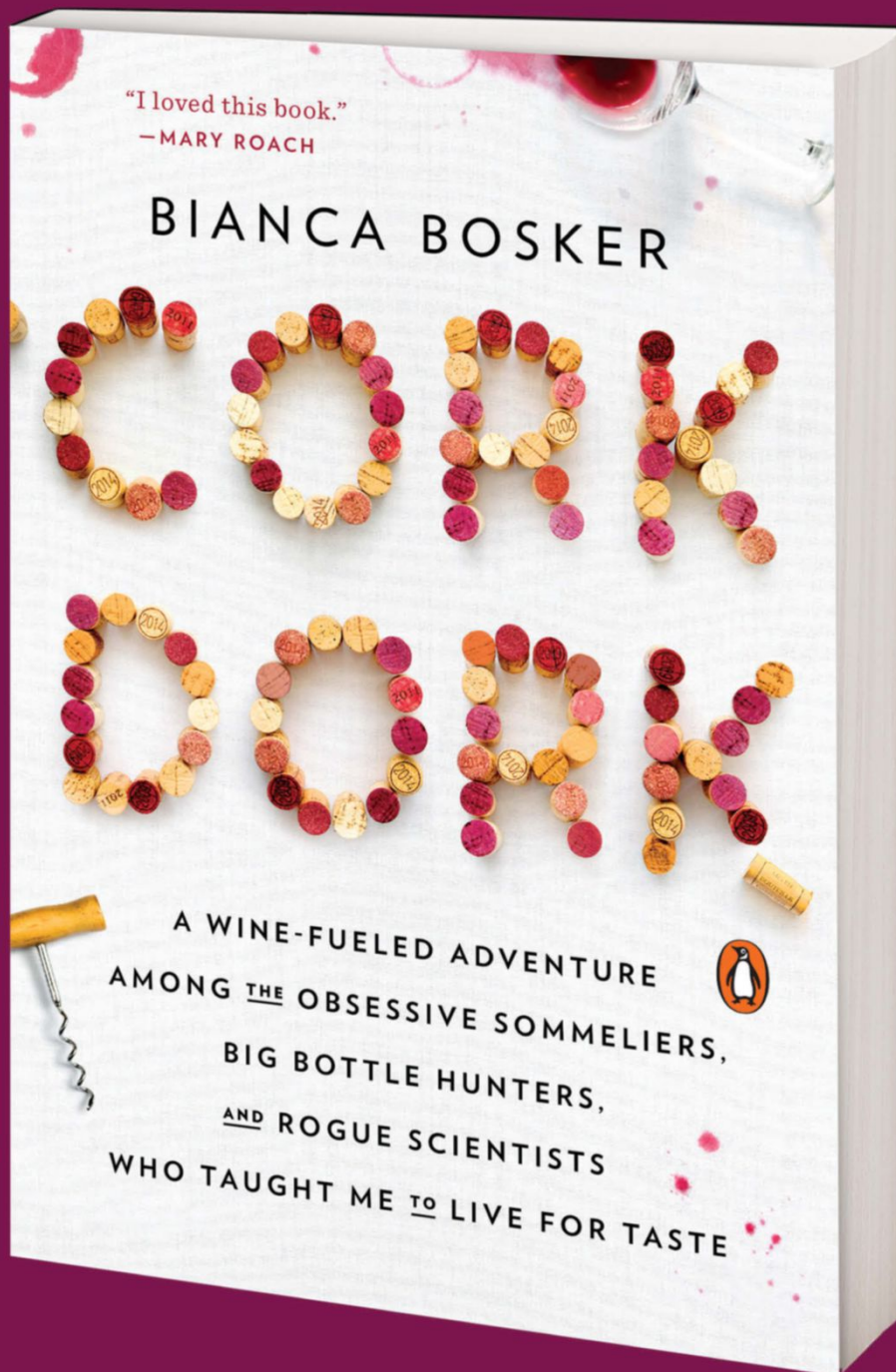
The American Tap Dance Foundation's annual sampler of what's new in tap choreography moves into a nicer theatre this year, one ideal for tap: the Duke on 42nd St. Participants include Ana Rokafella Garcia, Brinae Ali, Felipe Galganni, Chloe Arnold, and Gabe Winns. Whether there's a commensurate rise in the level of imagination—which customarily ranges from prosaic to breathtaking—is an open question, but several of the returning regulars, including Kazu Kumagai, Max Pollak, and Caleb Teicher, are reliable spellbinders. (*229 W. 42nd St. 646-223-3010. March 29-April 2.*)

### Aynsley Vandenbroucke

This thoughtful choreographer has long been as interested in words as she is in movement. She describes her latest solo, "AND," as "a series of live, three-dimensional essays," a kind of performance lecture that plays with literary techniques, mingling fact and fiction, narrative and abstraction, life and art. (*Abrons Arts Center, 466 Grand St. 212-352-3101. March 30-April 2.*)

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# CLASSICAL MUSIC



"Three Generations" offers four concerts of music by minimalist masters and their protégés.

## Less Is More

*Carnegie Hall and Steve Reich celebrate the legacy of minimalism.*

THE MUSICAL STYLE so loosely called minimalism—or, in Philip Glass's preferred term, "music with repetitive structures"—is not an exclusively American product. There have long been foreign fellow-travellers (Louis Andriessen, Arvo Pärt) and deep influences from abroad (the musical cultures of India and West Africa). But during the past half century minimalism has spread across the world like a sonic Pax Americana, replacing twelve-tone composition as classical music's ruling common tongue. Glass and Steve Reich have both turned eighty in the past year, so it seems like a good time for Carnegie Hall to celebrate the phenomenon. It does so in "Three Generations," a series of four concerts at Zankel Hall (March 30, April 6, April 19, and April 26) curated by Reich, Carnegie's current composer chair.

Reich's series is not an all-embracing festival of American minimalism; otherwise, it would have included works by such crucial figures as La Monte Young, Michael Torke, Ingram Marshall, and Scott Johnson. Reich is clearly trying to forge a legacy here, one that stretches from him and his near-coevals down to the middle-aged generation of the Bang on a Can composers—Julia Wolfe, Michael Gordon, and David Lang—and

even further, to the comparative youngsters Nico Muhly and Bryce Dessner.

While the festival is very New York-heavy, the first concert, at least, brings back California dreaming. For many, Terry Riley's "In C," from 1964, is the piece that started the ball rolling. Against the complex techniques of post-war Western composition, Riley, a native Californian, posited a piece with a one-page score, entrusting a group of musicians to sing or play fifty-three brief musical fragments in successive, overlapping waves; the result was a more lulling, laid-back analogue to the phase processes that Reich was developing with tape loops in such shattering works as "Come Out." (It was Reich who suggested that Riley stabilize performances of the piece by having one player intone a constant pulse; at Carnegie, that practice will be abandoned, offering a rare chance to hear Riley's original vision.) Preceding that piece is "Shaker Loops" (1978), a seminal work by a somewhat younger colleague, John Adams. Adams was originally a New Englander, and when he moved out West he brought a dose of East Coast angst along with him. "Shaker Loops" is written for a small string ensemble, but its febrile yearnings and rhythmic thrusts point to the rapprochement that Adams would soon make with the Romantic orchestral tradition. Adams's budding branch was but one on a mighty, growing tree.

—Russell Platt

## Metropolitan Opera

Jürgen Flimm's decision to use a contemporary setting for his 2000 production of Beethoven's "Fidelio"—a two-and-a-half-hour paean to heroism and justice in the face of corrupt power—feels more apt than ever these days. Klaus Florian Vogt lends his trumpeting tenor to Florestan, a man imprisoned unlawfully by a political enemy, and Adrianne Pieczonka sings the role of his wife and liberator, Leonore, with warm, poignant tones. Much like his symphonies, Beethoven's opera makes its points in dense and eloquent musical arguments, but its fervor doesn't always come across in Sebastian Weigle's conducting. *April 1 at 1.* • Anna Netrebko, in the sympathetic role of Tatiana, brings her irreducible vocal glamour to a revival of Tchaikovsky's powerfully lyrical "Eugene Onegin," sharing the stage with such talents as Mariusz Kwiecien (in the title role), Alexey Dolgov, Elena Maximova, and Štefan Kocán; Robin Ticciati conducts. *March 30 and April 3 at 7:30.* • Also playing: Willy Decker's bracingly modern production of "La Traviata" continues its run with a mostly new cast that features Carmen Giannattasio, Átalla Ayan, and George Petean in the leading roles; Nicola Luisotti. *March 29 and April 4 at 7:30 and April 1 at 8.* • Sonja Frisell's grand production of Verdi's "Aida" is not exactly a shrinking violet on the Met's schedule. It returns with two estimable singers, Krassimira Stoyanova and Violeta Urmana, as Aida and her nemesis, Amneris, and a newcomer tenor, Jorge de León, as Radamès; Daniele Rustioni. *March 31 at 7:30. (Metropolitan Opera House. 212-362-6000.)*

## New York City Opera: "La Campana Sommersa"

Ottorino Respighi—the composer of "The Pines of Rome" and other Technicolor tone poems—composed this adaptation of Gerhart Hauptmann's play, which premiered in Hamburg in 1927; it arrived at the Metropolitan Opera a year later, with a prestigious cast headed by Elisabeth Rethberg and Giovanni Martinelli. City Opera, in a co-production with the Teatro Lirico di Cagliari, brings it back to New York at long last, featuring Brandie Sutton, Kristin Sampson, and Fabio Armiliato, and conducted by Ira Levin. *March 31 and April 4-5 at 7:30 and April 1 at 8. (Rose Theatre, Jazz at Lincoln Center, Broadway at 60th St. 212-721-6500.)*

## Manhattan School of Music: "Adventures of Vixen Sharp-Ears"

The conservatory's Senior Opera Theatre takes on Janáček's vibrant fable (usually known as "The Cunning Little Vixen") about a clever fox and the havoc she wreaks among the humans and animals unfortunate enough to cross her. Dona D. Vaughn directs, and Jorge Parodi conducts. *March 29-April 1 at 7:30. (Ades Performance Space, Broadway at 122nd St. msmnyc.edu.)*

## ORCHESTRAS AND CHORUSES

### Tan Dun's "Terracotta" Symphony

The Chinese composer, a flamboyant presence in New York during the aughts, has kept a lower profile of late. But he's back on the scene this week, at the Met Museum, where he'll direct the Juilliard Orchestra in a work commissioned for the exhibition "Age of Empires," which shows



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off the renowned terra-cotta sculptures of soldiers which were buried with the Emperor Qin Shi Huang. Also on the bill is a violin concerto based on Tan's music from the film "Hero." *March 31 at 7 and April 1 at 2. (Fifth Ave. at 82nd St. metmuseum.org.)*

### St. Louis Symphony

David Robertson, a committed and persuasive advocate for contemporary music, conducts this vital heartland ensemble in "The Gospel According to the Other Mary," a vivid, unorthodox Passion oratorio by John Adams that conflates Biblical themes with ruminations on politics and social justice. Featured are the mezzosopranos Kelley O'Connor and Michaela Martens, the tenor Jay Hunter Morris, three countertenors, and the St. Louis Symphony Chorus. *March 31 at 7:30. (Carnegie Hall. 212-247-7800.)*

### Munich Philharmonic Orchestra

The first of two concerts that this venerable German orchestra will present at Carnegie Hall with its principal conductor, Valery Gergiev, proposes a lively dialogue between sensual flamboyance and heroic rigor: the former in Ravel's "La Valse" and Piano Concerto in G Major (with the soloist Pierre-Laurent Aimard), the latter in Beethoven's "Eroica" Symphony. (A second program, featuring music by Debussy, Schubert, and Mahler, follows on April 5.) *April 3 at 8. (212-247-7800.)*

## RECITALS

### Mitsuko Uchida

Carnegie Hall's queen of the keyboard returns to the house in league with the composer-clarinetist Jörg Widmann. Her first concert, at Stern Auditorium, features the New York premiere of Widmann's "Sonatina Facile," nestled among classics by Mozart and Schumann ("Kreisleriana" and the Fantasy in C Major). In the second program, at Zankel Hall, Widmann joins her in person for works by Brahms (the Sonata No. 1 in F Minor for Clarinet and Piano) and Berg, while Uchida goes it alone in music by Schubert and Schumann ("Fantasiestücke"), plus a repeat of the Widmann sonatina. *March 30 at 8 and April 2 at 3. (212-247-7800.)*

### BAM: "A Nonesuch Celebration"

Brooklyn's ever-innovative performance hub pays tribute to Bob Hurwitz, the man whose exploratory spirit has made Nonesuch Records a unique and vital presence in American music. The highlight is a sequence of new works for solo piano by such composers as John Adams, Laurie Anderson, Philip Glass, Timo Andres, and Steve Reich—some of whom will play their pieces themselves. Also with performances from Dawn Upshaw, Natalie Merchant, the Kronos Quartet, and other luminaries. *April 1 at 7:30. (Howard Gilman Opera House, 30 Lafayette Ave. bam.org.)*

### Anne-Sophie Mutter and Lambert Orkis

The incandescent German violinist values long-term artistic relationships. She and her trusted accompanist come to Carnegie Hall for a concert that features repertory works by Mozart, Respighi (the supremely elegant Sonata in B Minor for Violin and Piano), and Saint-Saëns (the Introduction and Rondo Capriccioso) in addition to a piece by one of her favorite contemporary composers, Sebastian Currier ("Clockwork"). *April 2 at 2. (212-247-7800.)*

# MOVIES

## OPENING

**All This Panic** A documentary, directed by Jenny Gage, about a group of teen-age girls growing up in Brooklyn. *Opening March 31. (In limited release.)* • **Carrie Pilby** Bel Powley stars in this comedy, as an adolescent intellectual prodigy who struggles to cope with practical matters. Directed by Susan Johnson; based on a novel by Caren Lissner. *Opening March 31. (In limited release.)* • **Ghost in the Shell** A science-fiction thriller, starring Scarlett Johansson as a cyber-crime fighter who faces a diabolical artificial-intelligence plot. Directed by Rupert Sanders; based on the manga series by Masamune Shirow. *Opening March 31. (In wide release.)*

## NOW PLAYING

### After the Storm

Three generations' worth of frustration and longing are deftly compressed by the writer and director Hirokazu Kore-eda into a few days of small-scale action. The drama is centered on Ryota, a fortysomething novelist who has run out of inspiration and money. His marriage has broken up; he can't pay child support to his ex-wife, Kyoko, and so he risks not seeing his young son, Shingo, who misses him and dislikes Kyoko's rich new boyfriend. Ryota seeks literary material by working as a detective; a compulsive gambler who's constantly in debt, he steals from his recently widowed mother. She, in turn, looks with cold clarity at her own lifelong disappointments. When a typhoon strikes, the whole family is stuck in the elderly woman's cramped apartment, and long-stifled emotions rise to the surface. Kore-eda looks sensitively at the deep roots of unquenched anguish, but he constructs the characters too neatly and the situations too precisely for the drama to seem like anything but a well-meaning lesson. His calm and precise images stick close to the script, divulging its meaning at once and leaving little room for thought and wonder. In Japanese.—*Richard Brody (In limited release.)*

### Beauty and the Beast

Back from the drawing board, into live-action, comes yet another version of the tale. Disney has taken its own animated film from 1991 and, at vast expense, tried to keep it real—or, in the case of the actors, half-real. Emma Watson, whose determined air is not matched by her singing voice, plays the book-loving Belle. She takes the place of her father (Kevin Kline) as the prisoner of the Beast (Dan Stevens), who in turn is held captive by a magic spell. Moping and short-tempered, he dwells in his castle, attended by living objects—the clock (Ian McKellen), the teapot (Emma Thompson), the full-throated wardrobe (Audra McDonald), and so on. Belle's task, of which she seems all too aware, is to fall for the Beast and thus to restore his proper nature, as a handsome and slightly boring prince. The songs from 1991, such as "Be Our Guest," are reheated and dished up anew, together with a batch of fresh numbers, by Alan Menken and Tim Rice; the resulting

movie, though stuffed with wonders, is forty-five minutes longer than its predecessor and much less dramatically lean. With Luke Evans and Josh Gad.—*Anthony Lane (Reviewed in our issue of 3/27/17.) (In wide release.)*

### The Birth of Love

This ardent, muted Parisian melodrama, from 1993, gets its power from the director Philippe Garrel's total identification with its middle-aged protagonists. Paul (Lou Castel), a paunchy, dishevelled actor, and Marcus (Jean-Pierre Léaud), a blocked writer with delusions of grandeur, are ready to sacrifice anything or anyone to their amorous impulses, every tremor of which is captured by Garrel's intimate images. Paul lives tensely with his grimly steadfast wife (Marie-Paule Laval), their teen-age son, and a newborn daughter, yet brazenly philanders with Ulrika (Johanna ter Steege), who makes no pretense of loving him. Marcus, whose girlfriend has fled to Rome, tries to win her back, while Paul encounters an angelic apparition (Aurélia Alaïs) who, in an age-old transaction, offers youth and beauty in exchange for experience. Against a media backdrop of the Gulf War and its human cost, Garrel, for all his intense personal sympathy for the artists' emotional turbulence, presents its price as well. The scene in which Paul—unsurprisingly—leaves home is one of the most painful scenes of paternal anguish ever filmed. In French.—*R.B. (Film Society of Lincoln Center; March 30.)*

### Demon Seed

In this techno-erotic horror movie, from 1977, Julie Christie is sensational as a sometime child psychotherapist stuck in a loveless marriage with a computer whiz (Fritz Weaver). His greatest accomplishment is a thinking supercomputer called Proteus IV—which isn't satisfied with being a machine. After wife and husband separate, Proteus IV takes one look at the woman of the house and decides to father a child with her. Proteus IV may sound like HAL with a sore throat, but he comes off as more of a humanitarian than his human masters (who want to use him for lucrative projects like strip-mining the ocean floor), and he insists that his child will make computers, not humans, obsolete. Although half the film is taken up with the computer's bullying of Christie, the director, Donald Cammell, doesn't control the sex-charged situations in the same way that, say, William Wyler did in "The Collector." But Cammell does stage a stunning action set piece of Proteus IV battling a young scientist (Gerrit Graham), and Christie's passionate, vulnerable performance keeps pulling the entire movie into her point of view.—*Michael Sragow (Metrograph; April 3.)*

### Frantz

The new film from François Ozon takes place just after the First World War, and the action is shared between enemies; the first part is set in a small German town, and the second is centered in Paris. Reconciliation, however well meant, turns out to be an elusive ideal. Paula Beer, whose performance gains momentum as the plot unfolds, plays Anna, who lost her fi-

ancé, Frantz (Anton von Lucke), in the conflict; she still lives with his parents, the Hoffmeisters (Ernst Stötzner and Marie Gruber). They are visited by Adrien Rivoire (Pierre Niney), a tremulous Frenchman, who says that he was a friend of Frantz, and whose recollections bring solace to the bereaved. As Ozon's admirers will know, however, from "Under the Sand" (2000) and "In the House" (2012), mourners can surprise both themselves and others, and the telling of tales can lead one down curious paths. Thus, when Anna travels to a still hostile France, all that she believes begins to fall apart. On the surface, the film—shot in black and white, with short surges of color—is placid and polite, yet what stirs beneath feels unhappy and unresolved. In French and German.—A.L. (3/20/17) (In limited release.)

#### Get Out

A young white woman named Rose (Allison Williams) takes Chris (Daniel Kaluuya), her black boyfriend, to meet her parents for the first time. They live, in some style, in the country, and Chris, though an unruffled soul, feels a mild trepidation. But Rose's father (Bradley Whitford) and mother (Catherine Keener), liberal to a fault, offer a warm welcome; if anything, it is their African-American staff—Walter (Marcus Henderson) and Georgina (Betty Gabriel)—who make Chris feel more uneasy. A party for friends and family, the day after the couple's arrival, deepens his suspicion that something is awry, and the final third of the film bursts into open hostility and dread. The writer and director is Jordan Peele, making his feature-film debut, and the result feels inflammatory to an astounding degree. If the awkward social comedy of the early scenes winds up as a flat-out horror movie, that, we feel, is because Peele finds the state of race relations so horrific—irreparably so—that no other reac-

tion will suffice. Kaluuya makes a likable hero, for whom we heartily root.—A.L. (3/6/17) (In wide release.)

#### Gold Diggers of 1933

The glittery undulations of Busby Berkeley's opening number, "We're in the Money" (featuring Ginger Rogers), and the stomping lamentations of his closer, "Remember My Forgotten Man" (with Joan Blondell), are high on scenographic complexity but short on sensual pleasure. For this geometric wizard, who both choreographs and directs the Depression-centered comedy's musical sequences, sex depends on excess. The electric-light violins of "Shadow Waltz" engage in the world's largest game of Spin the Bottle, and "Pettin' in the Park" turns the pure superfluity of the city's open land into an erotic riot. Starting with the natural pressures of the mating urge, Berkeley spins out a florid display of sport and fashion. The backstage-Broadway plot, about a daring producer (Ned Sparks), three struggling showgirls (Blondell, Ruby Keeler, and Aline MacMahon), a talented songwriter (Dick Powell) who's a Boston blue blood in hiding, and his stuffy folks from home (Warren William and Guy Kibbee), is put through its clattery paces by the director, Mervyn LeRoy. But the movie thrives and survives on Berkeley's genius; for all his spectacular theatrical flair, he's a sociobiologist in rhythm.—R.B. (MOMA; March 29.)

#### I Called Him Morgan

One of the traumas of modern music was the death of the trumpeter Lee Morgan, at the age of thirty-three, when he was shot in a Lower East Side jazz club, in 1972, by his common-law wife, Helen Morgan. Kasper Collin's documentary is centered on the sole recorded interview granted by Helen, in 1996, shortly before her death. Her story, as presented by Collin, has

a vast historical dimension, focussing on her life in New York in the nineteen-fifties, where she defied the limited opportunities for black women and turned her midtown apartment into a freestyle artistic salon. Interviews with Lee Morgan's great musical cohorts, such as Wayne Shorter and Albert (Tootie) Heath, reveal the jazz circuit's high-risk behind-the-scenes activities, involving fast cars, sharp clothes, sexual conquests, and, often, drugs. When Lee's career was derailed by his heroin addiction, Helen took him under her wing and checked him into rehab. When he came out clean, they lived together as a couple and she managed his triumphant comeback; then he left her for another woman, and tragedy ensued. With an insightful blend of interviews and music, archival footage and photographs, Collin anchors this resonant double portrait in its subjects' enduringly influential artistic scene and era.—R.B. (In limited release.)

#### Kong: Skull Island

An unmapped and storm-girdled island, deep in the South Pacific, is too much to resist. Hence the expeditionary force that is dispatched there—set in motion by a scientist (John Goodman), guided by a British tracker (Tom Hiddleston), and caught on film by a dauntless photographer (Brie Larson). Military muscle is provided by a squad of American troops, newly released from the toils of the Vietnam War and commanded by Lieutenant Colonel Preston Packard (Samuel L. Jackson), who is already itching for another conflict. The fun starts—and it starts with admirable speed—when the island proves to be far from uninhabited. In residence is a U.S. pilot (John C. Reilly), who's been stranded there for almost thirty years and has never heard of the Cold War ("They take the summers off"); a bunch of prehistoric nasties with a grievance; and a monkey the size of



Blake Edwards's comedy "Victor/Victoria," from 1982, stars James Garner, as a Chicago gangster, and Julie Andrews, as a singer who pretends to be a man. It's based on the 1933 German musical "Viktor und Viktoria." Both films screen at Anthology Film Archives in the "Cross-Dressing on Film" series.

the Chrysler Building, whom we seem to have met somewhere before. The director of this heady nonsense is Jordan Vogt-Roberts, who sees no reason that “Apocalypse Now” should not be mashed up with monster flicks; the result, apart from a stale patch in the middle, is dished up with energy and verve.—*A.L.* (3/13/17) (*In wide release.*)

### Logan

This is the ninth occasion on which Hugh Jackman has played Logan, otherwise known as Wolverine, and, in the absence of resurrection, it's hard to imagine a tenth. Grizzled and wry, he looks beaten down in the role, limping and drinking, and eking out his days as a limousine driver. As he dons a pair of reading glasses, or joins forces with his mentor, Charles Xavier (Patrick Stewart), who is ninety years old and bad-tempered, you glimpse a melancholy future, in which all the Marvel heroes start to wane; to be blessed with a superpower, after all, is no defense against the onslaught of time. Balancing out the old guys, in James Mangold's film, is the taciturn Laura (Dafne Keen), age eleven, whose knuckles, like those of Logan, are able to sprout lethal blades. The unlikely trio sets off from Texas to North Dakota, and the movie becomes a mixture of the rambling and the enraged; for some viewers, the scenes of violence, in which Laura and Logan fend off the assaults of a pursuing posse, will seem far more flailing and more unrelenting than they need to be. It's an exhausting trip.—*A.L.* (3/6/17) (*In wide release.*)

### The Long Day Closes

In this exquisite, impressionistic, largely autobiographical reverie, from 1993, the British director Terence Davies celebrates, with meticulous grace, a Liverpool boyhood in 1955-56. The tender, introverted eleven-year-old protagonist, Bud Davies (Leigh McCormack), is nurtured in a milieu of working-class gentility by his widowed mother and his three elder siblings (two brothers and a sister). Bud's imagination is haunted by movies and music (and the soundtrack features a flood of snippets ranging from Debbie Reynolds and the Platters to “The Magnificent Ambersons” and Mahler's Tenth), as well as by his family's Catholicism. His favorite position is seated and musing, whether on a staircase or at a window, with a perpetual half smile on his lips as he savors the view and his own refined sensations. A nocturnal family stroll through a carnival takes on the air of a solemn religious procession, and a breathtaking set of overhead tracking shots through a church and a movie theatre suggests the essential unity of Bud's passions—and their equally strong exaltation of daily life. Davies resurrects footfalls and shadows, the pattern and texture of carpets, the sound of his mother's singing voice—the inner drama of undramatic things that are lodged in memory for a lifetime.—*R.B.* (*Metrolgraph; March 29.*)

### The Mother and the Whore

The three lovers at the center of Jean Eustache's vast and voracious romance, from 1973, make history on the wing. The floppy-haired Alexandre (Jean-Pierre Léaud) spends his days reading books in a café, philosophizing with friends, and pursuing affairs. He lives with Marie (Bernadette Lafont), a thirtyish shopkeeper who finances his idleness. But he picks up Veronika (Françoise Lebrun), a sexually uninhibited

nurse, who falls in love with him. Eustache, in his tender and passionate depiction of their romantic roundelay, delivers nothing less than a comprehensive vision of France's post-1968 revolution—and it's a ferociously conservative view. He fills the film's three and a half hours with the loam of collective memory—the sediment of wartime burdens and compromises, the unresolved tensions of nineteen-thirties pop culture. He sees radical utopias and libertine dreams shattered by workaday troubles and intimate crises. His young Parisians' breezy erotic sophistication masks a streetwise urban populism that's as artistically fertile as it is politically risky; their range of intimate disasters has the feel and tone of epic clashes.—*R.B.* (*Film Society of Lincoln Center; March 29 and April 3.*)

### Personal Shopper

Kristen Stewart, who has made a wise habit of turning to distinctive directors, colludes again with Olivier Assayas. In “Clouds of Sils Maria” (2014), she played the assistant to a celebrated actress; here she takes a similar but grimmer role as Maureen, the dogsbody who runs around buying clothes and bags for a celebrity (Nora von Waldstätten) of no perceptible talent. Any social satire, though, is lightly handled, for Assayas has other zones of obsession and frustration to explore. Maureen is psychic, and desperate to hear from her twin brother, who succumbed to a heart condition from which she also suffers. In that spirit, the movie becomes a ghost story, with the heroine prowling a vacant house in search of the dead; as if that were not enough, death then shows up uninvited, in the shape of a savage murder. Some audiences will doubtless be baffled and annoyed by this mixing of genres and tones, yet Assayas and Stewart just about hold things together, and there are thrilling stretches—Maureen exchanging texts with an unknown presence who could be a killer, a stalker, or a phantom soul—when the movie stops your breath.—*A.L.* (3/20/17) (*In limited release.*)

### Raw

Julia Ducournau's movie tells the tale of Justine (Garance Marillier), who is joining her older sister Alexia (Ella Rumpf) at veterinary school. Justine arrives there as a hardworking student, a strict vegetarian, and a blushing timid soul; what we observe, in stages, is the process by which she turns into a lusty carnivore on the rampage. The trigger is the hazing ritual to which she and other novices must submit, which involves, among other delights, a shower of blood and the chomping of a raw rabbit kidney—sufficient to give Justine a craving for flesh of other kinds. She is not alone in her appetites, we learn, and Ducournau does not shy away from detailing the tasting menu that follows. Viewers with nervous stomachs should stay well clear, yet the film, however lurid, is memorable less for its capacity to disgust than for its portrayal of sisterly bonding, and for exploring the extent to which the characters—not merely the young ones, as a late revelation suggests—are both liberated and caged by bodily wants. In French.—*A.L.* (3/13/17) (*In limited release.*)

### Song to Song

In this romantic drama, set in and around the Austin music scene, Terrence Malick places the transcendental lyricism of his later films on sharply mapped emotional terrain. It's a story

of love skewed by ambition. Rooney Mara plays Faye, a young musician who falls into a relationship with a record-company mogul (Michael Fassbender) who can boost her career. Then she starts seeing another musician (Ryan Gosling), who also gets pulled into the impresario's orbit. The shifting triangle à la “Jules and Jim” is twisted by business conflicts and other players, including a waitress (Natalie Portman), a socialite (Cate Blanchett), and an artist (Bérénice Marlohe). Meanwhile, Patti Smith, playing herself, is the voice of conscience and steadfast purpose, in art and life alike. Without sacrificing any of the breathless ecstasy of his urgent, fluid, seemingly borderless images (shot by Emmanuel Lubezki), Malick girds them with a framework of bruising entanglements and bitter realizations, family history and stifled dreams. His sense of wonder at the joy of music and the power of love is also a mournful vision of paradise lost.—*R.B.* (*In limited release.*)

### T2 Trainspotting

A sad sequel to “Trainspotting,” the drug-driven and sidewalk-pounding hit of 1996. The usual suspects have returned for further punishment. Once again, Danny Boyle directs, and the screenplay, adapted from Irvine Welsh's fiction, is by John Hodge. The plot—or the cracked mosaic of incidents that passes for a plot—finds Renton (Ewan McGregor) coming home to Edinburgh, following his worst instincts, and falling into company with his old pals. None of them are thriving: Spud (Ewen Bremner), a junkie, is on the brink of suicide; Sick Boy (Jonny Lee Miller) is trying to turn a pub into a brothel; and Franco (Robert Carlyle), having sprung himself from jail, is best avoided. There is more fear in the air than there was twenty years ago, and Renton's famous rant—“Choose life”—becomes in part a broadside against social media. The editing is as jittery as ever and the soundtrack has lost none of its guts, but there is no mistaking the sense that we are watching a pack of rebels, in middle-aged desperation, casting around for a cause. Anjela Nedyalkova makes quite an impact as Sick Boy's Bulgarian girlfriend, who sees through them all.—*A.L.* (3/27/17) (*In wide release.*)

### A United Kingdom

A love story, but only just. In 1947, in London, and in defiance of the fog and the rain, a clerk named Ruth Williams (Rosamund Pike) meets Seretse Khama (David Oyelowo), who turns out to be the heir to a tribal throne in Bechuanaland. Without ado, they fall for each other and get married, to the indignant dismay of pretty much everyone, from the bride's father (Nicholas Lyndhurst) and the groom's royal uncle (Vusi Kunene) to a sizable wing of the British establishment. Things only get worse for the couple when they fly to his homeland, where Ruth finds herself disdained, for a while, by black and white women alike. Amma Asante's film, written by Guy Hibbert, has many themes piled on its plate, some of them far from digestible. We get large chunks of constitutional politics, plenty of stuff about Anglo-South African relations at the unsavory end of an empire, and a subplot about diamond mines. Oyelowo remains a commanding presence, especially in front of a crowd, but the movie affords him a fraction of the opportunity that “Selma” provided, and there are times when the romantic origins of the crisis all but vanish from sight.—*A.L.* (2/13 & 20/17) (*In limited release.*)

# NIGHT LIFE

## ROCK AND POP

*Musicians and night-club proprietors lead complicated lives; it's advisable to check in advance to confirm engagements.*

### Playboi Carti

This Atlanta rapper traffics in slurred flows that land frictionlessly for club rats and mall loiterers; "Broke Boi," his 2015 breakout, has earned more than twenty-two million streams, each accounting for three minutes of mindless, numb fun. He came to notoriety as part of Awful Records, a loose collective of Atlanta beatniks who have self-released dozens of mixtapes, and on the strength of a handful of songs and riotous performances he was soon tugged toward A\$AP Rocky's orbit. Bellowing bass, bright, wiry synthesizers, and slack-jawed ad-libs characterize Carti's style; this performance at the brick bunker on the edge of Queens is sure to be as enthusiastic as the rapper makes everything sound. (*Knockdown Center, 52-19 Flushing Ave., Maspeth, Queens. 347-915-5615. March 31.*)

### Deadmau5

Is E.D.M. over? What is competitive vogueing? Who's that walking up to me from stage left? These are some of the questions rattling under the large plasma mouse helmet owned by Joel Zimmerman, the thirty-six-year-old d.j. and producer who quickly became the animatronic face of electronic dance music, in the mid-aughts. His mastery of the grinding push-and-pull of deep house and dub-step on singles like "Strobe" helped popularize the sound with rabid festival crowds, and earned him six Grammy nominations; he's a crucial link in the evolution of the guitar-less rock star who remains characteristically neurotic. Of his sixth studio album, "*W:/2016ALBUM/*," Zimmerman recently told *Rolling Stone*, "Having listened to it again, I'm now getting comfortable with it." He supports the new record with four nights at Hammerstein Ballroom. (*311 W. 34th St. 800-745-3000. March 29-April 1.*)

### Jay Som

Melina Duterte, from Oakland, makes emotive indie pop that sticks, as Jay Som. After pillaging backlogs of nineties rock on Limewire, some ten years ago, the twenty-two-year-old multi-instrumentalist began self-recording songs that shine with an affable edge and a soft quirk. She was given a guitar at eight, and learned how to play from the Internet; "Everybody Works," her debut record on Polyvinyl, bears her patchwork charm, dragging in the odd accordion, ambitious bridges, and an occasional stray guest voice. It's a pleasure to hear Duterte dip a toe in groovier waters on songs like "Baybee," a velvety yacht jam that shows just how much pop can be wrung out of bedroom studios. (*Baby's All Right, 146 Broadway, Brooklyn. 718-599-5800. March 29.*)

### King Gizzard & the Lizard Wizard

This psychedelic garage outfit from Melbourne provides the best argument that Jodorowsky films and spaghetti Westerns can be sources for transcendent musical inspiration. Formed in 2010, the band has perfected its manic funk and a grainy tint, and churns out albums overflowing with ideas. There's

"Quarters," composed of four ten-minute-and-ten-second-long tracks; "Paper Mâché Dream Balloon," a "concept-less concept album"; and last year's "Nonagon Infinity," which seamlessly looped between its last moment and its first. Their live shows are notorious scenes that do their wily time signatures and campy music videos justice; they added a second night to this engagement after tickets moved quickly. (*Webster Hall, 125 E. 11th St. 212-353-1600. March 31-April 1.*)

### Music for Enophiles

During the mid-seventies, the iconic composer Brian Eno recorded and released "Another Green World," "Here Come the Warm Jets," and "Before and After Science," imaginative and creative works of art-rock that set off decades of imitation and analysis by fanatics and academics. But Eno never seemed to take himself too seriously: he performed the material only a handful of times, and was more preoccupied with digging out new, untouched concepts than promoting the work he'd already finished. Larry Heinemann, the founding musical director and bandleader of the Blue Man Group and an Eno enthusiast, revisits this period with Music for Enophiles, which he delicately avoids describing as a cover band. The eight-piece ensemble hopes, instead, to give the producer's catalogue a staging it has long been denied, and to bring exposure for the uninitiated while performing Eno's

songs with a unique style and spirit. (*Bowery Electric, 327 Bowery. 212-228-0228. March 29.*)

### Nicky Siano

Born in Brooklyn, Siano helped fertilize the blossoming dance-music community of nineteen-seventies Manhattan, opening the formative Gallery night club, in Chelsea, with his brother Joe, and soon becoming a resident d.j. at Studio 54. The self-anointed Master of Disco Soul was an indispensable character in the transient downtown music community: he helped launch the careers of Grace Jones and Frankie Knuckles, and clocked studio time with Arthur Russell. Since 2011, Siano has returned to d.j.-ing, and now hosts a recurring "Native New Yorker" party series, extending his winding legacy in the city and keeping disco thumping in the boroughs. This week, he celebrates his birthday with **Nancy Whang** and **Jayson Green**. (*Good Room, 98 Meserole Ave., Brooklyn. 718-349-2373. March 31.*)

### Weyes Blood

Natalie Mering, a singer-songwriter who borrowed her stage name from a Flannery O'Connor novel, is a bit like Lana Del Rey meets Enya; she makes swooping, thoughtful ballads that sound like lost standards, with fierce meaning and flourishes of eccentricity. The Santa Monica native was raised in Pennsylvania, and after being drawn to music early (to the disapproval of her conservative parents) she found herself navigating the local worlds of noise and hardcore rock—the exposure arguably sharpened the folk sound she was still developing, and opened up a spread of collaborators and bandmates. Mering is an occasional guest on material from Ariel Pink, and a formidable voice on



"I'll wipe your blood off the concrete / Take you to the party," Jay Som sings on "I Think You're Alright." These are among the sour and sweet quips she'll share at *Baby's All Right*.

her own: the compositions on “Front Row Seat to Earth,” her 2016 album, make moving use of her cinematic timbre. (*Music Hall of Williamsburg*, 66 N. 6th St., Brooklyn. 718-486-5400. March 30.)

## JAZZ AND STANDARDS

### Chano Dominguez

Flamenco music, deeply passionate and tinged with improvisation, has long captivated jazz musicians: important work by Miles Davis, Charles Mingus, and Chick Corea testifies to the obsession. As a pianist and composer, Dominguez is an ardent proponent of jazz-flamenco fusion; on an earlier visit to this club, he recorded “Flamenco Sketches,” an Iberian-inflected tribute to Davis. He returns with a quintet that features the singer **Ismael Fernandez** and the dancer **Sonia Olla**, whose *palmas* (hand clapping) will provide additional rhythmic zest. (*Jazz Standard*, 116 E. 27th St. 212-576-2232. March 30–April 2.)

### Adam Kolker

Compact yet bristling with invention and lyricism, the trio that the saxophonist and bass clarinetist Kolker has assembled includes two other highly nuanced players, the guitarist **Steve Cardenas** and the drummer **Billy Mintz**. With the addition of a bassist and three wind instrumentalists, the expanded band will present evocative material from an upcoming album, “Beckon.” (*Cornelia Street Café*, 29 Cornelia St. 212-989-9319. April 1.)

### Azar Lawrence

Time hasn't quite stood still for Lawrence, but the extended, fervently voiced John Coltrane-infused solos that garnered the saxophonist attention in the seventies still echo today. Though any number of contemporary saxophone stylists traffic in the master's idiom, Lawrence is closer to the source than most, having honed his prodigious chops in the bands of the key Trane collaborators McCoy Tyner and Elvin Jones. His quintet this week includes the trumpeter **Eddie Henderson**, a trusted associate. (*Smoke*, 2751 Broadway, between 105th and 106th Sts. 212-864-6662. March 31–April 2.)

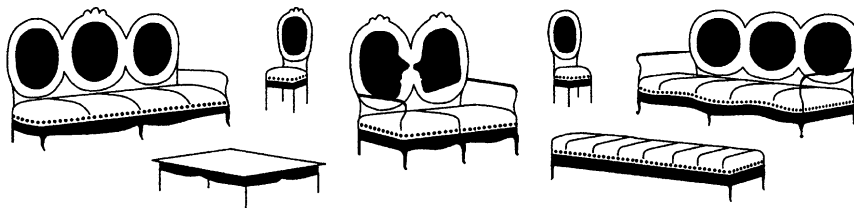
### John O'Hurley

You know him and love/hate him as J. Peterman, on “Seinfeld,” or even from his appearances on “Dancing with the Stars” and “The National Dog Show Presented by Purina,” but O'Hurley's artistic ambitions range further than these iconic pop-culture moments. “A Man with Standards,” an evening of song and reminiscence, finds O'Hurley giving the classics of the Great American Songbook his best shot. Elaine Benes-style dancing is not encouraged. (*Café Carlyle*, *Carlyle Hotel*, *Madison Ave.* at 76th St. 212-744-1600. Through April 8.)

### Joshua Redman

Old and New Dreams, a vital repertory band active in the nineteen-seventies and eighties, brought together four veterans of Ornette Coleman's revolutionary ensembles—the trumpeter Don Cherry, the bassist Charlie Haden, the saxophonist Dewey Redman, and the drummer Ed Blackwell—to explore the related work of the master, who, like all the members of O.A.N.D., is now gone. Dewey's son Joshua, himself a respected saxophone player, has convened a quartet in honor of the former band, combining three players equally attuned to controlled free improvisation: the trumpeter **Ron Miles**, the bassist **Scott Colley**, and the drummer **Brian Blade**. (*Appel Room*, *Jazz at Lincoln Center*, *Broadway* at 60th St. 212-721-6500. March 31–April 1.)

# ABOVE & BEYOND



### MoCCA Arts Festival

For two days, thousands of illustration enthusiasts will enjoy a buffet of independent comics and cartoons at Manhattan's largest festival of its kind. This year, the festival honors the work of Christian Hincker, known to fans as Blutch, a pillar of the contemporary comics community; his graphic novel, “Peplum,” from 2016, follows a group of bandits in ancient Rome and draws influences from Shakespeare and the Satyricon. Hundreds of additional guests will showcase their work, including R. Sikoryak, whose “Terms and Conditions” grafts Apple legalese onto iconic cartoon panels; Israel's Ritu Modan and David Polonsky; the French Web-comic author Penelope Bagieu; and Wojciech Stefaniec, from Poland. (*Metropolitan West*, 639 W. 46th St. *societyillustrators.org*. April 1–2 at 11 A.M.)

### April Fools' Day Parade

“Our satire knows no bounds,” the organizers of this annual parade of jesters promise, yet is there any target more rewarding for the modern satirist than the Commander-in-Chief? New York's thirty-second April Fools' Day Parade calls for an army of Trump look-alikes to gather at Fifth Ave. and 59th St., to trail floats skewering the past year's politicians and policies—including one overflowing with Hillary Clinton e-mails, and a Dakota Access Pipeline that sprays water onto spectators. The route concludes at Washington Square Park, where the surreal scene continues with booths and staged performances, as well as the crowning of one of the costumed Trumps as the King of Fools. (*aprilfoolsdayparade.com*. April 1 at noon.)

## AUCTIONS AND ANTIQUES

Among the more fascinating lots in **Swann's** auction of African-American manuscripts and documents (March 30) is a previously unknown portrait of Harriet Tubman as a young woman, seated elegantly on a chair. The image is one of forty-four portraits of abolitionists from the collection of Emily Howland, who was prominent in the fight for women's rights, abolition, education, and temperance. (104 E. 25th St. 212-254-4710.) • A two-day offering of photographs at **Phillips** (April 3–4) begins with a group of images from the Joy of Giving Something Foundation, a charitable institution created by the late Howard Stein. The collection is rich in works from the nineteenth and early twentieth centuries, such as Carleton Watkins's majestic albumen print “Cape Horn, Columbia River” and Alfred Stieglitz's gritty photogravure of Hoboken street life, “The Terminal.” A more general sale follows (April 4). (450 Park Ave. 212-940-1200.) • **Sotheby's** devotes a day (March 29) to

objects of design, organized by period: Art Nouveau, Arts and Crafts, contemporary, and so on. The sale includes lamps in all shapes, sizes, and hues by Tiffany, including a striking table lamp worthy of Morticia Addams: its shade is designed to look like a cobweb, with a mushroom-inspired base. (*York Ave.* at 72nd St. 212-606-7000.) • An expanded **Photography Show**—presented, as always, by the Association of International Photography Art Dealers—has a new location this year: Pier 94, on the Hudson. The fair, which runs March 30–April 2, will host more than a hundred dealers, with works ranging from mid-nineteenth-century photogravures to video, mixed media, and beyond. In addition to the bustling booths, there will be public programs, including a screening room showing documentaries, a roving photographer shooting portraits of attendees, and an outdoor video projection that explores the knotty issue of animal captivity. (*Twelfth Ave.* at 55th St. For more information, visit *aipad.com*.)

## READINGS AND TALKS

### Rizzoli Bookstore

In 1966, Larry Fink spent less than a week shadowing Andy Warhol for a profile in a literary magazine, which shuttered before the photographs could go to print. For fifty years, Fink's candid portraits of Warhol, Ingrid Superstar, Lou Reed, and Edie Sedgwick, all bearing the photographer's identifiable black-and-white style and piercing honesty, lay dormant. The images, beaming with funky looks and powerful subjects—city boys clustered around the camera in a dingy alley, protesters, everyday loiterers—are now compiled in “Fink on Warhol,” out this week, after an exhibition this winter. Fink signs copies of his book at this launch. (1133 Broadway. *rizzolibookstore.com*. March 30 at 6.)

### Strand Bookstore

Founded by two former CUNY students, ThinkOlio is a series of pop-up classes, hosted by university professors, with the aim of upending traditional education practices. Hakim Mohandas Amani Williams, an assistant professor at Gettysburg College, questions what he calls “mass schooling” in his coming lecture, “A Radical Peace Education: Responding to the Structural Violence of Schooling.” He characterizes modern public education as assembly-line style, taught with little focus on critical thinking by underpaid teachers who are alienated from their students. Williams traces the history of mass schooling, and argues that the practice is outmoded; this talk and others put on by the organizers may offer themselves as worthy alternatives. (828 Broadway. *strandbookstore.com*. March 31 at 7.)

# FOOD & DRINK



## TABLES FOR TWO

### Augustine

5 Beekman St. (212-375-0010)

DINING AT AUGUSTINE, the new Keith McNally restaurant in FiDi's Beekman Hotel, is, unintentionally, a choose-your-own-adventure game. Follow one path, and Augustine resembles the most convivial of Parisian brasseries. Select another, and it is the pinnacle of Wall Street establishments, all slicked hair and steaks. Choose carefully.

For the full experience of the former, sit at the bar. It's like being in a Manet painting: the yellow glow from sconces, tiles painted by a Tuscan artist, a clock worthy of the Gare du Nord. Everyone, it seems, is speaking French. One evening, Roberta, the restaurant's all-knowing *directrice*, escorted a young woman through a crowd packed two or three deep. "François," she said, gesturing to the head bartender, in his leather arm garters, "will take good care of you." The diner ordered from the half of the menu that is an ode to bistro classics: legs of lamb aux fines herbes, salades Niçoise, bouillabaisse. Her neighbors' elbows ended up on her plate, but so did her fork on theirs. "Try the tartare," the Frenchman next to her encouraged, sliding over his dish. It was far too salty, but when her duck à l'orange arrived—juicy slices of Grand Marnier-braised breast meat, layered over turnips and greens, served with

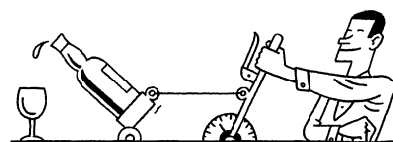
a side of duck confit—all was forgiven.

At the tables in the back, on the other hand, the restaurant's "Bonfire of the Vanities" alter ego comes to the fore. Nothing seems the same; waiters rush to fill water glasses and to change the tablecloth mid-meal. Even François is tossing back shots with diners. Here, the other half of the menu, dripping with eighties nostalgia, seems more pronounced. Say hello to avocado and crab salad, and foie gras with artichoke. Giant porterhouse steaks, which retail for a hundred and forty-five dollars, are "à mourir." There are gems—particularly the sea-urchin spaghetti, creamy and earthy-sweet—but, unless you have a banker's budget, you have to order wisely. What screams bull market more than a squab dish, for forty-one dollars, that is only half the bird and entirely unremarkable?

Unlike McNally's two-decades-old Balthazar, a bistro machine that churns out the Napoleonic ideal of steak frites night after night, Augustine hasn't quite got the food down. But what it lacks in consistency it makes up for in kindness. Roberta's mere presence, as she delivers the tarte tatin, a rose of butter-caramel apple slices hugging a hazelnut crust, rescues the experience from the dispassion of the suits—as does François's wink and pour of gifted Calvados. You might forget the food, but you'll feel like family exiting to a heartfelt chorus of "*À la prochaine*" and "*Ciao, ciao!*" (Entrées \$27–\$145.)

—Becky Cooper

## BAR TAB



### Woodwork

583 Vanderbilt Ave., Brooklyn (718-857-5777)

It was noon on a freezing Saturday when most of the patrons of Woodwork, a bar in Prospect Heights, arrived for a pint. The early hour might suggest that some were seeking the hair of the dog, but none were, at least not noticeably—they were drinking for a different time zone. In London, it was five o'clock, and Arsenal was about to play Lincoln City in the FA Cup quarter-finals. A woman wearing red Arsenal gear walked in and shouted, "Come on, you Gunners!"—her team's nickname—and was met with cheers. The day had started even earlier for one Everton enthusiast, who had performed fist pumps over a coffee and a whiskey (in separate cups) as his team beat West Bromwich Albion, 3–0, after a kickoff at ten. Woodwork opens its doors at eight on Saturday mornings, and shows football, of the English variety, on large TVs throughout the day. The bar's specialty gives it its name: "hitting the woodwork" refers to the football bouncing off a goalpost or the crossbar. A crisp Radeberger Pilsner and a gooey croissant grilled cheese with bacon make a well-rounded breakfast, but may require playing an entire football match to burn off. The croissants are made with a luxurious butter from Vermont—perhaps that's why an Irishman called it the "best sandwich in Brooklyn." As a woman in a Bayern Munich shirt explained, the quarter-final game being played wasn't an entirely even match: Arsenal is one of the best teams in England, while Lincoln City, nicknamed the Imps, is four leagues below them. They had made it to the quarter-finals against all odds—imagine the New York Yankees playing the Brooklyn Cyclones. The Imps put up a good fight, but lost, 5–0. We hope someone bought them a drink.—Colin Stokes

For adults with advanced melanoma,  
**KEYTRUDA** could be your first treatment option.

**“LAST YEAR I WORRIED I’D BE  
JUST A PHOTO TO MY KIDS.  
TODAY I’M DRIVING THEM  
TO SCHOOL.” – ERIK**

KEYTRUDA will not work for everyone. Results may vary.

**At the time of patient follow-up, 67% (185 of 277 patients) treated with KEYTRUDA every 3 weeks were alive, compared to 60% (166 of 278 patients) treated with ipilimumab.**

A clinical trial compared patients with advanced melanoma who received KEYTRUDA every 2 weeks (279 patients) or 3 weeks (277 patients) with those who received ipilimumab (278 patients).

KEYTRUDA is a prescription medicine used to treat a kind of skin cancer called melanoma. KEYTRUDA may be used when your melanoma has spread or cannot be removed by surgery (advanced melanoma).

It is not known if KEYTRUDA is safe and effective in children less than 18 years of age.

## **IMPORTANT SAFETY INFORMATION**

**Call or see your doctor right away if you develop any symptoms of the following problems or these symptoms get worse:**

- **Lung problems (pneumonitis).** Symptoms of pneumonitis may include shortness of breath, chest pain, or new or worse cough.
- **Intestinal problems (colitis) that can lead to tears or holes in your intestine.** Signs and symptoms of colitis may include diarrhea or more bowel movements than usual; stools that are black, tarry, sticky, or have blood or mucus; or severe stomach-area (abdomen) pain or tenderness.
- **Liver problems (hepatitis).** Signs and symptoms of hepatitis may include yellowing of your skin or the whites of your eyes, nausea or vomiting, pain on the right side of your stomach area (abdomen), dark urine, feeling less hungry than usual, or bleeding or bruising more easily than normal.
- **Hormone gland problems (especially the thyroid, pituitary, adrenal glands, and pancreas).** Signs and symptoms that your hormone glands are not working properly may include rapid heartbeat, weight loss or weight gain, increased sweating, feeling more hungry or thirsty, urinating more often than usual, hair loss, feeling cold, constipation, your voice gets deeper,

muscle aches, dizziness or fainting, or headaches that will not go away or unusual headache.

- **Kidney problems, including nephritis and kidney failure.** Signs of kidney problems may include change in the amount or color of your urine.
- **Problems in other organs.** Signs of these problems may include rash, changes in eyesight, severe or persistent muscle or joint pains, severe muscle weakness, or low red blood cells (anemia).
- **Infusion (IV) reactions, that can sometimes be severe and life-threatening.** Signs and symptoms of infusion reactions may include chills or shaking, shortness of breath or wheezing, itching or rash, flushing, dizziness, fever, or feeling like passing out.

**Getting medical treatment right away may help keep these problems from becoming more serious.** Your doctor will check you for these problems during treatment with KEYTRUDA. Your doctor may treat you with corticosteroid or hormone replacement medicines. Your doctor may also need to delay or completely stop treatment with KEYTRUDA if you have severe side effects. *Important Safety Information is continued on the next page.*





**IT'S TRU.**

**KEYTRUDA**<sup>®</sup>  
(pembrolizumab) injection 100 mg

Learn more at [keytruda.com](http://keytruda.com).

Actor portrayal of a real patient  
from a clinical trial.

KEYTRUDA is a type of treatment called immunotherapy that may treat your advanced melanoma by working with your immune system. KEYTRUDA can cause your immune system to attack normal organs and tissues in many areas of your body and can affect the way they work. These problems can sometimes become serious or life-threatening and can lead to death.

### **IMPORTANT SAFETY INFORMATION** *(continued)*

**Before you receive KEYTRUDA, tell your doctor if you** have immune system problems such as Crohn's disease, ulcerative colitis, or lupus; have had an organ transplant; have lung or breathing problems; have liver problems; or have any other medical problems. If you are pregnant or plan to become pregnant, tell your doctor. KEYTRUDA can harm your unborn baby. Females who are able to become pregnant should use an effective method of birth control during treatment and for at least 4 months after the final dose of KEYTRUDA. Tell your doctor right away if you become pregnant during treatment with KEYTRUDA.

If you are breastfeeding or plan to breastfeed, tell your doctor. It is not known if KEYTRUDA passes into your breast milk. Do not

breastfeed during treatment with KEYTRUDA and for 4 months after your final dose of KEYTRUDA.

**Tell your doctor about all the medicines you take**, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Common side effects of KEYTRUDA include feeling tired, itching, diarrhea, decreased appetite, rash, shortness of breath, constipation and nausea.

These are not all the possible side effects of KEYTRUDA. Tell your doctor if you have any side effect that bothers you or that does not go away. For more information, ask your doctor or pharmacist.

**Please read the adjacent Medication Guide for KEYTRUDA and discuss it with your doctor.**

**Ask your doctor if KEYTRUDA could be your first treatment option.**

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit [www.fda.gov/medwatch](http://www.fda.gov/medwatch) or call 1-800-FDA-1088.

Having trouble paying for your Merck medicine?  
**Merck may be able to help.** [www.merckhelps.com](http://www.merckhelps.com)

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## MEDICATION GUIDE

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### KEYTRUDA® (key-true-duh) (pembrolizumab) for injection

### KEYTRUDA® (key-true-duh) (pembrolizumab) injection

#### What is the most important information I should know about KEYTRUDA?

KEYTRUDA is a medicine that may treat your melanoma, lung cancer, or head and neck cancer by working with your immune system. KEYTRUDA can cause your immune system to attack normal organs and tissues in many areas of your body and can affect the way they work. These problems can sometimes become serious or life-threatening and can lead to death.

**Call or see your doctor right away if you develop any symptoms of the following problems or these symptoms get worse:**

**Lung problems (pneumonitis).** Symptoms of pneumonitis may include:

- shortness of breath
- chest pain
- new or worse cough

**Intestinal problems (colitis) that can lead to tears or holes in your intestine.** Signs and symptoms of colitis may include:

- diarrhea or more bowel movements than usual
- stools that are black, tarry, sticky, or have blood or mucus
- severe stomach-area (abdomen) pain or tenderness

**Liver problems (hepatitis).** Signs and symptoms of hepatitis may include:

- yellowing of your skin or the whites of your eyes
- nausea or vomiting
- pain on the right side of your stomach area (abdomen)
- dark urine
- feeling less hungry than usual
- bleeding or bruising more easily than normal

**Hormone gland problems (especially the thyroid, pituitary, adrenal glands, and pancreas).** Signs and symptoms that your hormone glands are not working properly may include:

- rapid heart beat
- weight loss or weight gain
- increased sweating
- feeling more hungry or thirsty
- urinating more often than usual
- hair loss
- feeling cold
- constipation
- your voice gets deeper
- muscle aches
- dizziness or fainting
- headaches that will not go away or unusual headache

**Kidney problems, including nephritis and kidney failure.** Signs of kidney problems may include:

- change in the amount or color of your urine.

**Problems in other organs.** Signs of these problems may include:

- rash
- changes in eyesight
- severe or persistent muscle or joint pains
- severe muscle weakness
- low red blood cells (anemia)

**Infusion (IV) reactions, that can sometimes be severe and life-threatening.** Signs and symptoms of infusion reactions may include:

- chills or shaking
- shortness of breath or wheezing
- itching or rash
- flushing
- dizziness
- fever
- feeling like passing out

**Getting medical treatment right away may help keep these problems from becoming more serious.** Your doctor will check you for these problems during treatment with KEYTRUDA. Your doctor may treat you with corticosteroid or hormone replacement medicines. Your doctor may also need to delay or completely stop treatment with KEYTRUDA, if you have severe side effects.

#### What is KEYTRUDA?

KEYTRUDA is a prescription medicine used to treat:

- a kind of skin cancer called melanoma. KEYTRUDA may be used when your melanoma has spread or cannot be removed by surgery (advanced melanoma).
- a kind of lung cancer called non-small cell lung cancer (NSCLC). KEYTRUDA may be used when your lung cancer:
  - has spread (advanced NSCLC) **and**,
  - tests positive for “PD-L1” **and**,
    - you have not received chemotherapy to treat your advanced NSCLC and your tumor does not have an abnormal “EGFR” or “ALK” gene, **or**
    - you have received chemotherapy that contains platinum to treat your advanced NSCLC, and it did not work or it is no longer working, **and**
    - if your tumor has an abnormal “EGFR” or “ALK” gene, you have also received an EGFR or ALK inhibitor medicine and it did not work or is no longer working.
- a kind of cancer called head and neck squamous cell cancer (HNSCC). KEYTRUDA may be used when your HNSCC:
  - has returned or spread (advanced HNSCC) **and**
  - you have received chemotherapy that contains platinum to treat your advanced HNSCC, and it did not work or is no longer working.

It is not known if KEYTRUDA is safe and effective in children less than 18 years of age.

## What should I tell my doctor before receiving KEYTRUDA?

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### Before you receive KEYTRUDA, tell your doctor if you:

- have immune system problems such as Crohn's disease, ulcerative colitis, or lupus
- have had an organ transplant
- have lung or breathing problems
- have liver problems
- have any other medical problems
- are pregnant or plan to become pregnant
  - KEYTRUDA can harm your unborn baby.
  - Females who are able to become pregnant should use an effective method of birth control during and for at least 4 months after the final dose of KEYTRUDA. Talk to your doctor about birth control methods that you can use during this time.
  - Tell your doctor right away if you become pregnant during treatment with KEYTRUDA.
- are breastfeeding or plan to breastfeed.
  - It is not known if KEYTRUDA passes into your breast milk.
  - Do not breastfeed during treatment with KEYTRUDA and for 4 months after your final dose of KEYTRUDA.

**Tell your doctor about all the medicines you take**, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Know the medicines you take. Keep a list of them to show your doctor and pharmacist when you get a new medicine.

### How will I receive KEYTRUDA?

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- Your doctor will give you KEYTRUDA into your vein through an intravenous (IV) line over 30 minutes.
- KEYTRUDA is usually given every 3 weeks.
- Your doctor will decide how many treatments you need.
- Your doctor will do blood tests to check you for side effects.
- If you miss any appointments, call your doctor as soon as possible to reschedule your appointment.

### What are the possible side effects of KEYTRUDA?

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#### **KEYTRUDA can cause serious side effects. See "What is the most important information I should know about KEYTRUDA?"**

Common side effects of KEYTRUDA include: feeling tired, itching, diarrhea, decreased appetite, rash, shortness of breath, constipation, and nausea.

These are not all the possible side effects of KEYTRUDA. For more information, ask your doctor or pharmacist.

Tell your doctor if you have any side effect that bothers you or that does not go away.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

### General information about the safe and effective use of KEYTRUDA

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Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. If you would like more information about KEYTRUDA, talk with your doctor. You can ask your doctor or nurse for information about KEYTRUDA that is written for healthcare professionals. For more information, go to [www.keytruda.com](http://www.keytruda.com).

### What are the ingredients in KEYTRUDA?

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**Active ingredient:** pembrolizumab

**Inactive ingredients:**

KEYTRUDA for injection: L-histidine, polysorbate 80, and sucrose. May contain hydrochloric acid/sodium hydroxide.

KEYTRUDA injection: L-histidine, polysorbate 80, sucrose, and Water for Injection, USP.

Manufactured by: Merck Sharp & Dohme Corp., a subsidiary of **MERCK & CO., INC.**, Whitehouse Station, NJ 08889, USA

For KEYTRUDA for injection, at: Schering-Plough (Brinny) Co., County Cork, Ireland

For KEYTRUDA injection, at: MSD Ireland (Carlow), County Carlow, Ireland

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For patent information: [www.merck.com/product/patent/home.html](http://www.merck.com/product/patent/home.html)

usmg-mk3475-iv-1610r006

Revised: October 2016

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This Medication Guide has been approved by the U.S. Food and Drug Administration.

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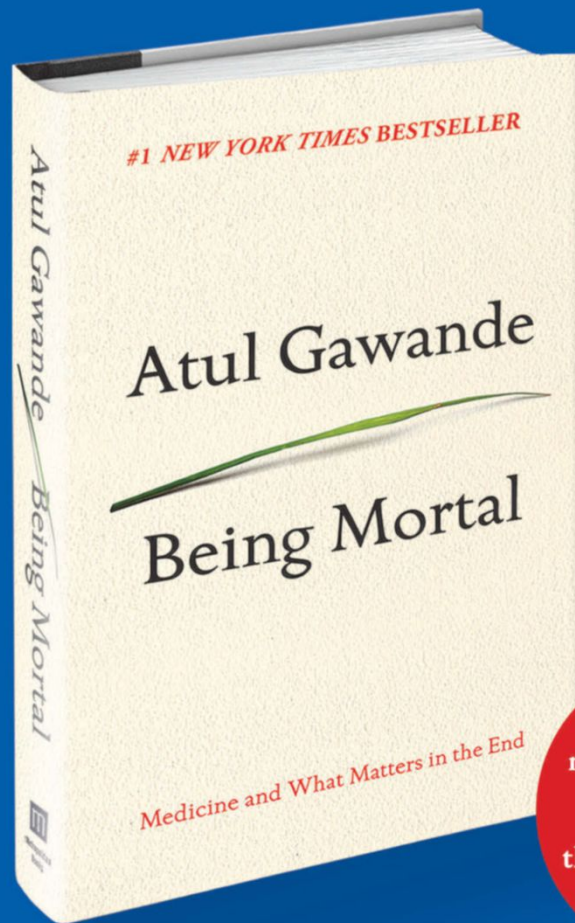
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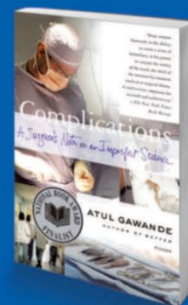
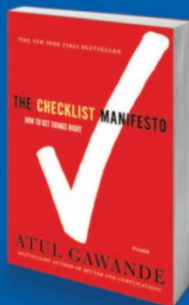
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Gawande’s  
most powerful  
—and moving—  
book.”

—MALCOLM  
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## THE TALK OF THE TOWN

### COMMENT CASE STUDIES

**R**UTH BADER GINSBURG, the diminutive liberal colossus of the Supreme Court, has built a distinguished record as a Justice, but her legacy as a nominee is more dubious. In her confirmation hearing before the Senate Judiciary Committee, in 1993, she refused to answer most questions about how, if confirmed, she would rule. In an oft-quoted phrase, she vowed to give “no hints, no forecasts, no previews.” Nominees have invoked this stonewall ever since. Last week, Neil Gorsuch, Donald Trump’s choice to fill the seat of the late Antonin Scalia, proved an especially ardent follower of what has come to be known as the Ginsburg rule.

Asked repeatedly by members of the committee about his views of such cases as *Roe v. Wade* and *Citizens United*, Gorsuch not only refused to answer but went on to say that his feelings, if he had any, were of no consequence: “It’s not a matter of agreeing or disagreeing. It’s a matter of it being the law, and my job is to apply and enforce the law.” Gorsuch portrayed himself as a kind of judicial automaton, obligated to pay mindless obeisance to the Court’s prior rulings. This interpretation of the role of Supreme Court Justices is, to put it charitably, incorrect—they can and do overturn their earlier holdings. And Trump didn’t nominate Gorsuch simply because he knows how to follow precedent. He nominated Gorsuch because his career resembles a lab experiment synthesizing every trend in modern conservative thought.

A ruggedly handsome Coloradan—this President cares a great deal about appearances—Gorsuch has an appealing manner and an impressive résumé. He did well in good schools, held prestigious clerkships, worked at a fine law firm, took a senior post in the Department of Justice, and for the past decade has served on the Tenth Circuit Court of Appeals. From his boyhood days as a Republican Senate page to his decades of volunteer work for G.O.P. candidates,

Gorsuch has been a strong party loyalist. (Like many Republican pols, he refers to the “Democrat,” rather than the Democratic, Party.)

His background also includes a dose of pro-corporate, deregulatory libertarianism, as reflected in his close relationship with the billionaire Philip Anschutz, a client turned mentor. A sampling of authoritarianism can be seen in Gorsuch’s service in George W. Bush’s Justice Department, where he helped craft a proposal for the treatment of detainees at Guantánamo. (The Supreme Court later ruled it unconstitutional.) There’s social conservatism, too, evident in his one book, a critique of death-with-dignity laws and physician-assisted suicide. “All human beings are intrinsically valuable,” he wrote, “and the intentional taking of human life by private persons is always wrong.” It’s easy to read the book as a coded attack on abortion rights.

To the extent that Gorsuch said anything of substance at his hearing, he put himself across as a mainstream figure. He said that he had participated in some twenty-seven hundred cases on the appeals court, and had voted with the majority in ninety-nine per cent of them. This proves only that most cases

are routine. (Even the Supreme Court issues unanimous rulings more than half the time.) The hard cases are the ones that matter, and it’s reasonable to project how Gorsuch would vote in them. He would oppose abortion rights. (Trump promised to appoint a “pro-life” Justice.) His predilection for employers over employees is such that it yielded a circuit-court opinion of almost Gothic cruelty. When subzero temperatures caused a truck driver’s trailer brakes to freeze, he pulled over to the side of the road. After waiting three hours for help to arrive, he began to lose feeling in his extremities, so he unhitched the cab from the trailer and drove to safety. His employer fired him for abandoning company property. The majority in the case called the dismissal



unjustified, but Gorsuch said that the driver was in the wrong.

As a Justice, Gorsuch would embrace the deregulation of campaign finance symbolized by the Citizens United decision. (He argued in an opinion that judges should evaluate limits on political contributions using the same tough standards that they apply to racial discrimination.) His most famous Tenth Circuit decision had him taking a side in the culture wars. In *Hobby Lobby Stores, Inc. v. Sebelius*, he ruled that a multibillion-dollar corporation could withhold federally guaranteed rights to birth control from thousands of female employees because of the religious beliefs of the corporation's owners. (His position was upheld, 5–4, by the Supreme Court.) In an embarrassing coincidence, on the second day of Gorsuch's testimony, the Court unanimously rejected one of his holdings in the Tenth Circuit, ruling that it denied adequate educational opportunities to students with disabilities. Every sign suggests that Gorsuch would be at least as conservative a judicial activist as Samuel Alito.

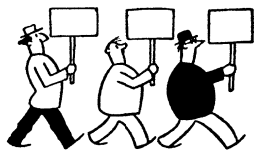
It's also clear what Neil Gorsuch is not: Merrick Garland. Gorsuch's nomination is inextricable from its shameful political context. When Scalia died, more than eleven months remained in Barack Obama's Presidency, but Senate Republicans refused to give his nominee even a hearing. This departure from norms was all the more outrageous because

the tactic was used to block a moderate; the Republicans denied Obama his constitutional right in order to trade a Justice who might have been less liberal than Stephen Breyer for one who might be as radical as Clarence Thomas. Such a turn-about seems especially disturbing given that the F.B.I. and other agencies are now investigating the very legitimacy of the Trump Presidency. Indeed, Chuck Schumer, the Democratic leader in the Senate, has called for a delay in the Gorsuch vote until there is some clarity about the Trump camp's ties to Russia. Last week, he also promised to lead a filibuster against Gorsuch's confirmation, but Republicans, in response, vowed to change the Senate rules to allow them to confirm the nominee by a simple majority.

The Supreme Court is, as political scientists like to say, a counter-majoritarian institution: the President and the members of Congress must answer to the voters; the Justices, who serve for life, answer only to the commands of the Constitution. But, in doing so, it's their duty to speak for those who lack political power. The Trump era has already meant trouble for these people—the poor, the sick, dissenters, immigrants—and Gorsuch, for all his intellectual distinction, has shown scant regard for their concerns. There's little reason to believe that he would as a Justice, either.

—Jeffrey Toobin

## COUNTER-PROTEST DEPT. CAPTURE THE FLAG



A FEW YEARS AGO, after he starred in “Transformers,” the actor Shia LaBeouf seemed poised to become the next Johnny Depp; instead, he started behaving more like the next James Franco. In 2014, he showed up at the Berlin Film Festival wearing a tuxedo, with a brown paper bag over his head. This was a piece of performance art called “I AM NOT FAMOUS ANYMORE,” which he had created with the artists Nastja Säde Rönkkö and Luke Turner. The trio went on to produce a skywriting project, a hitchhiking project, and, most recently, “HE WILL NOT DIVIDE US,” a piece of anti-Trump protest art, launched on Inauguration Day. The work, according to a statement, consisted of “a camera mounted on a wall outside the Museum of the Moving Image,” in Queens. Members of the public were invited to recite, into the camera, the titular mantra. The statement continued, “The participatory performance will be live-streamed at

www.hewillnotdivide.us continuously for four years, or the duration of the presidency.”

The project caught the attention of the hordes on 4chan, an online message board where people post anonymously. One of the most notorious parts of 4chan is called /pol/, which stands for “politically incorrect,” and where the ideologies range from anarchism to fascism and ironic anarcho-fascism. It was the denizens of /pol/ who, last year, turned Pepe the Frog, once a benign cartoon, into a neo-Nazi icon. Many frequent posters there could be called trolls—young, understimulated men whose main goal is to be the chaos they wish to see in the world.

Within hours, 4chan trolls had decided to protest the protest. Or, as one poster put it, “Shia Leboof and a bunch of libtards making an ass of themselves for 4 years live because Trump won. /pol/ fucks with them.” At MOMI, a few trolls infiltrated the crowd, shouting about conspiracy theories and white supremacy. Six days after the live stream began, LaBeouf, who was in the crowd, confronted one of the trolls and got arrested, on camera. On February 10th, the museum cancelled the project, citing public-safety concerns.

A week later, the live stream recommenced, from a location in Albuquerque, New Mexico, across the street from a tire store. “You tried to shut us down in New York—we’re still out here,” LaBeouf shouted into the camera. “How is it cool to be a Nazi now? Shut the fuck up.” The trolls appeared, and vandalized it with spray paint. Within five days, the Albuquerque live stream went dark.

On March 8th, the artists updated their site. “The project moved to an unknown location,” they wrote. “A flag emblazoned with the words ‘HE WILL



Shia LaBeouf

NOT DIVIDE US' will be flown for the duration." The live stream was back up, showing a white flag with black letters against an open sky.

Five minutes later, someone started a thread on /pol/: "Can we find where the flag is?"

"Does the sun come into view?" someone else posted. "We can find angle from the sun path to the ground if we assume the pole is vertical."

"We might be able to do trigonometry with shadows on the flag," another person wrote. One of the trolls quickly found a clue: a photo of LaBeouf, taken days earlier, at a diner in Greeneville, Tennessee. Another troll checked the weather in Greeneville; it matched the video. "Anyone else hear the frogs croaking?" someone wrote, referring to the live stream's audio. This prompted a discussion, including color-coded maps, about local species of cricket frogs.

At 1:56 P.M., a plane flew by on the live stream. "AIRPLANE GUYS AIRPLANE AIRPLANE!" someone wrote. A troll suggested checking Flightradar24.com, a site that tracks flight paths. "If it's in Greeneville, we'll see new planes come in from the east and the north," someone posted. Seven seconds later, another plane flew by, heading south.

"GREENEVILLE CONFIRMED. WE DID IT LADS."

When they had a good idea of the flag's coordinates, a /pol/ poster who lives in the Greeneville area drove around and honked, hoping that the noise would be audible on the live stream. It was. Night fell, and the trolls used astronomy to further pinpoint the flag: "The faint star visible next to the flag is Polaris—it has to be since the other star is rotating around it in a perfect circle."

In the middle of the night, a group of trolls gathered at the exact location, a farmhouse with an open field behind it. Anyone who was watching the live stream at that time saw the white flag come down. A minute later, something was hoisted in its place: a Pepe the Frog T-shirt, and a "Make America Great Again" hat. On March 22nd, the artists reopened the live stream, this time from Liverpool. British trolls got to the flag the next morning. Once again, the live stream went dark.

—Andrew Marantz

## BRAVE NEW WORLD DEPT. FIREWALL



LAST MONDAY, TWENTY-ONE public-school students burst through the door of a building at Thirty-ninth Street and Lancaster Avenue, in West Philadelphia, for a session of Fake News Finders, an after-school workshop run by the nonprofit group Mighty Writers. An eight-year-old named Thomas parked his scooter opposite a framed photograph of Barack Obama beneath a "Black Lives Matter" banner. A ten-year-old named Musa carried his violin sheet music. James, eleven, had a backpack filled with snacks. All but three of the students were boys. Most found seats at a conference table.

"How many people know what fake news is?" the instructor, Annette John-Hall, asked. She is a former Philadelphia *Inquirer* columnist who now reports for public radio.

"News that is fake," a student said.

"A made-up story," said another.

John-Hall, a tall woman, who was dressed in a pink skirt, a navy sweater, and ankle boots, asked, "What's the danger when you talk to other people about something that's not true?"

"You'll either end up in a war or a riot," one boy said. "Something really bad will happen."

At the back of the room sat Tim Whitaker, the former editor of *Philadelphia Weekly*. He founded Mighty Writers, in 2009, because the city had some of the highest rates of illiteracy and poverty in the country. Whitaker believes that in order to write clearly students must think clearly.

"We have a new President," John-Hall said. "Who knows his name?"

A chorus: "Donald Trump."

"Wait, wait, wait," a teen-ager in a hoodie said. "Donald J. Trump."

John-Hall said, "When you think about our new President, give me a one-word descriptor."

"Evil." "Dumb." "Racist." "Sexist." "Disrespectful."

John-Hall said, "There are facts to back up every single word you just used."

She cued up a CNN video—"First

100 Days: Price of Protecting the First Family." The students watched as the moderator, Don Lemon, interviewed guests about Mar-a-Lago and golfing and business conflicts.

"Paris, what do you think?" Lemon asked Paris Dennard, President George W. Bush's director of black outreach. Dennard said, "I think this is fake news." Lemon, clearly irritated, cut the interview short.

John-Hall explained to the class, "Fake news' has been redefined, for a lot of people, as news that they don't agree with." But she also wanted the students to be alert to news reports that were simply fiction. The class discussed how to compare suspect material, like that produced by Infowars, with the journalism of credible news outlets. Khalia Robinson, who is Mighty Writers' program director, offered an example: TMZ (real) and TMZWorldNews (parody).

Musa asked her, "Why do you watch TMZ?"

"I don't, but I do follow the links so I'll know the difference," Robinson said.

"My mom watches TMZ," Musa said. "I tell her it's inappropriate."

They moved on to how fake news spreads. John-Hall asked the students which social-media platforms they used.

"Instagram." "Facebook." "Google Plus." "Snapchat."

"Google Plus?" someone said.

John-Hall said, "Can somebody tell me the danger in sharing something that isn't true on social media?"

More students mentioned war, and John-Hall agreed that President Trump's behavior had "international ramifications." She said, "Our own President doesn't know how to tell the truth."

"Even a *kindergartner* can tell the truth," a boy said.

James, who was halfway through a bag of Cheetos, asked what "international ramifications" meant.

Next, John-Hall asked for clues to spot fake news. "Let's say you're reading something about Beyoncé," she said.

"Don't use that as an example," another boy said, groaning.

"O.K., let's say you're reading something about Kevin Durant—"

"Even worse."

"Kevin Hart!" a small voice said.

"O.K., Kevin Hart," John-Hall re-

peated. "Let's say you're reading something that says Kevin Hart played in a celebrity basketball game, and he blocked Kevin Durant's shot." Everyone laughed. "Why would your common sense tell you that's not true?"

"Kevin Hart's too short to be blocking some shots!"

"That's right!" John-Hall said. "You know Kevin Hart is no taller than Musa!"

After they'd discussed telltale signs of fake news such as mismatched fonts and bad grammar, John-Hall asked, "What about quotes? Like, if Kevin Durant says, 'Man, I can't stand Steph Curry and I can't stand Draymond Green.'"

Julius, nine, raised his hand: "I don't think anybody likes Draymond Green."

—Paige Williams

## KEEPSAKE DEPT. COOL MOM



NOT LONG AGO, Fay Ennis, a retired market-research executive who just celebrated her ninety-second birthday, was telling family members stories from her past, which turned into an occasion for bringing out a box of moody black-and-white photographs. She had posed for them seventy years ago, as a graduate student at Columbia, where Margaret Mead was one of her professors. The pictures were taken by Saul Leiter, who later became well known as a member of the so-called New York School.

At the time, Leiter was an impoverished would-be painter, with a crush on Ennis's younger sister, Sarah—or so Ennis

recalled recently, when she and her twin daughters, Betsy and Susan, took the images to the Howard Greenberg Gallery, Leiter's dealer. They wanted to show Greenberg and Margit Erb, the director of the Saul Leiter Foundation, what Ennis had squirreled away in a drawer.

"Saul and I had no romance at all—he was always telling me how much he cared about Sarah," Ennis said, as she spread out the ten prints that Leiter, who died in 2013, had made at the end of the forties. In them, she is wearing lots of lipstick and dressed in a polka-dot pajama top, looking with sultry, mascaraed eyes into the camera, her tousled hair spilling across a pillow. "I am half exposed, but I never posed nude," she said. "We were completely Platonic. I was never his muse."

"You were very cool, Mom," Betsy, a public-relations consultant, said.

"I got married in 1952," Ennis replied, firmly.

"I think you are not remembering," Betsy said. "You were very cool."

"New York was very cool," Ennis insisted.

Leiter, who was brought up in an Orthodox Jewish family in Pittsburgh, moved to New York in 1946, when he was twenty-three, and lived on Perry Street. Ennis, who also came from an Orthodox background, moved from Detroit the same year; she lived in a rooming house in the West Nineties. "Detroit was a place you got away from," she said. They met because their younger sisters were yeshiva friends.

"Saul and I used to spend time going to the galleries on Fifty-seventh Street. If you had any money, you could buy all sorts of things, but we didn't have any money," Ennis said. "I remember looking at a painting by Paul Klee that was

five hundred dollars. I didn't have five hundred dollars. Saul came home one day and said, 'I met an artist!' He had met Richard Pousette-Dart. He was so excited. He wanted to be a painter, but he always carried a camera."

Ennis and Leiter's friendship dwindled, and came to an end in the mid-fifties, after Leiter failed to show up for a dinner invitation extended by Ennis and her husband, Jerome, a psychiatrist. "My husband was very offended, and said, 'Don't invite him again,'" Ennis recalled. She kept Leiter's note of apology: "I know this sounds ridiculous," he wrote, "but I lost the little slip of paper on which I'd written the address."

Margit Erb had brought her own box of photographs: images of Ennis that Leiter had printed over several decades, and that had been preserved in his archive. One showed Ennis in the polka-dot pajamas. The shirt was falling open, exposing a breast. "That's me," Ennis said, slightly cagey. "I don't think you girls are old enough to see these pictures." There was a photograph well known to admirers of Leiter, called "Fay Smoking." It shows Ennis reclining, smoke wafting from her mouth as she regards the camera across the voluptuous landscape of her naked torso. Ennis gazed at it. "I never had any romantic feelings for Saul—maybe that's why I could do this," she said. "I must have trusted Saul that he wasn't going to seduce me."

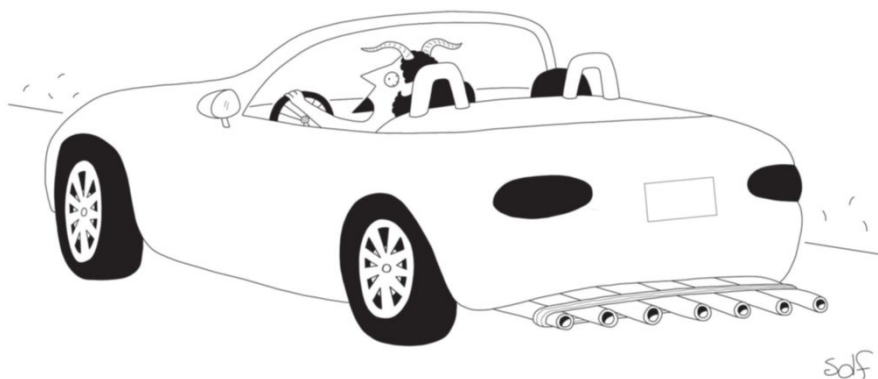
Leiter never photographed Sarah, who died of cancer at the age of twenty-one, when she was eight months pregnant. Part of the reason Ennis treasures the images and letters saved in her drawer is that she has so little to remember her sister by. (There are two love letters from Leiter to Sarah.) Seeing the forgotten images from the archive, Ennis had an encounter with another long-lost person from her past: herself. "I didn't realize I was so uninhibited," she said, wonderingly.

"Do you remember having fun?" Erb asked gently.

"Oh, yes," Ennis said.

Erb picked up an image of Ennis leaning against a wall, a blanket pulled up to her chin, her face partly hidden, fixing the camera with a hooded, intelligent eye. "This one was printed in 2008," Erb said. "He went back and printed you. He didn't forget."

—Rebecca Mead



THE FINANCIAL PAGE  
REAL NUMBERS

ON JANUARY 22, 1930, not quite three months after the stock-market crash and the ensuing economic collapse, the *Times*, in a front-page article, quoted President Herbert Hoover saying that “the tide of employment has changed in the right direction.” His Secretary of Labor, James J. Davis, citing reports on America’s industries, pronounced the country “well on the way to complete recovery.”

Reading the article, Frances Perkins, the industrial commissioner of New York State, was horrified. She knew that the President was relying on data from the U.S. Employment Service, a notoriously inaccurate source, rather than from the Bureau of Labor Statistics, which showed that huge numbers of people were being laid off. She imagined the psychological harm that Hoover’s words would inflict on the unemployed, writing in her memoir that she feared the jobless “would feel that there was something wrong with them personally. A great despair would enter their hearts.” Young people would “read the story and say, ‘Why doesn’t Papa work?’”

Perkins called a press conference, prompting a national scandal about statistical methodology. Within a month, the *Times* was condemning Hoover’s misuse of data and praising Perkins (who went on to become Secretary of Labor under Franklin Roosevelt). The economist overseeing the unemployment numbers quit when he learned that the Administration also was trying to alter Bureau of Labor Statistics data to make them seem sunnier. Congress commissioned the development of objective employment data, and, since the nineteen-forties, two government data sets have been essential measures of the nation’s economic health.

Those statistics have often played a role in politics. In good times—under Dwight Eisenhower, Ronald Reagan, and Bill Clinton—the data have helped an incumbent win reelection. In bad times—Jimmy Carter, George H.W. Bush—the data have contributed to defeat. Still, until Donald Trump, no major candidate or President had publicly challenged the validity of even the grimmest numbers. Throughout the campaign, Trump openly mocked employment data released by the Bureau of Labor Statistics and the Bureau of Economic Analysis as “phony” and “totally fiction.” His tone changed when he wanted to take credit for a good jobs report. In March, Sean Spicer said at a press briefing that the President wanted to make clear that the

unemployment rate “may have been phony in the past, but it’s very real now.” The White House press corps laughed, but, to government statisticians, the words sounded less like a joke and more like a threat. “When I saw that, I said, ‘Wow. You said the numbers were wrong,’” Kathleen Utgoff, who ran the B.L.S. under President George W. Bush, told me. “‘Now you are politicizing them.’” She said that she is “terrified” by the President’s willingness to declare the government data “very real” or fake news based solely on how they reflect on him.

Utgoff isn’t afraid that the Trump Administration will meddle with statistical methodologies or the numbers they produce; that would require co-opting thousands of career government surveyors, statisticians, and economists in an effort to alter data collected from hundreds of thousands of businesses and citizens. (Even Richard Nixon, who, in 1971, hatched a plan to rid the B.L.S. of what he thought was a “Jewish cabal” out to destroy him, was unable to un-

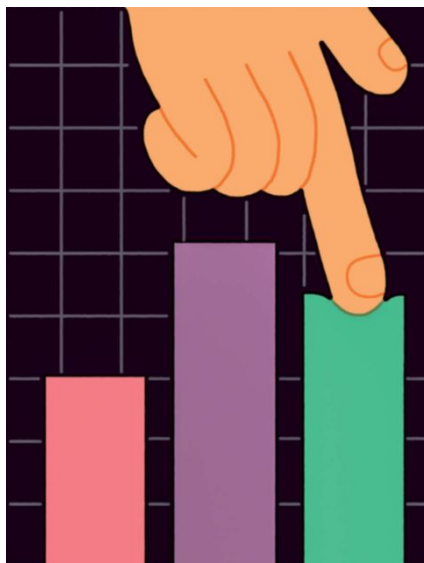
dercut the bureau’s independence.) Nor does anyone object to the reasonable arguments about which unemployment rate (there are six of them) best reflects the true state of the economy. The danger is that a President who disparages the data might convince his followers that bad economic news is political propaganda, and offer numbers that have no statistical rigor behind them.

Good economic statistics benefit the left and the right, government and business. Without reliable data, businesses can’t take risks on investments. Boeing, for example, decides how many 787 Dreamliners to build and therefore how many people to employ based on its Current Market Outlook forecast, which is rooted in B.L.S. data

and projects aircraft demand for the next twenty years.

On a visit to a Boeing plant in South Carolina, in February, President Trump made his first major speech about employment. “We’re going to fight for every last American job,” he told the crowd, which had gathered in a hangar, in front of a new Dreamliner. Rhetoric and anecdote are Trump’s preferred jobs data. Last month, he claimed credit for a new Intel chip-manufacturing plant in Arizona “that will result in at least ten thousand American jobs.” In December, he celebrated a deal to keep around eight hundred jobs at a Carrier plant in Indiana. Trump didn’t point out other, less convenient facts—that Boeing was laying off thousands of American workers; that Intel’s plant had been announced in 2011, and would employ three thousand people, not ten thousand; and that Carrier was eliminating twenty-one hundred jobs in Indiana. Were Frances Perkins still alive, she would surely be thinking about those laid-off workers, who, hearing how Trump had saved their jobs, might see the failure in themselves and not in the Administration’s false promises.

—Adam Davidson



## PARDON?

*High-tech hope for the hard of hearing.*

BY DAVID OWEN



WHEN MY MOTHER'S mother was in her early twenties, a century ago, a suitor took her duck hunting in a rowboat on a lake near Austin, Texas, where she grew up. He steadied his shotgun by resting the barrel on her right shoulder—she was sitting in the bow—and when he fired he not only missed the duck but also permanently damaged her hearing, especially on that side. The loss became more severe as she got older, and by the time I was in college she was having serious trouble with telephones. (“*I’m glad it’s not raining!*” I’d shout, for the third or fourth time, while my roommates snickered.) Her deafness probably contributed to one of her

many eccentricities: ending phone conversations by suddenly hanging up.

I’m a grandparent myself now, and lots of people I know have hearing problems. A guy I played golf with last year came close to making a hole in one, then complained that no one in our foursome had complimented him on his shot—even though, a moment before, all three of us had complimented him on his shot. (We were walking behind him.) The man who cuts my wife’s hair began wearing two hearing aids recently, to compensate for damage that he attributes to years of exposure to professional-quality blow-dryers. My sister has hearing aids, too. She traces her problem to repeat-

edly listening at maximum volume to Anne’s Angry and Bitter Breakup Song Playlist, which she created while going through a divorce.

My ears ring all the time—a condition called tinnitus. I blame China, because the ringing started, a decade ago, while I was recovering from a month-long cold that I’d contracted while breathing the filthy air in Beijing, and whose symptoms were made worse by changes in cabin pressure during the long flight home. Tinnitus is almost always accompanied by hearing loss. My internist ordered an MRI, to make sure I didn’t have a brain tumor, and held up a vibrating tuning fork and asked me to tell him when I could no longer hear it. After a while, he leaned forward to make sure the tuning fork was still humming, since he himself could no longer hear it. (We’re about the same age.) There’s no cure for tinnitus. The ringing in my ears is constant, high-pitched, and fairly loud—it reminds me of the cicadas I listened to on sweltering summer nights when I was a kid—but I’m usually able to ignore it, unless I’m lying awake in bed or, as I discovered recently, writing about tinnitus.

Unlike taste buds and olfactory receptors, which the body replenishes continuously, the most delicate elements of the human auditory system don’t regenerate. The National Center for Health Statistics has estimated that thirty-seven million American adults have lost some hearing, and, according to the National Academy of Sciences, hearing loss is, worldwide, the “fifth leading cause of years lived with disability.” Hearing problems can lead to social isolation and cognitive decline, both of which make getting older—itsself a cause of hearing loss—seem worse than it does already.

In recent years, scientists searching for ways to restore hearing have made a number of promising discoveries. There are also increasingly effective methods of preventing damage in the first place, and of compensating for it once it’s occurred. The natural human tendency, though, is to do nothing and hope for the best, usually while pretending that nothing is wrong. (People who notice they’re having hearing problems typically wait more than ten years before doing anything about them.) I recently

*The ear’s mechanism is exquisitely sensitive and much damage is irreversible.*

heard a joke about a man who was worried his wife was going deaf. He told his doctor, who suggested a simple test. When the man got home, he stood at the door of the kitchen, where his wife was at the stove, and asked, "Honey, what's for dinner?" She didn't respond, so he moved closer and asked again. She still didn't respond, so he stood directly behind her and asked one more time. She turned around and snapped, "For the third time, chicken!"

**T**WO YEARS AGO, in Dallas, I went out to eat with a large group in a noisy restaurant. I was seated near one end of the table and couldn't hear what anyone at the other end was saying. I assumed that that was because I was the oldest person there, but then a young guy sitting across from me asked the young guy sitting next to him whether he could hear anything. "No," he said. "I'm just nodding and smiling." A little later, one of the young guys cupped his hands around his ears, like an ear trumpet, and the other asked whether doing that helped. He said that it helped a lot, so we all tried it—and, indeed, I found that I could even home in on particular speakers.

The part of the ear that sticks out—the auricle, or pinna—functions like a smaller version of a cupped hand: it funnels sound waves into the external auditory canal, which is the thing you're not supposed to stick a Q-tip into. At the other end of the canal, roughly an inch inside your head, those waves strike the tympanic membrane, also known as the eardrum, and the resulting vibrations pass through three small bones and into the cochlea, a fluid-filled organ shaped like a snail. There the vibrations are transmitted to orderly arrays of "hair cells," which are tuned to specific frequencies. Each hair cell is topped with a neat bundle of bristle-like stereocilia, arranged in curving rows of different heights. As the stereocilia are nudged back and forth, they generate electrical signals. These produce nerve impulses, which travel to the parts of the brain that interpret sounds.

A hair-cell stereocilium is almost impossible to glimpse with an optical microscope, because it's only as wide as the smallest wavelength of visible light. I saw some recently, though, in the lab of

David Corey, a neurobiology professor at Harvard Medical School. The image was an electron micrograph of a mouse hair cell, which measures about one-five-thousandth of an inch across and is structurally similar to a human one. Hair cells are exquisitely sensitive. "Humans can detect a sound that vibrates our cilia by about the diameter of an atom, or a few atoms," Corey said. "We can also hear sounds ten million times as loud. Yet a cilium's entire operating range of motion is only about half of its diameter."

Damage to hair cells or to the nerve synapses they're attached to is the most common source of hearing loss. Aging and noise are the leading causes; among the others are the chemotherapy drug cisplatin, the aminoglycoside family of antibiotics, and various autoimmune diseases, including the one that deafened (but didn't silence) Rush Limbaugh. Corey showed me another electron micrograph, from the ear of a mouse that had been exposed for two hours to sound as intense as that experienced by someone using a chainsaw. The cilia looked like tree trunks thrown around by a tornado.

Hair cells can recover if a noise isn't too loud and doesn't last too long, but permanent injuries accumulate. A widely cited damage threshold for sustained exposure is eighty-five or ninety decibels. (The human hearing range is so wide that it has to be described logarithmically to keep the numbers from becoming unmanageable: every ten-decibel increase represents a tenfold increase in sound energy.) An unsettling number of everyday activities lie at or above the danger line, including lawn-mowing, motorcycle-riding, rock-concert-going, Shop-Vac-ing, milkshake-making, subway-riding, and power-tool-using. "Most carpenters have lost a lot of hearing by the time they're fifty," Corey said. "I'm sometimes around construction sites, and I often pass out ear protection."

At louder volumes, a single instance can cause permanent damage, as it did with my grandmother. A gunshot a metre away can measure more than a hundred and forty decibels. A professor at the University of Texas at San Antonio told me that a major unrecognized cause of hearing loss is recreational shooting. Hunters often say

they can't wear ear protection because they need to be able to hear things like deer walking through dry leaves—although, of course, people who gradually deafen themselves can't hear those things, either.

Members of the military face greater risks. Combat soldiers experience periods of intense gunfire, and also far louder explosive blasts, from bombs, rocket-propelled grenades, and improvised explosive devices. And military hearing threats aren't limited to battle zones. James Henry, a research scientist at a U.S. Department of Veterans Affairs facility in Portland, Oregon, told me, "Aircraft carriers are a real problem—especially on deck, but really everywhere. Even when you're sleeping on an aircraft carrier the noise can be above a damaging level." Soldiers have access to effective sound-protection gear, but, like hunters, they're often reluctant to use it. A fifth of all hearing aids sold in the United States are purchased by the V.A.

Hearing problems were part of Henry's life before he began working with veterans. In the nineteen-seventies, he was the lead guitarist for Eli, a rock band that (after he quit) performed as a warmup act for Kiss. "I remember going home at night and having this roaring in my ears," he said. "I didn't realize that the roaring would eventually become a permanent condition." That's not what led him to his profession, though. Henry and his wife have a daughter who was born with virtually no hearing (because of genetic bad luck, not Eli concerts experienced in utero). In the early eighties, they moved to Portland so that she could attend the Tucker Maxon School, which specializes in teaching speech and listening skills to deaf children. That experience prompted Henry to earn a master's degree in audiology, and after he went to work at the V.A. he got a Ph.D. in behavioral neuroscience.

Henry's daughter is now thirty-eight. When she was twenty, she received a cochlear implant—a surgically placed electronic device that transmits sound impulses from a microphone near the ear to electrodes in the cochlea, bypassing the eardrum and directly stimulating the hair cells and the auditory nerve fibres. The Food and Drug Administration



initially approved cochlear implants only for adults, but research has shown that they're vastly more effective if they're put in before the parts of the brain that process speech have developed fully. Henry's daughter has a daughter, now five years old, also born deaf, who was fitted with cochlear implants in infancy. "The difference between my daughter and my granddaughter is that my daughter had great difficulty learning speech skills," Henry said. "But my granddaughter can hear things and repeat them back without looking at the person who's speaking."

At the V.A., Henry's specialty is tinnitus, which is both his own principal auditory problem and the leading cause of service-connected disability claims made by veterans. (Hearing loss is second.) Tinnitus is believed to be similar to the phantom-limb pain suffered by some amputees: as fewer impulses reach the cochlear nerve, the brain's auditory circuitry compensates by becoming overactive, creating an illusion of sound. Soldiers who have both tinnitus and hearing loss often find the tinnitus more bothersome, since it's an unceasing reminder of whatever horrifying incident caused it; in severe cases, sufferers sometimes require psychotherapy. Tinnitus treatment also often includes hearing aids, which can disguise the problem by bringing up the volume of everything else. For milder cases, air-conditioners, fans, and other masking devices can be helpful, especially at night. I sometimes pretend that the ringing in my ears is a sound I play on purpose to mask the ringing in my ears—a Zen-like switcheroo that works better than you might think.

A FEW WEEKS AGO, David Corey, at Harvard, and his colleague Bence György showed me a sequence of videos in which three mice were dropped into a tank of water. The mouse in the first video paddled back and forth, trying to escape. "This is a normal mouse, and that's the way a normal mouse swims," Corey said. "He knows which way is up, and he always keeps his head above the water." The second mouse had been bred with a specific genetic mutation, as a consequence of which it could hear nothing and had no sense of balance. (Balance is governed by a separate

but connected part of the inner ear, and also depends on hair cells—a reason that hearing loss and balance problems sometimes occur together.) The second mouse thrashed wildly underwater, as though caught in a turbulent current. “He doesn’t know which way is up, and he just tumbles, and we have to rescue him,” Corey said. The third mouse had the same mutation, but had been given a functioning version of the faulty gene, delivered to its cochlea by a harmless virus. “He’s not quite as good a swimmer as the control mouse,” Corey said, “but he has enough of a balance system now to keep his head above the water.” The treated mouse was also able to hear, as it demonstrated by responding to a loud handclap. György and Corey said that although genetic mutations cause only a small percentage of hearing-loss cases, the viral delivery mechanism holds promise as a treatment for other types of hearing loss as well.

The inaugural breakthrough in the field of hearing restoration occurred in the late nineteen-eighties, when two researchers discovered, independently, that the ears of young chickens do something that human ears don’t: they rapidly regrow dead hair cells, restoring lost hearing within weeks. No mammal is known to share that enviable capability, but self-healing hair cells look enough like non-self-healing hair cells that scientists have been tantalized ever since by the possibility that human ears might be induced to repair themselves, too. In 2011, the Hearing Health Foundation, based in New York, created the Hearing Restoration Project, a consortium of fourteen scientists who agreed to work together toward that goal, partly with funding from the foundation. One of the originators of the project, Edwin Rubel, who was a co-discoverer of hair-cell regrowth in chickens, told me, “It’s potentially the best thing that ever happened, because it really does bring together a lot of different kinds of expertise.”

Four years ago, Albert Edge—a member of the consortium and a researcher at the Eaton-Peabody Laboratories, part of Massachusetts Eye and Ear—led a group of scientists who showed that young mice with noise-damaged ears could regenerate hair cells and recover some hearing if a drug was delivered into their inner ears shortly after they were

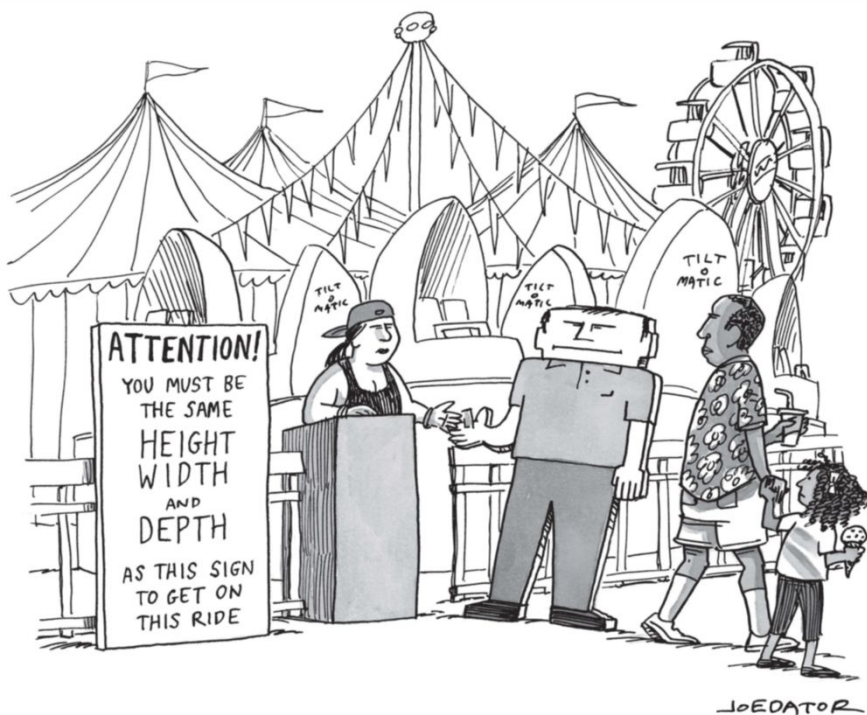
deafened. It was the first time that mammals had proved able to regenerate hair cells. The drug, which had been developed for treating Alzheimer’s but turned out to be unsuitable for that, suppresses the activity of a protein that prevents hair cells from being created by so-called supporting cells—cells in the cochlea that function something like stem cells. “What that shows, beautifully, is that there is something there that can support regeneration,” Rubel said. “We just have to figure out how to goose it along.”

I visited Edge’s lab not long ago. A postdoctoral fellow there told me that she and her colleagues were currently able to improve the hearing of a deafened mouse by about fifteen decibels. “Which is good,” she said, “but we’d like to improve it further.” She took me up a flight of stairs to a small room containing a piece of equipment about the size of a washing machine. “This is the chamber we use to deliver high levels of noise, to kill off hair cells,” she said. On a black-and-white video monitor, I could see that the chamber contained a small cage with several mice inside. The mice appeared to be running around normally, but they were being subjected to two hours of steady noise at above a hundred decibels—enough to ruin their hearing, like being in a front-row seat at a Metallica concert.

Recently, Edge and several other researchers succeeded in causing supporting cells they’d extracted from normal mice to divide and differentiate into large clusters of hair cells. At the lab, Danielle Lenz, a co-author of the paper describing that experiment, put on latex gloves, washed her hands with alcohol, and removed two plastic trays from a shelf in an incubator, then placed them under a microscope. “In the second tray,” she said, “you can clearly see the organoids that have been formed from the single cells in the first tray, and you can see that they are multicellular.” The benefit right now is in the laboratory—having access to a big supply of living hair cells in dishes makes screening potential remedies easier—but there are hopes for bigger things. Edge told me, “The ear is maybe a little bit behind the eye, in terms of treatment, but there has been a lot of progress, and between the soldiers and the baby boomers there’s a lot of interest.”

Eaton-Peabody’s director is Charles Liberman, whose office is down the hall from the mouse-deafening chamber. In a major study a decade ago, he and his colleague Sharon Kujawa solved a mystery that had puzzled some audiologists for years: the fact that two people with identical results on a standard hearing test, called an audiogram, could have markedly different abilities to understand speech, especially against a background of noise. The reason, they discovered, has to do with nerve connections. Scientists had known for a long time that most hearing impairment involves damage to the synapses and nerve fibres to which hair cells are attached, but they had assumed that the nerve damage followed hair-cell loss, and was a consequence of it. “What we discovered is that it’s actually the connections between the sensory cells and the nerve fibres that go first,” Liberman told me. “They are much more vulnerable than the sensory cells.” The hearing of a person who has trouble understanding speech can appear normal or nearly normal on an audiogram, because a standard hearing test measures only the ability to detect pure tones along a scale of frequencies. It requires only functioning hair cells, Liberman said, and is unaffected by nerve damage until more than eighty per cent of the synapses are gone. For that reason, the phenomenon he and Kujawa explained is now usually referred to as “hidden hearing loss.”

A disturbing implication of their finding is that hearing can be damaged at decibel levels and exposure times that have traditionally been considered safe. Nonetheless, among researchers, the discovery has been a cause for optimism, because reconnecting nerve synapses is almost certain to be easier than regenerating functioning hair cells inside human ears. “This is the simplest sensory circuit that you could possibly have,” Liberman said. “It’s one sensory cell type and one neuronal cell type, and it’s possible to do local delivery through the eardrum.” He and others have successfully restored some damaged connections in lab animals, and he believes that far greater advances are to come. “In the past five years, there’s been an explosion of biotech companies getting serious about the inner ear for the first time,”



he continued. “I think most people in the field would say it’s no longer a question of if we will be able to unlock enough of the secrets but merely a question of when.”

**I**F I COULD relive my adolescence, I wouldn’t listen to Steppenwolf with loudspeakers leaning against my head, and I wouldn’t have cherry-bomb fights with my friends unless I was wearing ear protection. On the recommendation of James Henry, at the V.A., I now own several sets of so-called musician’s earplugs, which reduce the over-all level of sound but maintain the full sonic spectrum—unlike regular foam earplugs, which disproportionately mute high frequencies. I wear them even while vacuuming (or will the next time I vacuum anything), and if I were a hunter I would buy a pair of microprocessor-controlled earmuffs, which amplify quiet sounds but turn gunshots into muffled pops.

Luckily for those of us who have been careless with our ears, there are hearing aids. Most of them are made by six major manufacturers, only one of which is based in the United States: Starkey Hearing Technologies, whose headquarters are in Eden Prairie, Minnesota. Starkey’s greatest marketing triumph occurred in 1983, when President Ronald Reagan revealed that he was wearing one of its products. (The main

source of Reagan’s hearing problem was a gun that someone fired near his right ear on a movie set in the early thirties.)

I visited Starkey in February, and when I arrived at the company’s testing department the receptionist greeted me in a voice that she seemed to have turned up a couple of notches—an occupational necessity, I assumed. Another employee told me, as I waited to be examined by an audiologist, that I had been preceded recently by two members of a well-known rock band that’s been around since the early seventies. The rockers, she said, looked “very old and very weathered,” and had hearing problems they’d apparently ignored for decades. “Oh, my gosh, they’ve lived hard,” she said. But they have hearing aids at last.

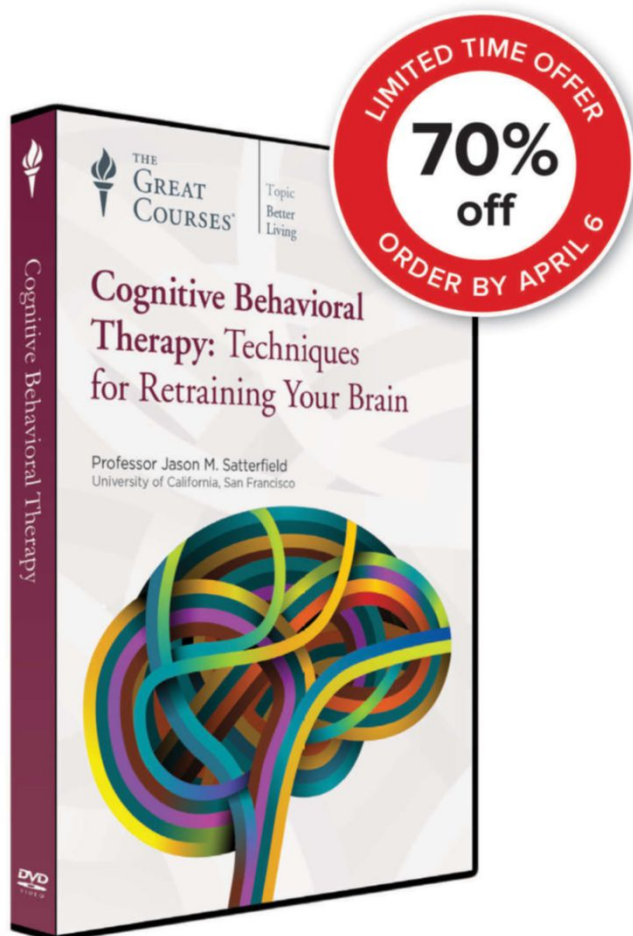
Before my ears were tested, a technician used a digital otoscope and a curette—a long, wirelike tool with a tiny scoop at the end—to remove wax from my external auditory canals, while I watched on a video monitor that magnified everything forty times. The wax pieces looked like boulders made of amber. The technician pointed out several bumps, which he said were exostoses, benign bone growths that form in response to repeated exposure to cold water and are common among surfers (who refer to the condition as “surfer’s ear”). Large exostoses can cause

hearing loss, by blocking the auditory canal. “But yours are too small to worry about,” the technician said.

Then I sat in an insulated booth and pressed a button every time I heard a tone. An audiologist outside the booth plotted the results on an audiogram, and showed me that, while most of my hearing falls within the lower half of the normal range, I have a mild loss in both ears above four thousand hertz, which is about the frequency of the highest C on a piano—a typical result for a non-rocker in his early sixties. As sounds at those frequencies fade, speech becomes harder to understand, because consonants are pitched higher than vowels and when they disappear sentences turn to mush. Struggling to make out what other people are saying leaves less brain power for anything else. A Starkey research scientist told me that, as people lose hearing, they rely more on unconscious lipreading, which even in people with good hearing accounts for as much as twenty per cent of comprehension. To demonstrate, he covered his mouth. “If you can’t get those visual clues,” he said, “listening becomes more challenging and more effortful, even for something like this.”

Based on my audiogram, I was fitted for a pair of Starkey’s Muse hearing aids. Each unit sits behind an ear, as my grandmother’s hearing aid did, but is so small that it’s all but invisible. A coated wire leads to a receiver—red for right, blue for left. Each receiver is about half an inch long and the diameter of a kitchen match, and it goes right into the ear canal. A button on the part behind the ear allows me to choose among settings programmed by the audiologist. Two of them add a subtle tone that’s meant to mask my tinnitus, which during my hearing test she pinpointed at about six thousand hertz. My main reaction when I first put the hearing aids on was mild annoyance at the sound of my voice. I also became more aware of turning pages, creaking doors, and the surprisingly varied noises made by my pants. The audiologist said that people with new hearing aids get used to all that within about a month, as the brain adjusts.

With my hearing aids on, I was given a tour of the premises. Hearing aids that fit snugly into the ear canal, as many do, are custom-made from silicone impressions



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that audiologists create by injecting goop into patients' ears. The cured impressions look like miniature Henry Moore sculptures. Laser scanners turn them into three-dimensional digital files, and the images are trimmed, shaped, and manipulated by technicians using an in-house computer program that's essentially Photoshop for ear canals. I saw test hearing aids being subjected to stresses that were meant to replicate the surprisingly hostile microenvironment of an external auditory canal: baking in an oven suffused with "salt fog"; lengthy exposure to blowing clouds of dustlike talc; submersion for days at the bottom of a metre-tall column of water.

The Starkey line with the most features is Halo, the first version of which was introduced in 2014. Halo wearers can stream music, phone calls, recorded books, television shows, and other audio content via Bluetooth directly into their hearing aids from all current Apple devices. The hearing aids adjust automatically to different environments. They eliminate wind noise and reduce background sounds between spoken syllables during conversations in crowded places, and they can be used with a smartphone app that enables them to do things like switch to a customized automobile mode as soon as the phone's accelerometer detects that the wearer is moving faster than ten miles an hour. Chris McCormick, who is Starkey's chief marketing officer, told me, "If you regularly visit a Starbucks, you can fine-tune a setting for that particular environment—the barista grinding coffee beans, other customers talking—and then geotag it, so that when you pull into the parking lot your hearing aids will switch to that mode."

Successfully linking hearing aids and iPhones required a long collaboration between Starkey and Apple. One challenge was that hearing aids, because of their size, have to operate on minuscule voltages, much lower than the ones that smartphones use. Another was that the human body acts like a sponge for many radio frequencies, blocking communication between the device in your left ear and the phone in your right pocket. In Starkey's main research building, I stepped into a chamber that from the outside looked like a walk-in freezer. Mounted on a pedestal and surrounded

by a ring of sensors was a plastic head, with ears. "It contains a gel that mimics the frequency-absorption characteristics of a human head," a scientist said. A technician outside the chamber had been bombarding it with radio waves and studying the results on four large color monitors.

Starkey's newest hearing aid, the SoundLens Synergy, is even smaller than Halo and Muse—too small for Bluetooth. Each unit looks scarcely larger than the aspirin-size battery it runs on, and is designed to be inserted deep into an ear canal. Chris McCormick pushed one into his own ear, and turned his head to the side; I could see no part of it, even from close up. He retrieved it by pulling on a snippet of nylon filament.

**I**N 2013, CHARLIE ROSE devoted a program to hearing loss, and during the broadcast two of the participants—Eric Kandel, a scientist who won a Nobel Prize in 2000, and Rose himself—were wearing hearing aids. (David Corey, the Harvard Medical School professor I met with, appeared on the program as well, and got a good look.) Yet neither man mentioned that fact, even though the program lasted nearly an hour and hearing aids were a major topic of discussion. The wearing of hearing aids has long been stigmatized in a way that the wearing of eyeglasses has not, and, as a consequence, hearing-aid manufacturers have invested heavily in inconspicuousness—one of several reasons that hearing aids like Halo and SoundLens sell for more than three thousand dollars each.

Attitudes about visibility may be changing, though, now that people of all ages walk around with electronic gadgets sticking out of their ears. Hearing-aid companies increasingly compete with manufacturers of over-the-counter devices known as "personal sound-amplification products." The cheapest PSAPs, some of which sell for less than fifty dollars, are notoriously junky and may even exacerbate hearing loss by indiscriminately amplifying harmful sounds. But some companies make user-adjustable Bluetooth devices that have received favorable reviews from technology critics and people with mild hearing problems.

A couple of weeks ago, I had lunch with Kevin Franck, an audiologist at Bose, the sound-equipment company. Snow had fallen overnight, and the restaurant I'd picked, near my home, in Connecticut, wasn't as crowded and loud as it usually is. "That's too bad," Franck said, as we were seated. He was on his way to New York, and had made a detour to show me a new Bose product, still in limited release, called Hearphones—high-fidelity headphones designed, in part, to help people cope with conversations in places like noisy restaurants.

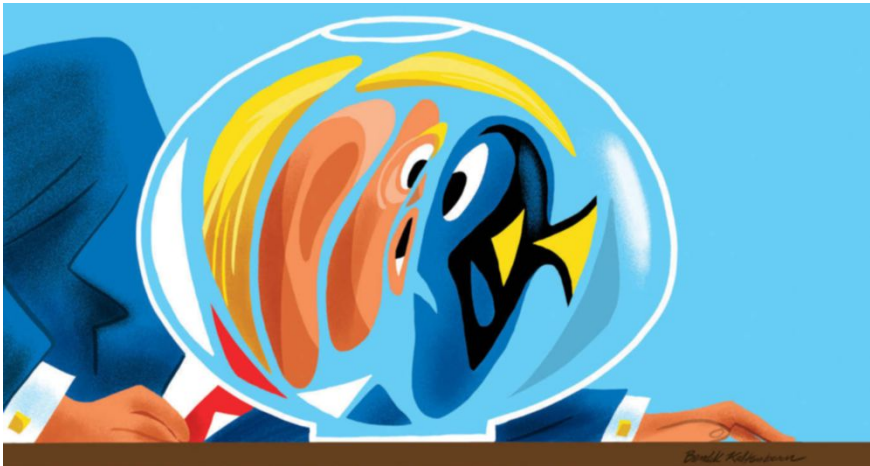
In comparison with SoundLens hearing aids, Hearphones look like a technological throwback: a pair of acorn-size earpieces connected by wires to a choker-like yoke (which can be concealed under a shirt collar). But because Hearphones aren't meant to be invisible they have room for a long antenna, a big rechargeable battery, high-quality microphones and speakers, and far more power-hungry sound-processing and noise-cancelling technology than could be concealed inside an ear canal.

I put them on. "One of the things you get really good at when demonstrating this device is talking without saying much," Franck said, then chatted away. I used a smartphone app to raise and lower background sound levels. I could also focus specifically on Franck's voice or widen the range to include, first, the tables on either side of ours, then some chefs and waiters moving around in the kitchen, behind me. If my cell phone had rung, directional microphones inside the earpieces would have aimed themselves toward my mouth when I answered it. Once I'd found a sound level I liked, I used a slider in the app to fine-tune the pitch. I was able to play music in the background as we conversed—with far better fidelity than is possible with even the most expensive hearing aids—and I could raise and lower its volume independently from everything else.

You wouldn't wear Hearphones on a first date, probably. But, if I'd had a pair at that noisy restaurant I went to in Dallas, I'd have been able to hear everyone at the table without cupping my ears, and, during the boring bits, to tune out the entire room and listen in peace to my audiobook of "A Game of Thrones." ♦

# WHAT I HAVE IN COMMON WITH TRUMP

BY ETHAN KUPERBERG



The forces that divide us are not as strong as those that unite us.

—Barack Obama.

I love television.

I have almost zero understanding of international politics.

I have not exercised in 2017.

I have never read the second half of “Infinite Jest.”

I have never read “The Art of the Deal,” by Donald Trump.

I know it’s silly and will never happen, but I secretly wish that Barack Obama were my best friend.

I have been scared every day since November 8, 2016.

I’m not as good at having sex as I think I am.

I am related to Jewish people whom I don’t understand.

A waiter once forgot to charge me for a drink at a restaurant, and I did not tell him to adjust the check.

Melania Trump has no interest in having sex with me.

When I get really stressed out, I like to watch the film “Finding Dory.”

I have recently Internet-stalked the people who bullied me in middle school.

I need more therapy than I am currently undergoing.

I look awful in hats.

Hillary Clinton is much smarter than I am, and I know it.

I would rather win an Emmy than be in politics.

I would rather win a free drink at the Coffee Bean than be in politics.

Sometimes I wish that dogs could talk. I wonder what they would say.

Not to harp on it, but “Finding Dory” has a plotline that I find easy to follow.

I am not on the correct medication.

I have a recurring nightmare in which my father tells me that he is not proud of me.

I have never had a one-on-one conversation with Tiffany Trump that lasted for longer than ten minutes.

I’m pretty sure I’m not gay, but every once in a while I see an attractive man and I think, Geez, that guy is good-looking.

I hope they make a sequel to “Finding Dory.”

I think that Paul Ryan is a fucking wimp.

I will never understand what it’s like to be a Syrian refugee.

It’s embarrassing to admit, but all I want, deeply and unequivocally,

on any given day, at any given hour, is to have someone look me in the eye and tell me, with complete and profound sincerity, “I love you.”

I have never been democratically elected President of the United States. ♦

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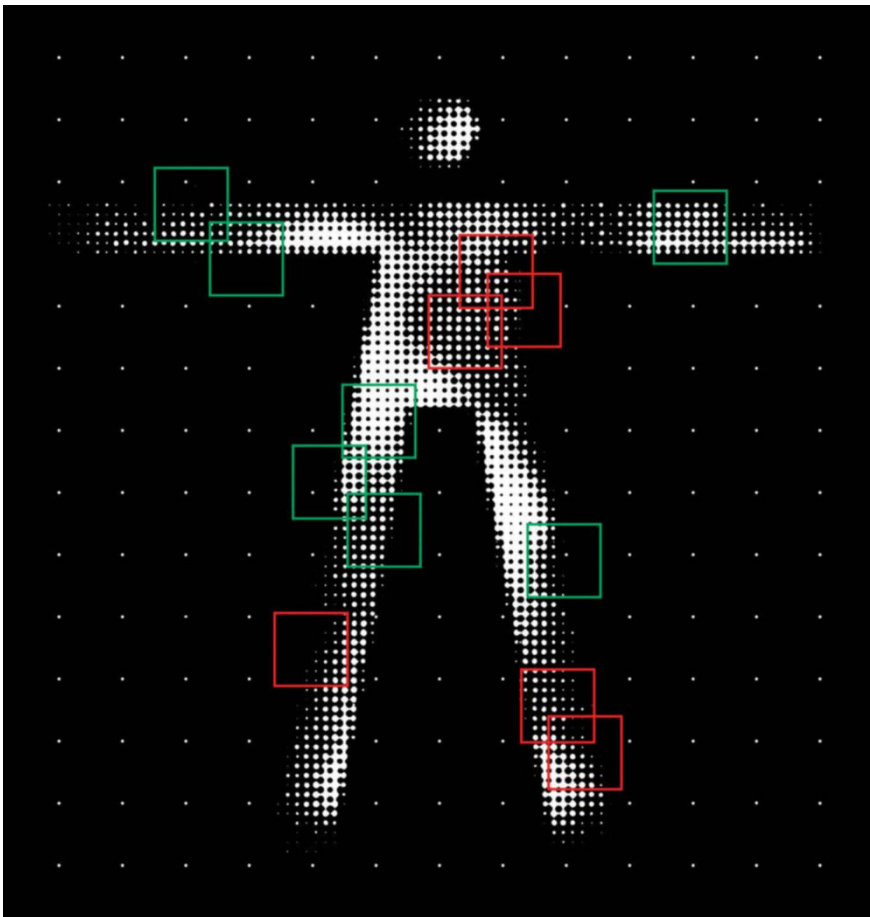


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# THE ALGORITHM WILL SEE YOU NOW

*When it comes to diagnosis, will A.I. replace the M.D.?*

BY SIDDHARTHA MUKHERJEE



*In some trials, “deep learning” systems have outperformed human experts.*

ONE EVENING LAST November, a fifty-four-year-old woman from the Bronx arrived at the emergency room at Columbia University’s medical center with a grinding headache. Her vision had become blurry, she told the E.R. doctors, and her left hand felt numb and weak. The doctors examined her and ordered a CT scan of her head.

A few months later, on a morning this January, a team of four radiologists-in-training huddled in front of a computer in a third-floor room of the hospital. The room was windowless and dark, aside from the light from the screen, which looked as if it had been filtered through

seawater. The residents filled a cubicle, and Angela Lignelli-Dipple, the chief of neuroradiology at Columbia, stood behind them with a pencil and pad. She was training them to read CT scans.

“It’s easy to diagnose a stroke once the brain is dead and gray,” she said. “The trick is to diagnose the stroke before too many nerve cells begin to die.” Strokes are usually caused by blockages or bleeds, and a neuroradiologist has about a forty-five-minute window to make a diagnosis, so that doctors might be able to intervene—to dissolve a growing clot, say. “Imagine you are in the E.R.,” Lignelli-Dipple continued, raising the ante. “Every

minute that passes, some part of the brain is dying. Time lost is brain lost.”

She glanced at a clock on the wall, as the seconds ticked by. “So where’s the problem?” she asked.

Strokes are typically asymmetrical. The blood supply to the brain branches left and right and then breaks into rivulets and tributaries on each side. A clot or a bleed usually affects only one of these branches, leading to a one-sided deficit in a part of the brain. As the nerve cells lose their blood supply and die, the tissue swells subtly. On a scan, the crisp borders between the anatomical structures can turn hazy. Eventually, the tissue shrinks, trailing a parched shadow. But that shadow usually appears on the scan several hours, or even days, after the stroke, when the window of intervention has long closed. “Before that,” Lignelli-Dipple told me, “there’s just a hint of something on a scan”—the premonition of a stroke.

The images on the Bronx woman’s scan cut through the skull from its base to the apex in horizontal planes, like a melon sliced from bottom to top. The residents raced through the layers of images, as if thumbing through a flipbook, calling out the names of the anatomical structures: cerebellum, hippocampus, insular cortex, striatum, corpus callosum, ventricles. Then one of the residents, a man in his late twenties, stopped at a picture and motioned with the tip of a pencil at an area on the right edge of the brain. “There’s something patchy here,” he said. “The borders look hazy.” To me, the whole image looked patchy and hazy—a blur of pixels—but he had obviously seen something unusual.

“Hazy?” Lignelli-Dipple prodded. “Can you describe it a little more?”

The resident fumbled for words. He paused, as if going through the anatomical structures in his mind, weighing the possibilities. “It’s just not uniform.” He shrugged. “I don’t know. Just *looks* funny.”

Lignelli-Dipple pulled up a second CT scan, taken twenty hours later. The area pinpointed by the resident, about the diameter of a grape, was dull and swollen. A series of further scans, taken days apart, told the rest of the story. A distinct wedge-shaped field of gray appeared. Soon after the woman got to the E.R., neurologists had tried to open the clogged artery with clot-busting

drugs, but she had arrived too late. A few hours after the initial scan, she lost consciousness, and was taken to the I.C.U. Two months later, the woman was still in a ward upstairs. The left side of her body—from the upper arms to the leg—was paralyzed.

I walked with Lignelli-Dipple to her office. I was there to learn about learning: How do doctors learn to diagnose? And could machines learn to do it, too?

**M**Y OWN INDUCTION into diagnosis began in the fall of 1997, in Boston, as I started my clinical rotations. To prepare, I read a textbook, a classic in medical education, that divided the act of diagnosis into four tidy phases. First, the doctor uses a patient's history and a physical exam to collect facts about her complaint or condition. Next, this information is collated to generate a comprehensive list of potential causes. Then questions and preliminary tests help eliminate one hypothesis and strengthen another—so-called “differential diagnosis.” Weight is given to how common a disease might be, and to a patient's prior history, risks, exposures. (“When you hear hoofbeats,” the saying goes, “think horses, not zebras.”) The list narrows; the doctor refines her assessment. In the final phase, definitive lab tests, X-rays, or CT scans are deployed to confirm the hypothesis and seal the diagnosis. Variations of this stepwise process were faithfully reproduced in medical textbooks for decades, and the image of the diagnostician who plods methodically from symptom to cause had been imprinted on generations of medical students.

But the real art of diagnosis, I soon learned, wasn't so straightforward. My preceptor in medical school was an elegant New Englander with polished loafers and a starched accent. He prided himself on being an expert diagnostician. He would ask a patient to demonstrate the symptom—a cough, say—and then lean back in his chair, letting adjectives roll over his tongue. “Raspy and tinny,” he might say, or “base, with an ejaculated thrum,” as if he were describing a vintage bottle of Bordeaux. To me, all the coughs sounded exactly the same, but I'd play along—“Raspy, yes”—like an anxious impostor at a wine tasting.

The taxonomist of coughs would im-

mediately narrow down the diagnostic possibilities. “It sounds like a pneumonia,” he might say, or “the wet rales of congestive heart failure.” He would then let loose a volley of questions. Had the patient experienced recent weight gain? Was there a history of asbestos exposure? He'd ask the patient to cough again and he'd lean down, listening intently with his stethoscope. Depending on the answers, he might generate another series of possibilities, as if strengthening and weakening synapses. Then, with the élan of a roadside magician, he'd proclaim his diagnosis—“Heart failure!”—and order tests to prove that it was correct. It usually was.

A few years ago, researchers in Brazil studied the brains of expert radiologists in order to understand how they reached their diagnoses. Were these seasoned diagnosticians applying a mental “rule book” to the images, or did they apply “pattern recognition or non-analytical reasoning”?

Twenty-five such radiologists were asked to evaluate X-rays of the lung while inside MRI machines that could track the activities of their brains. (There's a marvellous series of recursions here: to diagnose diagnosis, the imagers had to be imaged.) X-rays were flashed before them. Some contained a single pathological lesion that might be commonly encountered—perhaps a palm-shaped shadow of a pneumonia, or the dull, opaque wall of fluid that had accumulated behind the lining of the lung. Embedded in a second group of diagnostic images were line drawings of animals; within a third group, the outlines of letters of the alphabet. The radiologists were shown the three types of images in random order, and then asked to call out the name of the lesion, the animal, or the letter as quickly as possible while the MRI machine traced the activity of their brains. It took the radiologists an average of 1.33 seconds to come up with a diagnosis. In all three cases, the same areas of the brain lit up: a wide delta of neurons near the left ear, and a moth-shaped band above the posterior base of the skull.

“Our results support the hypothesis that a process similar to naming things in everyday life occurs when a physician promptly recognizes a characteristic and previously known lesion,” the

researchers concluded. Identifying a lesion was a process similar to naming the animal. When you recognize a rhinoceros, you're not considering and eliminating alternative candidates. Nor are you mentally fusing a unicorn, an armadillo, and a small elephant. You recognize a rhinoceros in its totality—as a pattern. The same was true for radiologists. They weren't cogitating, recollecting, differentiating; they were seeing a commonplace object. For my preceptor, similarly, those wet rales were as recognizable as a familiar jingle.

**I**N 1945, THE British philosopher Gilbert Ryle gave an influential lecture about two kinds of knowledge. A child knows that a bicycle has two wheels, that its tires are filled with air, and that you ride the contraption by pushing its pedals forward in circles. Ryle termed this kind of knowledge—the factual, propositional kind—“knowing that.” But to learn to ride a bicycle involves another realm of learning. A child learns how to ride by falling off, by balancing herself on two wheels, by going over potholes. Ryle termed this kind of knowledge—implicit, experiential, skill-based—“knowing how.”

The two kinds of knowledge would seem to be interdependent: you might use factual knowledge to deepen your experiential knowledge, and vice versa. But Ryle warned against the temptation to think that “knowing how” could be reduced to “knowing that”—a playbook of rules couldn't teach a child to ride a bike. Our rules, he asserted, make sense only because we know how to use them: “Rules, like birds, must live before they can be stuffed.” One afternoon, I watched my seven-year-old daughter negotiate a small hill on her bike. The first time she tried, she stalled at the steepest part of the slope and fell off. The next time, I saw her lean forward, imperceptibly at first, and then more visibly, and adjust her weight back on the seat as the slope decreased. But I hadn't taught her rules to ride a bike up that hill. When her daughter learns to negotiate the same hill, I imagine, she won't teach her the rules, either. We pass on a few precepts about the universe but leave the brain to figure out the rest.

Some time after Lignelli-Dipple's session with the radiology trainees, I

spoke to Steffen Haider, the young man who had picked up the early stroke on the CT scan. How had he found that culprit lesion? Was it “knowing that” or “knowing how”? He began by telling me about learned rules. He knew that strokes are often one-sided; that they result in the subtle “graying” of tissue; that the tissue often swells slightly, causing a loss of anatomical borders. “There are spots in the brain where the blood supply is particularly vulnerable,” he said. To identify the lesion, he’d have to search for these signs on one side which were not present on the other.

I reminded him that there were plenty of asymmetries in the image that he had ignored. This CT scan, like most, had other gray squiggles on the left that weren’t on the right—artifacts of movement, or chance, or underlying changes in the woman’s brain that preceded the stroke. How had he narrowed his focus to that one area? He paused as the thought pedaled forward and gathered speed in his mind. “I don’t know—it was partly subconscious,” he said, finally.

“That’s what happens—a clicking together—as you grow and learn as a radiologist,” Lignelli-Dipple told me. The question was whether a machine could “grow and learn” in the same manner.

**I**N JANUARY, 2015, the computer scientist Sebastian Thrun became fascinated by a conundrum in medical diagnostics. Thrun, who grew up in Germany, is lean, with a shaved head and an air of comic exuberance; he looks like some fantastical fusion of Michel Foucault and Mr. Bean. Formerly a professor at Stanford, where he directed the Artificial Intelligence Lab, Thrun had gone off to start Google X, directing work on self-learning robots and driverless cars. But he found himself drawn to learning devices in medicine. His mother had died of breast cancer when she was forty-nine years old—Thrun’s age now. “Most patients with cancer have no symptoms at first,” Thrun told me. “My mother didn’t. By the time she went to her doctor, her cancer had already metastasized. I became obsessed with the idea of detecting cancer in its

earliest stage—at a time when you could still cut it out with a knife. And I kept thinking, Could a machine-learning algorithm help?”

Early efforts to automate diagnosis tended to hew closely to the textbook realm of explicit knowledge. Take the electrocardiogram, which renders the heart’s electrical activity as lines on a page or a screen. For the past twenty years, computer interpretation has often been a feature of these systems. The programs that do the work tend to be fairly straightforward. Characteristic waveforms are associated with various conditions—atrial fibrillation, or the blockage of a blood vessel—and rules to recognize these waveforms are fed into the appliance. When the machine recognizes the waveforms, it flags a heartbeat as “atrial fibrillation.”

In mammography, too, “computer-aided detection” is becoming commonplace. Pattern-recognition software highlights suspicious areas, and radiologists review the results. But here again the recognition software typically uses a rule-based system to identify a suspicious lesion. Such programs have no built-in mechanism to learn: a machine that has seen three thousand X-rays is no wiser than one that has seen just four. These limitations became starkly evident in a 2007 study that compared the accuracy of mammography before and after the implementation of computer-aided diagnostic devices. One might have expected the accuracy of diagnosis to have increased dramatically after the devices had been implemented. As it happens, the devices had a complicated effect. The rate of biopsies shot up in the computer-assisted group. Yet the detection of small, invasive breast cancers—the kind that oncologists are most keen to detect—*decreased*. (Even later studies have shown problems with false positives.)

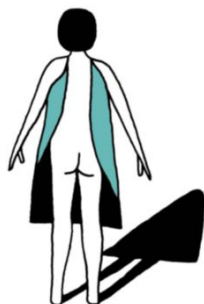
Thrun was convinced that he could outdo these first-generation diagnostic devices by moving away from rule-based algorithms to learning-based ones—from rendering a diagnosis by “knowing that” to doing so by “knowing how.” Increasingly, learning algorithms of the kind that Thrun works with involve a

computing strategy known as a “neural network,” because it’s inspired by a model of how the brain functions. In the brain, neural synapses are strengthened and weakened through repeated activation; these digital systems aim to achieve something similar through mathematical means, adjusting the “weights” of the connections to move toward the desired output. The more powerful ones have something akin to layers of neurons, each processing the input data and sending the results up to the next layer. Hence, “deep learning.”

Thrun began with skin cancer; in particular, keratinocyte carcinoma (the most common class of cancer in the U.S.) and melanoma (the most dangerous kind of skin cancer). Could a machine be taught to distinguish skin cancer from a benign skin condition—acne, a rash, or a mole—by scanning a photograph? “If a dermatologist can do it, then a machine should be able to do it as well,” Thrun reasoned. “Perhaps a machine could do it even better.”

Traditionally, dermatological teaching about melanoma begins with a rule-based system that, as medical students learn, comes with a convenient mnemonic: ABCD. Melanomas are often asymmetrical (“A”), their borders (“B”) are uneven, their color (“C”) can be patchy and variegated, and their diameter (“D”) is usually greater than six millimetres. But, when Thrun looked through specimens of melanomas in medical textbooks and on the Web, he found examples where none of these rules applied.

Thrun, who had maintained an adjunct position at Stanford, enlisted two students he worked with there, Andre Esteva and Brett Kuprel. Their first task was to create a so-called “teaching set”: a vast trove of images that would be used to teach the machine to recognize a malignancy. Searching online, Esteva and Kuprel found eighteen repositories of skin-lesion images that had been classified by dermatologists. This rogues’ gallery contained nearly a hundred and thirty thousand images—of acne, rashes, insect bites, allergic reactions, and cancers—that dermatologists had categorized into nearly two thousand diseases. Notably, there was a set of two thousand lesions that had also been biopsied and examined by



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pathologists, and thereby diagnosed with near-certainty.

Esteva and Kuprel began to train the system. They didn't program it with rules; they didn't teach it about ABCD. Instead, they fed the images, and their diagnostic classifications, to the neural network. I asked Thrun to describe what such a network did.

"Imagine an old-fashioned program to identify a dog," he said. "A software engineer would write a thousand if-then-else statements: *if* it has ears, and a snout, *and* has hair, and *is not* a rat . . . and so forth, ad infinitum. But that's not how a child learns to identify a dog, of course. At first, she learns by seeing dogs and being told that they are dogs. She makes mistakes, and corrects herself. She thinks that a wolf is a dog—but is told that it belongs to an altogether different category. And so she shifts her understanding bit by bit: this is 'dog,' that is 'wolf.' The machine-learning algorithm, like the child, pulls information from a training set that has been classified. Here's a dog, and here's not a dog. It then extracts features from one set versus another. And, by testing itself against hundreds and thousands of classified images, it begins to create its own way to rec-

ognize a dog—again, the way a child does." It just knows *how* to do it.

In June, 2015, Thrun's team began to test what the machine had learned from the master set of images by presenting it with a "validation set": some fourteen thousand images that had been diagnosed by dermatologists (although not necessarily by biopsy). Could the system correctly classify the images into three diagnostic categories—benign lesions, malignant lesions, and non-cancerous growths? The system got the answer right seventy-two per cent of the time. (The actual output of the algorithm is not "yes" or "no" but a probability that a given lesion belongs to a category of interest.) Two board-certified dermatologists who were tested alongside did worse: they got the answer correct sixty-six per cent of the time.

Thrun, Esteva, and Kuprel then widened the study to include twenty-five dermatologists, and this time they used a gold-standard "test set" of roughly two thousand biopsy-proven images. In almost every test, the machine was more sensitive than doctors: it was less likely to miss a melanoma. It was also more specific: it was less likely to call something a melanoma when it wasn't. "In

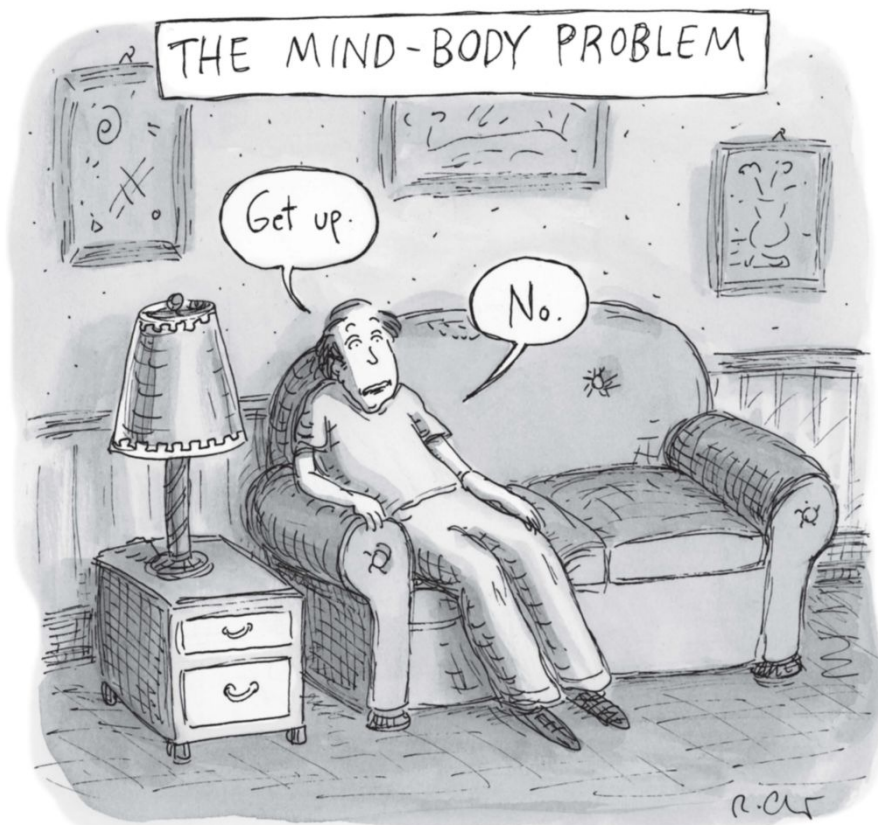
every test, the network outperformed expert dermatologists," the team concluded, in a report published in *Nature*.

"There's one rather profound thing about the network that wasn't fully emphasized in the paper," Thrun told me. In the first iteration of the study, he and the team had started with a totally naïve neural network. But they found that if they began with a neural network that had already been trained to recognize some unrelated feature (dogs versus cats, say) it learned faster and better. Perhaps our brains function similarly. Those mind-numbing exercises in high school—factoring polynomials, conjugating verbs, memorizing the periodic table—were possibly the opposite: mind-sensitizing.

When teaching the machine, the team had to take some care with the images. Thrun hoped that people could one day simply submit smartphone pictures of their worrisome lesions, and that meant that the system had to be undaunted by a wide range of angles and lighting conditions. But, he recalled, "In some pictures, the melanomas had been marked with yellow disks. We had to crop them out—otherwise, we might teach the computer to pick out a yellow disk as a sign of cancer."

It was an old conundrum: a century ago, the German public became entranced by Clever Hans, a horse that could supposedly add and subtract, and would relay the answer by tapping its hoof. As it turns out, Clever Hans was actually sensing its handler's bearing. As the horse's hoof-taps approached the correct answer, the handler's expression and posture relaxed. The animal's neural network had not learned arithmetic; it had learned to detect changes in human body language. "That's the bizarre thing about neural networks," Thrun said. "You cannot tell what they are picking up. They are like black boxes whose inner workings are mysterious."

The "black box" problem is endemic in deep learning. The system isn't guided by an explicit store of medical knowledge and a list of diagnostic rules; it has effectively taught itself to differentiate moles from melanomas by making vast numbers of internal adjustments—something analogous to strengthening and weakening synaptic connections in the brain. Exactly how did it determine that



a lesion was a melanoma? We can't know, and it can't tell us. All the internal adjustments and processing that allow the network to learn happen away from our scrutiny. As is true of our own brains. When you make a slow turn on a bicycle, you lean in the opposite direction. My daughter knows to do this, but she doesn't know *that* she does it. The melanoma machine must be extracting certain features from the images; does it matter that it can't tell us which? It's like the smiling god of knowledge. Encountering such a machine, one gets a glimpse of how an animal might perceive a human mind: all-knowing but perfectly impenetrable.

Thrun blithely envisages a world in which we're constantly under diagnostic surveillance. Our cell phones would analyze shifting speech patterns to diagnose Alzheimer's. A steering wheel would pick up incipient Parkinson's through small hesitations and tremors. A bathtub would perform sequential scans as you bathe, via harmless ultrasound or magnetic resonance, to determine whether there's a new mass in an ovary that requires investigation. Big Data would watch, record, and evaluate you: we would shuttle from the grasp of one algorithm to the next. To enter Thrun's world of bathtubs and steering wheels is to enter a hall of diagnostic mirrors, each urging more tests.

It's hard not to be seduced by this vision. Might a medical panopticon that constantly scans us in granular—perhaps even cellular—detail, comparing images day by day, enable us to catch cancer at its earliest stages? Could it provide a breakthrough in cancer detection? It sounds impressive, but there's a catch: many cancers are destined to be self-limited. We die *with* them, not *of* them. What if such an immersive diagnostic engine led to millions of unnecessary biopsies? In medicine, there are cases where early diagnosis can save or prolong life. There are also cases where you'll be worried longer but won't live longer. It's hard to know how much you want to know.

"I'm interested in magnifying human ability," Thrun said, when I asked him about the impact of such systems on human diagnosticians. "Look, did industrial farming eliminate some forms of farming? Abso-

lutely, but it amplified our capacity to produce agricultural goods. Not all of this was good, but it allowed us to feed more people. The industrial revolution amplified the power of human muscle. When you use a phone, you amplify the power of human speech. You cannot shout from New York to California"—Thrun and I were, indeed, speaking across that distance—"and yet this rectangular device in your hand allows the human voice to be transmitted across three thousand miles. Did the phone replace the human voice? No, the phone is an augmentation device. The cognitive revolution will allow computers to amplify the capacity of the human mind in the same manner. Just as machines made human muscles a thousand times stronger, machines will make the human brain a thousand times more powerful." Thrun insists that these deep-learning devices will not replace dermatologists and radiologists. They will *augment* the professionals, offering them expertise and assistance.

GOFFREY HINTON, a computer scientist at the University of Toronto, speaks less gently about the role that learning machines will play in clinical medicine. Hinton—the great-great-grandson of George Boole, whose Boolean algebra is a keystone of digital computing—has sometimes been called the father of deep learning; it's a topic he's worked on since the mid-nineteen-seventies, and many of his students have become principal architects of the field today.

"I think that if you work as a radiologist you are like Wile E. Coyote in the cartoon," Hinton told me. "You're already over the edge of the cliff, but you haven't yet looked down. There's no ground underneath." Deep-learning systems for breast and heart imaging have already been developed commercially. "It's just completely obvious that in five years deep learning is going to do better than radiologists," he went on. "It *might* be ten years. I said this at a hospital. It did not go down too well."

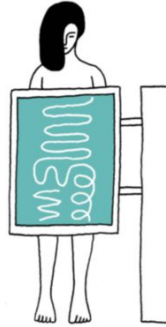
Hinton's actual words, in that hospital talk, were blunt: "They should stop training radiologists now." When I

brought up the challenge to Angela Lignelli-Dipple, she pointed out that diagnostic radiologists aren't merely engaged in yes-no classification. They're not just locating the embolism that brought on a stroke. They're noticing the small bleed elsewhere that might make it disastrous to use a clot-busting drug; they're picking up on an unexpected, maybe still asymptomatic tumor.

Hinton now qualifies the provocation. "The role of radiologists will evolve from doing perceptual things that could probably be done by a highly trained pigeon to doing far more cognitive things," he told me. His prognosis for the future of automated medicine is based on a simple principle: "Take any old classification problem where you have a lot of data, and it's going to be solved by deep learning. There's going to be *thousands* of applications of deep learning." He wants to use learning algorithms to read X-rays, CT scans, and MRIs of every variety—and that's just what he considers the near-term prospects. In the future, he said, "learning algorithms will make pathological diagnoses." They might read Pap smears, listen to heart sounds, or predict relapses in psychiatric patients.

We discussed the black-box problem. Although computer scientists are working on it, Hinton acknowledged that the challenge of opening the black box, of trying to find out exactly what these powerful learning systems know and how they know it, was "far from trivial—don't believe anyone who says that it is." Still, it was a problem he thought we could live with. "Imagine pitting a baseball player against a physicist in a contest to determine where a ball might land," he said. "The baseball player, who's thrown a ball over and over again a million times, might not know any equations but knows exactly how high the ball will rise, the velocity it will reach, and where it will come down to the ground. The physicist can write equations to determine the same thing. But, ultimately, both come to the identical point."

I recalled the disappointing results from older generations of computer-assisted detection and diagnosis in mammography. Any new system would need



to be evaluated through rigorous clinical trials, Hinton conceded. Yet the new intelligent systems, he stressed, are designed to learn from their mistakes—to improve over time. “We could build in a system that would take every missed diagnosis—a patient who developed lung cancer eventually—and feed it back to the machine. We could ask, What did you miss here? Could you refine the diagnosis? There’s no such system for a human radiologist. If you miss something, and a patient develops cancer five years later, there’s no systematic routine that tells you how to correct yourself. But you could build in a system to teach the computer to achieve exactly that.”

Some of the most ambitious versions of diagnostic machine-learning algorithms seek to integrate natural-language processing (permitting them to read a patient’s medical records) and an encyclopedic knowledge of medical conditions gleaned from textbooks, journals, and medical databases. Both I.B.M.’s Watson Health, headquartered in Cambridge, Massachusetts, and DeepMind, in London, hope to create such comprehensive systems. I watched some of these systems operate in pilot demonstrations, but many of their features, especially the deep-learning components, are still in development.

Hinton is passionate about the future of deep-learning diagnosis, in part, because of his own experience. As he was developing such algorithms, his wife was found to have advanced pancreatic cancer. His son was diagnosed with a malignant melanoma, but then the biopsy showed that the lesion was a basal-cell carcinoma, a far less serious kind of cancer. “There’s much more to learn here,” Hinton said, letting out a small sigh. “Early and accurate diagnosis is not a trivial problem. We can do better. Why not let machines help us?”

ON AN ICY March morning, a few days after my conversations with Thrun and Hinton, I went to Columbia University’s dermatology clinic, on Fifty-first Street in Manhattan. Lindsey Bordone, the attending physician, was scheduled to see forty-nine patients that day. By ten o’clock, the waiting room was filled with people. (Identifying details have been changed.) A bearded man, about sixty years old, sat in the

corner concealing a rash on his neck with a woollen scarf. An anxious couple huddled over the *Times*.

Bordone saw her patients in rapid succession. In a fluorescent-lit room in the back, a nurse sat facing a computer and gave a one-sentence summary—“fifty years old with no prior history and new suspicious spot on the skin”—and then Bordone rushed into the examining room, her blond hair flying behind her.

A young man in his thirties had a scaly red rash on his face. As Bordone examined him, the skin flaked and fell off his nose. Bordone pulled him into the light and looked at the skin carefully, and then focussed her handheld dermoscope on it.

“Do you have dandruff in your hair?” she asked.

The man looked confused. “Sure,” he said.

“Well, this is facial dandruff,” Bordone told him. “It’s a particularly bad case. But the question is why it appeared now, and why it’s getting worse. Have you been using some new product in your hair? Is there some unusual stress in your family?”

“There’s definitely been some stress,” he said. He had lost his job recently, and was dealing with the financial repercussions.

“Keep a diary,” she advised. “We can determine if there’s a link.” She wrote a prescription for a steroidal cream, and asked him to return in a month.

In the next room, there was a young paralegal with a spray of itchy bumps on his scalp. He winced as Bordone felt his scalp. “Seborrheic dermatitis,” she said, concluding her exam.

The woman in another room had undressed and donned a hospital gown. In the past, she had been diagnosed with a melanoma, and she was diligent about getting preventive exams. Bordone pored over her skin, freckle by freckle. It took her twenty minutes, but she was thorough and comprehensive, running her fingers over the landscape of moles and skin tags and calling out diagnoses as she moved. There were nevi and keratoses, but no melanomas or carcinomas.

“Looks all good,” she said cheerfully at the end. The woman sighed in relief.

And so it went: Bordone came; she

saw; she diagnosed. Far from Hinton’s coyote, she seemed like a somewhat manic roadrunner, trying to keep pace with the succession of cases that treadmilled beneath her. As she wrote her notes in the back room, I asked her about Thrun’s vision for diagnosis: an iPhone pic e-mailed to a powerful off-site network marshalling undoubted but inscrutable expertise. A dermatologist in full-time practice, such as Bordone, will see about two hundred thousand cases during her lifetime. The Stanford machine’s algorithm ingested nearly a hundred and thirty thousand cases in about three months. And, whereas each new dermatology resident needs to start from scratch, Thrun’s algorithm keeps ingesting, growing, and learning.

Bordone shrugged. “If it helps me make decisions with greater accuracy, I’d welcome it,” she said. “Some of my patients could take pictures of their skin problems before seeing me, and it would increase the reach of my clinic.”

That sounded like a reasonable response, and I remembered Thrun’s reassuring remarks about augmentation. But, as machines learn more and more, will humans learn less and less? It’s the perennial anxiety of the parent whose child has a spell-check function on her phone: what if the child stops learning how to spell? The phenomenon has been called “automation bias.” When cars gain automated driver assistance, drivers may become less alert, and something similar may happen in medicine. Maybe Bordone was a lone John Henry in a world where the steam drills were about to come online. But it was impossible to miss how her own concentration never wavered and how seriously she took every skin tag and mole that she ran her fingers over. Would that continue to be true if she partnered with a machine?

I noticed other patterns in Bordone’s interactions with her patients. For one thing, they almost always left feeling better. They had been touched and scrutinized; a conversation took place. Even the naming of lesions—“nevus,” “keratosis”—was an emollient: there was something deeply reassuring about the process. The woman who’d had the skin exam left looking fresh and unburdened, her anxiety exfoliated.

There was more. The diagnostic moment, as the Brazilian researchers might have guessed, came to Bordone in a flash of recognition. As she called out “dermatitis” or “eczema,” it was as if she were identifying a rhinoceros: you could almost see the pyramid of neurons in the lower posterior of her brain spark as she recognized the pattern. But the visit did not end there. In almost every case, Bordone spent the bulk of her time investigating causes. Why had the symptoms appeared? Was it stress? A new shampoo? Had someone changed the chlorine in the pool? Why now?

The most powerful element in these clinical encounters, I realized, was not knowing that or knowing how—not mastering the facts of the case, or perceiving the patterns they formed. It lay in yet a third realm of knowledge: knowing *why*.

**E**XPLANATIONS RUN SHALLOW and deep. You have a red blister on your finger because you touched a hot iron; you have a red blister on your finger because the burn excited an inflammatory cascade of prostaglandins and cytokines, in a regulated process that we still understand only imperfectly. Knowing why—*asking* why—is our conduit to every kind of explanation, and explanation, increasingly, is what powers medical advances. Hinton spoke about baseball players and physicists. Diagnosticians, artificial or human, would be the baseball players—proficient but opaque. Medical researchers would be the physicists, as removed from the clinical field as theorists are from the baseball field, but with a desire to know “why.” It’s a convenient division of responsibilities—yet might it represent a loss?

“A deep-learning system doesn’t have any explanatory power,” as Hinton put it flatly. A black box cannot investigate cause. Indeed, he said, “the more powerful the deep-learning system becomes, the more opaque it can become. As more features are extracted, the diagnosis becomes increasingly accurate. Why these features were extracted out of millions of other features, however, remains an unanswerable question.” The algorithm can solve a case. It cannot build a case.

Yet in my own field, oncology, I couldn’t help noticing how often advances were made by skilled practitioners



*“Pretty good. The ending was a bit predictable.”*

who were also curious and penetrating researchers. Indeed, for the past few decades, ambitious doctors have strived to be at once baseball players *and* physicists: they’ve tried to use diagnostic acumen to understand the pathophysiology of disease. Why does an asymmetrical border of a skin lesion predict a melanoma? Why do some melanomas regress spontaneously, and why do patches of white skin appear in some of these cases? As it happens, this observation, made by diagnosticians in the clinic, was eventually linked to the creation of some of the most potent immunological medicines used clinically today. (The whitening skin, it turned out, was the result of an immune reaction that was also turning against the melanoma.) The chain of discovery can begin in the clinic. If more and more clinical practice were relegated to increasingly opaque learning machines, if the daily, spontaneous intimacy between implicit and explicit forms of knowledge—knowing how, knowing that, knowing why—began to fade, is it possible that we’d get better at doing what we do but less able to reconceive what we *ought* to be doing, to think outside the algorithmic black box?

I spoke to David Bickers, the chair of dermatology at Columbia, about our automated future. “Believe me, I’ve tried to understand all the ramifications of

Thrun’s paper,” he said. “I don’t understand the math behind it, but I do know that such algorithms might change the practice of dermatology. Will dermatologists be out of jobs? I don’t think so, but I think we have to think hard about how to integrate these programs into our practice. How will we pay for them? What are the legal liabilities if the machine makes the wrong prediction? And will it diminish our practice, or our self-image as diagnosticians, to rely on such algorithms? Instead of doctors, will we end up training a generation of technicians?”

He checked the time. A patient was waiting to see him, and he got up to leave. “I’ve spent my life as a diagnostician and a scientist,” he said. “I know how much a patient relies on my capacity to tell a malignant lesion from a benign one. I also know that medical knowledge emerges from diagnosis.”

The word “diagnosis,” he reminded me, comes from the Greek for “knowing apart.” Machine-learning algorithms will only become better at such knowing apart—at partitioning, at distinguishing moles from melanomas. But knowing, in all its dimensions, transcends those task-focussed algorithms. In the realm of medicine, perhaps the ultimate rewards come from knowing together. ♦

## THE GOD PILL

*Silicon Valley's quest for eternal life.*

BY TAD FRIEND

ON A VELVETY March evening in Mandeville Canyon, high above the rest of Los Angeles, Norman Lear's living room was jammed with powerful people eager to learn the secrets of longevity. When the symposium's first speaker asked how many people there wanted to live to two hundred, if they could remain healthy, almost every hand went up. Understandably, then, the Moroccan phyllo chicken puffs weren't going fast. The venture capitalists were keeping slim to maintain their imposing vitality, the scientists were keeping slim because they'd read—and in some cases done—the research on caloric restriction, and the Hollywood stars were keeping slim because of course.

When Liz Blackburn, who won a Nobel Prize for her work in genetics, took questions, Goldie Hawn, regal on a comfy sofa, purred, "I have a question about the mitochondria. I've been told about a molecule called glutathione that helps the health of the cell?" Glutathione is a powerful antioxidant that protects cells and their mitochondria, which provide energy; some in Hollywood call it "the God molecule." But taken in excess it can muffle a number of bodily repair mechanisms, leading to liver and kidney problems or even the rapid and potentially fatal sloughing of your skin. Blackburn gently suggested that a varied, healthy diet was best, and that no single molecule was the answer to the puzzle of aging.

Yet the premise of the evening was that answers, and maybe even an encompassing solution, were just around the corner. The party was the kickoff event for the National Academy of Medicine's Grand Challenge in Healthy Longevity, which will award at least twenty-five million dollars for breakthroughs in the field. Victor Dzau, the academy's president, stood to acknowledge several of the scientists in the room.

He praised their work with enzymes that help regulate aging; with teasing out genes that control life span in various dog breeds; and with a technique by which an old mouse is surgically connected to a young mouse, shares its blood, and within weeks becomes younger.

Joon Yun, a doctor who runs a health-care hedge fund, announced that he and his wife had given the first two million dollars toward funding the challenge. "I have the idea that aging is plastic, that it's encoded," he said. "If something is encoded, you can crack the code." To growing applause, he went on, "If you can crack the code, you can *hack* the code!" It's a big ask: more than a hundred and fifty thousand people die every day, the majority of aging-related diseases. Yet Yun believes, he told me, that if we hack the code correctly, "thermodynamically, there should be no reason we can't defer entropy indefinitely. We can end aging forever."

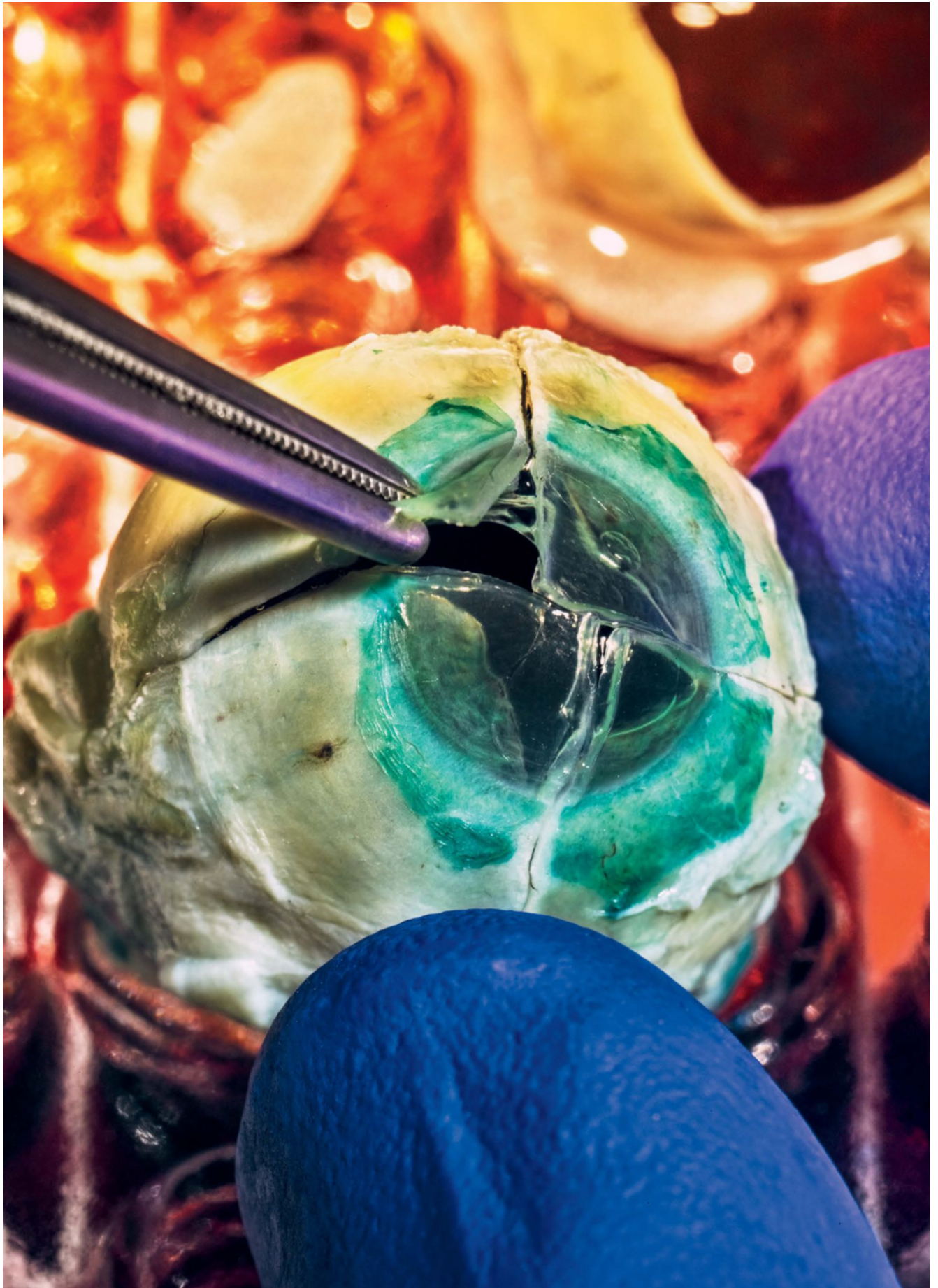
Nicole Shanahan, the founder of a patent-management business, announced that her company would oversee longevity-related patents that Yun had pledged to the cause. "I'm here with my darling, Sergey," she said, referring to her boyfriend, Sergey Brin, the co-founder of Google. "And he called me yesterday and said, 'I'm reading this book, "Homo Deus," and it says on page twenty-eight that I'm going to die.' I said, 'It says you, personally?' He said, 'Yes!'" (In the book, the author, Yuval Noah Harari, discusses Google's anti-aging research, and writes that the company "probably won't solve death in time to make Google co-founders Larry Page and Sergey Brin immortal.") Brin, sitting a few feet away, gave the crowd a briskly ambiguous nod: *Yes, I was singled out for death; no, I'm not actually planning to die.*

After Moby put in a plug for being vegan, Dzau called on Martine Roth-

blatt, the founder of a biotech firm called United Therapeutics, which intends to grow new organs from people's DNA. "Clearly, it is possible, through technology, to make death optional," Rothblatt said. (She has already commissioned a backup version of her wife, Bina—a "mindclone" robot named Bina48.) Aging has long lacked the kind of vocal constituency that raised awareness of H.I.V. and breast cancer; as a species, we stink at mobilizing against a deferred collective calamity (see: climate change). The old wax fatalistic, and the young don't really believe they'll grow old. But Rothblatt suggested that the evening marked an inflection point. Turning to Dzau, she declared, "It's *enormously* gratifying to have the epitome of the establishment, the head of the National Academy of Medicine, say, 'We, too, choose to make death optional!'" The gathering blazed with the conviction that such events can spark: the belief that those inside the room can determine the fate of all those outside the room.

In the back, Andy Conrad picked up a mike to challenge the emphasis on extending maximum life span, which is currently around a hundred and fifteen. Conrad is the C.E.O. of Verily, a life-sciences firm owned by Google's parent company, Alphabet. Like most of the scientists in the room, he aims simply to help people enjoy a few more "quality-adjusted life years." He asked, "Isn't longevity a misnomer? Isn't it 'living longer well'? Or 'healthspan'?" The biologists nodded with relief.

Norman Lear, still vigorous at ninety-four, closed the night by saying, "Seven years ago, I wrote a pilot script for a TV show called 'Guess Who Died?,' about people at a retirement community. I just learned *today* that it's on its way to being made." The audience demographics were catching up to him: by 2020, for the first time, there will be



*One approach to defeating aging suggests replacing body parts as they fail. Another aims at finding a master key to youth.*

more people on Earth over the age of sixty-five than under the age of five. Lear continued, "So what I wish to offer you is, we have a stage now to get some of the things you've said tonight out to a national audience." More applause: the message would spread!

But which message? Death is optional? Or death will just have to wait?

FOR DECADES, the solution to aging has seemed merely decades away. In the early nineties, research on *C. elegans*, a tiny nematode worm that resembles a fleck of lint, showed that a single gene mutation extended its life, and that another mutation blocked that extension. The idea that age could be manipulated by twiddling a few control knobs ignited a research boom, and soon various clinical indignities had increased the worm's life span by a factor of ten and those of lab mice by a factor of two. The scientific consensus transformed. Age went from being a final stage (a *Time* cover from 1958: "Growing Old Usefully") and a social issue (*Time*, 1970: "Growing Old in America: The Unwanted Generation") to something avoidable (1996: "Forever Young") or at least vastly deferrable (2015: "This Baby Could Live to Be 142 Years Old"). Death would no longer be a metaphysical problem, merely a technical one.

The celebration was premature. Gordon Lithgow, a leading *C. elegans* researcher, told me, "At the beginning, we thought it would be simple—a clock!—but we've now found about five hundred and fifty genes in the worm that modulate life span. And I suspect that half of the twenty thousand genes in the worm's genome are somehow involved." That's for a worm with only nine hundred and fifty-nine cells. The code book is far more complex for animals that excite our envy: the bee larva fed copiously on royal jelly that changes into an ageless queen; the Greenland shark that lives five hundred years and doesn't get cancer; even the humble quahog clam, the kind used for chowder, which holds the record at five hundred and seven.

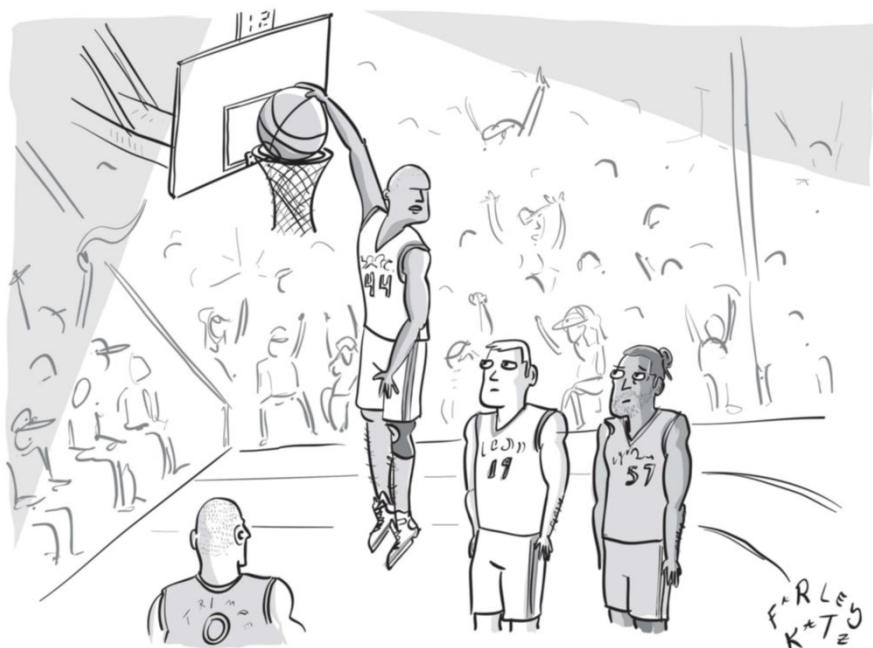
For us, aging is the creeping and then catastrophic dysfunction of everything, all at once. Our mitochondria sputter, our endocrine system sags, our DNA snaps. Our sight and hearing and strength diminish, our arteries clog, our brains fog, and we falter, seize, and fail. Every research breakthrough, every announcement of a master key that we can turn to reverse all that, has been followed by setbacks and confusion. A few years ago, there was great excitement about telomeres, Liz Blackburn's specialty—DNA buffers that protect the ends of chromosomes just as plas-

tic tips protect the ends of shoelaces. As we age, our telomeres become shorter, and, when these shields go, cells stop dividing. (As Blackburn said, "It puts cells into a terribly alarmed state!") If we could extend the telomeres, the thinking went, we might reverse aging. But it turns out that animals with long telomeres, such as lab mice, don't necessarily have long lives—and that telomerase, the enzyme that promotes telomere growth, is also activated in the vast majority of cancer cells. The more we know about the body, the more we realize how little we know.

Still, researchers plunge ahead. Understanding isn't a precondition for successful intervention, they point out; we had no real grasp of virology or immunology when we began vaccinating people against smallpox.

In the murk of scientific inquiry, every researcher looks to a ruling metaphor for guidance. Aubrey de Grey likes to compare the body to a car: a mechanic can fix an engine without necessarily understanding the physics of combustion, and assiduously restored antique cars run just fine. De Grey is the chief science officer of Silicon Valley's SENS Research Foundation, which stands for Strategies for Engineered Negligible Senescence—a fancy way of saying "Planning Your Comprehensive Tune-up." An Englishman who began his career with a decade of work in A.I., he speaks with rapid fluidity, often while stroking his Rasputin-length beard. De Grey has proposed that if we fix seven types of physical damage we will be on the path to living for more than a thousand years (assuming we can avoid getting hit by a bus or an asteroid).

When I met him at the SENS office, in Mountain View, he told me, "Gerontologists have been led massively astray by looking for a root cause to aging, when it's actually that everything falls apart at the same time, because all our systems are interrelated. So we have to divide and conquer." We just need to restore tissue suppleness, replace cells that have stopped dividing and remove those that have grown toxic, avert the consequences of DNA mutations, and mop up the gunky by-products of all of the above. If we can disarm these killers, de Grey suggests, we should gain thirty years of healthy life, and during



"O.K., who overinflated the ball?"

that period we'll make enough further advances that we'll begin growing biologically younger. We'll achieve "longevity escape velocity."

De Grey vexes many in the life-extension community, and one reason may be his intemperate life style. He told me, "I can drink as much as I like and it has no effect. I don't even need to exercise, I'm so well optimized." Until recently, he maintained two girlfriends and a wife. Now, he said, "I'm engaged, and my polyamorous days are behind me."

But the main reason is his prophetic air of certainty. His 2007 book, "Ending Aging," is replete with both exacting research into the obstacles to living longer and proposed solutions so ambitious that they resemble science fiction. De Grey's fix for mitochondrial mutation, for instance, is to smuggle backup copies of DNA from the mitochondria into the vault of the nucleus, which evolution annoyingly failed to do—probably because the proteins needed in the mitochondria would ball up during their journey through the watery cell body. His fix for that, moving the DNA one way and the proteins that it produces another, amounts to a kind of subcellular hokey pokey. A number of scientists praise de Grey for anatomizing the primary threats, yet they see troubleshooting all seven pathways through such schemes—and you have to troubleshoot them all for his plan to work—as a foredoomed labor. Matt Kaerberlein, a biogerontologist at the University of Washington, said, "It's like saying, 'All we have to do to travel to another solar system is these seven things: first, accelerate your rocket to three-quarters of the speed of light . . .'"

The great majority of longevity scientists are healthspanners, not immortalists. They want to give us a healthier life followed by "compressed morbidity"—a quick and painless death. These scientists focus on the time line: since 1900, the human life span has increased by thirty years—and so, as a consequence, have cancer, heart disease, stroke, diabetes, and dementia. Aging is the leading precondition for so many diseases that "aging" and "disease" are essentially metonyms. Accidents and violence are the leading causes of death up to age



*"I'm sorry, but refusing to use an Oxford comma isn't really grounds for divorce."*

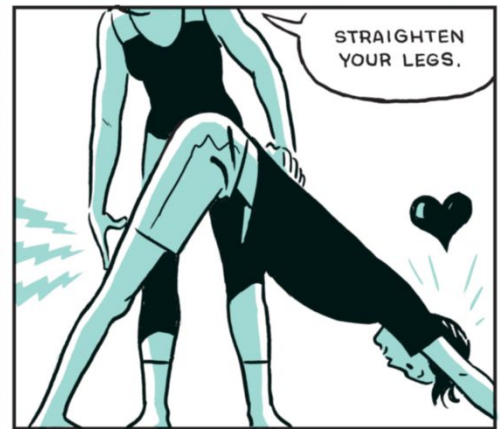
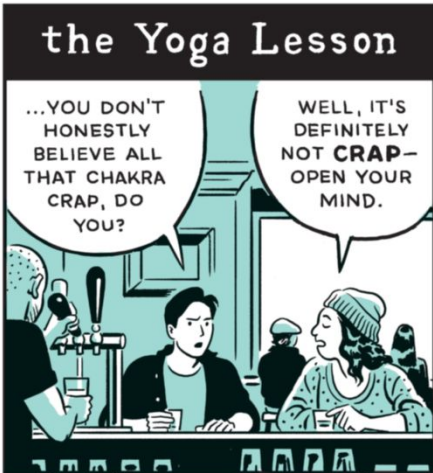
forty-four, then cancer rises to the top, and then, at sixty-five, heart disease. Healthspanners want to understand the etiologies of cancer and heart disease and then block them. Why do we almost never get those diseases at age two? How can we extend that protection to a hundred and two? But if we cured cancer we would add only 3.3 years to an average life; solving heart disease gets us an extra four. If we eliminated all disease, the average life span might extend into the nineties. To live longer, we'd have to slow aging itself.

Even if we do that, the healthspanners believe, we're not going to live forever—nor should we. They worry about the rapid drain on natural resources and on Social Security; the potential for a Stalin or a Mugabe to stay in power for centuries; the loss of new ideas from the young; and profound lifelong boredom. Amy Wagers, a researcher at Harvard, told me, "Part of the meaning of life is that we die." The Greeks warned about the danger of grasping for god-like powers. It didn't work out well for Asclepius or Achilles, and it worked

out even worse for Tithonus, whose lover, Eos, begged Zeus to grant him eternal life but forgot to request eternal youth as well. Decrepit, senile, and miserable, Tithonus eventually shrank into a cicada who stridulated ceaselessly, calling out for release.

WHEN I MET Ned David, I thought that he was about thirty. He had an unlined face and thick auburn hair, he walked rapidly with his hands stuffed into his jeans pockets, and he wore red Converse high-tops.

David is forty-nine. He is a biochemist and a co-founder of a Silicon Valley startup called Unity Biotechnology. Unity targets senescent cells—cells that, as they age, start producing a colorless, odorless, noxious goo called SASP, which Unity's researchers call "the zombie toxin," because it makes other cells senescent and spreads chronic inflammation throughout the body. In mice, Unity's treatments delay cancer, prevent cardiac hypertrophy, and increase median life span by thirty-five per cent. "We think our drugs vaporize a third



of human diseases in the developed world,” David told me.

David isn’t taking any of Unity’s drugs, which won’t be on the market for at least seven years. His youthfulness derives from existing therapies: he takes metformin—a diabetes drug that has made elderly diabetics live *longer* than a healthy control group—and Retin-A, for his skin. He also swims a lot, having quit running because of spinal osteoarthritis. “I am often accused, here, of picking the things we work on based on the problems of aging I have,” David said. “But because of our drugs I predict that I will run again!”

A systemic approach to aging, which would ideally result in your general practitioner prescribing you a “God pill,” is philosophically attractive but financially infeasible. Pharma and biotech companies make money only if they treat a disease, and, because aging affects everything, the F.D.A. doesn’t recognize it as an “indication” susceptible to treatment (or to insurance-company reimbursement). So Unity is taking aim at glaucoma, macular degeneration, and arthritis; the fridge in its lab is stocked with human eyeballs and knee cartilage. This is the customary serial-specialist approach to aging, which tackles it symptom by symptom: let’s restore those eyes, then send you down the street for a 3-D-printed kidney.

Last fall, Unity raised a hundred and sixteen million dollars from such investors as Jeff Bezos and Peter Thiel, billionaires eager to stretch our lives, or at least their own, to a span that Thiel has pinpointed as “forever.” In a field rife with charlatans, Ned David’s Dorian Gray affect has factored into his fundraising. “One class of investor, like Fidelity, finds my youthful appearance alarming,” he said. “Another class—the Silicon Valley type, a Peter Thiel—finds anyone who looks over forty alarming.”

Traditionally, it has been the graying tycoons of technology who funded aging research, hoping to disrupt the three-act structure of the Silicon Valley journey: life hacker, rock climber, cadaver. Now aging has cachet in the startup world. Arram Sabeti, the thirty-year-old founder of a tech company called ZeroCater, told me, “The proposition that we can live forever is obvious. It doesn’t violate the laws of physics, so we

will achieve it.” Sabeti spends his leisure time reading all-cause-mortality metastudies, and is an investor in the Longevity Fund, a venture fund recently launched by Laura Deming. Deming, who is twenty-two, terms the longevity market a “two-hundred-billion-dollar-plus” opportunity, but she told me that “it’s really impossible to say how big it could be, because if you cured aging you’d change medicine entirely.”

Unsurprisingly, it was Google that transformed the Valley’s view of aging. Surprisingly, perhaps, it was the company’s Bill Maris who was in the vanguard. As the founder and C.E.O. of Google Ventures, Maris led successful investments in companies such as Nest and Uber; he was amiable, admired, and financially secure—not an obvious modern-day alchemist. However, he told me, “My thoughts can turn to dark things when I’m alone.” His father died of a brain tumor in 2001, when Maris was twenty-six. “I majored in neuroscience, I’ve worked in hospitals, but until my father died I did not understand the finality of ‘Gone, never to be seen again,’” he said.

Maris, who is forty-two, is a long-time vegetarian who works out on an elliptical machine for an hour every day. He comforts himself with the knowledge that the scientist who performed a 3-D scan of his brain praised his robust corpus callosum, the bundle of nerve fibers that connects the hemispheres. (Maris displays gleaming polymer models of his and his wife’s brains under glass bells in his office.) But such precautions and advantages were temporary, personal stopgaps. How could he fix the problem permanently, and for everyone?

He decided to build a company that would solve death. He discussed the idea with Ray Kurzweil, the futurist who popularized the concept of the Singularity—the idea that humans will merge with A.I. and transcend our biological limitations—and Kurzweil was enthusiastic. Maris also discussed it with Andy Conrad, the geneticist who runs Alphabet’s Verily, and Conrad was thoughtfully discouraging. The first problem was the long study time in humans: it’s hard to run a clinical trial on subjects who take eighty years to die. (A related issue is that we have no ac-

cepted model for how to measure biological age, which often differs significantly from chronological age. Seventy probably isn’t the new fifty for, say, Ozzy Osbourne.) The second problem was the immense difficulty of determining whether any seeming cause of aging was actually causal, or merely a correlative of some other, stealthier process.

“Andy did throw a lot of cold water on the idea,” Maris said. “But there were no issues of fact. He didn’t say, ‘Aging isn’t a genetic disease,’ or ‘Google will never fund this.’” In 2011, Maris pitched his proposed company to John Doerr, a prominent venture capitalist who is on Alphabet’s board. “Imagine you found a lamp on the beach, and a genie came out and granted you a wish,” Maris said. “If you were clever, your first wish would be for unlimited wishes.” As Doerr nodded, Maris continued, “Let’s say you’re going to live, at most, another thirty years.” Doerr had just turned sixty. “If each day is a wish, that’s only between one and ten thousand wishes. I don’t know about you, but I want to add more—I want to add wishes faster than they’re taken away.” Doerr, confronted with the limits to his life span, was galvanized. When Maris pitched Google’s founders, Sergey Brin, who has a gene variant that predisposes him to Parkinson’s disease, loved the idea, and Larry Page declared, “We should do it here!”

In 2013, Google launched Calico, short for the California Life Company, with a billion dollars in funding. “Calico added a tremendous amount of validation to aging research,” George Vlasuk, the head of a biotech startup called Navitor, told me. “They have money, brainpower, and time.” But Calico has proved to be extremely secretive. All that’s known is that it’s tracking a thousand mice from birth to death to try to determine “biomarkers” of aging—biochemical substances whose levels predict morbidity; that it has a colony of naked mole rats, which live for thirty years and are amazingly ugly; and that it has invested in drugs that may prove helpful with diabetes and Alzheimer’s. (The company declined to comment.)

A number of longevity scientists confess to disappointment with Calico’s direction. Nir Barzilai, a geneticist who is a leader in the aging field, told me, “The

truth is, we don't know *what* they're doing, but whatever it is doesn't really seem to be attacking the problem." Another scientist who's familiar with Calico's workings said that it's pursuing its mission judiciously, but that the company began, fatally, as a vanity project. The scientist said, "This is as self-serving as the Medici building a Renaissance chapel in Italy, but with a little extra Silicon Valley narcissism thrown in. It's based on the frustration of many successful rich people that life is too short: 'We have all this money, but we only get to live a normal life span.'"

Maris, who has retired from Google Ventures, strongly disagreed with that view. "This is not about Silicon Valley billionaires living forever off the blood of young people," he said. "It's about a 'Star Trek' future where no one dies of preventable diseases, where life is fair."

**I**F SILICON VALLEY billionaires end up being sustained by young blood, they will satisfy an ancient yearning. In 1615, a German doctor suggested that "the hot and spirituous blood of a young man will pour into the old one as if it were from a fountain of youth." In 1924, the physician and Bolshevik Alexander Bogdanov began young-blood transfusions, and a fellow-revolutionary wrote that he "seems to have become seven, no, ten years younger." Then Bogdanov injected himself with blood from a student who had both malaria and tuberculosis, and died. Parabiosis, the surgical linkage of circulatory systems, has had a mostly grisly history in humans—when it was tried as a desperate measure on terminal cancer patients, in 1951, a two-year-old boy lost part of his foot to gangrene—and in rodents, which resisted being conjoined. A 1956 study warned, "If two rats are not adjusted to each other, one will chew the head of the other until it is destroyed."

We kept trying. In 2005, a Stanford lab, run by a stem-cell biologist and neurologist named Tom Rando, announced that heterochronic parabiosis, or an exchange of blood between older and younger mice, rejuvenated the livers and muscles of the older ones. Vampires everywhere felt validated. Last fall, on "The Late Show," Stephen Colbert warned teen-agers that President Trump

We were cold. All day we were cold.

We thought of bitter gods (hard not to think of gods so close to the heavens) and were frightened.

The mountain is divided. On one side the sun spilled its brilliance.

The snow glistened. The aspen and birch trees

stood tall and tiny mountain chickadees chased one another in strange and compelling harmony. If there was terrorism in our midst,

we did not know it. If there was an animal that threatened us,

we did not sense it, though one of us saw a wolf lurking in the forest.

All the birch trees wore different spots on their long and beautiful spines.

What the small children liked to do most was slide down on their bums.

All of us were in mourning. We the people, we with our inalienable rights.

On the other side of the mountain it is ungroomed and barren.

A bald eagle flies overhead searching for prey. There is no

regard for order. Only the foolish come to perform their egotistical

stunts. The clouds are disseminating. Who knows what else.

When the slopes close we release our skis

from their binding, and trudge home, mere mortals, tired and spent.

Our muscles ache. We undress, strip off our layers

and plunge into the hot tub. *Hate has been unleashed*, Daughter No. 1 says.

Daughter No. 2 says that we must withstand it because it's our turn now.

would replace Obamacare with mandatory parabiosis: "He's going to stick a straw in you like a Capri Sun."

Entrepreneurs and venture capitalists also had their straws poised. Rando said, "I've had a lot of meetings with young billionaires in Silicon Valley, and they all, to varying degrees, want to know when the secrets are coming out, both so they can get in on the next big thing and so they can personally take advantage of them. I say, 'This is not an app. If you come at biology from a tech point of view, you're going to be disappointed, because the pace is much slower.'"

In recent years, the parabiosis field has grown quarrelsome. Is the rejuvenative key the presence of young-blood proteins, or the absence of something like *sASP*? Could it be a cellular by-product from one mouse, or the effect of borrowing a younger mouse's liver? In 2014, the Harvard scientist Amy Wagers concluded that young-blood factors, particularly a protein called GDF11, gave older mice a stronger grip and renewed their brains. Most of her colleagues questioned her results, and the drug company Novartis promptly did a study that suggested the exact opposite: you should *blockade* GDF11. Wa-

ggers told me, "Different groups have reported that amounts of GDF11 go up, go down, or stay the same with age." With a bleak laugh, she added, "Clearly, one group is right."

After Rando's colleague Tony Wyss-Coray showed that young blood can foster new neurons in the hippocampus region of the brains of old mice, a company called Alkahest spun out from his work. Alkahest has begun to sift the more than ten thousand proteins in plasma, in hopes that the right protein cocktail can cure Alzheimer's—a process that is expected to continue for more than a quarter century.

When I visited Alkahest recently, Joe McCracken, the vice-president of business development, cued up side-by-side videos of genetically identical, equally aged mice. They were about to run a Barnes maze: a disk dotted with black circles, one of which was a hole—a laboratory version of a burrow in which to escape a diving hawk. During previous runs, they'd been trained to remember the hole's location. McCracken, who was with two colleagues, explained that the first mouse had been treated only with a placebo of inert saline. We watched it nose here and there, uncertainly, before finally stumbling upon

*But I don't like it. I want to understand. How did this happen?  
What can we do?* Daughter No. 3 says.  
Daughter No. 2 considers this.  
*Everything is changing.* The mothers are quiet.  
This is their world now, we think. We don't want to intrude.  
Daughter No. 3 says she's frightened. She wakes up in her sleep.  
*What will we do in the face of the vile and vengeful? How will we  
live in a world without ethics? Why has the clock turned back  
instead of forward?* It won't do. We fire up the hot tub.  
Steam rises, obscuring our faces.  
The air is frigid, but the water is hot and our limbs  
are numb with the letting go.  
We watch the sun slowly descend into the mountain.  
Underneath the water we can't tell  
whose legs are whose, whose hand is touching ours.  
Who is mother, daughter. Who belongs to whom.  
When the uprising will begin. Everything is floating away  
from us against our will. *The price of his glory is our suffering,*  
Daughter No. 1 says. She is the vigilant one.  
The water gurgles against the throbbing of the jets.

—Jill Bialosky

the hole. It took a minute and twenty seconds. The men clapped, releasing their anxiety. "It's me in the parking lot, looking for my car," Sam Jackson, the company's chief medical officer, said. Then McCracken played the video of a mouse that had been tuned up with plasma from eighteen-year-old human beings. That mouse darted purposefully toward one sector of the maze, found the hole, and scooted into it in eighteen seconds. The execs grinned and shook their heads: youth.

Every longevity experimenter has talismanic photos or videos of two mice: one timid and shuffling, with patchy fur; the other sleek and vital, thrumming with the miracle elixir. But can mice be our proxy? Empathy beguiles us into believing so. When you read that mice made to run on a treadmill were given "a five-minute warmup period and a five-minute cooldown period," you think, Very sensible. Yet mice don't have heart attacks, and their muscles start wasting suddenly, rather than gradually, as ours do. Mice also don't get Alzheimer's disease, so scientists mimic it by breeding mice with genes taken from humans. But, since we get Alzheimer's only when we're old, testing treatments in young mice often

proves misleading. It doesn't help that labs use radiation to cause artificial aging, or that lab mice live much longer than wild mice. Tony Wyss-Coray told me, "People say, 'The young mouse finds the hole—O.K., we're good, give me the treatment!' And I say, 'We don't know if it's safe, we don't know if mice are the same as humans—you have to wait.'" We've cured cancer in lab mice dozens of times, and made them live twice as long, yet none of those results have transferred upstream. "So many times, the mice have failed us," the geneticist Nir Barzilai lamented.

THE REIGNING VIEW among longevity scientists is that aging is a product not of evolutionary intent but of evolutionary neglect: we are designed to live long enough to pass on our genes, and what happens afterward doesn't much matter. As the geroscientist Richard A. Miller wrote, "Mice that devote their energies to eating and breeding will do better than those that spend valuable capital on eye repair and anticancer surveillance." We mature more slowly than mice and live much longer, because we, like whales and naked mole rats, are at much less risk of being eaten in our first year. Yet from the age of thirty or forty

on, after we've spawned, we're living on time that evolution regards as pointless. Eric Verdin, the C.E.O. of the Buck Institute for Research on Aging, the leading nonprofit in the field, noted that "if you just kept aging at the rate you age between twenty and thirty, you'd live to a thousand. At thirty, everything starts to change." From that point, our risk of mortality doubles every seven years. We're like salmon, only we die in slow motion.

The battle between healthspanners and immortalists is essentially a contest between the power of evolution as ordained by nature and the potential power of evolution as directed by man. The healthspanners see us as subject to linear progress: animal studies take the time that they take; life sciences move at the speed of life. Noting that median life expectancy has been increasing in developed nations by about two and a half years a decade, Verdin told me, "If we can keep that pace up for the next two hundred years, and increase our life spans by forty years, that would be *incredible*."

The immortalists have a different view of both our history and our potential. They see centuries of wild theorizing (that aging could be reversed by heating the body, or by breathing the same air as young virgins) swiftly replaced by computer-designed drugs and gene therapies. Bill Maris said, "Health technology, which for five thousand years was symptomatic and episodic—'Here are some leeches!'—is becoming an information technology, where we can read and edit our own genomes."

Many immortalists view aging not as a biological process but as a physical one: entropy demolishing a machine. And, if it's a machine, couldn't it be like a computer? Progress in computers, or anyway in semiconductors, has been subject to Moore's Law, the exponential flywheel that has doubled capacity every two years. In linear progress, after thirty iterations you've advanced thirty steps; in exponential progress, you've advanced 1.07 billion steps. Our progress in mapping the human genome looked like it was linear—and then was revealed, once the doublings grew significant, as exponential.

A number of startups are trying to harness exponential curves. BioAge has

been using machine learning and crunching genomics data to search for biomarkers that predict mortality. Kristen Fortney, the company's thirty-four-year-old C.E.O., told me that she had also begun testing computationally designed drugs to find an unexpected substance that would powerfully affect those markers. She's about to seek her next round of venture financing, and she's optimistic: "Biotech is something a lot of V.C.s don't understand, but machine learning and big data are things they do understand."

Aging doesn't seem to be a program so much as a set of rules about how we fail. Yet the conviction that it must be a program is hard to dislodge from Silicon Valley's algorithmic minds. If it is, then reversing aging would be a mere matter of locating and troubleshooting a recursive loop of code. After all, researchers at Columbia University announced in March that they'd stored an entire computer operating system (as well as a fifty-dollar Amazon gift card) on a strand of DNA. If DNA is just a big Dropbox for all the back-office paperwork that sustains life, how hard can it be to bug-fix?

**I**N JULY, BRIAN HANLEY, a sixty-year-old microbiologist who lives in Davis, California, began trying to give himself the equivalent of an operating-system update: he injected analogues of the gene for growth-hormone-releasing hormone, or GHRH, into his left thigh. GHRH is normally produced in the brain, but Hanley was essentially turning a pencil-eraser-size part of his thigh into a gland that made the molecule, which stimulates the heart, the kidneys, and the thymus. He believed that the treatment was working. His testosterone and good cholesterol were up, his heart rate and bad cholesterol were down, his eyesight was keener. And there was a peculiar side effect: euphoria. On one bike ride, when his bike began to topple sideways, he just let it take him down, laughing.

When I met with him, though, he moved gingerly around his dining-room table, unable to sit for long. A few days earlier, he'd herniated a disk trying to

lift a refrigerator. It was his fourth significant injury since beginning his gene therapy, but he assured me that this was a common problem for people taking a course of regenerative medicine: they feel so good that they try to do too much. When George Church, a Harvard geneticist whose lab collaborates with Hanley, heard about his injuries, he told me, "It sounds like it affected his mind more than his muscles."

For those frustrated by the stately progress of research up the animal chain, from worms to flies to mice to dogs to monkeys, speculative treatments abound. In Monterey, California, a clinic will give you young plasma for eight thousand dollars a pop—but you have no idea what it's doing to you. Peter Nygård, a leonine seventy-five-year-old Finnish-Canadian clothing designer who got rich making women look slim in modestly priced pants, has had injections with stem cells derived from his DNA. He believes that the process has reversed his aging. In an interview a few years ago, he proclaimed, "I'm the only guy in the world today who has me, in a petri dish, before I was born."

While Hanley has a tinkerer's mentality—there's a hyperbaric chamber stuffed behind his couch—he's a dedicated researcher. Since the F.D.A. requires an authorization for any new tests on humans, he began trying therapies on himself. He'd read the literature on self-experimentation, and tallied the results: eight deaths (including that of the blood-transfusing Alexander Bogdanov), and ten Nobel Prizes. Coin toss.

Hanley acknowledged that his research had a few basic problems as a template for reshaping life spans. First, a sample size of one; second, a therapeutic method whose results may not last; third, a gene whose effects seem to be regenerative rather than transformative. In order to comprehensively reprogram ourselves, we'd want to insert corrective genes into a virus that would disperse them throughout the body, but doing so could alarm the immune system.

The advent of CRISPR, a gene-editing tool, has given researchers confidence that we're on the verge of the gene-ther-

apy era. George Church and his Harvard postdocs have culled forty-five promising gene variants, not only from "super centenarians"—humans who've lived to a hundred and ten—but also from yeast, worms, flies, and long-lived animals. Yet Church noted that even identifying longevity genes is immensely difficult: "The problem is that the bowhead whale or the capuchin monkey or the naked mole rat, species that live a lot longer than their close relatives, aren't that close, genetically, to those relatives—a distance of tens of millions of genetic base pairs." The molecular geneticist Jan Vijg said, "You can't just copy a single mechanism from the tortoise," which can live nearly two hundred years. "We'd have to turn our genome over to the tortoise—and then we'd be a tortoise."

Becoming part tortoise wouldn't necessarily alarm Brian Hanley. If we can only find the right genes and make their viral transmission safe, he declared, "we can enable human transformations that would rival Marvel Comics. Super muscularity, ultra-endurance, super radiation-resistance. You could have people living on the moons of Jupiter who'd be modified in this way, and they could physically harvest energy from the gamma rays they were exposed to."

**A**LTHOUGH NED DAVID has maintained his milk-fed aspect by battling his own aging on multiple fronts, down to his choice of sneakers, he can't shake the idea that our foe is fundamentally unitary. David likens longevity research to a huge tree, and he believes that most current efforts, including the therapies his company is pursuing, are just branches of the tree. "No one is working on the trunk," he told me, mournfully. In December, however, he began to have hope that "trunkness," as he puts it, was in sight.

David had long suspected that the epigenome was central to longevity. If the genome is our cellular hardware, then the epigenome is its software: it's the code that activates DNA, telling a cell to differentiate—to become a macrophage or a neuron—and then how to remember its identity. The epigenome itself is controlled by agents that add or subtract chemical groups,



known as marks, to its proteins. Biologists suspect that when the epigenome accumulates too many marks, over time, the signals it sends to cells change dramatically—and that those new signals produce the effects of aging. This process could explain, for instance, why an old person's skin can refresh itself with new cells every month and yet continue to look old.

In 2012, Tom Rando and his Stanford colleague Howard Chang published a paper noting that a fertilized human egg has properties of eternal youth: sperm and eggs can age, but every embryo resets the clock. Chang, a dermatologist and genome scientist, had discovered that the epigenome in aging skin, once it has accumulated enough marks, turns the genome on with a protein called NF- $\kappa$ B in ways that inflame and age skin. When he inhibited NF- $\kappa$ B in genetically modified mice, it rejuvenated their skin. Rando's work in parabiosis seemed to hinge on a similar process: making stem cells revert to a more youthful stage. The scientists suggested that "the ideal would be to reset the aging clock but to leave the differentiation program untouched"—that is, to engage the stem cells and make them refresh tissues and organs without making them revert to a predifferentiated state, which would introduce hairy, tooth-filled tumors called teratomas. The goal was young-Brad-Pitt-stage Benjamin Button, nothing more.

After that paper, Rando turned back to parabiosis, and Chang began work on a cream to make skin look decades younger. He explained, "That's what people want." But he also said that the longevity community had proved too fractious: "It's the most difficult field I've ever worked in, and I didn't want to define my scientific life with all these fights."

In December, Juan Carlos Izpisua Belmonte, of the Salk Institute, in San Diego, announced that he'd done the work that Rando and Chang had proposed. After four years of trial and error in mouse experiments, he had figured out a way to trigger the Yamanaka factors, four genes that reset the clock in fertilized eggs. When lab mice drank water laced with doxycycline—but only two days a week—they lived more than thirty per cent longer. Wild mice sub-

jected to the same method had rejuvenated muscles and pancreases.

As in most modern efforts to circumvent aging, Belmonte was tricking the body—borrowing a powerful mechanism from embryos and, very gingerly, applying it to adults. He told me, "You want a cardiac cell to become a new cardiac cell, but not to revert all the way to a stem cell, which would stop the heart beating. We did that. Our experiment was very rude and uncontrollable, and there will be other deleterious effects, as well as many unknowns. But this is very promising." Modifying cells' software was less dangerous than tampering with their hardware, he said, and, as with software, "there will always be a better version of our program next year." Belmonte was careful to downplay the obvious question that his research provoked: If we could keep resetting our clock, couldn't we live indefinitely? "The idea is not to increase life span but to have yourself working better," he told me. He chuckled, and added, "Obviously, if you improve all the cells in your body, as an indirect consequence you will live longer."

Galvanized by Belmonte's work, Ned David flew to San Diego twice this winter to meet with him and see if there was a way "to prove that this was the

ticking clock" and then to "nudge us back to twenty-five-ness." In mid-March, they discussed ways to proceed. Could they develop markers so that cells would change color in the lab if a drug made them younger—and change to a different color if they were perturbed too far? Could the team activate telomerase to rejuvenate the epigenome? Could they find genes that would act as an emergency brake on the reversion process? There was so much systems logic to think through.

David was tantalized by the possibility of trunkness, yet still unsure. "We can revert some tissues, in a shotgunny way," he said, "but we haven't figured out the Francis Crick experiment that changes everything." He laughed. "If I knew what *that* experiment was, I'd be doing it now." Even if Belmonte and David find a substance that rejuvenates stem cells the perfect, Goldilocks amount, there will likely be unexpected side effects—for the hip bone is connected not only to the thigh bone but to every other damn bone. To repair tissue, you need to rejuvenate stem cells. But stem cells need to divide to do their job, and the division process invites random mutations—which drive cancer.

A great many longevity papers end with mystified hand-waving in the



*"I'll have whatever's your most populist beer."*



direction of unknown “systemic factors.” Solving aging is not just a whodunnit but a howdunnit and where-dunnit and a whyohwhydunnit. Tom Rando suggested, “It’s not A causes B causes C causes D causes aging. It’s a network diagram of nodes and links—all subject to feedback loops where consequences become causes—that gradually becomes more and more destabilized.” If the body is a set of Christmas-tree lights—and it’s not—then every time you plug it into a new outlet some lights go on and some go off. Stabilizing one part of the network further destabilizes another. That which makes us also unmakes us, and the process of living seems inextricably bound to the process of dying.

SO FAR, THE most powerful interventions you can make to extend your life are the kinds of low-tech things that your doctor has already told you in a droning voice. Quit smoking (ten more years) and wear a seat belt (two more). Assuming you’ve already done that, exercise regularly and watch your diet. Pankaj Kapahi, a researcher at the Buck Institute, recently showed me two clear boxes filled with fruit flies in vials, with two types of food at the bottom: orange goo in one set of vials and yellow goo in the other. “These are the flies on the burger diet, these are the flies on the Spartan diet,” he said, pointing to the boxes. “You can gauge their health by how quickly they go up the vial.” He banged both boxes, hard. The burger-fed flies struggled upward, while the Spartan flies soared. “Some of these diets can double their life spans,” he said.

Both caloric restriction and exercise appear to dampen mTOR, a signalling pathway that regulates cellular metabolism. Under strain, the body realizes that it’s a bad time to reproduce and a good time to repair cells and increase stress resistance. Scientists believe this is nature’s way of responding to famine: hunker down and wait for better times to procreate. There seems to be a link between forgoing sex and extending life, since what the French call the little death apparently hastens the big one. The immune suppressant rapamycin makes mice live longer, yet shrivels their testicles. Likewise, the most proven

way for a man to live fourteen years longer than average is to become a eunuch. Good news/bad news.

Starving yourself, unsurprisingly, has disadvantages. If you want caloric restriction to have a chance of working, you should take in at least thirty per cent fewer calories, and the most useful way to do that—intermittent fasting—is both unpleasant for subjects to endure and impossible for researchers to patent. So the goal is to develop powerful drugs that subdue mTOR without making you feel famished. In the meantime, the Calorie Restriction Society’s Web site warns you to be careful how you go about limiting your intake: “Sudden adult onset calorie restriction shortens the lifespans of mice.” The site goes on to say, “There are several other risks you should be aware of”—at which point the page breaks off.

Leonard Guarente, an M.I.T. biology professor who did important research on the mTOR-regulating enzymes called sirtuins—which seemed like a potential master key a decade ago—is a co-founder and the chief scientist of Elysium Health. Elysium’s first nutraceutical product, called Basis, promises “metabolic repair and optimization.” For fifty dollars a month, a daily pill provides you with chemicals that nourish sirtuins. There are no clinical data yet that Basis does anything useful in humans, so, when I visited Guarente in his office at M.I.T., I asked if he’d noticed any effects from taking it. “I *have*,” he said. He glanced at Elysium’s P.R. person. “Can I say it? It is O.K.?” She gave a calibrated nod, and he said, “*My fingernails grow faster.*” And what does that mean? “I don’t know. But *something.*”

ALL THE LEADING immortalists started out in tech, and all had a father who died young (as Ray Kurzweil’s did when he was twenty-two), or absconded early (as Aubrey de Grey’s did before he was born). They share an early loss of innocence and a profound faith that the human mind can perfect even the human body. Larry Ellison, the co-founder of Oracle, lost his adoptive mother to cancer when he was in college—and later donated three hundred and seventy million dollars to aging

research. “Death has never made any sense to me,” he told a biographer. “How can a person be there and then just vanish?” Bill Maris, who conceived of Calico, said that, when he pondered the inevitability of death, “I felt it was maybe our mission here to transcend that, and to preserve consciousness indefinitely.”

Immortalists fall into two camps. Those who might be called the Meat Puppets, led by de Grey, believe that we can retool our biology and remain in our bodies. The RoboCops, led by Kurzweil, believe that we’ll eventually merge with mechanical bodies and/or with the cloud. Kurzweil is a lifelong fixer and optimizer: early in his career, he invented the flatbed scanner and a machine that reads books aloud to the blind. Those inventions have improved dramatically in subsequent iterations, and now he’s positive that what he calls “the law of accelerating returns” for human longevity is about to kick in.

I met with Kurzweil at Google, where he is a director of engineering, but he emphasized that he was speaking in his private capacity as a futurist. Though a few days short of his sixty-ninth birthday, he looked much younger. After discovering, in his thirties, that he had Type 2 diabetes, he changed his life style radically and began taking supplements. He swallows some ninety pills a day, including metformin; Basis; a coenzyme called Q10, for muscle strength; and phosphatidylcholine, to keep his skin supple. “How does it look?” he asked me, plucking at his forearm. “Supple!” I said.

Kurzweil thinks of such efforts, which attempt to slow aging by using current technology, as Bridge One to indefinite longevity. But he also subscribes to the belief that the body is essentially a computer made up of over-writable data and updatable apps. Therefore, we’ll soon be in the midst of a biotech revolution, which will offer personally tailored immune therapies for cancer as well as organs grown from our own DNA. This is Bridge Two, which he believes will bring us to longevity escape velocity within about fifteen years. “I’m actually a little more optimistic than Aubrey,” he said. Bridge Three, which he expects us to cross by the two-thousand-thirties, is nanobots—blood-cell-size devices that will

roam the body and the brain, cleaning up all the damage that de Grey wants to fix with medical interventions. “I used to call it the killer app of health technology,” Kurzweil said, “but that’s not a good name.”

When we cross Bridge Four, those same nanobots will connect our brains to a neocortical annex in the cloud, and our intelligence will quickly expand a billionfold. Once that transformation happens, in 2045, the Singularity occurs and we become like gods. “For a time, we’ll be a hybrid of biological and nonbiological thinking, but, as the cloud keeps doubling, the non-biological intelligence will predominate,” Kurzweil said. “And it will be anachronistic, then, to have one body.” He raised his arms slightly and squinted at them, a carpenter troubled by a burl in the wood.

Kurzweil acknowledges that he was profoundly affected by the early death of his father, Fredric. Fredric was a brilliant conductor and pianist, but he worked incessantly to make ends meet and was often absent from the family. Kurzweil’s mother once observed, “It was hard on Raymond. He needed a father—and his father was never around.” Kurzweil has preserved fifty boxes of his father’s effects, everything from his

letters and photographs to his electric bills, all pack-ratted into a storage facility in Newton, Massachusetts. He hopes to someday create a virtual avatar of his father and then populate the doppelgänger’s mind with all this information, as well as with his own memories of and dreams about his father, ex-huming a Fredric Kurzweil 2.0.

“We have spent millennia rationalizing the tragedy of death—‘Oh, it’s natural, it’s the goal of life,’” Kurzweil told me. “But that’s not really how we feel when we hear that someone we love has died.” He fell silent, then reverted to the question of how realistic his father’s avatar would be, how consoling. “Passing a Fredric Kurzweil Turing test is getting easier and easier,” he said, smiling wryly, “because the people who knew him, like me, are getting older and older.”

**T**HE MEAT PUPPETS, fighting off old age, must contend with evolutionary contingency. Jan Vijg, who co-authored a recent paper arguing that our life span is basically capped at a hundred and fifteen, told me, “Yes, our bodies are information-processing systems. But to fix the body-as-computer requires an in-depth understanding of what’s going on in your cells at a mo-

lecular level. And we don’t even know how many types of cells there are! Creating a human is not nearly as easy as creating an A.I., because we’re so very confusingly and *unintelligently* designed by random changes acted upon by natural selection.”

The RoboCops must contend with the boundaries of the human terrain. Osman Kibar, the C.E.O. of a biotech company called Samumed, told me, “We humans are very creative. When we hit a biological limit, we cheat—like Kurzweil, who’s saying, ‘Let’s change the definition of human.’ As each of our functions is uploaded or replaced, at some point you stop calling that a human and start calling it an A.I.” We already have technologies that work inside the body, such as pacemakers and cochlear implants. A paralyzed man recently typed eight words a minute by using a brain-computer interface inserted in his motor cortex. How long will it be before the advantages of scaling and precision manufacture can be applied to the whole body?

The 2045 Institute, started by a wealthy Russian inspired by Kurzweil’s time line, believes that we can at least begin making down payments on that moment. The institute’s Web site has an “immortality button,” which you click “to start the development of your own personalized immortal avatar.” You can select from among a remote-controlled robotic copy, a full-body prosthesis topped off by your transplanted head, and a top-of-the-line, wholly artificial body containing your uploaded essence, which will “achieve perfection of form and be no less attractive than the human body.”

The sticking point seems to be what to do about our heads, specifically our brains. The futurist Juan Enriquez told me, “We’ll be able to transplant a mouse head within five years. And then it gets really interesting—does Mickey remember Minnie?” At the moment, however, no one has figured out how to refresh Mickey’s brain biology, no matter which body it’s attached to. Neurons don’t regenerate, and we don’t grow new ones, except in the hippocampus. Stem cells imported into the brain don’t help; they just sit there, then die.

Benjamin Rapoport, a neurosurgery resident at Weill Cornell Brain and



*“I love the smell of diesel in the morning.”*

Spine Center who's working on a project that would directly connect brains to A.I.s, said, "The question is, What is the fundamental you that is you? Most people feel it's the mind. But can your mind exist only in a biological substrate that weighs 1.5 kilograms, is very wet, and floats like a jellyfish? Or could it conceivably exist someplace else?" In a computer, say. A two-way, high-bandwidth interface with the brain could be available within a decade, and scientists are already trying to map the hundred billion neurons in the brain and the hundred-trillion-plus connections between them—the "connectome," as it's infelicitously called. Currently, you can model someone's brain at the synapse level only by slicing it up after the person is dead. Eventually, however, it seems possible that we could achieve "whole-brain emulation" with live subjects. There would then be permanent copies of our brains that would—we hope—themselves have consciousness.

But would that be us? Even if you set aside the question of what portion of being human is somatic—of how much our identity derives from the tactile and sensory and emotional consequences of being embodied in flesh, rather than in Row D of a server farm—you can't dispense with the problem of memory. Unlike the RAM in a computer, human memories emerge from electrochemical inputs, which trigger your brain to match a pattern and produce an output. There is no physical location for your memory of a first kiss. The recollection changes with the stimulus that triggers it, depending on whether you recall the kiss the next day, read about it in a letter, or run into that old girlfriend twenty years later. So if the connectome project works, and we're transferred to silicon, we might be invulnerable to physical decay and capable of astounding feats of learning and ratiocination, yet shorn of that first memory of crocuses in a spring rain. But maybe we'd have no memory of caring.

**R**AY KURZWEIL AND Aubrey de Grey have the same backup plan if the work doesn't advance as quickly as they expect: when they die, they will be frozen in liquid nitrogen, with instructions



*"That's one more reason not to like him."*

left to reawaken them once science has finished paving the road to immortality. Their optimism is admirable, and perhaps the anxieties that their blueprints stir up are just the standard resentments of the late adopters and the left-behinds. "People are daunted when they hear of these things," Kurzweil told me. "Then they say, 'I don't know if I want to live that long.'" For Kurzweil, who has two children, the acceptance of inevitable death is no saner than the acceptance of early death. "It's a common philosophical position that death gives meaning to life, but death is a great robber of meaning," he said. "It robs us of love. It is a complete loss of ourselves. It is a tragedy."

And yet. Last year, the geneticist Nir Barzilai hosted a screening of a documentary about longevity, and afterward he posed a question to the three hundred people in the audience. He told

me, "I said, 'In nature, longevity and reproduction are exchangeable. So Choice One is, you are immortalized, but there is no more reproduction on Earth, no pregnancy, no first birthday, no first love'—and I go on and on and on." He laughed, amused by his own determination to load the dice. "'Choice Two,' I said, 'is you live to be eighty-five and not one day sick, everything healthy and fine, and then one morning you just don't wake up.'" The vote was decisive, he said. "Choice One got ten or fifteen people. Everyone else raised their hands for Choice Two."

This wish to preserve life as we know it, even at the cost of dying, is profoundly human. We are encoded with the belief that death is the mother of beauty. And we are encoded, too, with the contradictory determination to remain exactly as we are, forever—or at least for just a bit longer, before we have to go. ♦



LETTER FROM SWEDEN

# THE APATHETIC

*Why are refugee children falling unconscious?*

BY RACHEL AVIV

*Uppgivenhetssyndrom, or resignation syndrome, is said to exist only in Sweden, and only among refugees. The patients seem to have*



*lost the will to live. "They are like Snow White," a doctor said. "They just fall away from the world."*

PHOTOGRAPHS BY MAGNUS WENNMAN

**G**EORGI, A RUSSIAN refugee who came to Sweden with his family when he was five years old, could talk at length about the virtues of the Volvo. His doctor described him as “the most ‘Swedeified’ in his family.” He was also one of the most popular boys in his class. For his thirteenth birthday, two friends listed some of the qualities that he evoked: energetic, fun, happy all the time, good human being, amazingly kind, awesome at soccer, sly.

Georgi’s father, Soslan, had helped found a pacifist religious sect in North Ossetia, a Russian province that borders Georgia. Soslan said that in 2007 security forces demanded that he disband the sect, which rejected the entanglement of the Russian Orthodox Church with the state, and threatened to kill him if he refused. He fled to Sweden with his wife, Regina, and their two children, and applied for asylum, but his claim was denied, because the Swedish Migration Board said that he hadn’t proved that he would be persecuted if he returned to Russia.

Sweden permits refugees to reapply for asylum, and in 2014, having lived in hiding in central Sweden for six years, the family tried again. They argued that there were now “particularly distressing circumstances,” a provision that allowed the board to consider how deportation will affect a child’s psychological health. “It would be devastating if Georgi were forced to leave his community, his friends, his school, and his life,” the headmaster of Georgi’s school, Rikard Floridan, wrote in a letter to the board. He described Georgi as “an example to all classmates,” a student who spoke in “mature and nuanced language” and showed a “deep gratitude for the school.”

In the summer of 2015, shortly before he entered seventh grade, Georgi learned that the Migration Board had rejected his family’s application again. The news came in a letter, which he translated for his parents, who couldn’t read Swedish.

They appealed the board’s decision, and Georgi tried to focus on school as he waited for more news. Not long afterward, a friend on his floor-hockey team stopped coming to practice. Georgi was distraught when he learned that the teammate, a refugee from Af-

ghanistan, had been deported with his family, “as if they were criminals,” he said. Georgi became sullen and aloof, and he stopped speaking Russian. He said that the words were just sounds, whose meaning he could no longer decipher. He withdrew from his parents, whom he accused of having failed to assimilate. His nine-year-old brother, Savl, acted as the family’s interpreter. “Why haven’t you been learning Swedish?” Georgi said in Swedish to his brother, who translated the words into Russian for their parents.

In December, 2015, the Migration Board rejected their final appeal, and, in a letter, told the family, “You must leave Sweden.” Their deportation to Russia was scheduled for April. Soslan said that to his children Russia “might as well be the moon.” Georgi read the letter silently, dropped it on the floor, went upstairs to his room, and lay down on the bed. He said that his body began to feel as if it were entirely liquid. His limbs felt soft and porous. All he wanted to do was close his eyes. Even swallowing required an effort that he didn’t feel he could muster. He felt a deep pressure in his brain and in his ears. He turned toward the wall and pounded his fist against it. In the morning, he refused to get out of bed or to eat. Savl poured Coca-Cola into a teaspoon and fed Georgi small sips. The soda dribbled down his chin.

At the recommendation of neighbors, Georgi’s parents called Elisabeth Hultcrantz, an ear-nose-and-throat doctor who volunteers for the charity Doctors of the World. Three days after Georgi took to his bed, Hultcrantz drove to his home, a red wooden cottage with white trim in the farmlands of Garpenberg, a hundred and twenty miles northwest of Stockholm. Georgi was wearing boxers and short athletic socks. He appeared to be asleep. A tulip-patterned blanket had been pulled up to his chin. When Hultcrantz touched him, his eyelids trembled, but he didn’t move. Using a pillow, she propped up his head, but it flopped to the side. “He provides no contact whatsoever,” she wrote.

After a week, Georgi had lost thirteen pounds. Hultcrantz, a professor emeritus at Linköping University, urged the family to take him to the emer-

gency room in Falun, a city forty miles away. He hadn’t eaten for four days and had not spoken a full sentence in a week.

A doctor at the hospital wrote that Georgi “lies completely still on the examination table.” His reflexes were intact and his pulse and blood pressure were normal. The doctor lifted Georgi’s wrists a few inches above his forehead and then dropped them. “They fall down on his face,” she wrote. A nurse noted that he showed “no reaction to caregiving.”

The next day, a doctor inserted a feeding tube through Georgi’s nostril. “He showed no resistance,” Soslan said. “Nothing.” Georgi was given a diagnosis of *uppgivenhetssyndrom*, or resignation syndrome, an illness that is said to exist only in Sweden, and only among refugees. The patients have no underlying physical or neurological disease, but they seem to have lost the will to live. The Swedish refer to them as *de apatiska*, the apathetic. “I think it is a form of protection, this coma they are in,” Hultcrantz said. “They are like Snow White. They just fall away from the world.”

**T**HE APATHETIC CHILDREN began showing up in Swedish emergency rooms in the early two-thousands. Their parents were convinced that they were dying. Of what, they didn’t know; they worried about cholera or some unknown plague. Soon patients with the condition filled all the beds in Stockholm’s only psychiatric inpatient unit for children, at Karolinska University Hospital. Göran Bodegård, the director of the unit, told me that he felt claustrophobic when he entered the rooms. “An atmosphere of Michelangelo’s ‘Pietà’ lingered around the child,” he said. The blinds were drawn, and the lights were off. The mothers whispered, rarely spoke to their sick children, and stared into the darkness.

By 2005, more than four hundred children, most between the ages of eight and fifteen, had fallen into the condition. In the medical journal *Acta Paediatrica*, Bodegård described the typical patient as “totally passive, immobile, lacks tonus, withdrawn, mute, unable to eat and drink, incontinent and not reacting to physical stimuli or pain.”

Nearly all the children had emigrated from former Soviet and Yugoslav states, and a disproportionate number were Roma or Uyghur. Sweden has been a haven for refugees since the seventies, accepting more asylum seekers per capita than any other European nation, but the country's definition of political refugees had recently narrowed. Families fleeing countries that were not at war were often denied asylum.

In an open letter to the Swedish minister of migration, forty-two psychiatrists asserted that the new restrictions on asylum seekers and the time it took the Migration Board to process their applications—children could be in limbo for years—were causing the disease. They accused the government of “systematic public child abuse.” Opinion within the medical community converged on the theory that the illness was a reaction to two traumas: harassment in the children's home country, and the dread, after acclimating to Swedish society, of returning. Sweden's leading medical journal, *Läkartidningen*, devoted dozens of articles, and several poems, to the syndrome. “Your eyes had seen it all/ aged with an old man's weariness without any hope of life in the future,” Mildred Oudin, the chief of child psychiatry in Skövde, in central Sweden, wrote. Magnus Kihlbom, the director of an institute for child psychiatry in Stockholm, proposed in the journal that the disorder represented a kind of willed dying. Kihlbom cited the psychiatrist Bruno Bettelheim, a Holocaust survivor, who wrote that some prisoners in the concentration camps were “so totally exhausted, both physically and emotionally, that they had given the environment total power over them.” They “stopped eating, sat mute and motionless in corners, and expired.”

Swedish news programs broadcast footage of children on stretchers being loaded into airplanes and expelled from the country. Sweden prides itself on its commitment to helping the most vulnerable, and the illness was seen as an affront to the country's national character. Even the King was alarmed. “It's terrible, what is happening to these poor children,” he told the press in 2005. (A psychologist tracked down an apathetic boy who had been de-

ported to Serbia and found him, six months later, still unconscious, his skin sallow, in a one-room house with no running water.)

A hundred and sixty thousand Swedes signed a petition to stop the deportations of apathetic children and other asylum seekers. Five of Sweden's seven political parties demanded amnesty for apathetic patients. On the television program “Mission Investigate,” Gellert Tamas, one of the country's best-known journalists, reported, “The issue is only a few hours from bringing down the government.” The Swedish Parliament passed a temporary act that gave thirty thousand people whose deportations were pending the right to have the Migration Board review their applications again. The board began allowing apathetic children and their families to stay.

In a hundred-and-thirty-page report on the condition, commissioned by the government and published in 2006, a team of psychologists, political scientists, and sociologists hypothesized that it was a culture-bound syndrome, a psychological illness endemic to a specific society. Every culture possesses what Edward Shorter, a medical historian at the University of To-

ronto, calls a “‘symptom repertoire’—a range of physical symptoms available to the unconscious mind for the physical expression of psychological conflict.” In parts of India, patients are said to suffer from *dhat* syndrome: they complain of impotence and have the delusion that they are losing their semen. In Nigeria, students who can't retain information and report feeling a burning sensation in their heads are sometimes given a diagnosis of “brain fog.” The illnesses are reinforced by a local belief that the symptoms are a sign of authentic suffering, worthy of expert attention and care.

The Swedish government's report proposed that the apathetic children were from “holistic cultures,” where it is “difficult to draw boundaries between the individual's private sphere and the collective domain.” They were sacrificing themselves for their family by losing consciousness. “Even if no direct encouragement or directive is given,” the report said, “many children raised with holistic thinking may nonetheless act according to the group's ‘unspoken’ rules.”

The report seemed to ignore the influence of Sweden's own culture on the illness. When the Swedish government



*“Exactly how entrenched is your beard?”*

sent doctors and sociologists to visit Kosovo, Serbia, Azerbaijan, Kazakhstan, and Kyrgyzstan, to find out if the illness was a culturally specific way of reacting to trauma, local doctors said that they had never heard of such symptoms.

**G**EOGI'S NEXT-DOOR NEIGHBOR, a Russian girl named Revekka, was given a diagnosis of apathy three years before him. She had become ill when she was twelve, after the Migration Board rejected her family's application for asylum. Ellina Zapolskaia, a friend of both families who lived nearby and had practiced medicine in Russia, told me that, after Georgi's first day in bed, "I knew it was the same sickness."

Georgi spent three nights at the hospital in Falun before being sent home with a special supportive mattress. His friends called and texted him repeatedly, but they received no response. Georgi's teachers called his family to find out why he had been absent for a week. Floridan, the headmaster, said that Georgi's classmates were in tears when he explained what had happened. He told them, "Georgi has waited such a long time to get an answer about whether he can stay here in Sweden, and he has more or less given up. He finds no meaning in school or to even exist."

A physiotherapist at the hospital advised Georgi's parents to turn on the lights in his bedroom every morning, and to immerse him in the daily rou-

tine of the household. Georgi was rolled to the dinner table in a wheelchair; a cushioned headrest propped up his head, though his eyes remained closed. He was fed four hundred and fifty millilitres of nutrients five times a day, through a tube.

When Hultcrantz visited Georgi a month after his hospitalization, she noticed that the expression on his face had "smoothed out." He no longer appeared distressed, as he had in the early days of the illness. She told his parents, "This is more peaceful for him," but she was guessing.

Hultcrantz, who has treated more than forty children with apathy, empathizes with her patients so viscerally that answers to routine questions can make her cry. Her husband jokes that she treats medicine like a "contact sport." She spends her days driving long distances through central Sweden, providing medical exams to refugees for free. She believes that people cannot be truly healthy unless they have *trygghet*, a word that in English translates as "security" but which has a broader meaning in Swedish: trust, a sense of belonging, freedom from danger, anxiety, and fear. The modern Swedish welfare state was built on the idea that it must safeguard *trygghet* for its citizens, minimizing the risks to which they are exposed. "Security is the most basic foundation of the individual," the Swedish minister of social

affairs explained, in 1967. "Nothing good has ever come out of insecurity."

In a seventy-six-page guide for treating *uppgivenhetssyndrom*, published in 2013, the Swedish Board of Health and Welfare advises that a patient will not recover until his family has permission to live in Sweden. "A permanent residency permit is considered by far the most effective 'treatment,'" the manual says. "The turning point will usually be a few months to half a year after the family receives permanent residence." The guidelines draw on the Israeli sociologist Aaron Antonovsky's notion of a "sense of coherence." Mental well-being, Antonovsky theorizes, depends on one's belief that life is orderly, comprehensible, structured, and predictable. Antonovsky suggests, as Freud did, that psychological illness is born of narrative incoherence, a life story veering off course.

As Hultcrantz sees it, her most important task as a doctor is to be a good writer, constructing a coherent narrative from her patients' physical symptoms, which she interprets as metaphors for psychic distress. In a letter to the Migration Board, Hultcrantz wrote that Georgi "suddenly fell into a deep sleep when he perceived that his final hope for the future was taken from him," a description that she recently applied to another patient. "If the boy can get secure residency with his entire family, the prognosis is good and you can expect a full continuous recovery within one year," she wrote. "If the boy does not have security, he will not wake up in whatever country he is in."

A chipper, gray-haired grandmother, Hultcrantz seems unaware of her power. She sometimes encourages families to "get their tubing"—the feeding tube—as quickly as possible, in order to emphasize their suffering to the Migration Board. Her iPhone is full of photographs that she has taken of refugee children lying in bed. Their eyes are closed, their faces are pale, and they have an expression of dull tranquillity.

**T**HE CANADIAN PHILOSOPHER Ian Hacking writes that diagnoses can become "a way to be a person, to experience oneself, to live in society." Psychological illnesses often adapt to a culture's preoccupations and fears. In



*"That's the one I like best, but everyone else seems to like the other one."*

## THE TAVERN PARLOR

A giant step up into the dip—  
the unavoidable tremble of cocktail tumblers  
against bottles of bourbon and bitters  
droning the spittoon.

All dim, unwoken, shut  
as the Duchess's  
(née Clare Singleton's)  
dust-caked woodcut gramophone

as the frail jail of Limoges and miniature  
salt shakers belling at my footfall  
recalled country wenches  
doing the quadrille

with speculators' sons, and Ben  
the tavern houseboy, in canary pantaloons  
wafting a fan sewn from the tails  
of fifty peahens

to keep off the Luciferian flies.

—Danielle Chapman

late-nineteenth-century Europe, as women were resisting their social and sexual powerlessness, a new type of madwoman emerged: diagnosed as a hysteric, she was sexually erratic and outrageous, unleashing qualities that a lady was supposed to suppress. In the nineteen-eighties, in the United States, a new illness took root as doctors became increasingly aware of the prevalence of childhood sexual abuse. Thousands of women were given a diagnosis of multiple-personality disorder; they discovered that they had two or more distinct personalities, at least one of which had been abused as a child. Hacking argues that it is irrelevant to ask, "Is it real?" The better question is: "What makes it possible, in such and such a civilization, for this to be a way to be mad?"

No country has responded to refugees, arguably the moral crisis of our era, with greater diligence and conscientiousness than Sweden. The apathetic children embody the country's worst fantasy of what will become of the most vulnerable if Sweden abandons its values. The children are embedded in a moral and political debate that is central to the country's identity,

complete with heroes (doctors), victims (patients), and villains (those who doubt the victims' suffering). In an article about the illness that appeared in the newspaper *Dagens Nyheter*, Karin Johannisson, a Swedish historian, wrote, "Never had the ethics of compassion had such power, fed by vague historical guilt. This was about the whole image of Sweden—a country dripping with wealth but prepared to deport the most defenseless."

From afar, the country looks like a humanitarian utopia, but for twenty years Swedes have been arguing about the proper limits of their country's good will. In the past three years, as some three hundred thousand refugees, many from Syria and Afghanistan, have sought asylum, there has been a growing sense that the country can no longer afford to be beneficent. The Sweden Democrats, a party with roots in the neo-Nazi movement, has won the support of eighteen per cent of the population, by claiming that immigration is degrading the country. Within the past two years, Sweden has introduced border controls and new restrictions on asylum seekers; a leading mem-

ber of Parliament announced the rules while choking back tears.

For nearly two decades, a political question—What should we do about migration?—has played out through the bodies of hundreds of children. The number of new cases of apathy declined in 2006, after the Migration Board took a more lenient approach, but the illness is still being diagnosed in dozens of children. Last year, some sixty children lost the ability to move and to speak. There is now universal consensus that the children are not faking, but no one knows why the illness is particular to Sweden. I spoke with more than twenty Swedish doctors who had either treated apathetic patients or written about them, and none of them had an explanation; most were hesitant to even propose a hypothesis. Björn Axel Johansson, a child psychiatrist at Skåne University Hospital, in southern Sweden, who has treated twelve apathetic children, told me, "I'm not convinced that this is only happening in Sweden. Maybe it's only being documented and discussed and published in Sweden?"

THIRTY-SEVEN OF GEORGI'S classmates sent him letters. "These few weeks that you haven't been here have been so god damn empty," Louise wrote. She said that all she wanted to do was hug him. "You're the one that makes everyone happy and is friends with everyone," Oliver wrote. Georgi's classmates were dismayed that Sweden intended to deport him. "It was always in the back of our minds, but it was like a punch in the jaw when we heard them say it," Lilla-Lisa told him.

Teachers from Georgi's school visited once a week and read him novels and excerpts from his textbooks, and his friends visited in groups of two and three, carrying on conversations by his bedside. Although psychiatrists do not know whether apathetic children can process language, they recommend that patients be treated as if they were sentient. Floridan said that he told Georgi, "We are longing for you." He thought that he could detect Georgi's eyes moving under the closed lids.

Georgi's mother, Regina, a beautiful, delicate-featured woman prone to headaches, became withdrawn and

depressed. Savi stopped going to school. A doctor from Falun Hospital wrote that Savi was consumed by “fear and anxiety that he will be picked up by the police and deported.”

Although Hultcrantz referred to Georgi’s state as a coma, she acknowledged that the term wasn’t quite accurate. Each time she visited, she rubbed his sternum and applied pressure to his fingernails—tests that elicit responses in comatose patients—but he didn’t move. Then she stroked the sole of one of his feet, a test devised by the neurologist Joseph Babinski as a way to determine whether a patient’s paralysis is organic or hysterical. Georgi curled his big toe, an indication that there was no structural damage to his brain.

In April, four months after Georgi became ill, the family’s deportation was postponed, because his dependence on the feeding tube made flying hazardous. He seemed to be sinking deeper into the condition. Hultcrantz observed that he had begun to drool. At Falun Hospital, a doctor noted that Georgi had “no muscle tone in either the arms or legs,” and that his arm reflexes were “difficult to trigger.” The doctor wrote, “The boy is alive but barely.”

LAST FALL, HULTCRANTZ took me to meet two sisters, Roma girls from Kosovo, who were both apathetic. Djeneta, the younger of the two, had been bedridden and unresponsive for two and a half years, since she was twelve. In a letter to the Migration Board, in October, 2015, Hultcrantz warned, “The only thing that can help the whole family get out of their sense of powerlessness is if they can be guaranteed security.” A year later, the family’s application for residency was rejected, and within twenty-four hours Djeneta’s sister, Ibadeta, who was fifteen, lost the ability to walk. Her father, Muharrem, tried to force her to go to school by putting her on the seat of her bicycle and pushing it. By the time they got to the school, Ibadeta was limp. Muharrem carried her home and put her in bed, where she had remained for the past five months.

The family lives in central Sweden, in a brick dormitory that houses refugees. When we visited, the two girls had taken over the only bedroom in

the apartment. They lay side by side on twin beds that had been pushed together in the middle of the room. Beside their beds was a package of diapers. Their heads, centered on their pillows, were tilted toward the window. Snow was falling, the first of the season. Djeneta had a feeding tube through her right nostril and Ibadeta through her left. Their long black hair had recently been combed.

At the family’s interview with the Migration Board, in 2014, their mother, Nurije, had explained that in Kosovo her children had been harassed for being Gypsies. “We are Roma and we have no country and we are badly treated,” she said. She told the Migration Board that they couldn’t return to Kosovo, because “there’s no life.” She didn’t have the documentation to substantiate her claims, but her daughters now embodied the sentiment.

Nurije led Hultcrantz into the bedroom, pulled off the girls’ quilts, and undressed them, leaving their blouses draped around their necks. “Oh, Djeneta,” Hultcrantz said, in a maternal tone. She opened Djeneta’s eyelids with her fingers. To my alarm, Djeneta looked straight ahead. It was the sort of stare one would expect from a dead person.

Hultcrantz shined a flashlight in each of Djeneta’s pupils, and they contracted. “This shows that, physically, she is O.K.,” Hultcrantz told me. “It is just that her brain is in a moth bag,” she said, using a term for the container in which Swedes store their winter clothes.

Hultcrantz walked to the other side of the bed and opened Ibadeta’s eyes, but she couldn’t find the pupils. Her eyes were white, the result of a reflex known as Bell’s phenomenon, in which the eyeball rolls back to protect the cornea. “The condition is not as deep,” Hultcrantz said. She took Ibadeta’s pulse and blood pressure and found that they were normal, unlike her sister’s, whose pulse and blood pressure had lowered during her two years in bed.

Then Hultcrantz asked Muharrem for ice. He couldn’t find any cubes in the freezer, so he returned with a bag of frozen chicken. Hultcrantz placed the chicken on Ibadeta’s bare stomach

and tested her pulse and blood pressure again. In a healthy patient, the sudden chill would have spurred fluctuations in the measurements, but Ibadeta’s vital signals remained the same. Throughout the exam, Nurije cried so silently and unobtrusively that no one saw fit to comment.

When Hultcrantz gave Ibadeta a breast exam—one of her patients had developed cancer, which remained undetected during the months that she lay in bed—I began to feel faint. The girls looked uncannily beautiful. Except for a speckling of acne on Ibadeta’s chin, their skin was perfect, and their bodies, just past puberty, looked agile and lithe. Ibadeta breathed a little more deeply after her breasts were touched, but her expression never changed. The hushed reverence with which everyone treated the girls, lying side by side in the same position, reminded me of some sort of pagan ritual. Their illness was so freighted that the principles they embodied seemed to overshadow the particulars of their condition. Hultcrantz took no notes during her examination; she said that the information is always the same.

After the exam, the family served us a plate of Oreos. The girls had a cousin who had become apathetic, and I asked Muharrem and Nurije, through a Romani translator who helped with the interview, if they thought that the illness was contagious.

“No, no, no,” Hultcrantz interrupted, before the translator could relay the question. “They had never been in contact with the cousin when she was sick.”

“But from one sister to the other sister?” I asked. I pointed out that even depression can be contagious.

Hultcrantz refused to let the interpreter translate my question, which she seemed to consider an insinuation that the condition was somehow less real. But Nurije, grasping the gist, answered directly: “She got sick because she saw her sister in this condition.”

Muharrem said that when Ibadeta read the rejection from the Migration Board she started shaking and crying and said, “I will never be able to see my sister recovered.” She had gone to her sister’s doctors’ appointments, translating from Swedish to Romani

for her parents, and she had heard the doctors say that a residency permit was the only cure.

**I**N 1942, THE American physiologist Walter Cannon described a phenomenon called “voodoo death,” observed in Aboriginal cultures. Condemned to death by a medicine man, often for breaking a religious edict, the victim is so frightened that his physical condition deteriorates rapidly and he dies within days. He fulfills the medicine man’s prognosis. “It is the fatal power of the imagination working through unmitigated terror,” Cannon wrote.

Hultcrantz’s prescriptions also acquire the weight of prophecy. She is humble, selfless, and extraordinarily generous—she often lets asylum seekers stay in her house for months or years—but the story she tells about her patients’ illness is perhaps too compelling; she seems to inadvertently reinforce their symptoms. Like the medicine man, she has the authority to shape people’s beliefs about their own biology. In more contemporary terms, she and other Swedish doctors create the conditions for a placebo effect: the families expect that unless they are granted residency—the only medicine—their children will waste away.

No apathetic patients are known to have died, but a few have been bedridden for as long as four years. Lars Joelsson, the president of the Swedish Association for Child and Adolescent Psychiatry, told me, “As doctors, we don’t have the tools to treat these patients. Most of the treatment is to be there and see that they don’t die.” He believes that doctors have been tasked with solving a dilemma that is not medical but social and structural, the responsibility of the government. “People think they are coming to the promised land,” he said. “We don’t live up to our high ideals.”

Swedes have an admirable capacity

to blame themselves for failures of empathy. But, in the case of the apathetic children, the illness seems to have been exacerbated and enlarged by its moral symbolism. The struggle to cure the disease has also become an endeavor to restore Sweden’s imperilled humanitarian values. The patients have been described in medical papers as if they were superior beings, almost invariably the smartest, most sensitive, and best



*“All my will—I didn’t have it anymore,” Georgi said.*

assimilated children in their families. Prescribing medication has been deemed ineffective, and electroconvulsive therapy is considered unethical. “It’s a way of forcing the children back to a life that they have said they can’t take part of,” Lotta Spangenberg, a Stockholm child psychologist, told me. She sees the illness as a form of communication after words have failed. “This is a way of saying, ‘This is unspeakable,’” she said.

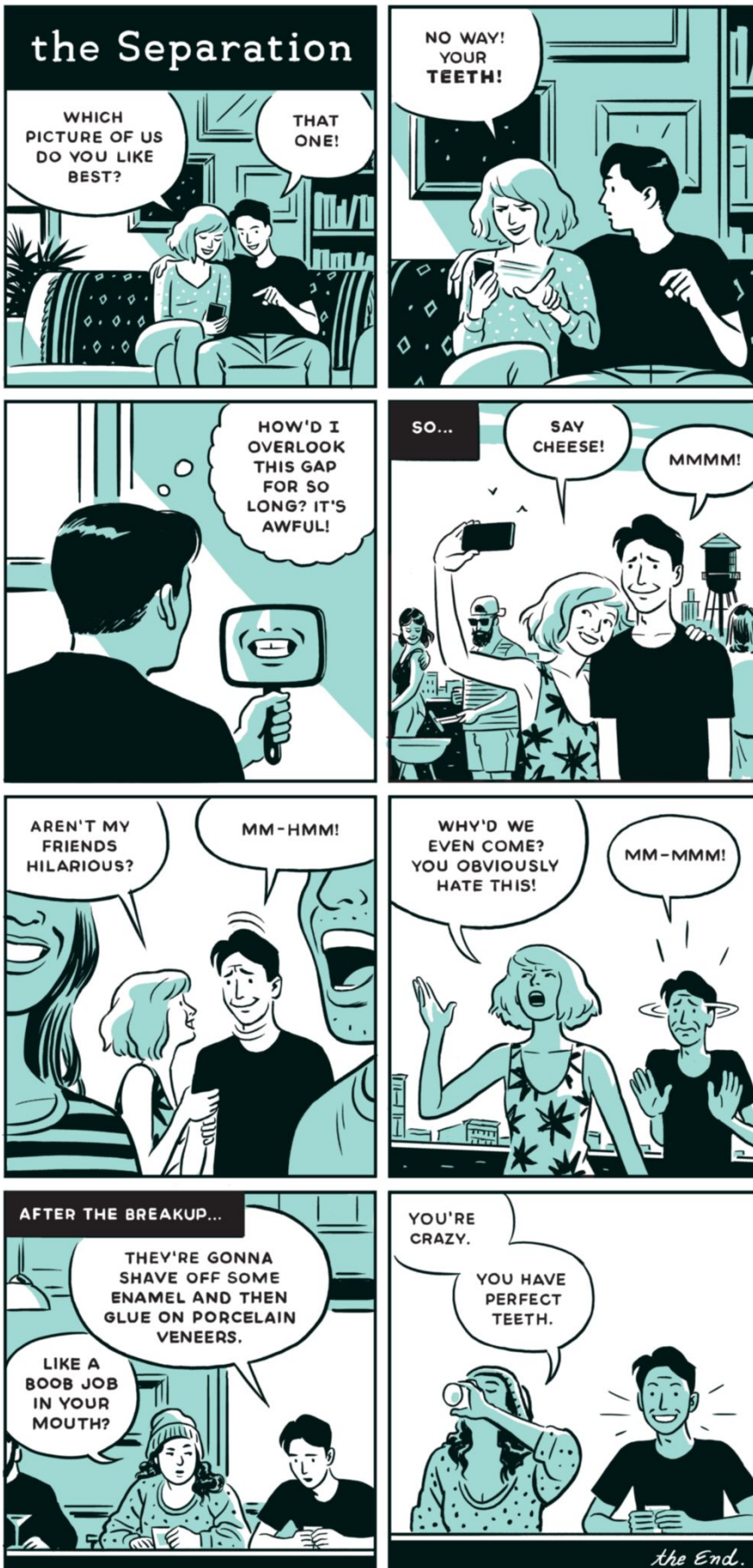
Isolated in a culture that can’t relate to their traumas, refugees have often been the purveyors of unique forms of

psychological expression. In the nineteen-eighties, in the United States, healthy refugees from Laos went to bed, cried out in their sleep, and never woke up; doctors concluded that their nightmares had scared them to death. Around the same time, in California, a hundred and fifty Cambodian women, who’d seen family members tortured during the Pol Pot regime, lost the ability to see. The apathetic children embody psychic wounds in a similarly literal way: they feel totally helpless, and they become totally helpless. As the poet D. M. Thomas writes, “The unconscious is a precise and even pedantic symbolist.”

Karl Sallin, a pediatrician at Karolinska University Hospital, who is writing a Ph.D. dissertation on apathy, said that he finds it disturbing that doctors seem content to let children dwell in a coma-like state for months or years, until Sweden grants them residency. “Another way to give the children hope would be to treat them properly and not leave them lying on a bed with a nasal tube for nine months,” he said. “I think it’s an open question if there’s a medical solution to the problem, because no one has really tried.” There is little empirical research on the illness, a necessary step toward devising treatments. “I’ve tried to persuade people to collaborate with me

on studies, but there’s been this resistance to look into the brain and acknowledge that there is a biological system at work,” he said. “People have built this sort of belief system around these children, and this is where the residency permit comes in—it’s the symbol in this battle.”

**I**N LATE MAY, 2016, Georgi’s family received another letter from the Migration Board. Their neighbor Ellina Zapolskaia translated it. “The Migration Board finds no reason to question what is stated about Georgi’s health,” she read



out loud. "He is therefore considered to be in need of a safe and stable environment and living conditions in order to recuperate." The family was granted permanent residence in Sweden.

Georgi's parents immediately went upstairs to his bedroom to tell him. He showed no reaction. "He doesn't listen," Zapolskaia said. "He's not there—not anywhere." For two weeks, Georgi's brother, parents, and friends tried to get him to absorb the good news. His family took him in his wheelchair to an ice-skating rink, where his classmates were playing hockey, but the fresh air had little noticeable effect. "You have got the positive!" one of his friends kept shouting. Zapolskaia said, "We tried to show him that our mood had changed."

His parents were confident that his recovery was imminent. According to Björn Axel Johansson, the psychiatrist at Skåne University Hospital, it takes weeks, and sometimes months, for an apathetic patient to grasp that his milieu has changed. "It is in the mother's voice—her decisiveness, the way she talks to her spouse," he said. "The subtext is transferred to the sick child. It gives him the courage to slowly look into the future."

On June 6th, two weeks after the family learned that they could stay in Sweden, Georgi opened his eyes. "It was just a little—a little," Zapolskaia said. He quickly shut them. "The light was too painful," Georgi said later. "But I remember that I saw my family." His body throbbed, as if he had just exercised far beyond his natural capacity.

Georgi's neighbor Revekka and her family had been granted residence three years earlier, because of Revekka's illness, and it took her eight months to recuperate. Zapolskaia was not sure that Revekka had ever fully recovered. "Her mind is not normal," she told me. "She is very slow. She must think before she answers."

Georgi progressed more rapidly. His mother documented his milestones in one of his school notebooks. Three days after opening his eyes, he "drank some water with a spoon." The next day, he "ate some ice cream." The day after, he "stirred his hand." Four days later, he "made an attempt to turn his body."

On July 26th, Georgi's nasal tube, which had been taped to his cheek for seven months, fell out. That day,

Hultrantz visited him and took a photograph. He was wearing shorts and a Diesel T-shirt and sat on a black couch, leaning his head against the wall and looking down, his mouth slack and his gaze unfocused. His arms appeared leaden, as if they no longer belonged to him. He had just begun to whisper.

His curly brown hair had grown into a furry mop. "Maybe you should cut your hair," Hultrantz told him. She ran her hand through his hair, as she often did, but he stiffened. She asked him if she could continue touching him. In a soft voice, he answered, "No." She interpreted this as a good sign: he was re-drawing boundaries around his body.

LIKE MOST APATHETIC children, Georgi regained physical abilities in the reverse order in which he had lost them. He opened his eyes; made eye contact with his family; began to feed himself; started to walk, shakily at first and then more steadily; and finally began to talk in full sentences.

By fall, Georgi was strong enough to return to school. His friends avoided conversations about his illness. "They don't ask questions, and I try not to think about it myself," he told me. He tired easily. What had once felt automatic now required deliberation. A few times, he felt as if math problems were exacting too much from his brain, and he excused himself from class. But, within a week, he was joking around with classmates. Floridan, the headmaster, said, "We couldn't believe what was happening."

In November, I visited Georgi at his house with Hultrantz, who hadn't seen him since he'd returned to school. I was expecting to see an ailing child, but Georgi was warm and solicitous. He had taken four years of English classes and was eager to compare American pizza, candies, cars, and sports with their Swedish counterparts. "When you were younger and in school, did you know there was a country called Sweden?" he asked me. He assumed not, since Sweden is "a chill country, a peaceful country," he said. It had no wars or revolutions, and the only national holiday he could think of was Cinnamon Bun Day.

The house was airy and bright, with vines strung along the walls and potted plants in the windows. Hultrantz

handed Georgi a survey, with questions containing three statements that articulated varying levels of confidence in oneself and in the world. Hultrantz told Georgi to check the one that best matched his mood. He usually chose the most optimistic option: "It will go well for me"; "I do not feel alone"; "I can be as good as other children"; "I am satisfied with my appearance." When he checked a less positive response—"I have a hard time deciding"—he drew an asterisk next to the statement and wrote, "sometimes, usually easy."

Among doctors who treat apathy, there's a widely circulated anecdote about a young patient who learned Swedish while she was unconscious. Hultrantz hoped that Georgi had also been learning while his eyes were closed. But Georgi said that he hadn't even known that his teachers had been to his house. He used to be a B student. Now he got C's. "So it's not very bad," he said. "It's in the middle. I am not the worst. Not yet."

Georgi's mother, Regina, emerged from the kitchen carrying a dish of lasagna, which she set on a coffee table in the living room. She and her husband seemed slightly in awe of their son, who ate a whole plate of lasagna and three chocolate truffles for dessert, and who was able to communicate in both Swedish and English. He had returned to speaking Russian, too, but Zapolskaia, who ate with us, felt that his facility with the language had deteriorated. She said that the family was "still on their way to getting healthy again."

Hultrantz turned to Georgi. "You're still feeling tired—that's nothing unusual," she said. "After some time, you will be completely cured, we know that." She told him that the slow pace of recovery was "probably related to the fact that it's not just in the body but in the thoughts as well." Georgi agreed.

During his months in bed, he said, he had felt as if he were in a glass box with fragile walls, deep in the ocean. If he spoke or moved, he thought, it would create a vibration, which would cause the glass to shatter. "The water would pour in and kill me," he said.

When we had finished eating, I asked Georgi if he realized that his

family had been granted residency because of him. Earnest and respectful, he considered the question as if it had been posed by a teacher. "When I am thinking about it now, I don't think that I wanted to do this," he told me. "Not if I start to think about how I felt in the glass cage."

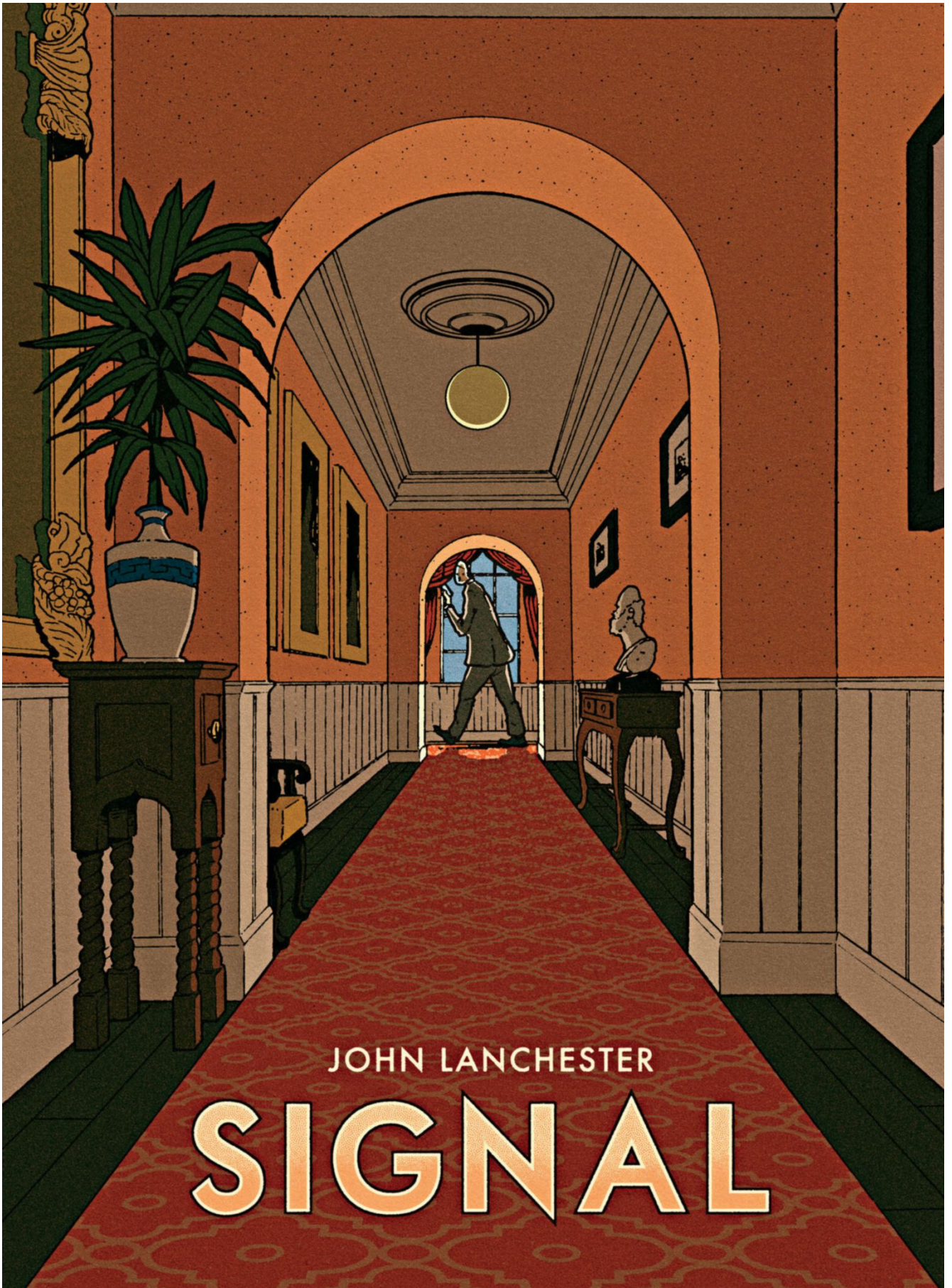
Hultrantz seemed to worry that I was directing him down an inappropriate conversational path, and she interrupted to tell him, "If I'm understanding you correctly, you're saying that, even if you had known this could save your family, you wouldn't want to go in the cage again."

"What I mean is, I didn't want to end up in it," he told her. "I didn't want to fall asleep." He explained that, at first, he had wanted to lie in bed all day, a decision born in part of anger at his parents. He felt that they should have worked harder to convince the board that they belonged in Sweden. "Why would I go to school if I cannot stay here in Sweden and get a job here?" he said. "It was that idea—why am I going to learn something if it doesn't have meaning in the future?" He added, "The only country I know—the only country where I can have a life—is here in Sweden."

The protest took on a momentum of its own. "All my will—I didn't have it anymore," he said. "It felt like I was deep under water." He struggled to find language that could adequately capture the experience. "I was just very tired," he said at one point. "It was not like now—I want to go and run." At another point, he compared it to eating too much: "You don't have any appetite." He didn't seem satisfied with either description and tried again: "My whole body was like water."

Georgi's experience of being trapped in a glass box sounded like a dream to me, but he said that, during the five months that he was in bed, he didn't dream. "Slowly, after some weeks or a month, I understood that it wasn't real," he told me. "The glass wasn't real. And now—now I understand that it wasn't real at all. But, at that time, it was very difficult, because every move could kill you. I was living there." ♦





JOHN LANCHESTER

# SIGNAL

I TRIED TO GIVE the children an etiquette lesson while we were waiting at King's Cross on December 30th.

"You aren't allowed to ask for the Wi-Fi password before you say hello," I said. "That's the main thing."

"Uncle Mike won't care," said Toby, who was nine.

"He's nice," said Mia, who was seven.

"Both of those things are true," I said. "Uncle Mike is nice, and he wouldn't care, but this is a life lesson. It's just not what you do. You say hello, you chat for a bit, and then you ask for the Wi-Fi password. It's just one of the rules."

"Fear? That's the other guy's problem," Toby said. We had recently let him stay up too late to watch "Trading Places," and this line had made a profound impact.

MICHAEL WASN'T MY oldest friend and he wasn't my closest friend, but he was older than any of the ones who were closer and closer than any of the ones who were older, so he had a special status, as part of the furniture of my life, the kind of friend who when you're asked how you met you have to think for a while to remember. What he certainly was, though, unequivocally and by a huge margin, was my richest friend. Michael was loaded, seriously and unambiguously loaded. He was the kind of rich that even other people who were rich considered rich. He had made the money himself. It was all the more impressive because Michael seemed barely to have noticed. His peers and friends and rivals and colleagues were all amazed by the fact that Mike was now some kind of gazillionaire, but it didn't seem to make much impression on Michael himself.

He'd drifted through Cambridge doing something scientific—engineering or maths, I think it was. I'd always thought that, like me, he was going to be an academic, but Michael had got a first and then stumbled into the City, and then shuffled or ambled through an escalating series of jobs in finance before "going off to try something a bit different," and at that point it became clear that he had ascended to some new stratosphere of international wealth. The first sign was when he in-

vited us to join him on holiday for a week, and that turned out to mean a helicopter pickup in Battersea taking us to a private jet at Northolt, taking us to a yacht the size of a municipal tennis facility, and a week's cruising in the Med. And still it was never clear how Michael had done what he'd done. This was a characteristic that had been salient from the time we first met, at university, his ambient, all-purpose, omnidirectional vagueness. It was a well-meaning vagueness, but it could also be highly irritating, and there were certain situations in which it more or less guaranteed disaster, such as anything involving social life.

This was shaping up to be another of those occasions. Michael had "bought a little place," as he put it, which, after he mentioned the address and I did a certain amount of cyberstalking, turned out to mean an estate of several thousand acres in North Yorkshire. The previous owner had suddenly died and the estate had been sold, in the flattering and far from accurate language of the only newspaper report, to a "mystery financier." Michael had invited us to go up for New Year's Eve about a month earlier and Kate and I couldn't resist, despite knowing that, while the setting was guaranteed to be amazing, from the social point of view it was likely to be chaotic, or hard work, or both. On the other hand, we knew that halfway through the alleged holidays we'd be hallucinating with fatigue, and three days with someone else looking after our lovely but exhausting little ones would feel like the kind of thing that should be available on the National Health Service.

THE TRIP UP NORTH felt like punishment for our hubristic attempt to change holiday routine. King's Cross was a maelstrom. The stress was magnified by the fact that Michael had said, by text, only that we'd be met at the station, without saying exactly where or by whom. Network Rail seemed to pride itself on displaying platform information at the last possible moment, so we were quivering like greyhounds as we waited to run to the train. Toby and Mia hadn't eaten and were holiday-cranky, and were demanding a trip to the Harry Potter Shop and to Platform 9¾. We didn't

know what we'd be doing at the house, or how fancy it would be, and as a result had overpacked. It was a perfect storm of travel stress and bad omens. Kate looked at me.

"This is a look of mute reproach," she said.

"Yep," I said. "Sorry. We'll wait for the platform info, get to our seats, and hope it sorts itself out at the other end."

"Unless he just forgot."

"No, he never forgets," I said, which was true: Michael might mis- or disorganize things, but he never plain forgot them.

The rest of the journey was both better and worse than I had expected. There were as many people standing as sitting, and when I say standing I mean lurching, swaying, listening to music at the perfect volume to irritate everyone within a five-metre radius. Add to that overheating, an unexplained twenty-minute delay after Peterborough, and two motion-sickness-prone children. We got off at York and, in the general mayhem, Kate found a driver carrying a sign with a misspelled version of our surname. The subsequent ninety-minute car trip through the Yorkshire dark, stopping only twice, for children's pee and vomit breaks, was a week at Jumeirah Dubai by comparison.

THE DRIVEWAY of Michael's big house was so long that even after we got there it took a while to get there. The four of us came out of the cold into a double-height entrance hallway, to be greeted by no one at all, apart from a very, very tall man, at least six feet five, who was looking at his mobile phone as if he was struggling to get reception, and more interested in that than in any other form of human interaction. His response to a family of four bursting through the door was to do nothing except scowl at us, then drift toward the side hallway. The rudeness was compounded by an air of complete coldness and disconnection, as if he couldn't have cared less whether we lived or died.

"Hello," Toby said. "Very nice to meet you. My name is Toby. How do you do? Also, would you mind awfully telling me the Wi-Fi password?"

While Kate and I spluttered and

glared at our firstborn, the man continued to walk away and vanished around the corner. Silence settled in the entrance hall of the big house. There was a stag's head on the far wall. Large portraits of formally dressed people from previous centuries frowned from above the unlit fireplace. Presumably, they were ancestors of the previous owner. The unwelcoming, inhospitable, eerie quiet loomed and grew. It seemed, for a moment, as if we didn't really exist. It seemed, for a moment, as if coming here for the holiday had been a very bad idea indeed.

Then, as in a farce, from the other side of the hall came four members of the household staff in uniform; a smartly dressed couple in early middle age arguing heatedly in French; and our host, who was carrying a pair of roller skates and a copy of a book called "Option Volatility & Pricing," by Sheldon Natenberg, thickly interleaved with Post-it notes.

"The four-fifteen," Michael said. He hadn't forgotten that we were arriving, but he had forgotten that we would be

arriving at that exact moment, so he was too distracted to greet us or smile or say hello. "Pickup at, say, four-thirty," he said to himself. "Ninety minutes across the moors. A few extra minutes for other journey variables. Six-thirty." He looked at his watch. "Yes!" And then suddenly there was the sweet smile and the abrupt sense of warmth and intimacy, which was why, after all, people did love him. "Yes!" he said and hugged Mia and then Toby and then Kate and me. He hugged like a natural non-toucher who had taken professional instruction in how to overcome his instincts and hug, and then found, greatly to his own surprise, that he liked it. Which, in fact, was what he was, and the reason I know is that I gave him the course, "I Hate Hugging: Overcoming Your Fear of Intimacy Through Touch," as a fortieth-birthday present.

After that, everything became better. I don't mean better from the social point of view, because Michael still didn't know how to introduce people, and, that evening, as we tried to work

out who was who, it became clear that he had done exactly what we suspected, and invited an essentially random group consisting of us, a large selection of work acquaintances who didn't know one another, and a few people he'd barely met but had asked at the last minute.

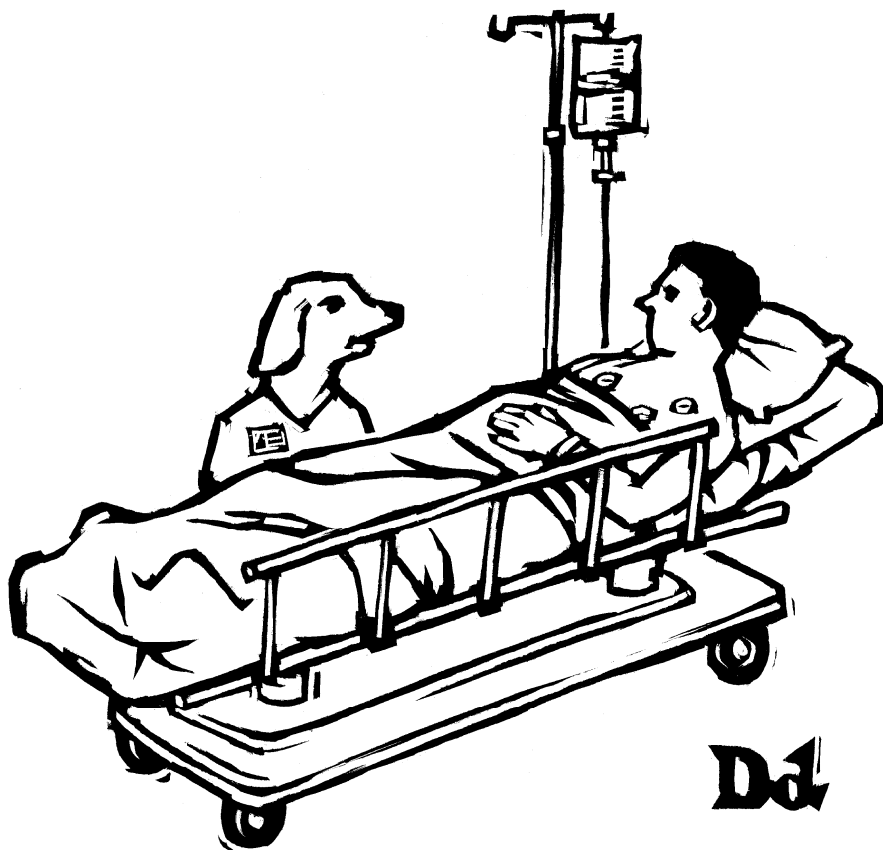
It seemed that there were roughly two dozen of us. Even the numbers were unclear and appeared to fluctuate from meal to meal, and there was never any seating plan or organization or itinerary or sense that anyone had thought about how to make the whole thing work. Balancing that, making the event feel like a lovely escape from reality, was the wonderfulness of the house itself, and the openhandedness with which it was run. The house looked big from the front, but we quickly realized that it was much bigger still, built like a ship with its narrow end facing the lawn and the drive. The bulk of the building stretched out backward and included, from a tired parent's point of view, every possible amenity you could think of. There was a video-game room, there was a retro-gaming room, there was a home cinema, there was a bouncy castle in a heated and covered area outdoors. There was a swimming pool; there was a multisized inventory of bicycles. There was a dedicated children's library, with books ascending in age range from the floor level upward.

Michael gave us the tour, in his habitual style ("Um—pinball machine").

"I've never seen so much stuff for kids—it's like a kids' hotel," I said.

"Previous owner. Mad about them," Michael said. "I like it, means I don't have to think about what kids want. I know that sounds a bit selfish, but you know what I mean."

I did. "It's brilliant!" Kate whispered to me. She was right, it was brilliant. And that was the great thing about the house, the fact that it was so functional, so thought-through, that it seemed to be looking after you of its own accord. Also, a small but crucial detail, the Internet connections were very poor. There was broadband—I mean, it wasn't Tora Bora—but the walls were thick and the frame of the building had a metal component, which meant that the Wi-Fi was so erratic that it was the same as not working. There was



*"Under your plan, the cute dogs do the surgery and the robots comfort you in the recovery room."*

next to no 3G or mobile data. That was luxurious, too—not for the few poor souls who were forced to roam the halls looking for mobile reception, but for us. I gave up on the Wi-Fi and stopped checking my phone. It was a holiday in itself to feel so out of touch, so uncontactable.

As for the children, we could more or less leave them to it. The school holidays had been going on for two and a half weeks already, and we were drained and resourceless from endless days of full-contact parenting. Here, that wasn't an issue. We sat with them while they ate their tea and then left them to a Disneython in the children's TV room. Then I wrangled them off to bed, a little hyper from the excitement and novelty—I mean me as well as the children—but still manageable. I needed one of the staff to help me find our room, up two flights of stairs, down two corridors, round a corner and then back again, unexpectedly, after all that twisting and turning, at the front of the house, overlooking the drive. The kids' very big room had a connecting door to our enormous one. We did faces and teeth, a perfunctory lullaby, I adjusted the lights so that they were low enough for Toby and high enough for Mia, and then I was back downstairs for dinner.

Conversation with this roomful of strangers was easier after the second drink. As the prune-and-Armagnac soufflé was served, Toby came down, announcing that he was worried and couldn't sleep. He seemed more scared than usual for his mid-sleep waking, but then it was a very big, very strange, very unfamiliar house. I was perhaps too quick to think nothing of it.

I took Toby up to bed. On the way, I complimented him on having managed to find the dining room. He said that one of the other guests, the tall man we'd seen looking for a mobile-phone signal in the entrance hallway, had shown him.

"He was on his mobile the whole time," Toby said. "It was a bit weird."

Looking back, all I can say in my defense is that it would have been very inconvenient to pay more attention to my sudden sense of unease. Easier to keep my head down and concentrate on having a good time. I found my way

to the bedrooms by turning left at a huge pot of poinsettias, and when Toby fell back onto his bed he was asleep by the second bounce.

**T**HE NEXT DAY started well. The children got themselves up and, after making a determined but mercifully short attempt to get us up, too, went off in search of breakfast—did I mention that there was something called a nursery, which was a separate children's dining room? We slept in until after nine, an extravagance of unprecedented dimensions. We were woken by the subliminal awareness that somewhere in this huge mansion somebody was cooking bacon.

There was a moment of incongruity when it turned out that, in the middle of all this lavishness, we couldn't open the curtains. They were soft and thick and hugely heavy, but there was no obvious pulley or cord to get them apart. The very definition of a First World problem: unopenable curtains. Luckily, just as I was about to give up, Toby and Mia returned from breakfast. Toby saw what I was doing and, trying to suppress his manifest sense of triumph, pressed a little button by the side of the bed. The curtains silently glided apart and we were looking out at a vista of lawn, oaks, and cloudy sky, down the driveway on which we'd arrived the day before. The lawns were pristine and stretched into the middle distance.

"I wish you'd been good at maths instead of English," Kate said.

"How did you know how to do that, darling?" I asked Toby. I had already noticed that one of the defining features of the house was that there were gadgets everywhere. Mostly buttons. The previous owner had evidently been button-mad. Everything from the curtains in the home cinema (oh, yes, forgot to mention, there were curtains) to the reclining mechanism on the seats in the spa (oh, yes, forgot to mention the spa) to the sliding door through to our dressing room (oh, yes, forgot to mention the dressing room) operated by buttons.

"The tall man told me," said Toby. "He knew how it works." Again, I felt uneasy, and again I ignored it.

At breakfast, there was that same



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sense of two dozen strangers thrown together by an indifferent destiny, and I had the impression that people were present who hadn't been at dinner the night before, and vice versa. No matter: the luxury was what mattered, what counted, what felt real. Toby and Mia had already disappeared off elsewhere. People muttered in desultory conversations and flicked through newspapers. Toward the end of the meal, Michael stood up at one end of the table and tapped a knife against a glass.

"Um," he said. I tried not to catch Kate's eye. "There isn't really a plan. For the day. Sort of, um, do whatever you, um, feel like. I thought we might go sort of shooting, you know, pheasants, so I'm going to do that and any of you who'd like to, um, do that can come too, um, at eleven or so, and have some lunch and so on."

So that's what we did. First, I went to find our host for a quiet word, which in a house this size was not straightforward. Eventually, I was steered by one of the staff to his office. Michael was sitting at a desk with "Option Volatility & Pricing" propped up in front of him, writing on a Post-it note.

"There's no futures market for onions," he said. "Gerald Ford had it banned when he was a congressman for Michigan. The Onion Futures Act was passed in 1958. It's the main reason onion prices are so volatile. Are you coming shooting?"

I said that I was.

"We have to bury some of them," he said, then, seeing that I had no idea what he was talking about, went on, "The pheasants. We shoot so many there's just no market. A market failure of a sort. Market for shooting but not for eating. So they get buried, plowed under by a tractor. I'm trying to find a way of giving them away. Strange thought, a food you literally can't give away. I forgot to ask: how was the trip up?"

"Fine," I lied. Then I counted to five, a technique I often employed with Michael, since if I changed the subject too quickly it would end up taking even longer: his face would

look like what a rebooting computer's face would look like, if it had one. *Four... five.*

"Michael," I asked, "just wondering, who is the very tall man?"

"I thought I'd said," Michael replied, visibly returning from his reveries about the international onion market and pheasant mass burial.

"Hector. He works for me. Well, sort of. He'd probably say he works 'with' me. I've noticed that that's a thing now, people say they work 'with' you, not 'for' you. They must think it sounds..." He faded out again.

"Hector," I said.

"Oh, yes, he's a data-mining person. Sort of, takes a haystack and digs out the needles."

"I'd like to have a word with Hector," I said. "Also, do you know if he has kids? I know he hasn't got any kids here, but does he have kids in general?"

"Um...yes. By a previous marriage. They came on the yacht once. The ex-wife seemed to be extremely cross with him, you sort of wondered why they were married. They're with her this Christmas. Boy and a girl." Michael got up and came round his desk.

I felt a sense of relief. Tall Hector was missing his children, so his interest in mine could easily be explained by that, and his wandering around semi-Aspergerishly on his phone when we'd first arrived would be accounted for by the kind of work he did: he was that type of person. Still, I felt that I should meet him. Michael took me on a tour of the public rooms (sitting room, library, salon, reading room, billiard room), and then we knocked on the door of Hector's suite, all without result.

"Probably gone for a walk. Some of them did. If he doesn't come shooting, or we don't bump into him in the course of things, I'll introduce you at dinner."

**T**OBY AND MIA didn't want to watch grownups shoot, so Kate gave them her mobile and gave the woman in charge of the house instructions not to allow them out but to let them



play video games or watch films or whatever until we got back. We headed off in a convoy of Land Rovers to an exposed patch of high ground a few miles away. I think slightly more than half our fellow-guests came. The beaters and drivers or whatever they're called were all in place. A reassuringly huge set of picnic baskets was arranged across trestle tables. Some of the party, who had clearly been forewarned, wore spectacularly complete English shooting drag, tweed waistcoats and jackets and caps and trousers and so on. A few of us, Kate and me very much included, were in jeans and trainers. The lugubrious man in charge of the shoot did not look impressed. He held out a bag and said, "Draw a peg." We did: I was No. 4, Kate No. 9. We set up with shotguns at our appointed spots. I introduced myself to the men on either side of me. One of them was a Hungarian former physicist who worked for Michael in some capacity that he either could not or would not explain, and who spoke what you'd have thought was an unemployably small amount of English. I don't know who the man on the other side of me was, because he didn't say anything. The pheasants were driven toward us, and we shot them, with varying degrees of competence. The argumentative Frenchwoman gave a small squeak every time her shotgun went off—and hit more pheasants than anyone else. I'd done this only once before, and set myself the target of hitting a single pheasant, which eventually, some way into the second hour, I did. While we were shooting, the clouds turned dark and threatened rain, but it stayed dry.

Lunch was—perhaps a macabre touch, but I appreciated it—pheasant sandwiches. Also blinis with caviar, made to order on a spirit stove, salad of salsify and chopped egg, custard tart, Billecart-Salmon rosé. The small talk continued to be hard work, but the shooting made it easier, because if the person you were talking to was hard going you could always point at the sky, say *bang!*, mime a pheasant falling to earth, and hold up a single finger. I did this with my Hungarian physicist. He looked at me, nodded slowly, and held up four fingers. I thought, Yeah,

right. After lunch, we were given new pegs and shot some more pheasants. I got another one.

**P**ARENTAL GUILT, LARGELY dormant while we were on the shoot, began to kick in on the way back, but, when we got to the house, a short unfrantic search found Toby and Mia parked in front of a “Star Wars” film in the TV room. In order to keep the level of digital distraction sufficiently intense, Toby had picked up an iPad—not his, a house iPad—and was playing a side game of Plants vs. Zombies.

“What did you have for lunch?” Kate asked.

“Beans,” they said in unison.

“Did you get bored?” I asked them as they sat side by side in matching reclining chairs, their legs not reaching to the end of the footrests.

“It’s ‘Star Wars,’” Toby said, as if to a simpleton. “We’re on the second one now.”

Kate and I exchanged a guilty look. We seemed to be doing a lot of that. We were having a good time, but it would also be possible to construct a case that we were the worst parents in the world.

“It was clever of you to get the new film and set up the screen and everything.”

“The tall man did it.”

Kate and I looked at each other and shrugged. Hector was lonely and missing his children. It made sense. But then Kate noticed something, and that was when the holiday went irrecoverably wrong.

“Your hair is wet,” she said. “You went for a swim?”

“Yup,” Toby said. “The tall man took us.”

“The tall man went swimming with you.”

“Yes. No. He didn’t get in. We went to the pool and wanted to go swimming, but there were no grownups there so we couldn’t, but then the tall man came and he let us in because he could reach the lock thing and then he waited by the side while we swam and then he went away. He was on his phone the whole time. He’s always on his phone.”

“The tall man was on his phone? Was he.” I tried to keep my voice level. “Did he look like he was filming you?”

“Maybe. I dunno. Maybe not. He kept moving his phone about. Even when we were in the changing room he was waving the phone about.”

I felt ill. I suddenly made a connection—the sight of Toby pressing the home button on the iPad was what did it.

“When the tall man told you how to make the curtains open in our bedroom, remember that? Pressing that button thingy? Did he just tell you, or did he come into the room and show you?”

I knew what Toby was going to say.

“We were looking and couldn’t find it, and he came in and showed us. He was on his phone then, too, when he came in our room. Like I said, he’s always on his phone. He never says anything, he just keeps looking at his phone.”

**I**KNEW SOMETHING WAS WRONG. I went at speed to look for Michael. I found him back in his office with his textbook. I told him we needed to find Hector, right away. He got up and came with me and we did the same circuit we had done earlier in the day. The house seemed to have refilled with guests during the afternoon, as people came back from whatever pursuits they’d been pursuing and started looking forward to dinner. Michael did a lot of smiling and nodding as we passed people in the corridors, the salon, the sitting room.

We found Hector in the library. A swarthy man with smooth dark hair was sitting in a red leather armchair with a copy of the *Financial Times* and a cup of tea. At a single glance, I could tell that he wasn’t the man we had seen in the hallway when we first arrived. “Hector!” Michael said. “Can I introduce my old friend David?”

Hector bounced to his feet. He was, at a generous estimate, five feet seven. I took his hand so distractedly I can’t have failed to seem rude. Then I said, “Excuse me” and dragged Michael out of the room.

“Michael, what the hell? I said the tall man. In fact, I said the very tall man. I was extremely specific. The whole point was how tall he is.”

Michael blinked at me. “Hector is tall. Unusually so. He is Bolivian, and they are the second-shortest people in the world. Average male height is 1.6 metres, or five feet two. Hector is many

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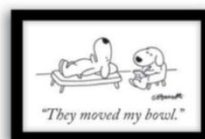
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centimetres taller than that. If he were Dutch and was that much taller than the national average he would be six feet eight. He could be a professional basketball player!"

I took a breath and wrestled for a moment with the desire to punch my close old friend in the face. *Three . . . four . . . five.*

"O.K., Michael, here's the thing. One of your guests has been behaving, let's just use that all-purpose word 'inappropriately' with my children. Going into their room at night, taking them for a swim, coming into the children's room when they're watching a film. O.K.? That clear enough for you? The person doing that is the tall guest. The one who is genuinely tall by any sane person's standards, not your bloody data person who could in some parallel universe be a Dutch basketball player if it weren't for the fact that in real life he's actually a fucking Bolivian dwarf."

Michael was completely still, usually a sign that he was thinking hard.

"Very tall," he said.

"Jesus, Michael? How clear do you want it to be? Yes, very tall."

He thought a bit more.

"No," he eventually said.

"What do you mean, no?"

"There are no guests that could be reasonably described as very tall. Taking that to mean, significantly in excess of six feet. I'm not sure that you yourself aren't the tallest man here."

That punch-old-friend-in-face feeling came back over me.

"Look: we saw him. When we arrived, he was right there in the hallway. In fact, we saw him before we saw you. A rude cold tall man. He went out one way just before you came in from the other side."

"No," Michael said again. "I'm sorry, but that doesn't fit my recollection. You were alone when I came in—I mean, except for some of the house people who were there to show you to your room and whatnot."

"Michael, I know social life and small talk and all that stuff aren't really your thing, but is it possible you have somebody here you don't know about? Somebody you accidentally invited in a casual moment and then forgot about?"

Copied in on an e-mail by mistake? Had a few drinks, blurted out a New Year's invitation, and they took you up on it without your realizing?"

"No," he said, yet again. "I'm sorry, but no. There is no possibility that there is a guest here I don't know about."

We both fell silent. It was easy to imagine how somebody could be moving around the house without being fully identified, since we were all essentially strangers to one another. The fact that this somebody was not a guest was what I found most disturbing. This meant that there was a man roaming around who wasn't supposed to be here, and who was taking an unsolicited interest in a nine-year-old boy and a seven-year-old girl, especially when there were no adults around. Michael and I came to no conclusion, and I could tell he thought that we had not seen quite what I knew we'd seen when we arrived, and also that the children were exaggerating or lying or had got imaginatively stuck on an inaccurate description of somebody, probably a member of staff. To be fair to him, I might have thought the same thing, if I hadn't seen the tall man with my own eyes.

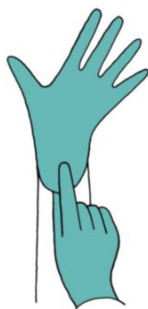
THAT NIGHT WAS New Year's Eve. A big evening was planned, with dinner and then a huge bonfire, where we were supposed to gather to toast the arrival of January 1st. I decided to skip all of it. After talking to Michael, I went to see Kate and we decided that it was too late to leave, but we would not let the children out of our sight for

the rest of the day. Kate sat with them while they ate their supper and then went to dress for dinner while I read them a story and got them settled. Then I took up position in an armchair opposite the doorway, turned off the light, and just sat there. It felt like an expiation, a penance for I don't quite know what. The leather chair squeaked when I moved, and the children murmured complaints for the first quarter of an hour, but once they'd fallen asleep I was free to wriggle about.

Time passed slowly. Although we were at the opposite end of the house and on the first floor, I could sense the big dinner party, the thrum and vibra-

tion of company and cooking and coming and going around a big crowded table. The bedroom was warm, and I alternated between feeling drowsy and anxiously, jerkily awake. Toby and Mia took turns muttering and shifting in their sleep. After a couple of hours, I could hear voices and movement; dinner had finished. Kate came into the room, pantomiming cat-burglarishly as she tiptoed in. She went through into our room, changed into many layers of warm clothing, came back to kiss the children once again, and headed off into Phase II of the celebrations. Noise came and went as doors opened and closed, and there were subtle drafts as guests went through the big doors at the front of the house. Then it grew properly quiet again. I sat and fidgeted and daydreamed, never managing to be either entirely comfortable or uncomfortable. I thought about the identity of the tall man. I thought about Michael and the ways in which he had and hadn't changed. I thought about the lectures I was giving next term, and how sick of them I was, and whether or not I could be bothered to write another course. I remembered back to the time I'd written these, in the first year of my first job, two decades ago, while Michael and I were sharing a flat, when nothing about the idea of being in my rich old friend's huge house with my two children asleep in the room, and my wife outside at a bonfire, would have seemed in any way imaginable. I thought about the ways in which I liked my life and the ways in which I was disappointed by it.

I may have fallen asleep. I'm not sure. What happened next was in the margin between dreams and full consciousness. I knew where I was and what I was doing, but my volition seemed to have been dialled down so that I could not move or speak. I saw the handle of the door, directly across from where I was sitting, start to move. It was easy to tell, because it was an irregular wooden handle and the pattern of light shifted on it as it turned. The door began, very gradually, to open. The figure in the doorway was backlit from the light in the hall, and I couldn't see its face, but I could see that it was a man. A tall man. Slowly and in complete silence, he came into the middle of the



room. He was holding a phone in his right hand, and when he got to the middle of the room he lifted it up to his face. For the first time, I could see his eyes. In the reflected light of the phone, they were completely white. There was no pupil and no iris. I ordered myself to stand, but couldn't. I felt as if there were nothing left of me but a compound of fear and helplessness.

The man walked across to Toby's bed and stood over my sleeping son. He held the phone out over Toby and moved it up and down. He looked at the phone and shook his head. Then he crossed to Mia's side of the room. He held the phone out again. There was a faint murmur, as if he was whispering to himself. He kept looking down at the children and then back at his phone. He never looked at me. After standing by Mia's bed for what felt like a long time, he shook his head again and went back to the middle of the room. Then he bowed his head for a moment, as if in prayer or resignation, and walked out of the bedroom. The door closed smoothly and silently. There was no noise of footsteps, but there was a regular tapping noise that hadn't been there before. It took me a few seconds to realize that it was my heartbeat, and that I was now, if I hadn't previously been, fully awake. I got up and ran to the door and opened it. The corridor was empty. Through the window at the far end of the hallway, facing over the back of the house, I could see the distant flames of the New Year's celebratory bonfire. I ran to the window, from which the corridor forked left and right to the two wings of the house. There was nobody to be seen.

**WE LEFT BEFORE** breakfast. There were no trains, so I had asked Michael's driver, the one who'd picked us up, if he would, as a private arrangement between him and me, take us all the way home. We agreed on a rate of a pound a mile, which at the time I felt was the best two hundred and fifty pounds I would ever spend. I would have said goodbye to Michael if I had seen him, but he wasn't up yet, so I didn't. We carried our own bags downstairs at seven o'clock, and the driver was waiting. He helped Kate and me shove our cases into the trunk.



The car set off down the long driveway. It had been cold overnight, and a hard frost had settled on the lawns and on the gravel, so the driver went slowly. When we got a few hundred yards from the house, my phone suddenly blossomed with texts and messages and missed calls. I took it out and looked: nothing important, just the electronic detritus of modern life. The driver laughed.

"That always happens," he said. "Used to drive the previous owner mad. Did everything he could to get reception inside, and none of it worked. He'd wander about the house, cursing the weak signal. He hated it, because he was mad about his gadgets. We used to say the two loves of his life were his gadgets and his children. And the sad thing was, that was how he died. He was driving up here, tried to send a text to say he was running late. Texting and driving—bad combination. Car turned over, he died. When they cut him out of the car, phone was still in his hand."

"Stop the car," I said. We crunched to a halt. I found myself breathing heavily. I undid my seat belt and got out. The grass was stiff with frost. I leaned down to my open door and said, "The previous owner—was he a tall man?" but I didn't wait for an answer, because I knew what it would be. I stood and turned and looked back at the house. Standing at the window of the children's bedroom, a familiar shape appeared in silhouette. I couldn't see him clearly, but there was a sharp flash of light, and then another, and then another. I realized that the light was coming from something in his hands, moving from side to side, catching the early-morning sun and dazzling it back at us, as he turned and moved and shifted, always moving, always adjusting, forever straining for that elusive thing, forever seeking, trapped in a moment that would never end, trying to find a signal. ♦

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John Lanchester on ghost stories.

# THE CRITICS



BOOKS

## OBSTACLE COURSE

*Abortion hasn't been banned. So why has it become so hard to get one?*

BY MARGARET TALBOT

AT A TOWN-HALL MEETING in Green Bay, Wisconsin, last March, Donald Trump was prompted for his views about abortion. He'd been pro-choice once, but as a Presidential candidate he was an eager, if ill-informed, pro-lifer. Much of his answer took the form of free-floating clauses, like dialogue from a bad experimental play, which made his actual positions challenging to parse. But Trump did manage to make one point clearly, and to repeat it. When the interviewer, Chris Matthews, of MSNBC, asked whether women who'd had abortions should be punished, Trump answered in the affirmative.

Politically speaking, this was not good. In recent years, the anti-abortion movement has tried hard to show that it cares as much about women as it does about fetuses. Right-to-life groups criticized Trump's wayward messaging, and, later that day, his campaign issued a statement explaining that it was actually doctors who ought to be punished if abortion were made illegal again: "The woman is a victim in this case as is the life in her womb."

Trump kept more or less to that script for the rest of the campaign; his choice of Mike Pence, a flawlessly anti-abortion evangelical Christian, as his running mate surely helped. But Trump's off-the-cuff comment had briefly exposed a truth at the core of anti-abortion politics. Since the nineteen-nineties, states have enacted hundreds of new restrictions on the constitutional right to abortion, from obligatory waiting periods and mandated state counselling to limits on public and even private insurance funding. The cumulative effect has been to transform the experience and the reputation of a safe, legal medical procedure into something shady and disgraceful that women pursue only

because they don't know enough about it or because they are easily manipulated emotional time bombs.

In a clear and persuasive new book, "About Abortion" (Harvard), Carol Sanger, a professor of law at Columbia, explores the roots and the ramifications of this chastening regime. "Much of current abortion regulation operates to punish women for their decision to terminate a pregnancy," Sanger writes. "This is so even though abortion has not been a crime since 1973, and even then, women themselves were rarely included within criminal abortion statutes." When you cannot ban something outright, it's possible to make the process of obtaining it so onerous as to be a kind of punishment, Sanger argues, drawing on the ideas of the legal scholar Malcolm Feeley.

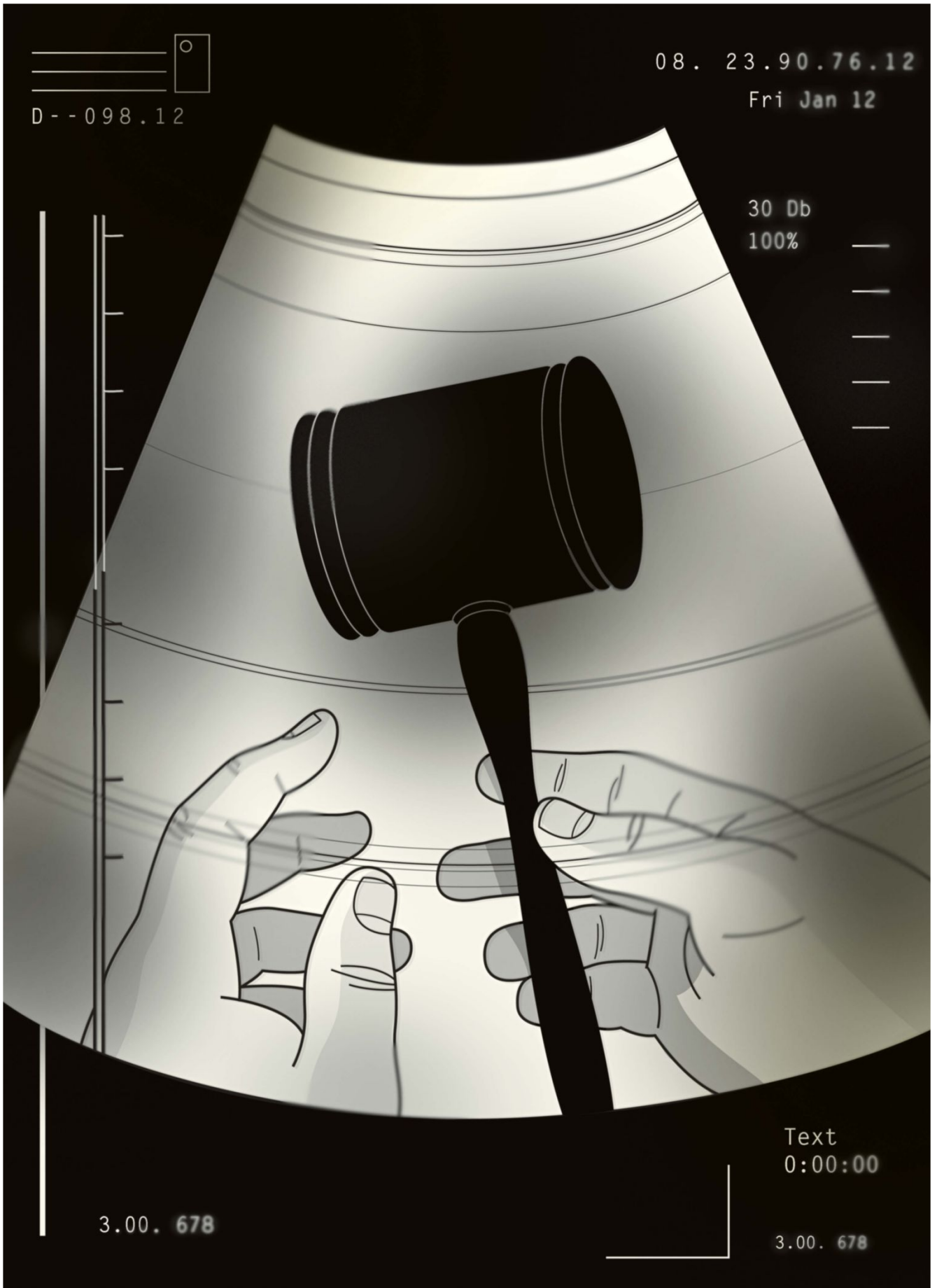
Consider the rise of Women's Right to Know laws, a cornerstone of Sanger's argument. Since the mid-nineties, such laws have been enacted in twenty-six states. They require that a pregnant woman seeking an abortion have an ultrasound of the fetus. In all but one of those states, she must be asked if she wants to look at the image. Some state laws require that her decision to look or not to look be noted and retained in her medical record. Six states—North Carolina, Oklahoma, Kentucky, Louisiana, Texas, and Wisconsin—go further: the monitor must be turned so the patient can see it, and the physician must narrate in detail, and in real time, what he or she is seeing. (The laws in North Carolina and Oklahoma are currently enjoined.)

At first glance, this approach might be mistaken for some sort of helpful, modern interpretation of informed consent. Sonograms are a nearly ubiquitous ritual

of wanted pregnancies now, and in that context most people think they're swell. Even those of us who could never quite make out what we were supposed to be seeing in the fuzzy, gray-scale images on the screen got teary-eyed, took the resulting printout home, maybe passed it around the office. These days, people might post their sonograms on Facebook, show them off at a baby shower or a "gender reveal" party, paste them on the first page of the baby book. Moreover, many doctors who perform abortions will do an ultrasound for legitimate medical reasons—to check how far along a pregnancy is, or to pinpoint where the embryo is situated.

But mandatory ultrasound laws are insidious. They proceed, first of all, from the notion that women don't realize that in choosing an abortion they will be ending some form of life, however they think of that life. Considering that nearly sixty per cent of women who have abortions have already given birth at least once, and so know something both visceral and emotional about pregnancy, fetal development, and childbirth, this is quite an assumption. Framed as a "right to know," the ultrasound obligation becomes even more disingenuous—"the right," as Sanger neatly puts it, "to be persuaded against exercising the right you came in with."

Another premise of the ultrasound laws is that women can be saved from their lack of knowledge and spared a lifetime of crippling regret. The idea that in undergoing abortion women experience something tragic and specific called "post-abortion syndrome" has been a linchpin of the anti-abortion movement in recent years. Like the claim that there is a link between abortion and breast cancer, this has been effectively refuted. A meta-analysis by the American Psychological



*Laws that mandate ultrasound viewing and parental consent seem innocuous, but they buttress a punitive political strategy.*

Association found no evidence to “support the claim that an observed association between abortion history and mental health was caused by the abortion per se, as opposed to other factors,” such as a prior history of mental illness. A 2011 review of scholarly evidence by the Academy of Medical Royal Colleges, in the U.K., found that “rates of mental health problems for women with an unwanted pregnancy were the same whether they had an abortion or gave birth.” Yet eight of the seventeen states that require counselling for women before an abortion stipulate that the counselling must include information on the procedure’s long-term mental-health consequences; five states say that it must cover the discredited link between breast cancer and abortion. This is not informed consent but ill-informed consent, with a side of coercion.

Evidence of regret is not refutable in the same way. Some women will regret having had an abortion, just as some will regret having a baby, getting married, dropping out of school, or a thousand other life choices that people make. Second thoughts are the lot of all decision-making adults; choosing one path closes off others. But, as Sanger writes, the Women’s Right to Know laws “draw upon a deep reserve of sentiment about what mothers are like and what causes them harm,” and the assumptions in both cases may well be wrong.

The laws’ clear intent is to discourage women from terminating their pregnancies, but they appear to be failing to do that. Only a few studies have examined the effects that viewing an ultrasound has on women seeking abortions, but

they suggest that it rarely changes their minds. In a 2014 study of more than fifteen thousand women who visited Planned Parenthood clinics in Los Angeles, around forty-two per cent of those who were offered the option of seeing the sonograms chose to; more than ninety-eight per cent of them decided to proceed with the abortion anyway. This confirmed the results of two smaller studies, in Canada and South Africa. The authors of the Canadian study observed that some women looking at the image had felt relief: “We have been aware that women tend to imagine something more like a miniature baby and this may be partly due to the images spread by anti-abortion organisations. Since most abortions are carried out in the first trimester, often no more than a gestational sac is seen and many women find this reassuring.” In a setting where women could not refuse to view the ultrasound or where counsellors were bent on persuading them not to have an abortion, perhaps the results would be different. But let’s say the pattern of those studies holds, and viewing the fetal images doesn’t make much of a difference. Should we care about these laws anyway?

Sanger says we should. They require a woman not only to look at something, after all, but to yield up the interior of her body so that it may be looked at—all to make the state’s case against abortion. This is something akin to unlawful search and seizure in a criminal case, where, as Sanger points out, there are limits on what the state can do to extract evidence from a defendant’s body. In this sense, mandatory ultrasounds

constitute not only coerced looking but “coerced production” of what is meant to be looked at. The language in some of the laws seems to acknowledge their creepy demandingness, while simultaneously magnifying it. A couple of the laws that require the ultrasound be visible to the patient allow her to “avert her eyes.” The Florida law says that she doesn’t have to look if she is pregnant as a result of rape, incest, or human trafficking. Though some of the laws as they were originally written required that a vaginal probe be used to produce the highest-resolution image of the fetus, these were amended, after public outcry, to allow an abdominal wand instead.

But, as Sanger contends, the intrusiveness is more than physical. In a liberal democracy, certain choices—whether to marry or have children; what, if any, religious faith we adopt—are generally regarded as being so personal and profound that they are protected from state interference. We accept that those kinds of decisions, Sanger writes, “reside within the special competence and authority of the person making the decision.” When someone applies for a marriage license, the state does not require her to read an analysis of divorce statistics first, or listen to a speculative recitation of the health risks of marriage. What is supposed to be protected, Sanger says, is not only the resolution a person comes to but the deliberative path she takes to get there. The ultrasound laws—and the counselling laws whose agenda is to persuade women not to have an abortion—wedge themselves into that private space for deliberation, undermining what Justice John Paul Stevens once called an individual’s “decisional autonomy.”

LIKE THE RIGHT TO KNOW laws, statutes requiring parental notification or consent when a minor seeks an abortion may at first seem unobjectionable. (Thirty-seven states have now enacted them.) Most of us would want a teenage girl to have the guidance and the support of a parent in such a decision. Furthermore, our legal system recognizes parents’ rights, within limits, to raise their children as they see fit. In fact, most minors who have abortions do involve their parents. If they don’t, there’s usually a good reason. Susan Hays, a lawyer who has represented pregnant minors in Texas



*“Guys, let’s demote Paul while he’s asleep!”*

for fifteen years, under the auspices of an organization called Jane's Due Process, told me that about a third of these women did not have parents or legal guardians who were alive and could be located. Hays has helped unaccompanied minors from Central America who had been raped on their journey here, de-facto orphans whose mothers were dead and fathers were in prison, girls who were living precariously on their own to escape abuse at home, and, once, a young woman whose parents ran a meth ring and were planning to pimp her out.

Owing to a 1979 Supreme Court decision, *Bellotti v. Baird*, minors who want an abortion but do not want their parents involved, or who do not have a parent who could get involved, can go to court and ask a judge's permission. The hearings are closed and confidential—the young women are all Jane Does. These judicial bypasses might seem like a reasonable compromise between parents' rights and concerns, on the one hand, and those of pregnant minors, to whom the Constitution also applies, on the other. But there is a peculiar logic at the heart of the judicial-bypass system. The judge is supposed to decide in the course of a hearing whether a petitioner is sufficiently mature and well informed to make her own decision. If the judge concludes that she's not mature enough to have an abortion, that means that she is mature enough to have a child, or, in any case, will have one.

Most petitions are granted. But those which aren't, Sanger writes, are often denied on dubious grounds. A judge in Alabama ruled that since sex education was taught at the petitioning minor's high school, the fact that she'd got pregnant demonstrated "that she has not acted in a mature and well-informed manner." Another Alabama judge refused a young woman's petition because it was not mature of her to "put the burden of the death of this child upon the conscience of the Court." In Nebraska, in 2013, a sixteen-year-old who was in foster care because her biological parents had abused and neglected her faced a Catch-22 when she sought a judge's permission to obtain an abortion. Her biological parents couldn't give consent, because their parental rights had been terminated; her foster parents couldn't, because her presence in the foster-care system made her a ward of the state, and the child-

welfare agencies of many states, including Nebraska's, refuse to consent to abortions. Yet the judge denied her petition, chiefly *because* she was a dependent living with her foster parents, proof of an immaturity that, in the court's view, consigned her to motherhood. Her situation was hardly unique, though it happened to become a national news story when she appealed the ruling—and the state supreme court upheld it.

Whatever the outcome of these hearings, Sanger argues, the process itself is an ordeal. To begin with, it's a considerable logistical challenge for pregnant teen-agers to avail themselves of the judicial-bypass system, if they even know it exists. Court officials who don't know much about it or who deliberately obfuscate make the task even harder. For a 2007 book, "Girls on the Stand," Helena Silverstein, a political scientist at Lafayette College, and a team of researchers called courts and children's-service advocates in Alabama, Pennsylvania, and Tennessee, to ask how a teenager could gain access to a hearing. Though they received some helpful answers, they also heard many along the lines of "Honey, I have no idea" or "A judge wouldn't touch that with a ten-foot pole"; prayer was sometimes recommended.

If a teen-ager nonetheless manages to obtain a hearing, in a public courthouse where she can only hope, especially in smaller jurisdictions, to avoid running into, say, a neighbor there for jury duty, she will likely have to answer questions from a judge about her sexuality, her birth-control practices, her mental health, her religious beliefs, and her family relationships, as well as her medical knowledge of pregnancy and abortion. If the judge happens to be personally opposed to abortion, she may be expected to display guilt or remorse that she does not feel, and be subjected to the judge's opinions on the matter. Sanger quotes an Alabama judge at one bypass hearing saying that doctors who performed abortions did so only for the money: "This is a beautiful young girl with a bright future, and she does not need to have a butcher get a hold of her."

A different kind of system for minors might be possible in these trying circumstances: a teen-ager who could not turn to her parent could obtain consent from her psychiatrist or another trusted adult—an older sibling, a grandparent, or a so-

cial worker, for example. But only a few states have made efforts in this direction. "When abortion was a crime, the extralegal punishment for women was being pushed into the unsavory and dangerous world of illegal abortions," Sanger writes. "Now that abortion is legal, the punishment (for minors at any rate) is embedded in the lawful hearings that young women must engage with in trial courts around the country. . . . It is as though if abortion can't be made illegal, it can still be made to *feel* illegal."

SO THIS IS where we are: the share of Americans who think abortion should be legal in all or most circumstances has hovered around or just above fifty per cent for the past twenty years (in 2016, it was fifty-seven per cent, a comparative high), while the partisan divide persists, and the procedure remains common and, medically speaking, routine. In 2008, it was estimated that one-third of American women would have an abortion at some point. In the past several years, though, the number of abortions has been decreasing. Whether this is because of legal obstacles or the wider use of more effective, long-acting contraceptive methods, such as I.U.D.s, is not entirely clear. (The fact that the numbers have declined in states where restrictive laws have not been passed suggests that the contraceptive explanation may be the better one.) Restrictions keep pouring out of statehouses, so whether or not *Roe v. Wade* itself is overturned the right is constantly being undermined.

Last June, the Supreme Court put some brakes on this in *Whole Woman's Health v. Hellerstedt*, which overturned a Texas law that required abortion clinics in the state to outfit themselves as ambulatory surgical centers and to mandate that doctors there have admitting privileges at local hospitals. The Court found that the regulations, which would have forced many of the abortion clinics in Texas to close, were not medically necessary, and imposed an "undue burden" on women seeking to exercise their right to abortion.

But anti-abortion legislators seem to have been emboldened by Donald Trump's victory. In the past several months, they've come up with a bill in Oklahoma that would require a woman seeking an abortion to get written

permission from the father of the fetus; in several other states, bills would require that women who have taken the abortion pill be informed of the doubtful proposition that, with timely intervention, the process can be “reversed.” These bills will be challenged, and it’s hard to imagine that they would ever be upheld; in 1992, the Supreme Court specifically rejected spousal consent as an “undue burden.” Yet their proliferation and the language used to justify them (the legislator who introduced the Oklahoma bill referred to any pregnant woman as a “host”) make life materially harder for women.

One reason we’ve reached this point is that pro-life activists have proved to be so tenacious, and have made smart use of new technology (those ubiquitous sonograms), and another is that legislators have turned out to have a heartier appetite for shaming and policing women than some of us might have reckoned. Yet another reason, Sanger argues, is that the personal experience of abortion, for all its political prominence, isn’t discussed much. More than fifty million abortions have been performed in the U.S. since 1973, but many of us have no idea who among our friends has had one. The fact that abortions often take place in specialized clinics set apart from “regular” doctors, or, in the case of the abortion pill, privately, at home, makes the practice feel covert. But, when people are more open about experiences that were once hush-hush, the political impact can be very real: gay people coming out to friends and family made it harder to oppose same-sex marriage, for instance.

Sanger distinguishes between privacy, which we often choose, and usually makes us feel more autonomous, and secrecy, which is often imposed on us and can make us feel oppressed. Abortion in the United States belongs more to the realm of secrecy, she maintains, than to that of privacy. Revealing it can have very practical consequences—she cites custody and criminal cases in which a woman’s past abortion has been introduced as evidence of poor character.

SANGER’S POINT RANG true to me in part because I almost never speak about my own abortion, which I had when I was an eighteen-year-old freshman at U.C. Berkeley. This was strange,

it occurred to me as I read Sanger’s book, because the decision was as consequential as any I’d made as a young person; it had allowed me to claim the future I imagined for myself. But, in another way, it wasn’t so strange, because I had never regretted having an abortion, so it was not a choice I felt compelled to revisit. My boyfriend and I had had a birth-control failure, and, though he was a nice guy, we’d never planned to spend our lives together. He was a student at a college nearly four hundred miles away, lived at home with an anxious, widowed mother, and had zero interest in a baby.

I knew what kind of mother I wanted to be someday—one very much like my own, playful and kind and capable of wise counsel. Having known what it was like to have a good mother, I would have been wrecked to be a bad one. I felt inadequate to cope with the emotional fallout of giving a child up for adoption. At eighteen, I had a great deal of inchoate intellectual ambition, and very little patience or self-discipline, the kinds of things I eventually gained more of, in time to raise the children I actually had, in my thirties, with a man I love and esteem. By then, I was able to be a mother as devoted as mine had been, in part because I knew what I was doing in the rest of my life, and in part because I had the right husband. In some foundational way, I have my abortion to thank for all that.

This was in 1980, when you could obtain a first-trimester abortion at the university health-services center, right on campus. (Today, Berkeley students have to go to a clinic in a nearby community to get abortions.) The anti-abortion movement hadn’t achieved anything like the successes it would have in the years to come, and *Roe v. Wade* still seemed like a mighty bulwark. I didn’t have to dodge picketers outside the university clinic, though even then, to try to forestall any trouble, abortions were offered only one day a week, and which day was not widely known.

The next year, as a reporter at the student newspaper, the *Daily Californian*, I visited a crisis-pregnancy center, where volunteers counselled women against having abortions. In a new book, “Women Against Abortion” (University of Illinois), Karissa Haugeberg, a professor of history at Tulane, describes how C.P.C.s proliferated in the nineteen-

nineties, often advertising themselves with words like “choice” and “confidential,” at a time when the number of abortion providers was dwindling. Crisis-pregnancy centers became one of the most popular forms of anti-abortion activism, offering a way for women to join the movement without having to denounce other women as heartless sinners. Instead, volunteers could reassure women that by carrying their pregnancies to term they were fulfilling their natural destinies as mothers, staving off a litany of woes, from promiscuity to suicide, while standing up to men who wanted sex with no strings attached. I went undercover, pretending to be the pregnant girl I had been a year before, just to see what they would tell me. As we sat beneath a poster showing a pregnant woman in a field of orange flowers, the counsellor told me, smiling sweetly, that if I didn’t have an abortion I might have to put my education on hold but I wouldn’t have to suffer in guilt all my life because I’d killed a baby.

I never did feel that I’d killed a baby; I felt that I’d ended a pregnancy. What I remember most of all was the relief when it was over, and the kindness of the doctor and the nurses at the health center, who treated me like a person with a reasonable sense of her own mind. So why don’t I ever talk about it? In part, because it’s long in the past, a medical procedure I underwent that’s at once so personal and so common that it does not warrant a mention. And in part, it’s true, because abortion has a stigma—a stigma I don’t believe should exist but am not entirely immune to, an aura of selfishness or callousness.

For all these reasons, I was moved to read Willie Parker’s “Life’s Work” (37 Ink/Atria). Like the feminist writer Katha Pollitt, in her 2014 book, “Pro: Reclaiming Abortion Rights,” Parker puts forth an argument for abortion as a social and moral good. But his is a voice we rarely hear in this discussion. A doctor dedicated to providing abortions, Parker is also a “follower of Jesus,” to whom “the procedure room in an abortion clinic is as sacred as any other space to me,” because “in this moment, where you need something that I am trained to give you, God is meeting both of us where we are.” Moreover, “Life’s Work” is a vivid and companionable memoir of a remarkable

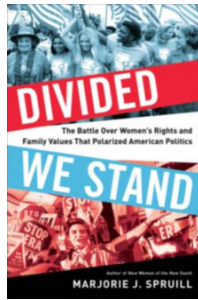
life. Parker, who is African-American, grew up in poverty in a former coal-mining community on the outskirts of Birmingham, Alabama. “Zebra babies can flat-out run within an hour of being born, because if they can’t, they’re dead,” he writes. “We were like zebras, so poor we didn’t know how poor we were, and tough and independent because there wasn’t any other way to be.”

The work he does today—travelling through Mississippi and Alabama, providing abortions to women, many of them poor—requires him to be tough and independent still, to put up with insults and death threats. George Tiller, the abortion doctor who was assassinated in 2009, during a Sunday service at the Lutheran church he attended, is often on Parker’s mind. When he first started performing abortions, though, protesters never guessed he was the doctor. Because he was black, they mistook him for “the irresponsible boyfriend” and a “prolific one,” he jokes, since he was back at the clinic every week.

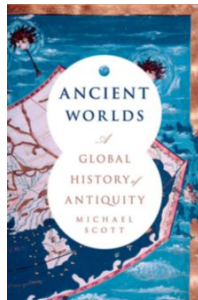
Parker has a carefully considered ethical framework for his practice. He regards “the meeting of a sperm and egg as a biological event, no less miraculous but morally and qualitatively different from a living, breathing human life, imbued with sacredness only when the mother, or the parents, deem it so.” He will not perform an abortion past twenty-five weeks, though he refers women to one of the few clinics in the country that do third-trimester abortions in the case of severe fetal anomalies or a threat to the life of the mother. He will not perform an abortion for purposes of gender or race selection or in cases where he has reason to believe that a woman is being coerced into it.

Like all doctors who do the work he does, Parker sometimes helps unintentionally pregnant women who are in dire circumstances—women who have been raped, or who are burdened with desperate poverty and overwhelming caretaking responsibilities. And he sometimes helps women who are more like I was when I was eighteen. In either situation, those women deserve respect. “As a free human being, you are allowed to change your mind, to find yourself in different circumstances, to make mistakes,” Parker says. “You are allowed to want your own future.” ♦

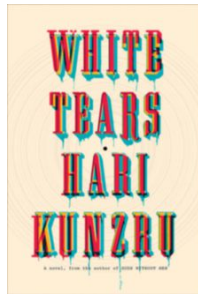
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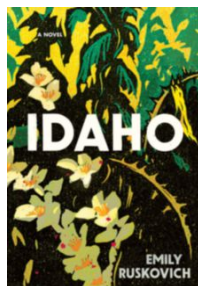
**Divided We Stand**, by Marjorie J. Spruill (*Bloomsbury*). In 1977, thousands of feminists flooded Houston for the federally funded National Women’s Conference, bringing together a diverse, bipartisan group of women to adopt a National Plan of Action—the culmination of an era of rapid legislative gains for women. The same weekend, anti-feminist forces, led by the charismatic and caustic Phyllis Schlafly, held a nearly all-white Pro-Life, Pro-Family Rally across town, mobilizing a radical-conservative movement that was to grow rapidly. This timely history anatomizes two bitterly opposed women’s movements, tracing a connection between 1977 and 2016, when Donald Trump, looking to replace an avowedly feminist President, assiduously courted Schlafly. What the years between Houston and Trump teach us, Spruill writes, is that “progress is not linear.”



**Ancient Worlds**, by Michael Scott (*Basic*). Examining a thousand years of “political, military and religious innovation” in the Mediterranean, China, and northern India, a classics professor writes that we underestimate the amount of interaction among these “many and diverse ancient worlds.” The result isn’t quite a global history (the Americas do not figure), but it is a satisfying survey of pivotal moments in antiquity, such as the development of Athenian democracy in the fifth century B.C. and the adoption of Buddhism by Chinese emperors in the fourth century A.D. The argument that globalization is a much earlier phenomenon than we realize is given a political cast. Historiography matters, Scott writes, because the past “is always a work in progress.”



**White Tears**, by Hari Kunzru (*Knopf*). In this surreal fantasy on race relations, a troubled twentysomething narrator roams New York recording its sounds. He is befriended by the bohemian heir to a fortune (built by means of black convict labor), who is an obsessive collector of early blues records by black artists. When the pair remix a haunting recording that the narrator made in his wanderings, the result is a song that torments them, catalyzing extreme violence. The narrator becomes possessed by the spirit of the original singer and is forced both to enact revenge and to suffer it. Sometimes didactic, the novel still springs surprises, as it makes clear its message: ours is not a post-racial world.



**Idaho**, by Emily Ruskovich (*Random House*). A quiet old farm is the setting for a reckoning with shocking events, in this debut novel. Nearly a decade before the book begins, a woman killed her young daughter, and an older daughter fled, never to be found. The girls’ father still lives on the farm, now with a second wife, Ann, who has struggled to understand what happened that day. As his memory begins to fail, Ann realizes that she doesn’t have long to find out. Ruskovich manages to make a tightly plotted mystery from early-onset dementia, mixing past and present in a race against loss. The book is also an affecting portrait of how love can endure when memory fails. Resting next to her husband, Ann sheds “her own life, too, to match him. They lay there together like a point in time.”

# FOOD FIGHTS

*Does fat make you fat, or is sugar the real culprit?*

BY JEROME GROOPMAN



IN THE EARLY nineteen-sixties, when cholesterol was declared an enemy of health, my parents quickly enlisted in the war on fat. Onion rolls slathered with butter, herring in thick cream sauce, brisket of beef with a side of stuffed derma, and other staples of our family cuisine disappeared from our table. Margarine dethroned butter, vinegar replaced cream sauce, poached fish substituted for brisket. I recall experiencing something like withdrawal, daydreaming about past feasts as my stomach grumbled. My father's blood-cholesterol level—not to mention that of his siblings and friends—became a regular topic of conversation at the dinner table.

Yet, despite the restrictive diet, his number scarcely budged, and a few years later, in his mid-fifties, he had a heart attack and died.

The dangers of fat haunted me after his death. When, in my forties, my cholesterol level rose to 242—200 is considered the upper limit of what's healthy—I embarked on a regimen that restricted fatty foods (and also cut down on carbohydrates). Six months later, having shed ten pounds, I rechecked my level. It was unchanged; genes have a way of signalling their power. But as soon as my doctor put me on just a tiny dose of a statin medication my cholesterol plummeted more than eighty points.

In recent decades, fat has been making a comeback. Researchers have questioned whether dietary fat is necessarily dangerous, and have shown that not all fats are created equal. People now look for ways of boosting the “good cholesterol” in their blood and extol the benefits of Mediterranean diets, with their emphasis on olive oil and fatty nuts. In some quarters, blame for obesity and heart disease has shifted from fat to carbohydrates. The Atkins diet and, more recently, the paleo diet have popularized the idea that you can get slim eating high-protein, high-cholesterol foods.

Still, I remained wary of the delicacies of my childhood. Surely it was wiser simply to avoid fats altogether? I wavered, though, in 2013, when *The New England Journal of Medicine* published an article endorsing the salubrious effects of Mediterranean eating habits. The article detailed the results of a study, the most rigorously scientific one yet conducted on the issue, which showed that following a Mediterranean diet rich in either olive oil or nuts could reduce the risk of heart attack, stroke, or death from cardiovascular causes by thirty per cent. I was elated until my wife, an endocrinologist who is an expert on metabolism, pointed out that the headline number of thirty per cent emerged from the complex statistical way that the study's results were projected over time. If you looked at what happened to the people in the study, the picture was less encouraging: 3.8 per cent of the people consuming olive oil and 3.4 per cent of the people eating nuts suffered cardiovascular misfortune, compared with 4.4 per cent of the group on a regular diet. The true difference in outcome between the two diets was, at best, one per cent.

It's one of many cautionary tales about assessing dietary data. Everyone wants to be healthy, and most of us like eating, so we're easily swayed by any new finding, no matter how dubious. Publishers know this all too well and continually ply us with diet and health books of varying degrees of respectability and uplift. The most prominent on the current menu are Sylvia Tara's “The Secret Life of Fat” (Norton) and “The Case Against Sugar,” by Gary Taubes (Knopf). Both present a range of cutting-edge dietary research, both

*Nutritional science is too complex to furnish easy answers about what to eat.*

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say that fat is unfairly maligned, and both inadvertently end up revealing that the science behind their claims is complex and its findings hard to translate into usable advice.

**S**YLVIA TARA is a freelance writer who holds a doctorate in biochemistry and an M.B.A.; she has worked at McKinsey and on the management side of various biotech companies. Drawing on insights from both science and consulting, she has produced a book that is part physiology and part marketing pitch. Tara wants us to view lipids positively. Once we stop treating fat “like a vicious enemy,” she argues, it “could become beloved once again.”

But Tara’s attitude to fat is more ambiguous than this statement suggests. She claims to be obsessed with her figure, measuring her worth by how well she fits into skinny jeans. In her telling, the spur to her investigations comes from her envy of a friend who stays svelte despite gorging on beer and burritos, drinking sugary lattes, and never exercising. Tara, who writes that she gains weight easily, is interested in the question of why some people eat like hogs and stay thin, while others expand no matter how abstemious they try to be.

The book is a useful primer on the biology of fat. Fat comes in different forms, categorized by color. White fat, the type that we seek to lose when overweight, stores energy. Brown fat, normally found in the neck, back, and around the heart, is filled with tiny structures called mitochondria, and serves as a furnace to burn energy for body heat. A third type, beige fat, was identified some five years ago; during exercise, it receives messages from our muscles to morph into brown fat. Moreover, fat should not be characterized simply as inert blubber. It is the vehicle by which our cells receive certain essential nutrients, like Vitamins A, D, E, and K. The myelin sheaths around our nerves are eighty per cent lipids, “which means fat is actually required to think,” Tara writes. Studies by Jeffrey Friedman, at the Rockefeller University, have shown that the hormone leptin travels from fat cells

to the hypothalamus, a part of the brain which is involved in regulating appetite. “Friedman’s discovery redefined fat,” Tara writes. “It was a verifiable endocrine organ with wide influence to our bodies. Through leptin, fat could talk. It could tell the brain to stop eating.”

All this will be illuminating for many readers, but Tara is a less reliable guide when she uncritically embraces various new theories about the causes and effects of obesity. She trumpets the findings of a Turkish physician, Gökhan Hotamisligil, whose work suggests that a molecule known as TNF-alpha, which has potent inflammatory properties, may be the link between obesity and Type 2 diabetes—a condition arising when the body becomes resistant to insulin,

a hormone that we need in order to process sugar. (Though there’s a clear correlation between diabetes and obesity, no one has yet discovered a causal link.) Hotamisligil’s experiments showed that not only is TNF-alpha produced by fat; it also can cause resistance to insulin. “This discovery was big news,” Tara writes. However, she fails to specify that the finding was in rodents, and that subsequent studies in humans, including some by Hotamisligil, did not show the same results.

Tara also speculates that viruses may cause obesity. The research she draws on here is obscure and unconvincing. It concerns a virus called Ad-36, which infects fowl and can make chickens fat. In the studies Tara cites, more overweight people appeared to have antibodies to Ad-36—suggesting that they had been infected in the past—than slim people did. There are many reasons to be skeptical: there’s no evidence that fowl can pass Ad-36 to humans, and there are many viruses that could easily be mistaken for Ad-36.

As with many books on diet, “The Secret Life of Fat” alternates exposition with prescription. But the idea that understanding lipids at a molecular level will help you stay trim seems far-fetched. It’s telling that Tara’s final triumph—managing to fit back into her skinny jeans—has little to do with her sophisticated understanding of fat. Rather, she follows the advice of Mark Sisson, a

“fitness educator” who fasts eighteen hours a day, and who, at sixty-two, she writes, is “muscular and fit and looks every bit like the Malibu surfer he is.” Tara lost weight by restricting her daily intake to at most a thousand calories and by intermittent total fasts.

**T**HIS IS HARDLY a healthy note to tend on, yet elsewhere Tara seems to take aim at our destructive cultural fixation on body image. Fat was prized in the past, she notes, with big bellies signalling access to plentiful food and, thus, prosperity. The Buddha’s belly “is a major part of his brand,” she writes. (Such consultant-speak seems odd in the context of religion.) The porcine aristocrats one sees in eighteenth-century portraits are frequently shown near tables overflowing with delicacies. The women’s bodies depicted in canvasses by Peter Paul Rubens have long since made “Rubenesque” a euphemism for plus-size. And, if one goes far enough back, the huge bellies and buttocks of the Paleolithic “Steatopygian Venus” figures that have been found across much of Europe suggest that fat can connote fertility and desirability.

Tara digs up examples of Americans celebrating fat as late as the latter half of the nineteenth century. *Ladies’ Home Journal* gave tips on gaining weight, as did an 1878 book titled “How to Be Plump.” Still, the nineteenth century in general was more notable for a growing concern with being slim, as has been shown by previous writers, such as Gina Kolata, whose “Rethinking Thin” (2007) itself draws heavily on Hillel Schwartz’s remarkable history “Never Satisfied” (1986). Lord Byron, who struggled with his weight, swore by vinegar; at other times, he ingested just a single raisin a day, supplemented by a glass of brandy. Women in the nineteenth century stuffed themselves into near-suffocating corsets to achieve an hourglass figure with an unnaturally tiny waist. Weight-loss regimens included consuming soap, chalk, pickles, digitalis, camphor tea, grapefruit (which was thought to contain fat-dissolving enzymes), potassium acetate (a diuretic), and ipecac (which induces vomiting). People tried sweating their fat away in rubber suits, or squeezing it away in a pressurized reducing machine.



Indeed, the weight-loss fads of past centuries include precedents for all the main contemporary diets, from low-fat, low-calorie ones to high-fat, low-carbohydrate ones, like the Atkins diet. In 1825, a French lawyer, Jean Anthelme Brillat-Savarin, wrote a famous treatise, "The Physiology of Taste," in which he contended that true carnivores and herbivores did not get fat; it was only when one ingested grain—read: bread—that the trouble started. Around the same time, an American Presbyterian minister, Sylvester Graham, reasoned that, as gluttony was the greatest sin, abstinence must lead to virtue; he advised eating vegetables and drinking water, eschewing meat, coffee, spices, and alcohol. For a while, students and faculty at Oberlin College were made to follow Graham's diet; graham crackers were so named in order to appeal to his acolytes. Several years later, Horace Fletcher, known as "the great masticator," touted very slow chewing as the remedy for obesity; adherents included normally skeptical people like Upton Sinclair and John D. Rockefeller.

A genuine advance, which put nutrition on a solid scientific footing for the first time, was the work of the chemist Wilbur Atwater. In the eighteen-nineties, he began studying how the body converted food to energy, by placing subjects in a closed chamber and measuring the amount of carbon dioxide they produced and oxygen they consumed after eating various foods. Atwater came up with the idea of the food calorie, adapting a measurement previously used for heat energy. In 1917, Herbert Hoover, then the head of the U.S. Food Administration, worked to publicize Atwater's findings. "I eat as little as I can to get going," he said. Low-calorie foods and skipping meals became popular. The importance of calories—if energy gained exceeds output, the excess becomes fat—remains one of the few unchallengeable facts in the field of dietary science. Still, further research has shown that calories eaten are only part of what determines weight. Our metabolism reflects an interplay of things like genes, hormones, and the bacteria that populate the gut, so how much energy we absorb from what we eat varies from person to person.

In the nineteen-fifties, the Ameri-

can Medical Association identified obesity as the country's No. 1 health problem, and the diet industry exploded. The end of that decade brought the idea of the liquid diet—skimmed milk, supplemented with bananas or other fruit—which, in turn, eventually gave rise to products like Metrecal, Carnation Slender, and SlimFast. Self-help groups modelled on Alcoholics Anonymous began proliferating with the establishment, in 1948, of a movement called TOPS (the acronym stood for "take off pounds sensibly"). Overeaters Anonymous followed, in 1960; Weight Watchers, in 1963; and Jenny Craig, in 1983.

The immediate postwar years also brought the first sustained scientific assault on dietary fat. Ancel Keys, a physiologist at the University of Minnesota, who had spent the war developing nutritionally optimal Army rations and studying the effects of starvation, became interested in the high rates of heart attack among a seemingly well-fed sector of the population—American businessmen. He soon became convinced that the saturated fats found in meat and dairy products were the cause, and thus began the war on fat that galvanized my parents. Keys became, with his wife, Margaret, an advocate for the Mediterranean diet of unsaturated fats. Their books promoting the diet were best-sellers, and Keys, who spent his latter years in Italy, lived to the age of a hundred. (Margaret lived to ninety-seven.)

THE AUTHOR OF "The Case Against Sugar," Gary Taubes, gained prominence as a science writer in 2002, with a cover story in the *Times Magazine*—"What If It's All Been a Big Fat Lie?"—which challenged the orthodoxy of restricting dietary fat. Carbohydrates were the real danger, he wrote—not just processed foods containing refined sugars like sucrose and fructose but also easily digestible starches from grains and vegetables. He expanded these arguments in a book, "Good Calories, Bad Calories" (2007), and, in his new book, he goes much further. Though he now allows that people can eat some carbohydrates and still live a "relatively" healthy life, he sees sugar as the devil incarnate, doing harm independent of its known

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*"You can get that out with a little seltzer."*

role in causing obesity. Taubes believes that a wide range of seemingly unrelated diseases—"diabetes, heart disease, cancer, stroke, and Alzheimer's, which account for five of the top ten causes of death in the U.S."—are in fact linked, and that dietary sugar is the cause of them all, as well as of "other disorders that associate with these illnesses, among them polycystic ovary syndrome (PCOS), rheumatoid arthritis, gout, varicose veins, asthma, and inflammatory bowel disease." In addition, he aims at showing that the food industry has systematically tried to obstruct scientific research that exposes the dangers of sugar, just as tobacco companies tried to hide the risks of smoking.

The latter claim is the more persuasive. Taubes, a pugnacious writer who clearly relishes the role of muckraker, digs up a long history of attempts to discredit charges against sugar and to point the finger at fat as the primary dietary cause of disease. In 1943, when sugar, dismissed by the government and medical organizations as "empty calories," was being rationed as part of the war effort, sugar companies formed a trade association "to set the record straight." It devised a two-pronged strategy: support scientists who endorsed the notion that sugar was a valuable source of dietary energy without any specific health risks; and then

mobilize these experts in a public-relations campaign. A prominent Madison Avenue firm was hired to design a public-health campaign that would "establish with the broadest possible audience—virtually everyone is a consumer—the safety of sugar as a food." Among the scientists they supported was Ancel Keys, the Mediterranean-diet pioneer; his work influenced the dietary guidelines of the American Heart Association and the American Diabetes Association. Fred Stare, an influential nutritionist at Harvard, received not only research funding but a donation of more than a million dollars, from the General Foods Corporation (whose products included Kool-Aid and Tang), to build a new department. He proclaimed that it was not even "remotely true" that "modern sugar consumption contributes to poor health." Taubes recounts that Stare appeared on talk shows on more than two hundred radio stations as a "front man to dismiss anti-sugar sentiments publicly."

The spread of diet crazes and of obesity anxiety in the fifties alerted the sugar industry to the fact that its product was at risk. Diet sodas with artificial sweeteners were gaining market share. The sugar industry responded in two ways: by stressing how important sugar was as an energy source for children ("neither a weight reducing nor

fattening food"); and by discrediting artificial sweeteners such as saccharin and cyclamates as health dangers. It funded research at the Wisconsin Alumni Research Foundation and at the Worcester Foundation for Experimental Biology, which managed to find various adverse effects from consumption of cyclamates in rats. The latter achieved this by giving rats an absurd dose—the equivalent, in human terms, of five hundred and thirty cans of Fresca. Nonetheless, the F.D.A. eventually banned cyclamates as a health risk.

Though Taubes's account of these little-known manipulations is useful, he overreaches in blaming sugar for such a wide range of diseases. In attempting to lump them together, he cherry-picks from a variety of recent research. For instance, some epidemiological surveys have shown that when people move from the developing world to the West they change diet and often become obese, leading to an increased incidence of diseases, including diabetes and cancer. And other diseases, such as Alzheimer's, appear on Taubes's list, because researchers have studied whether they are linked to insulin resistance.

Synthesizing these conjectures, Taubes sees insulin resistance as the bedrock disturbance in the body which unleashes a cascade of other hormonal and inflammatory molecules that attack the brain (causing dementia), degrade the heart and the blood vessels (causing heart attack and stroke), disturb the metabolism of uric acid (causing gout), and so on. He then attempts to build his case as a prosecuting attorney by means of a chain of "if/then" statements, such as "If sugar and high-fructose corn syrup are the cause of obesity, diabetes, and insulin resistance, then they're also the most likely dietary trigger of these other diseases." He invokes Occam's razor, a concept adopted by medieval philosophers and theologians, which holds that explanations should rely on the smallest possible number of causes. "If this were a criminal investigation, the detectives assigned to the case would start from the assumption that there was one prime suspect," Taubes writes.

Occam's razor is hardly a fundamental law of the universe, however. No credible scientist would ever think

of using it to prove or disprove anything. And Taubes neglects findings that contradict his idea that diabetes—and, by extension, sugar—is at the root of all our troubles. A study of the diabetes drug metformin, published two years ago in *The Lancet*, failed to show any impact on the treatment of pancreatic cancer. A placebo-controlled trial in which insulin was given to dementia patients did not find a meaningful improvement in cognition. Indeed, there is no conclusive evidence that excess dietary sugar per se causes diabetes. Most important, Taubes's assertion that all these diseases are "closely related" is not scientifically supported. The biological behavior of cancer—DNA mutations, aberrant growth, metastatic spread—is nothing like that of diabetes. Inflammatory-bowel disease, a complex disorder that appears to have a variety of genetic underpinnings, does not seem to be caused by any particular diet or substance, and there is no evidence that restricting sugar ameliorates it. The attempt to characterize Alzheimer's as "type-III diabetes," linking it to insulin resistance and inflammation, is likewise speculative.

The temptation to draw facile connections is ever-present in medical research, and the most valuable current work on these conditions is a matter not of grand unified theories but of a multiplicity of very fine-grained observations. Taubes is critical of scientists' tendency to see disorders as "multifactorial" and "multidimensional"—that is, as arising from a complex interplay of factors. Lung cancer, he argues, is also multifactorial (most smokers don't get it and many non-smokers do), yet no one disputes that smoking is the primary cause. But cigarette smoke contains carcinogens, molecules that have been shown to directly transform normal cells into malignant ones by disrupting their DNA. There's no equivalent when it comes to sugar. Taubes surmises a causal link by citing findings that cancer cells need glucose to thrive, and absorb more of it than other cells. But this proves nothing: malignant cells consume in abundance not only carbohydrates like glucose and fructose but other nutrients, like vitamins. To imagine that, just because cancer cells like glucose, elevated

levels of it might prompt healthy cells to become cancerous is to take a vast, unsubstantiated leap.

Ultimately, Taubes's indictment of sugar as the leading culprit in virtually all modern Western maladies doesn't provide enough evidence for us to convict. That doesn't mean sugar is without dangers: it certainly plays a role in the development of obesity, to say nothing of dental cavities. But these are lesser charges, and they make for a less dramatic headline.

Taubes's big claims get our attention, of course, but for people suffering from these diseases they're not just a harmless rhetorical strategy. A woman I know who recently emerged from chemotherapy treatment for ovarian cancer and is now in remission told me that she was terrified after reading Taubes's book. She asked if eating chocolate would make her tumor start growing again.

THE PROBLEM WITH most diet books, and with popular-science books about diet, is that their impact relies on giving us simple answers, shorn of attendant complexities: it's all about fat, or carbs, or how many meals you eat (the Warrior diet), or combinations of food groups, or intervalic fasting (the 5:2 diet), or nutritional genomics (sticking to the foods your distant ancestors may have eaten, assuming you even know where your folks were during the Paleolithic era). They hold out the hope that, if you just fix one thing, your whole life will be better.

In laboratories, it's a different story, and it sometimes seems that the more sophisticated nutritional science becomes the less any single factor predominates, and the less sure we are of anything. Today's findings regularly overturn yesterday's promising hypotheses. A trial in 2003, led by researchers at the University of Pennsylvania, compared an Atkins diet, high in fat and low in carbohydrates, with a low-fat, high-carbohydrate, low-calorie one. After a year, there were no significant differences in how much weight the people in each group had lost, or in their levels of blood lipids—including their LDL chole-

sterol, the primary concern for heart attack and stroke. In a follow-up study in 2010, participants who followed either a low-carbohydrate or a low-fat diet ended up losing about the same amount of weight (seven kilograms) after two years. It was impossible to predict which diet would lead to significant weight loss in any given individual, and, as most dieters well know, sustaining weight loss often fails after initial success.

Other research seems to undermine the whole idea of dieting: extreme regimens pose dangers, such as the risk of damaged kidneys from a buildup of excess uric acid during high-protein diets; and population studies have shown that being a tad overweight may actually be fine. Even studying these issues in the first place can be problematic. Although the study of the Mediterranean diet, for example, reflects randomized controlled experiments, most nutritional studies are observational; they rely on so-called food diaries, in which subjects record what they remember about their daily intake. Such diaries are notoriously inexact. No one likes admitting to having indulged in foods that they know—or think they know—are bad for them.

Science is an accretion of provisional certainties. Current research includes much that is genuinely promising—several groups have identified genes that predispose some people to obesity,

and are studying how targeted diets and exercise can attenuate these effects—but the more one pays attention to the latest news from the labs the harder it becomes to separate signal from noise. Amid the constant back-and-forth of various hypotheses, orthodoxies, and fads, it's more important to pay

attention to the gradual advances, such as our understanding of calories and vitamins or the consensus among studies showing that trans fats exacerbate cardiovascular disease. What this means for most of us is that common sense should prevail. Eat and exercise in moderation; maintain a diet consisting of balanced amounts of protein, fat, and carbohydrates; make sure you get plenty of fruit and vegetables. And enjoy an occasional slice of chocolate cake. ♦



## THE FUGITIVE

*Bill Knott's private poetry.*

BY DAN CHIASSON



*For Knott, publication—and the page itself—was a constant source of conflict.*

NEAR THE COUNTER of the old, lamented Avenue Victor Hugo Bookshop in Boston, there were boxes of ephemera: the standard hodgepodge of mangy postcards, wedding announcements, lobby cards, 45s, hippie stickers and patches, Civil Defense pamphlets and evacuation maps, poker chips, Old Maid decks, and the like, along with skinny small-press or homemade books, some even handwritten. It was in one of those boxes, in the early nineties, that I found a copy of “Are You Ready, Mary Baker Eddy???” published, in 1970, by Cloud Marauder Press, out of Berkeley. Its four authors—Bill James, Knott Tate, James Bill, and Tate Knott—

were, in point of fact, two people. One was James Tate, the American surrealist poet. The other was Bill Knott, an obscure but equally intriguing figure: a poet, artist, and illustrator, who penned several books, leaflets, chapbooks, and broadsides, along with, years later, blog posts and comment-section diatribes. Tate went on to literary fame and success. Knott forged, instead, an anti-career of guerrilla mischief, waged on the margins.

Knott died in 2014, but his insurgent D.I.Y. purity is on full display in “I Am Flying Into Myself: Selected Poems, 1960-2014” (Farrar, Straus & Giroux), which was compiled by his friend the

poet Thomas Lux. It is unclear whether Knott would have been pleased to see the volume in print. It follows a series of books that he had, in recent years, self-published and sold for next to nothing on Amazon—including a “shadow version” of a “stillborn” book that F.S.G. had, he claimed, commissioned, but which never saw daylight. Knott distanced himself immediately on the publication of an earlier book with F.S.G., “The Unsubscriber.” Even small-press attention was met at times with churlish defiance. The books that did make it to print usually featured brutal “anti-blurbs,” which Knott culled from reviews good and bad alike: his work was “grotesque,” “malignant,” “tasteless,” and “brainless,” according to some of the big names of the day.

Knott’s poems claim a peculiar kind of privacy, as though he confiscated his lines from public view in order to mete them out on his own stubborn terms. The result is a tangle of sweetness, irritability, hospitality, and paranoia. “No-one loves that vain solipsistic sect / You’d never join, whose dues you’ve always paid,” he writes in “The Unsubscriber.” Elsewhere, there is a naïve, almost oneiric undertow. Here is “Security” in its entirety:

If I had a magic carpet  
I’d keep it  
Floating always  
Right in front of me  
Perpendicular, like a door.

“Like a door,” or like a poem: a magically suspended rectangle, patterned like a carpet, “perpendicular” to one’s expectations, and perhaps to prose, which has no equivalent means of hanging itself in the white space of the page. If it is a door, it’s a closed door—and yet closed doors tempt us to open them, see what’s on the other side. This is the thrilling liminal hesitation that a reader feels when approaching Knott’s poems.

BILL KNOTT BEGAN his career by announcing its end, in a letter he wrote to a magazine, under an assumed name, proclaiming that Bill Knott—whom nobody had heard of, anyway—had died “a virgin and a suicide.” He was twenty-six. Two years later, in 1968, his debut collection, “The Naomi Poems: Corpse and Beans,” was “posthumously” published under yet another name, Saint

Geraud. The book established the Krazy Straw conditions of Knott's entire career. He rarely stuck with the same publisher for more than a book at a time, and he was almost always displeased when the finished copies arrived. When "Love Poems to Myself" was published, in 1974, by Lux's Barn Dream Press, Knott threatened to sue the imprint over using the wrong image on the cover. "A few times," Lux writes, "when I'd run across the book, the covers were torn off."

Knott's poems wear their nuttiness proudly on their sleeve, but many, like "Advice from the Experts," are dense with significance:

I lay down in the empty street and parked  
My feet against the gutter's curb while from  
The building above a bunch of gawkers  
perched  
Along its edges urged me don't, don't jump.

There's a lot to be decoded in this little word problem—about cause and effect, role-playing and representation, predatory gawking and simulated suicide. In a poem, you can beat linear time; you can have jumped without ever jumping. The "gawkers" are at once too early and too late to the party, urging the narrator not to jump as he rests on the pavement, their alarm seeming more like provocation. Gawking is Knott's parasitic vision of readers' attention. He knew, from the start of his career, that often the only way to survive is to play dead.

Knott's colicky poems assume the reader's malign intentions, imagining the page as a place of conflict or, at best, of fraying truce. These instincts developed early; it's hard to think of a writer more thoroughly wrecked by his childhood. Knott was born in 1940, in Carson City, Michigan. According to Lux, his mother died, in childbirth, when he was seven; three years later, while he was living in an orphanage, his father, a butcher, committed suicide. At sixteen, Knott was taken from a mental hospital by his uncle, on whose "crummy little farm" he spent a few years working before joining the Army. He was stationed at Fort Knox, where he sentinelled the country's gold reserves.

On the page, Knott returned always to the trauma of his youth. In "Christmas at the Orphanage," the "sparkling allotments" of the day "nearly hid / the

tree," and the "wish-lists / they'd made us write out in May lay granted / against starred branches." The child doesn't get a parent's knowing gift; he has a wish "granted," as though by institutional obligation, and whatever loneliness the gift is intended to minimize is instead cruelly deepened. To accept the gift "meant sealing the self," stifling the kid who wanted "to scream." "I said I'm sorry," Knott writes at the close of the poem, his tone suggesting the gnawing persistence, in adulthood, of internalized childhood corrections and reprimands.

Something about Knott froze in childhood, leaving a body of work marked by the child's tendency to literalize imaginative schemes. Knott was a poet of zany precision, the zaniness usually coming right away, often in the first line, followed by quite meticulous workings out of his oddball premises. He is, at his best, a poet of home-brewed koans, threading his philosophical paradoxes into scenes of slacker glamour. Here is the opening of one of several works resignedly titled "Poem":

They say the universe is expanding,  
not staying in one place.  
I, though, have a small rental room  
somewhere in it.

The wowie-zowie tone shields him from the sadness of his perceptions, but not for long. By the close of this short lyric, disconnected deep thoughts are symptoms, not expressions, of his late-on-the-rent metaphysics:

What do you grow in that vase?  
Shards.

I don't understand.  
And my worth is not enough  
to figure out why. Who.

What suffers such distance just to endure?

Knott's poems often peter out in this way, as though he had stored up only enough expression to cover their openings. And yet I'm much more taken by that dejected, surrendering last question than by the crowd-pleasing opening. Anybody who has been stoned in a dorm room knows that the universe is expanding, but Knott's contribution is to empathize not with the little human specks ordering pizza and watching "Ren & Stimpy" but with the universe itself, spread so thin

that its individual components suffer from isolation from one another. We all suffer such distance just to endure.

KNOTT'S SENSE OF himself as isolated and yet part of a hivelike whole found its final embodiment online, where many of his poems can still be read for free. He was an impresario of the early Internet, and among the first and best-known poets to embrace blogging in its heyday, before social media neutered the form as a mode of online expression. In the era of the flame wars, the Web brought poets of every region and aesthetic stripe together to semi-anonymously savage one another; anyone who'd published a book or two self-Google'd constantly, in the hope that someone, somewhere, was saying shit about them. I encountered my own name on Knott's blog around 2006, after I'd published a rather puerile and dyspeptic omnibus review. To Knott, I was "Chiasson-the-Assassin," and though we never met, I got the distinct idea that doing so would be a delight: far easier, I thought, than meeting most people who say nice things about you online. With Knott, the nastiness was all on the surface.

It was important, then, that he chose a genre we think of in terms of surfaces and depths. Poetry trains us to look past the advertised reality, or, better, to see surface commotion as a manifestation of inner turbulence. These are the skills you need to read Knott, and the experience is not intensely literary: it is, instead, weirdly like knowing a person. He tests your stamina, but in the end you want to be on the side of cranks like Knott, the "mouse / Michigander" whose poems acted as a soapbox for his "micro-mini-soul."

Knott's wrong-end-of-the-telescope intensity has only been amplified by his death. Last year, in homage to a deceased friend, a developer unveiled a chatbot that, fed on a diet of the friend's text messages, could mimic his speech: an artificial persona conceived as a memorial. Knott's mysterious candor, asserting warmly his own distance and coolness, sometimes feels like a bot's confidences coming from beyond the grave:

Every autobiography  
longs to reach out  
of its pages  
and rip the pseudonym  
off its cover. ♦

## FAKE I.D.'S

*The faux retro of "Riverdale."*

BY EMILY NUSSBAUM



“RIVERDALE,” WHICH AIRS ON the CW, has a witty conceit: take the “Archie” comic-book characters, then peer at them through the neon-noir lens of “Twin Peaks.” Riverdale is now a run-down maple-syrup town, where snooty founding families are hiding dark secrets. Veronica Lodge is a Bettie Page-style bombshell; Archie Andrews is a sensitive jock with a six-pack; Betty Cooper is a virgin with a blond ponytail, but she’s also an amateur detective who takes Ritalin. The show’s banter is up to date—“What do you say, Archiekins, be the Jay to my Bey?”—and yet when teen-age girls get pregnant they’re sent away to cruel convents straight out of the nineteen-fifties. It’s camp lite, essentially, all abs and arched eyebrows. But even air

quotes need something worth quoting.

Unfortunately, “Riverdale” can’t provide that. It began well enough, with a fun, moody pilot and early episodes in which an all-black Josie and the Pussycats sang “Sugar, Sugar” and a corpse was dredged from a river. With raven eyebrows and a coy pout, Camila Mendes is a charismatic blast as Veronica, lending weight to a character who could easily be a cliché vamp. The show has flair: it’s all saturated khaki green and ruby red, the lighting in Pop’s Chock’lit Shoppe as gloomy as an Edward Hopper painting. But, seven episodes in, it’s devolved into dull cosplay bracketed by bogus profundity. Betty and Veronica don kink-wear and roofie Chuck Clayton, a slut-shaming football player. The girls’

tart-tongued gay bestie, Kevin (a character from the new version of the comic strip), seduces a bi-curious Moose. Archie, when not working out shirtless, pursues a songwriting career. “Your songs,” a critical music professor sneers at him. “They’re juvenile. They’re repetitive.” That’s true of “Riverdale,” too, but the show clearly knows it and doesn’t care. Every time a plot feels corny or prurient or preachy, there’s an acknowledgment in the dialogue. It gets exhausting, like hanging out with someone who keeps saying, “God, I’m such a nightmare!”

It’s a shame, because on the surface the mashup makes perfect sense: the retro throuple of Archie, Veronica, and Betty—with their pointy bras and double entendres—share deep roots with the fifties-era fetishes that lit up David Lynch’s amygdala back when he launched “Twin Peaks,” in 1990. But that’s not enough for “Riverdale,” which is determined to provide hyperlinks to every teen drama of the past century. It pays homage to (and this is a non-comprehensive list): “Dawson’s Creek” (therapized psychobabble, glamorized sex with a MILF teacher); “Heathers” (mean girls, darkly comic funerals); “Gilmore Girls” (modern youths constantly name-checking old movies); “Lolita” (Miss Grundy in heart-shaped glasses); “Rebel Without a Cause” (leather jackets, a drive-in showing “Rebel Without a Cause”); “Wild Things” (teen girls framing people in bathing suits); “The O.C.,” “Beverly Hills, 90210,” and “Gossip Girl” (couture-clad bitches with rich parents); “Veronica Mars” (teen-age detective Betty); and “Pretty in Pink” (Duckie-like best friend Jughead Jones—a character so emo that he also feels trimmed from the director’s cut of “Pump Up the Volume”). When Veronica, reconceived as the daughter of a Bernie Madoff-like con man, snarks at her mean-girl rival, Cheryl Blossom, “You may be a stock character from a nineties teen movie, but I’m not,” it feels not so much knowing as damning. The episodes bear the titles of such camp classics as “Faster, Pussycat! Kill! Kill!” or of teen-centered dramas like “The Last Picture Show.” The parents are played by former teen stars, like the now grizzled Luke Perry (“90210”) and Mädchen Amick (“Twin Peaks”), not grizzled. Often, “Riverdale” feels less like a teen show than like

*“Riverdale” seems determined to reference every teen drama of the past century.*

a Pinterest page about the genre. The irony is, it may be more enjoyable if you don't get the references.

There's nothing wrong with pastiche or stylization, of course. Plenty of recent series have used these techniques wonderfully—or, at least, effectively. The sometimes self-serious but always beautiful “Mr. Robot” merged Occupy politics with films like “Fight Club” and “Taxi Driver.” “Legion” threw the “X-Men” comics into a blender with everything from Wes Anderson to David Bowie and Stanley Kubrick. The “American Horror Story” series is a bold, messy mélange of camp, glamour, and seventies horror films.

Last year's supernatural eighties-pastiche, “Stranger Things,” was, structurally speaking, pretty similar to “Riverdale”: a fun kiddie thriller full of retro homages. But, while some critics faulted the series for its obsessive Spielberg echoes, “Stranger Things” had more going for it than that. It was well plotted and smartly paced, and featured a terrific performance by Millie Bobby Brown. It also made emotional sense. Along with the visual nods to Spielberg, it shared his deep fascination with the fragile bond between children and parents, the failed dream of suburban safety. It was a show about grief and abandonment; on those subjects, it was sincere.

In contrast, “Riverdale” has an elevator pitch where its heart ought to be, to repurpose “All About Eve” (which will probably happen in the next episode). That might work if the show were a truly rude circus, extravagant and playful, like the best of “Glee,” another influence. But, mimicking “Twin Peaks” (and probably Raymond Chandler, and maybe

even “Blade Runner”), it's weighed down by Jughead's existential narration, which is full of phony musings about shame and guilt. “Hope, a word so close to home—and as tricky,” he broods in a typical passage. Mostly, he perseverates about how the American fantasy of small-town virtue is merely a mask for corruption. “This story is about a town, once wholesome and innocent, now forever changed by the mysterious murder of Jason Blossom on the Fourth of July,” he intones in each episode's intro.

That's a Lynchian theme, of course, one that plenty of moody adolescents have stumbled upon organically: the insight that everyone who looks happy is just faking it—and that sex is scary and kind of gross. But Lynch, whose reboot of “Twin Peaks” begins in May, on Showtime, comes by those anxieties honestly. The original “Twin Peaks” was surreal, with camp in the toolbox, but the creator's disgust and desire are always genuine: his fingerprints turn every corrupt image (an ear covered in ants, a prom queen wrapped in plastic) sticky. Call me a sincerity fetishist, but “Riverdale,” for all its heavy breathing, appears to be going through the motions.

**D**OES IT SEEM as if I'm being too hard on a teen show on the CW? The problem might be that I have higher standards for teen shows than for many adult ones. This year marks the twentieth anniversary of the premiere of “Buffy the Vampire Slayer,” the show that made me a TV critic. That series, like “Riverdale,” was built on banter, using an idiosyncratic lingo invented by its creator, Joss Whedon. It mixed genres, among them horror, super-

hero comics, and teen romance—and, because it was stylized, it was often wrongly described as camp. But, like “Stranger Things,” it had a generous eye for its characters: for Buffy, the apocalypse was not a joke, and the demons she confronted were metaphors for the terrors of female adolescence—abandonment, sexual violence, mortality. “Buffy” was made from genres that adult snobs dismissed as juvenile, but it never played dumb. It was sexy—and, in later seasons, downright kinky—but rather than being prurient it was romantic, in more ways than one. Many imitators bit its style, but only a handful, like “Veronica Mars,” had its substance.

The two standout dramas of the nineties were also set in high schools, in a more realistic style: “My So-Called Life” and “Freaks and Geeks.” But it never made sense to describe them as “teen shows,” any more than “The Sopranos” was a middle-aged-dad show. To create them, the writers drew on their own memories, and some of the most outrageous plots were autobiographical. But the shows themselves weren't nostalgic. They knew better. Their perspective was like that of Elizabeth Perkins's character in “Big,” when she's offered a chance to go back in time: “I've been there before. It's hard enough the first time.”

Teen-agers aren't dumb—and there's nothing wrong with fantasies that are made for them, or about them, or both. Anyone over twenty knows that those years can feel more vivid than adult life. But there's a difference between a truly clever teen show and one that's all winks. As any cranky mom will tell you, keep making that face and it'll stick that way. ♦

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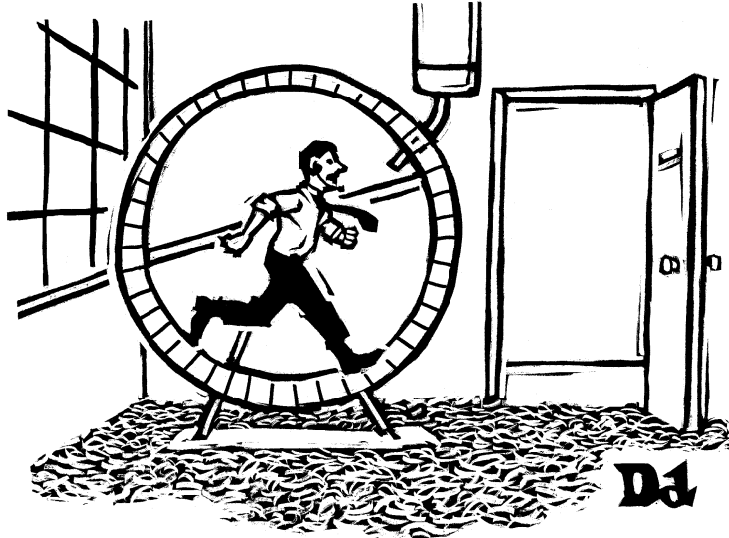
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## CARTOON CAPTION CONTEST

Each week, we provide a cartoon in need of a caption. You, the reader, submit a caption, we choose three finalists, and you vote for your favorite. Caption submissions for this week's cartoon, by Drew Dernavich, must be received by Sunday, April 2nd. The finalists in the March 20th contest appear below. We will announce the winner, and the finalists in this week's contest, in the April 17th issue. Anyone age thirteen or older can enter or vote. To do so, and to read the complete rules, visit [contest.newyorker.com](http://contest.newyorker.com).

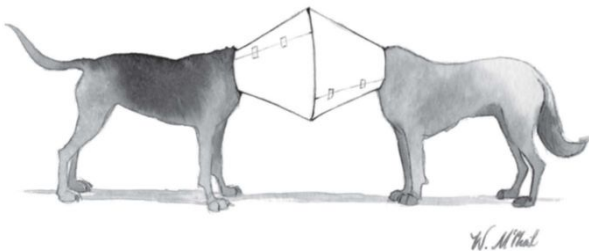
### THIS WEEK'S CONTEST



“

”

### THE FINALISTS



*“I'll let go of the stick when you let go of the stick.”*  
Erich Schrempp, Chicago, Ill.

*“This was more romantic in ‘Lady and the Tramp.’”*  
Ellen Fields, Iowa City, Iowa

*“Stay still. They'll never find us.”*  
Jim Campbell, Northborough, Mass.

### THE WINNING CAPTION

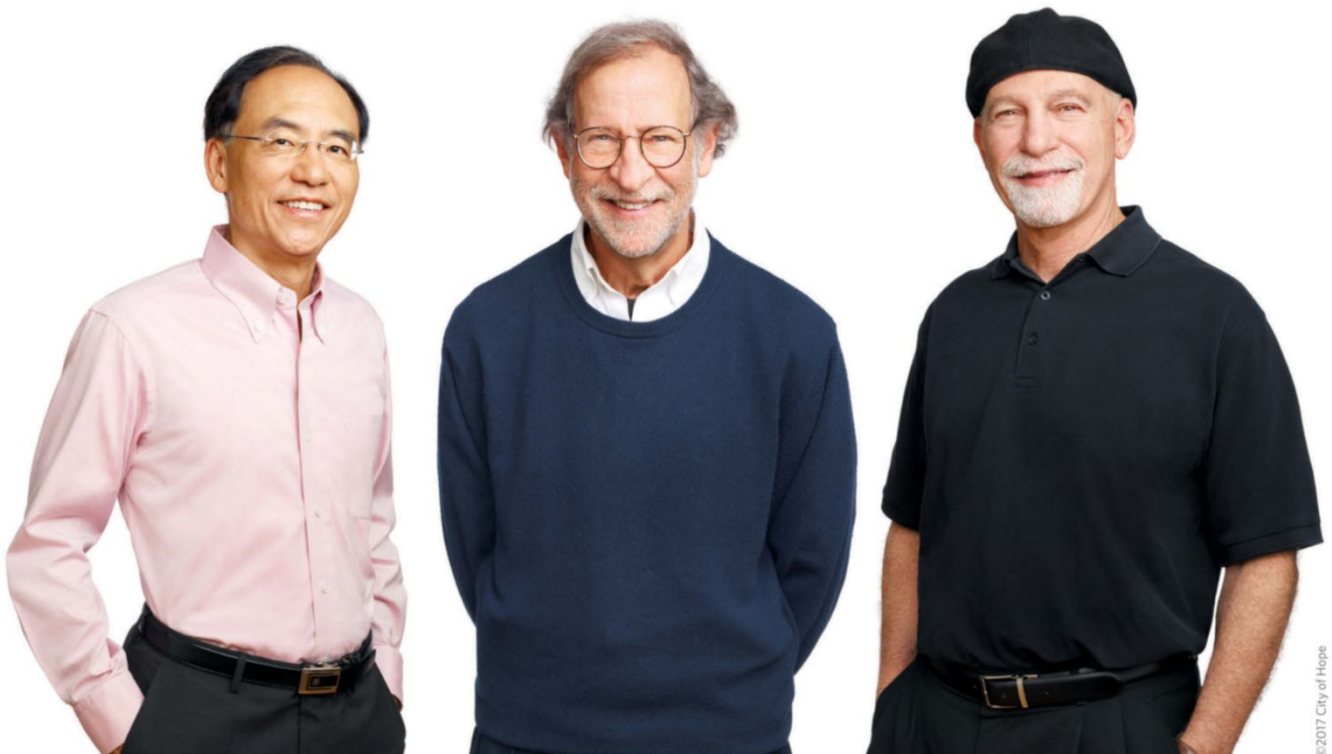


*“I can't believe my eye!”*  
Sean Harrigan, Atlanta, Ga.

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