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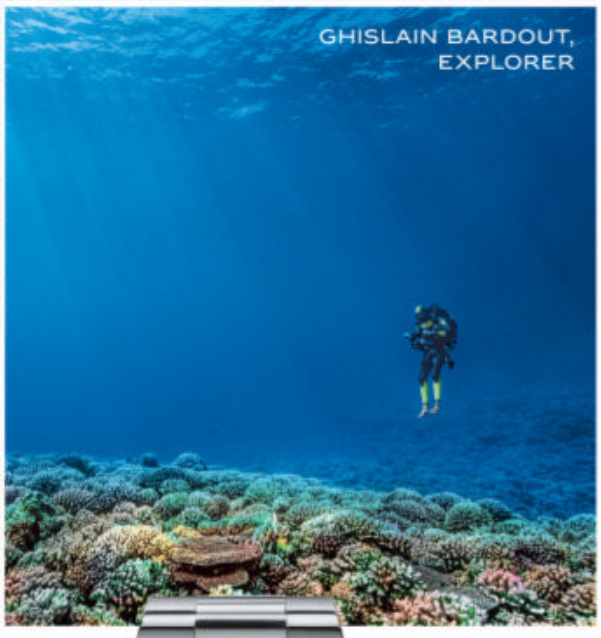
NOV. 28, 2022



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THE CLIMATE ISSUE

NOVEMBER 28, 2022

DRAWINGS *Danica Novgorodoff and Michael Voll, Kaamran Hafeez and Al Batt, Lars Kenseth, Amy Hwang, Christopher Weyant, Emily Bernstein, Benjamin Schwartz, Frank Cotham, Victoria Roberts, Roz Chast, P. C. Vey, Sam Gross* SPOTS *Philippe Petit-Roulet*

CONTRIBUTORS

Elizabeth Kolbert (*"A Vast Experiment," p. 32*), a staff writer, won the 2015 Pulitzer Prize for general nonfiction for "The Sixth Extinction." Her latest book is "Under a White Sky."

Philip Montgomery (*Portfolio, p. 58*) is a photographer and a regular contributor to the magazine. His new book of photography, "American Mirror," examines the fractured state of the country.

Helen Shaw (*The Theatre, p. 86*) became a theatre critic for the magazine in August.

D. T. Max (*Portfolio, p. 58*) is a staff writer. His latest book is "Finale: Late Conversations with Stephen Sondheim."

Robin Coste Lewis (*Poem, p. 54*) received the 2015 National Book Award for poetry. Her collection "To the Realization of Perfect Helplessness" is forthcoming.

Manvir Singh (*Books, p. 78*), a research fellow at the Institute for Advanced Study in Toulouse, is writing a book about shamanism.

Emily Witt (*"The Coming Storm," p. 48*), a staff writer, is the author of "Future Sex" and "Nollywood."

David W. Brown (*"Journey to Doomsday," p. 24*) is the author of "The Mission" and of the forthcoming book "The Outside Cats."

Birgit Schössow (*Cover*), an illustrator, an animator, and a musician, lives near Hamburg. Next year, she will publish the children's book "Oskar Urlaubär."

Adam Zagajewski (*Poem, p. 29*), who died in March, 2021, was an award-winning Polish poet. Clare Cavanagh's English translations of his books "True Life" and "Collected Poems" are forthcoming.

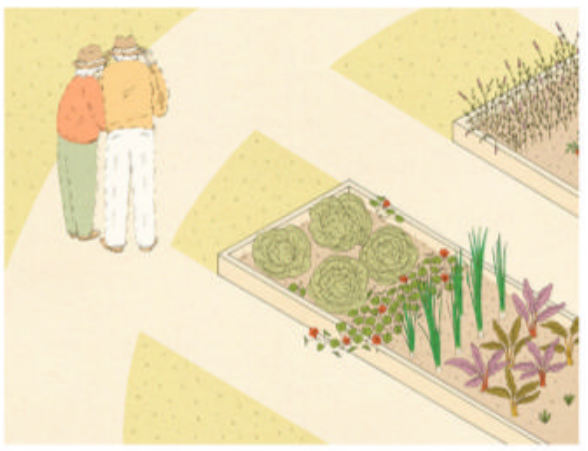
Reyhan Harmanci (*The Talk of the Town, p. 23*) is a writer and editor based in Brooklyn.

Louise Erdrich (*Fiction, p. 70*) has written eighteen novels, including "The Night Watchman," which won the Pulitzer Prize for fiction, and "The Sentence."

THIS WEEK ON NEWYORKER.COM

LETTER FROM THE SOUTH

Charles Bethea on Sanibel Island's precarious future after the destruction wrought by Hurricane Ian.



ANNALS OF INQUIRY

Marion Renault writes about a French village's radical vision of a good life with Alzheimer's.

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LEFT: BRYAN THOMAS FOR THE NEW YORKER;
RIGHT: ILLUSTRATION BY HARRIET LEE-MERRION

THE MAIL

THE POWER OF READING

As an author of young-adult novels who regularly gets Google Alerts notifying me that my books—many of which depict sensitive subject matter, such as child trafficking—are being banned, I'm grateful to Paige Williams for her insightful reporting about Moms for Liberty's efforts to reshape public-school curricula ("Class Warfare," November 7th). It seems to me that students are the real casualties in this front of the culture wars. Teen-agers are currently facing a crisis of mental health: rates of depression and suicide are high, and resources to help guide them away from dangerous outcomes are frightfully limited. Many children endure traumas that leave them feeling isolated, ashamed, angry, and afraid. But, when those children see their experiences rendered in books, they learn that they're not alone; they might even begin to see a path out of their pain. (And, for those who are not living in abusive homes, or fighting homophobia, racism, sexism, or the existential dread of gun violence, books can help them better understand their peers.) I know this from spending many days visiting classrooms and juvenile-detention centers, and from the thousands of kids who've told me about books that saved their lives—books that were the only safe places they had, and that allowed them to temporarily escape the messy, violent, unfair, warming world they've inherited. Rather than take books away, we should encourage kids to visit those magical worlds, and thereby help them get back in touch with their own magic.

Patricia McCormick
Sag Harbor, N.Y.

MORE MULTIVERSES

Stephanie Burt, in her history of multiverses in literature and popular culture, remarks that "the notion of the multiverse belongs to anyone who can use it to tell a good story" (Books, November 7th). Her remark brought to mind a noteworthy expression of this phenomenon: fan fiction. In the nineteen-sixties, many "Star Trek" viewers became "Star Trek" storytellers themselves, publishing their own imagined adventures of the Enterprise crew in mimeographed zines that were shared through the mail and at fan conventions. These stories, built around a TV series that embraced the idea of parallel universes, represent a vibrant embodiment of the multiverse. Beyond creating new fictional worlds, they exploded the one-way street of media production and consumption into an endless web of storytelling. Though the regular variations on classic franchises pumped out by studios like Marvel may be profitable, the full potential of the multiverse device lies not just in the unlimited dimensions available to its characters but in the sheer number of authors who can tell their stories.

Hugh Siegel
Jeffersonville, N.Y.

I would like to expand on Burt's brief mention of the science-fiction writer Philip K. Dick, whose novels and stories are rife with multiple universes, and whose works have been the basis for popular films and television adaptations (including "The Man in the High Castle," which Burt touches on). One of Dick's classic works in this mode is "Eye in the Sky," in which reality changes bizarrely depending on which character's consciousness is controlling the universe at that moment. The highbrow creations of Jorge Luis Borges, which Burt also considers, are certainly an important source of inspiration, but Dick's prolific contributions, which have been a prominent part of popular culture since the nineteen-eighties, could be considered a more direct influence.

Joseph Stanton
Professor Emeritus of American Studies and Art History
University of Hawaii at Manoa
Honolulu, Hawaii

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NOVEMBER 23 – 29, 2022

GOINGS ON ABOUT TOWN

The man-in-a-dress comedy is one of Hollywood's hoariest genres and, in recent years, fodder for Broadway musicals ("Tootsie," "Mrs. Doubtfire"). But it all traces back to **"Some Like It Hot,"** Billy Wilder's classic film from 1959. A new musical version, in previews at the Shubert, with direction by Casey Nicholaw and songs by Marc Shaiman and Scott Wittman ("Hairspray"), aims to splice the old-school fun with contemporary gender politics. Adrianna Hicks, J. Harrison Ghee, and Christian Borle (above, left to right) lead the cast.

PHOTOGRAPH BY CAMILA FALQUEZ

As ever, it's advisable to check in advance to confirm engagements.

ART

"Every Kind of Wind: Calder and the 21st Century"

In this unusual and thrillingly synergistic show, the curator Kelly Taxter presents Alexander Calder's art—from his early, drawing-like wire pieces, made in the nineteen-twenties, to his later mobiles, with their drifting, balletic geometry—as a jumping-off point for new interactive endeavors by six contemporary artists. (The effect of wind on Calder's kinetic works becomes the show's unifying metaphor, aided by a wonderful exhibition design from Selldorf Architects.) The vertiginous seascapes and startling atmospheric disturbances of Jakob Kudsk Steensen's virtual-reality ecosystem (experienced via a headset) change, sometimes radically, with the slightest turn of the head. Danielle Brathwaite-Shirley evokes a battered dystopia in a grainy, chaotic video game. Davide Balula's "A.I. Generated Instructions"—displayed using L.E.D.—have an affinity with Yoko Ono's prompts, from the sixties, for making art, but Balula's are the product of machine learning, based on data about his previous works. One poetic instruction, titled "Cloud Seeding," reads "listen to a balloon float"; it's accompanied by a red rubber ball, at the end of a string. In Taxter's provocative context, it comes across as slyly Calderesque.—*Johanna Fateman (Nahmad Contemporary; through Jan. 28.)*

Alex Katz

"Gathering" is the title of the Guggenheim's triumphant retrospective of this nonagenarian painter, but it might easily have been "Conversations with Friends"—and not just because a stylish detail of a Katz double portrait graces the cover of Sally Rooney's novel by that name. (That daffodil-yellow canvas, from 2009, is among the more than a hundred and fifty works here.) Two subjects have absorbed the ninety-five-year-old native New Yorker across his eight-decade career: the people he loves—above all, his wife, Ada, and such close pals as Frank O'Hara, John Ashbery, and Meredith Monk—and the landscapes of Maine, where he has summered for some seventy years. One bright outlier in the exhibition, "Round Hill," from 1977, finds his friends in the endless now of a Caribbean getaway. For years, Katz was something of an outlier himself, a figurative painter who favors the flatness of Ab Ex. His style is singular, neither Pop nor Photo-Realist. His sharp eye for fashion (a chic red lip, a patterned scarf, a snazzy pair of sandals) can be deceptive. Such details are to Katz what apples were to Cézanne (whom Katz has called "the first artist I understood"): an invitation to eye the interplay of color and light, load a brush with oil, and master the depths of a painting's surface.—*Andrea K. Scott (Guggenheim Museum; through Feb. 20.)*

Kerry James Marshall

The exquisite corpse—a collaborative drawing exercise invented by the Paris Surrealists, in 1925—is the basis of this brilliant American artist's new exhibition. As the show's subtitle, "This Is Not the Game," suggests, the nineteen drawings and paintings on view don't play by the rules of multiple authorship written by André Breton et al. nearly a century ago: instead, the fragmented Black worlds they present are all rendered by Marshall's versatile hand alone. Typically, exquisite-corpse drawings are feats of incompatible scales, perspectives, and genres, and Marshall playfully adheres to that precedent; one work on paper incorporates a boating scene, buttocks, immense hands grasping a fish, and a woman, seen in profile, carrying a bound and naked man on her head. In a ten-foot-long painting, a torqued figure reclines partially nude, in Rollerblades, incongruously dangling a small spine entangled with vertebrae from one hand. While toying with all manner of styles and imagery, the artist tends to leave something macabre, maybe a corpse, in the frame.—*J.F. (Shainman; through Dec. 23.)*

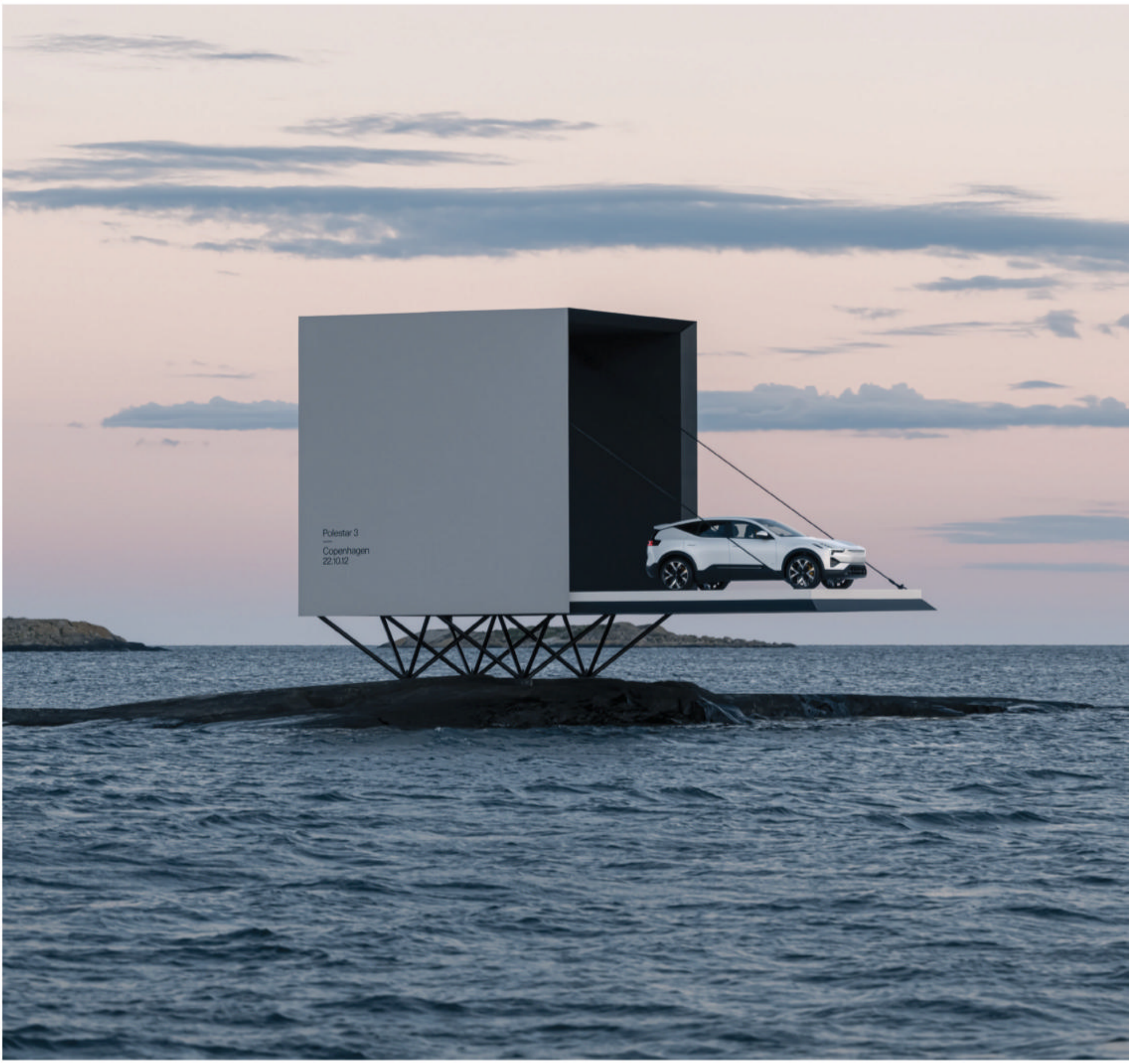
Wolfgang Tillmans

MOMA's immense, flabbergastingly installed retrospective of the photographer Wolfgang Tillmans, titled "To See Without Fear," persuades me that the man is a genius. There's a downside to the concession—it dampens my quarrels of taste with certain items, among the show's predominantly brilliant several hundred, that I do not like. Geniuses alter the basic terms of their fields; criteria that once applied no longer compel. The ground zero at MOMA is "art photography," its former autonomy diluted in a tsunami of images, in wildly varying sizes, mediums, and formats, which are often mounted from floor to ceiling, and may less risk than exalt banality. Tillmans observes no distinction, in the show's arrangement, between self-generated and commissioned works, original and appropriated images, framed fine prints and taped- or pinned-up photocopies, deliberate and accidental darkroom misadventures, and, in matters of content, the politically committed and the purely aesthetic. The fifty-four-year-old artist soared to fame, in the early nineties, for his ostensibly scattershot but, in truth, acutely selective documentation of soulful youths whom he encountered on night-life outings, in Berlin

AT THE GALLERIES

ART WORK BY JACQUELINE HUMPHRIES / COURTESY THE ARTIST / GREENE NAFTALI

The new **Jacqueline Humphries** show, at Greene Naftali (on view through Jan. 14), is almost overwhelmingly good, but not because everything in it is great. Although it includes some of the most magnificent abstract paintings of Humphries's career—bristling with ideas, both resisting and delivering pleasure—it also reveals an artist who insists on testing the limits of what "abstraction" can mean in the twenty-first century. Experimentation necessitates failure. In a room otherwise occupied by nine of Humphries's towering, densely layered, chromatically intricate canvases, a foot-tall, 3-D-printed white plastic square might as well be titled WTF. Then again, consider that painting has been succeeding by failing ever since Humphries arrived in New York City, from New Orleans, in the nineteen-eighties, a time when the intelligentsia dismissed the medium as obsolete, and smart heirs to the New York School, such as Christopher Wool, began turning the perceived deficit to their advantage, often using dark humor. Recently, Humphries—whose past formal adventures have included black-light paintings that can be made, and be seen, only in the dark—has been introducing emojis (as in "JH753😡," above) into her compositions, surrogates of Expressionism for the digital age.—*Andrea K. Scott*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CELEBRATING THE HOLIDAYS

Baroque Neapolitan Crèche

Below the choir of angels that's decorating the twenty-foot-tall spruce in the Met's Medieval Hall is a Nativity scene, crafted by Italian artisans in the eighteenth century, which calls to mind both Biblical Bethlehem and a jubilant prequel to Elena Ferrante's Neapolitan novels, as exquisite polychrome figurines of the Holy Family, the Magi, and the shepherds are joined by others representing the vibrant street life of Naples. *(The Met; through Jan. 8.)*

Gingerbread NYC

In early November, the Museum of the City of New York pulled a Paul Hollywood and hosted the first Great Borough Bake-Off, in which amateurs and professionals alike competed. (Somewhere Sinatra is singing, "If you can bake it there, you'll bake it anywhere.") The winners—including confectionary homages to the Staten Island Ferry, a Brooklyn brownstone, and the elevated subway in Queens—are now on view. *(Museum of the City of New York; through Jan. 8.)*

Holiday Train Show

To see Yankee Stadium, you head to the Bronx, where you don't expect to see the Brooklyn Bridge or the Statue of Liberty. But, at the Bronx's New York Botanical Garden, some twenty-five model trains and trolleys whiz past almost two hundred New York City landmarks—enchanting miniatures, meticulously constructed from bark, moss, and load-bearing cinnamon sticks—in the Enid A. Haupt Conservatory. *(New York Botanical Garden; through Jan. 16.)*

"George Balanchine's The Nutcracker"

When Balanchine created "The Nutcracker" for New York City Ballet, in 1954, he drew from childhood memories of the version in which he had danced in St. Petersburg, before the Revolution. His part was in the "hoop dance" (in a role now known as Candy Cane), a virtuosic jumping number set in the Land of the Sweets. (Balanchine kept the original choreography.) He had the excellent idea of filling the ballet with children, including its two protagonists, Marie and the Nutcracker Prince. Last year, because of vaccination issues, the kids were a little older, but this year they once again range from eight to thirteen. *(David H. Koch Theatre; Nov. 25-Dec. 31.)*

Kiki and Herb: "Do You Hear What We Hear?"

The twisted cabaret dynamos Kiki and Herb were never exclusively Christmastime visitors, but the holiday has long factored into their myth. In 2021, the duo—the singer Justin Vivian Bond as Kiki and the pianist Kenny Mellman as Herb—revived their seasonal show for the first time in more than a decade; for a segment of the downtown populace, natural order was restored. Now Kiki and Herb embark on a brief tour that stops at the Beacon; it's followed by a run of Bond's solo show, "Oh Mary, It's Christmas!," at Joe's Pub (Dec. 16-23). *(Beacon Theatre; Dec. 3.)*

Jingle Ball 2022

The artists may be young and contemporary, but iHeartRadio's annual holiday blowout is a brazenly old-fashioned event, down to its association with an entity that many attendees may hardly recognize—a radio station. As in years past, the program draws from some of the moment's shiniest pop stars, including Dua Lipa, Lizzo, Charlie Puth, and Demi Lovato, along with the antediluvian Backstreet Boys. But the true stars of the night might prove to be the teenyboppers in the audience, screaming their little heads off. *(Madison Square Garden; Dec. 9.)*

"Peter and the Wolf"

This tale, about a boy who defies a warning not to go out into a meadow, only to encounter a hungry wolf, originated as a Soviet lesson about youthful resourcefulness. Sergei Prokofiev, who set it to music, cleverly fashioned it as an introduction to the orchestra. In this charming half-hour production, for "Works & Process," narrated by the avuncular Isaac Mizrahi, with witty choreography by John Heginbotham, Central Park stands in for the Russian meadow. *(Guggenheim Museum; Dec. 10-11.)*

Winter Family Fair

'Tis the season for the Morgan Library to display a page from its original manuscript of Dickens's holiday classic, "A Christmas Carol." This year, additional inspiration for the child-friendly activities at the museum's annual event is provided by a trio of concurrent shows, devoted to "The Little Prince," to the Mesopotamian poet Enheduanna, and to the 2015 book "Sail Away," which pairs poems by Langston Hughes with collages by Ashley Bryan. *(Morgan Library & Museum; Dec. 11.)*

New York Philharmonic

John Williams's film scores for the Harry Potter movies begin with a melody that opens a portal to a young wizard's magical world, but the twinkling celesta and rushing strings could just as easily conjure the wonder of the holiday season—the very sound of tinselly snowflakes carried aloft on a wintry gust. The New York Philharmonic provides live accompaniment for a screening of "Harry Potter and the Chamber of Secrets" (Dec. 20-23); for the more traditionally inclined, there's Handel's "Messiah" (Dec. 13-17) and the brass players' annual holiday concert (Dec. 16-17). *(David Geffen Hall.)*

"Unsilent Night"

This year marks the thirtieth anniversary of "Unsilent Night," the perfect carolling option for those who cringe at the thought of singing in public. A sort of pre-Internet flash mob, the piece is the handiwork of the composer Phil Kline, who greets attendees at the Washington Square Arch with boom boxes loaded with different parts of his instrumental composition. (There's also an app.) After hitting Play, participants stroll to Tompkins Square Park. Last year, "Unsilent Night" fell during peak Omicron, making the outdoor happening the only palatable concert in town, and, year in, year out, it never fails to warm hearts on a cold night. *(Washington Square Park; Dec. 18.)*

"New Year's Eve Concert for Peace"

At the magnificent Cathedral of St. John the Divine, Kent Tritle and Bryan Zaros conduct the cathedral's forces in a program that runs the emotional gamut. Gustav Holst's uplifting, warmly orchestrated "St. Paul's Suite" appears alongside David Lang's "Make Peace," a clear-eyed plea arranged for a-cappella choir, and Philip Herbert's tearful "Elegy: In Memoriam Stephen Lawrence." Joseph Turrin's "Lullaby for Vaska," dedicated to the Ukrainian people, has its world première. *(Cathedral of St. John the Divine; Dec. 31.)*

ILLUSTRATION BY ALICE PIAGGIO

Chloé

and London. His party scenes are like panes of glass dropped through the middle of symbioses: beholding them, you are at once viewer and viewed. This body of work put Tillmans on the art-world map, but he has somewhat downplayed it in his choices for the present show, perhaps from exasperation at being lazily identified with a fleeting Zeitgeist that determined only the opening gambit for a game that he has conducted in no end of other directions.—*Peter Schjeldahl (Museum of Modern Art; through Jan. 1.)*

DANCE

Complexions Contemporary Ballet

Founded by the choreographer Dwight Rhoden and the phenomenal dancer Desmond Richardson, Complexions is known for its truly diverse ensemble of dancers, and for the athletic intensity of Rhoden's choreography. Arms slash, torsos twist, legs fly. A program at the Joyce includes Rhoden's new piece "Endgame/Love One," set to a soundscape of shifting rhythms, string orchestra, and voice, as well as William Forsythe's überstylish "Slingerland Duet," a company première.—*Marina Harss (Joyce Theatre; Nov. 22-Dec. 4.)*

THE THEATRE

Almost Famous

The arrival of this Broadway musical, based on Cameron Crowe's movie from 2000, which itself was based on his experiences during a nearly hallowed era of pop culture—the sex, drugs, and rock and roll of the nineteen-seventies—presents an opportunity to observe how myth becomes entertainment in America. "Almost Famous"—directed by Jeremy Herrin, with a book and lyrics by Crowe and original music and lyrics by Tom Kitt—tells the story of a fifteen-year-old superfan and outcast, William Miller (Casey Likes), who, under the unlikely tutelage of the journalist Lester Bangs, wants to be a rock critic. Like the movie it's adapted from, the musical foregrounds the dangers and the delusions—of the musicians themselves, and of their unthinkably young groupies—that undergirded that ballyhooed moment, but the show feels somewhat defanged. Its commitment to nostalgia makes it more a confection than a cautionary tale. But perhaps that's how memory works: as its objects get farther away, things get misty. Likes is a good singer and an engaging performer, and Solea Pfeiffer, as the romantic groupie Penny Lane, is, too. But the songs they sing tend toward schmaltz. The best moments come when the story falls away and the cast belts out a cover.—*Vinson Cunningham (Bernard B. Jacobs; open run.)*

& Juliet

What in the sweet bubblegum hell is the great Paulo Szot doing in this Max Martin jukebox musical? Look, I'm totally delighted to watch the world-class operatic baritone prowl the stage, singing "Everybody (Backstreet's Back)" while young folks bop energetically around him—it's like a tiger got into the kitten basket. The wicked humor of his casting, though, is a rarity among the broad swings of Martin and the book writer David West Read's pop musical. Shakespeare (Stark Sands) and his wife, Anne Hathaway (Betsy Wolfe, another welcome presence), give Juliet (Lorna Courtney) a new beginning, writing her a sequel requiring thirty Martin hits made famous by Britney Spears, Katy Perry, the aforementioned Backstreet Boys, and more. There are too many songs, but their placement, at least, can be sly: when Juliet receives a non-Romeo marriage proposal, she sings "Oops! . . . I Did It Again"; when her nonbinary friend May (Justin David Sullivan) finds true love, we hear a cracking pun on an 'NSync lyric. It's a shiny bauble, yes, but in the course of its two and a half hours the repetitive rhythms dull. Also, is it too much to hope for some cogency about the gender liberation(s) it wears on its sleeve? Sorry to ask, but I Want It That Way.—*Helen Shaw (Stephen Sondheim Theatre; open run.)*

the bandaged place

This subtly performed drama by Harrison David Rivers (directed by David Mendizábal) is essentially about what it feels like to inhabit a body: the sensations of dancing and eating and pinkie swears; the lingering, unpredictable effects of the pleasures and the injuries that one body imparts to another. When the play opens, Jonah (Jhardon DiShon Milton) hasn't fully terminated his relationship with the abusive Ruben (Anthony Lee Medina), even as he keeps his eight-year-old daughter, Ella (Phoenix Noelle and Sasha Manuel, in alternating performances), and grandmother (Stephanie Berry) at arm's length. Three of the characters (including Ella's teacher, Sam, played by Jake Ryan Lozano) are dancers, but the entire cast makes use of dance, and many of the show's

PODCAST DEPT.

ILLUSTRATION BY MAR HERNÁNDEZ

These days, the podcast-as-brand-extension is everywhere. If a television show, a TikTok account, or even a local pizzeria has the smallest amount of success, someone is going to ask, "Is there a podcast in here somewhere?" Not everything has to be a podcast! Sometimes, however, the rare podcast emerges from a project and it turns out to be the most thrilling arm of the enterprise. This is the case with **"Every Outfit,"** a garrulous talk show that grew out of an Instagram account that grew out of the HBO show "Sex and the City." Allow me to explain: in 2016, the L.A.-based fashion writers Lauren Garroni and Chelsea Fairless started an Instagram feed documenting every outfit on "S.A.T.C."; it became an instant smash and yielded the pair a book deal ("We Should All Be Mirandas," from 2019). In 2021, the duo launched a companion podcast that started out as a gabfest about Carrie Bradshaw, but over time it has morphed into something far richer. The two now discuss the larger intersections of fashion and pop culture, with gimlet accuracy and insider breathlessness. This is a podcast for overthinky clotheshorses; if you want smart, dishy style analysis that doesn't take itself seriously (but is dead serious about fashion), strut over this way.—*Rachel Syme*

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Critic's Pick

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Illustration by Anita Kunz

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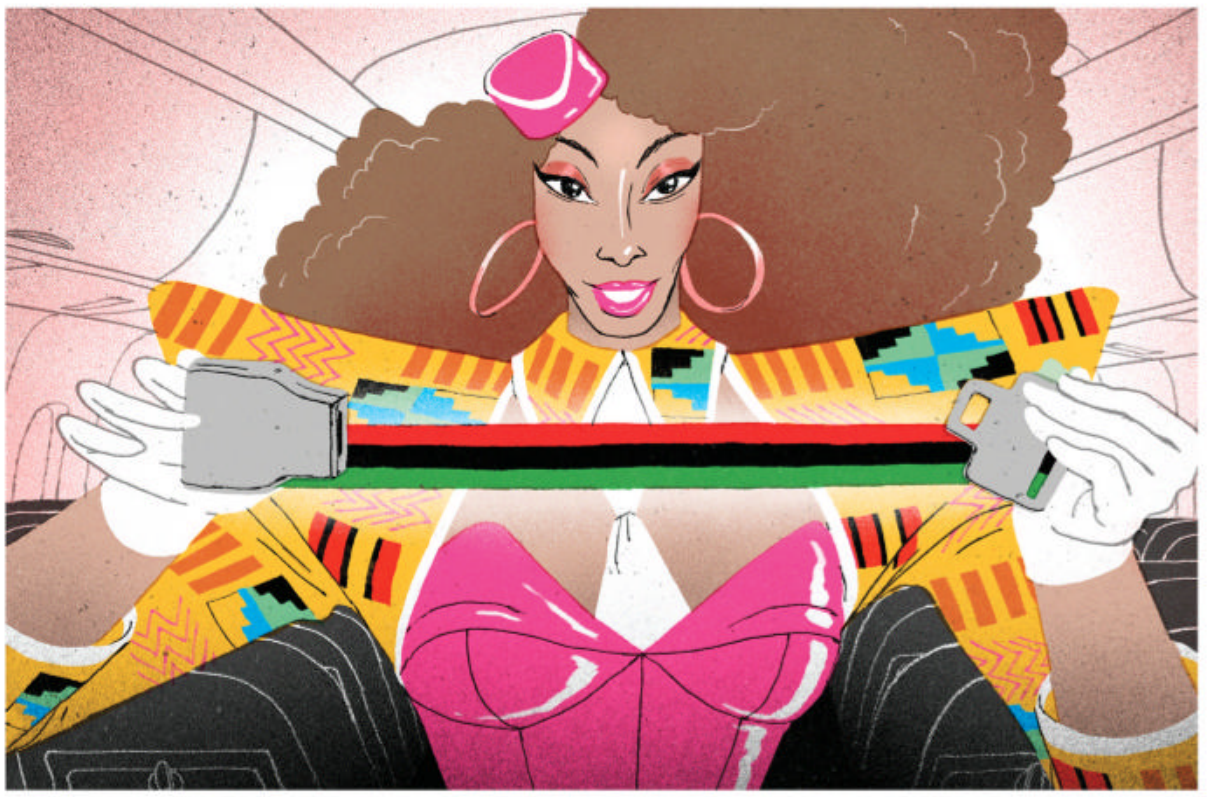


Here's a thought experiment: What if the U.S. government offered Black Americans a one-way plane ticket to Africa, and, weary of fighting for an equality that never arrives, they up and left? That's the premise of **"Ain't No Mo' "** (in previews, opening Dec. 1), a speculative satire by Jordan E. Cooper, which moves to Broadway's Belasco Theatre after a 2019 run at the Public. Working in the absurdist tradition of George C. Wolfe's 1986 play, "The Colored Museum," Cooper—who, at twenty-seven, is the creator of the BET sitcom "The Ms. Pat Show"—stars, as Peaches, a chatty, pink-haired airline agent who checks in passengers to African American Airlines Flight 1619. For all its ribaldry (one scene parodies the "Real Housewives" franchise), the play's outrageousness is fuelled by outrage, tracing the illusory hope of Barack Obama's ascent through the white backlash that fomented Trumpism. Stevie Walker-Webb directs.—*Michael Schulman*

most powerful and delightful moments arrive via Tislarm Bouie's choreography.—*Rollo Romig (Black Box Theatre in the Harold and Miriam Steinberg Center; through Dec. 18.)*

Camp Siegfried

It's odd to say about a play that contains a "Heil Hitler" salute, a shrieking anti-Semitic speech in German, and the corruption of two young American souls, but Bess Wohl's love-in-the-Bund drama seems . . . slight. Wohl, so deft with plays such as "Grand Horizons," has succeeded in writing a delicate love story, between an unnamed seventeen-year-old boy (Johnny Berchtold) and sixteen-year-old girl (Lily McInerny), set at a (real) summer camp on Long Island that's run by the Nazi-aligned German American Bund, in 1938. But the delicacy quickly bends, like grass, before the wind of the obvious. Over and over, we hear that the boy is called a "runt," and his victim mind-set and pro-German feelings are already rotting into Nazism; she, endearingly awkward at first, seems like a harder win for the Party, but soon the excitement of being noticed and chosen turns her into a vile mouthpiece, too. "Anybody can fall into anything, really," the girl says. "Anyone can be seduced." The outdoorsy setting, cleverly created by Brett J. Banakis in David Cromer's Second Stage production, includes a lot of opportunities for log-chopping and wood-hauling and platform-building. Lines like those, though, require the actors to hit the textual nail rather too squarely on the head.—*H.S. (Tony Kiser Theatre; through Dec. 4.)*

Downstate

Depending on whether you're the play-half-full or the play-half-empty sort, Bruce Norris's feel-bad drama is either a miracle of compassion (he writes searchingly and gently about four denizens of a post-incarceration group home for sexual offenders) or an affront of brutal callousness (he sees everybody else, even victims, as hypocrites and pills). Throughout his work, such as "Clybourne Park" or "The Pain and the Itch," Norris likes to create long-form discomfort—his comic effects stem from constant interruption and insult, and you can feel yourself fighting with his plays as they happen. (The worse you feel, the better he's doing.) What's unusual for Norris, though, is "Downstate" 's structural predictability: as he builds our sympathy for each man—the aw-shucks piano teacher in a wheelchair (Francis Guinan) being confronted by an old pupil (Tim Hopper), the devoted family man (Eddie Torres) facing off against his unkind case worker (Susanna Guzmán), the group nurturer (K. Todd Freeman) still grieving an old relationship—we're just waiting to hear the awful details that will make us think again. The repeated comments about a bad smell certainly spoil (as it were) the story's final tragic "surprise," and although the great Pam MacKinnon directs another gorgeously observed production, the play finally blunts its own sharp commentary on our culture's hysterical addiction to punishment.—*H.S. (Playwrights Horizons; through Dec. 11.)*

My Broken Language

This play, written and directed by Quiara Alegría Hudes, is adapted from Hudes's memoir of the same name, published last year. (Hudes won the Pulitzer Prize for drama, in 2012, for "Water by the Spoonful," and wrote the book for "In the Heights.") The play's text is, almost uniformly, a monologue with the texture of loving, lyrical prose. Five performers—Zabryna Guevara, Yani Marin, Samora la Perdida, Marilyn Torres, and the always exciting Daphne Rubin-Vega—take turns embodying the voice of the narrator, here called the Author. They move with a fluid grace through a green-tiled, houseplant-bedecked space, overhung with white ceiling fans, designed by Arnulfo Maldonado. As one actor pours forth Hudes's autobiographical material—often in the form of highly charged vignettes, describing social worlds and interior states in quick, compressed strokes—the others play members of her family: her mother or her coterie of revered older cousins. The Author is obviously Hudes, but what makes this an original work and not a regurgitated version of her memoir is the implication, realized in these bodies, that a person's life story is common property, not a house behind a fence. Others' real lives, their true personalities—call them spirits—shiver through us, leaving their mark.—*V.C. (Reviewed in our issue of 11/21/22.) (Pershing Square Signature Center; through Nov. 27.)*

Only Gold

This musical—directed and choreographed by Andy Blankenbuehler, for MCC, with a book by Blankenbuehler and Ted Malawer and music and lyrics by Kate Nash—is set in nineteen-twenties Paris, where a visiting royal family has come to prepare for the arranged marriage of a princess, Tooba (Gaby Diaz), who would rather find love on her own. The King (Terrence Mann) and the Queen (Karine Plantadit) have grown distant from each other—perhaps France will help revive their romance. It's a hackneyed plot, full of contrivance. The musical is really an extended showcase for Blankenbuehler's choreography (he's won three Tonys) and Nash's lyrics. The dancing is quite rousing in places—one exuberant number, helmed by Plantadit, is brilliant—and Nash offers big, emotional pop, the kinds of arena dirges that have become the lingua franca of the Broadway stage. Go to one of her concerts, maybe, or see Blankenbuehler's work in a less cliché play.—*V.C. (Newman Mills Theatre; through Nov. 27.)*

ILLUSTRATION BY JASJYOT SINGH HANS

MUSIC

Omar Apollo

R. & B. The story of the singer-songwriter and guitarist Omar Apollo's discovery follows an increasingly popular path. After a stint on SoundCloud, Apollo used thirty dollars from a friend to upload a song, "Ugotme," to Spotify; it found a home on one of the platform's playlists and subsequently took off. Apollo is the child of Mexican American immigrants, and his songcraft is built on a more traditional foundation—colored by church choir, *baile folklórico*, Latin pop, and telenovelas. By 2021, he'd been nominated for Record of the Year at the Latin Grammys, for his work with the Spanish star C. Tangana. His music distorts classic soul sounds with his vast array of influences: "Apolonio," from 2020, showcased deeply groovy, hallucinatory R. & B., but his recent album, "Ivory," is even more eclectic, swinging from alt-pop to trap. Apollo has joked that his earliest supporters were exclusively Latina girls; as he grows more confident in his sound, he seems poised to become an international presence.—*Sheldon Pearce (Kings Theatre; Nov. 26-27.)*

Black Art Jazz Collective

JAZZ A coöperative unit made up of six top-notch improvisers, all seasoned but all relatively young, the Black Art Jazz Collective is dedicated to both recognizing the African American foundation of jazz and drawing attention to relevant social and political concerns. Unlike the sound storms produced by related free-jazz ensembles of the sixties, the music brewed by the collective—which includes the saxophonist Wayne Escoffery, the trumpeter Jeremy Pelt, the trombonist James Burton III, the pianist Victor Gould, the drummer Mark Whitfield, Jr., and the bassist Rashaan Carter—is an expertly conceived offering of polished post-bop peppered with dexterous playing and original compositions.—*Steve Futterman (Smoke; Nov. 25-27.)*

"Music for New Romantics"

NEW WAVE The sixty-eight-song "Music for New Romantics"—initially titled "Music for Blitz Kids," after the habitués of the London soirée Blitz—provides an overview of the music that d.j.s played at fashion-forward British clubs that came in Blitz's wake, such as Rum Runner, a Birmingham spot where Duran Duran germinated. The box set encapsulates the elements that would beget much of British pop before infiltrating the States, in the early eighties, via MTV: synthesized grandeur, frisky drums, and a gleeful embrace of kitschy futurism, as defined by everyone from Donna Summer and Sister Sledge to Visage and the Cure. It's smartly assembled by Chris Sullivan—of another key night spot of the period, London's Wag—and by the reissue producer John Reed. Like a good d.j. set, the collection plays as one continuous statement.—*Michaelangelo Matos (Streaming on select platforms.)*

New York Philharmonic

CLASSICAL When the Icelandic pianist Víkingur Ólafsson makes his company début with the New York Philharmonic this month, the stage will be set for enchantment. Newly ensconced in its renovated auditorium, of undulating beechwood and rose-petal upholstery, the orchestra, with the conductor Stéphane Denève, delves into an all-French program rooted in myth and fantasy, playing Albert Roussel's rousing Suite No. 2 from "Bacchus et Ariane," Ravel's radiant Suite No. 2 from "Daphnis et Chloé," and a movement from Guillaume Connesson's strangely alluring "Les Cités de Lovecraft." Ólafsson performs Ravel's Piano Concerto in G Major, which was inspired by the jazz that Ravel heard on tour in the United States in the twenties.—*Oussama Zahr (David Geffen Hall; Nov. 23, Nov. 25, and Nov. 26.)*

Plaid: "Feorm Falorx"

ELECTRONIC For three decades, the British producers Ed Handley and Andy Turner, who collaborate as Plaid, have made electronic music with a bright melodicism that's given additional tang by deliciously sour-edged arrangements. Plaid's eleventh album, "Feorm Falorx," boasts a more playful hue than the duo's recent work. On the giddy "Wondergan," the music evokes a cross between a seventies-game-show theme and a nineties Nintendo jingle. The album's biggest surprise, "Nightcrawler," is led by jittery post-punk guitar, akin to early Cure, even when a synth wash and fluttering, wordless vocal samples rise up to join it in the mix.—*M.M. (Streaming on select platforms.)*

Rachael and Vilray

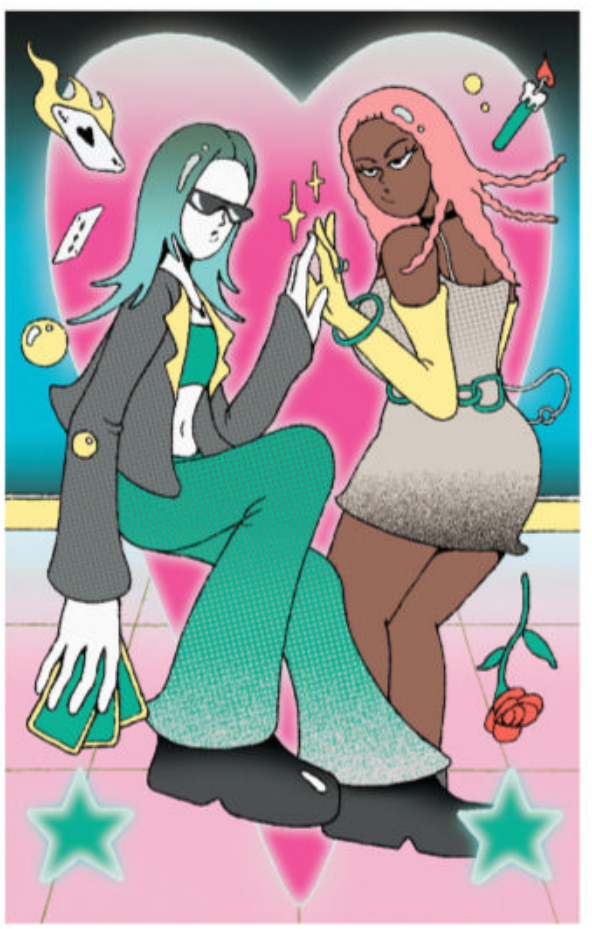
CABARET Imagine a parable: a songwriter prays for aptitude in his field and is granted his wish—yet fame and fortune elude him, as his style is locked in a long-eclipsed era. Such is the plight of Vilray, the singer and guitarist paired here with Rachael Price, a crooner on loan from the quartet Lake Street Dive. Together, the musicians explore the sounds of the nineteen-thirties and forties—if they had been written by Vilray. The music on the duo's self-titled album and on their forthcoming follow-up, "I Love a Love Song!" (due in January), seems designed for black-and-white films about the frisky rich. Narrators incessantly fall in love and cleverly contemplate the experience over swooning horns, which invoke luxury in a way that, say, somebody's flashy car could never summon. In their début at the venue, the twosome assume the stage of the Carlyle's cabaret temple—a combination that just might prove, as in all those songs, to be love at first sight.—*Jay Ruttenberg (Café Carlyle; Nov. 23, Nov. 25, and Nov. 26.)*

MOVIES

All the Beauty and the Bloodshed

Laura Poitras's documentary portrait of the photographer Nan Goldin shares its subject's passion, candor, and scope of action. The movie traces Goldin's troubled childhood in the nineteen-sixties—scarred by her older sister Barbara's death, by suicide—and the start of her career, on the Lower East Side, in the nineteen-seventies, making photographs of friends and acquaintances, including queer and trans people, when such subjects were largely excluded from the official art world. Her book "The Ballad of Sexual Dependency" was a key work of the eighties; she curated a 1989 show, centered on the AIDS crisis, that became a flash point of right-wing acrimony; and she was involved with ACT UP, which has informed her more recent activism. Goldin, a survivor of addiction to OxyContin, organized a group to hold the Sackler family—owners of Purdue Pharma (the drug's manufacturer)—accountable, protesting their prominence in the art world. (Poitras also interviews Patrick Radden Keefe, of *The New Yorker*, about Purdue and the Sacklers.) Goldin discusses profoundly

POP



The Atlanta duo **Coco & Clair Clair** pair brash boasts with spare cloud-rap beats, creating an uncanny valley of early-two-thousands mall pop. The artists met on Twitter, a decade ago, thanks to a shared sense of humor; they emerged on bills with punk bands one day and with Playboi Carti the next. These duelling sides converge in the singsong experiments of their recent album, "Sexy." Over effervescent productions that glitter like rhinestones, the musicians eviscerate clingy exes, poseurs, and clueless bosses. At Bowery Ballroom, on Nov. 26, Coco & Clair Clair join a long lineage of artists who wield girlishness to shock with unexpected statements. "He wanna synch up with my period," Coco raps on "Bad Lil Vibe." "Meanwhile he saved in my phone as 'idiot.'"—*Jenn Pelly*

ILLUSTRATION BY SHELTER SONG

painful experiences (and her photos of them) frankly and inspirationally, and she emerges as both a crucial witness of her era and one of its prime movers.—*Richard Brody (Screening at Film at Lincoln Center, IFC Center, and BAM.)*

The Fabelmans

Steven Spielberg's latest work begins in New Jersey in 1952, with a trip to the cinema; the whole movie, indeed, becomes a warm-blooded education in the making and watching of films. The avid learner is a Jewish boy named Sammy Fabelman, played first by Mateo Zoryon Francis-DeFord and later by Gabriel LaBelle. Sammy is ensconced within a loving home: his father, Burt (Paul Dano), and his mother, Mitzi (Michelle Williams), plus a number of siblings, and a guy named Bennie (Seth Rogen), who is always around, even when the family moves to Arizona. The twist in the tale—finely sustained by Spielberg and Tony Kushner, who co-wrote the screenplay—is that Sammy feels compelled, with a camera in hand, not only to step outside that close domestic embrace, and to forge new stories of his own, but also to scrutinize the world from which he comes. There is real pain in that scrutiny, and, as so often with Spielberg, it's hard not to yield to the emotional current with which he carries you along. The fable man does it again.—*Anthony Lane (Reviewed in our issue of 11/21/22.) (In wide release.)*

Ishtar

Elaine May's last feature to date, from 1987, is an elaborately antic musical of startling, even disturbing, originality. It's the story of the world's worst singer-songwriter duo—a nerdy Texan named Lyle Rogers (Warren Beatty) and the self-styled swinger Chuck Clarke (Dustin Hoffman)—who, owing to their oblivious inability to get their careers going in New York, accept a gig in Marrakesh, Morocco. On the way, however, they get sidetracked in the neighboring (and fictitious) North African country of Ishtar. There, amid the sub-rosa manipulations of a local revolutionary (Isabelle Adjani) and a C.I.A. agent (Charles Grodin), the musical pair find themselves secretly working on opposite sides of an international conflict—yet, even when threatened with death in the desert, they can't stop singing. The terrible, unbearably catchy songs (written by Paul Williams) are wild works of wit, and May exults in the possibilities that they offer Beatty and Hoffman, in their roles as true artists in every regard except talent. May films these intrepid losers at the painfully ambiguous border of comedy and tragedy—and films American political adventurism the same way.—*R.B. (Playing Nov. 27 and Dec. 4 at Museum of the Moving Image, and streaming on Tubi, Prime Video, and other services.)*

Nanny

Blending horror and satire, political critique and supernatural melodrama, the writer and director Nikyatu Jusu's first feature focusses on Aisha (Anna Diop), a Senegalese resident of Harlem who is struggling to earn enough money to bring her young son over from her home town of Dakar. She takes a job with a well-to-do white family, as a nanny to a girl named Rose (Rose Decker), whose parents are Amy (Michelle Monaghan), an overwhelmed executive, and Adam (Morgan Spector), a photographer in quest of picturesque hardships around the world. The distracted couple forget to pay Aisha and shift between patronizing warmth and oblivious aggression; along with the stress of her work—and of the delay in her son's travel—Aisha endures a series of increasingly terrifying nightmares and dangerous delusions. Jusu displays a scathingly nuanced attention to the arrogance of money and the presumptions of cultural dominance, and she portrays the vital force of tradition in the wisdom of an elder (Leslie Uggams). Though the drama occasionally stints on specifics, it packs immense symbolic resonance in its physical and metaphysical details alike.—*R.B. (In theatrical release.)*

Salò, or the 120 Days of Sodom

Pier Paolo Pasolini's last film, from 1975, is also, in a way, the ultimate film: its representation of depravity may be unsurpassable. Pasolini sets the Marquis de Sade's "120 Days of Sodom" in 1944-45, in a sumptuous villa in Mussolini's Republic of Salò, the Nazi puppet regime of northern Italy, where four potentates bring a phalanx of young men and women to submit to their unlimited power and pleasure. The cruelty is the point, as is the delight of the mighty in inflicting it. In a stately grand salon, with its paintings and piano, two grandes dames lyrically recite Sadean tales of obscene degradation, to the accompaniment of Chopin, as the men oversee the rituals of the house—rape, torture, coprophagy, mutilation, and murder—which Pasolini depicts clearly, unflinchingly, even lyrically. Shifting the viewer's identification to the killers, Pasolini suggests that the classical values of Western civilization are steeped in the blood of innocents. This film is essential to have seen but impossible to watch: a viewer may find life itself defiled beyond redemption by the simple fact that such things can be shown or even imagined.—*R.B. (Screening Nov. 25, Nov. 26, and Nov. 28 at Metrograph.)*

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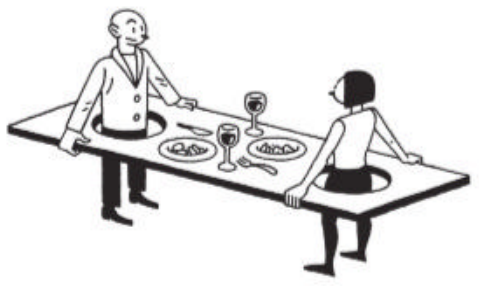
WHAT TO STREAM

ALAMY

In his exquisite and anguished adaptation, from 2000, of Edith Wharton's novel **"The House of Mirth,"** Terence Davies brings to life the book's daring societal X-rays—the revelations of codes and norms, unspoken rules and silent judgments, that govern the glittering whirl of fin-de-siècle New York high society, especially those that limit women's independence. Gillian Anderson stars as Lily Bart, the orphaned heiress to a vanished fortune, who depends entirely on an elderly aunt's charity. The alluringly free-spirited Lily's only hope to maintain her lavish life style is to marry into money, but the man she loves (Eric Stoltz), a lawyer, hasn't got much, and she spurns rich men she doesn't love. Pursuing her desires with an ingenuous sincerity, she risks exposing the falsehoods of other women, who eject her from their social ranks, sending her into free fall without a financial safety net. The tragic contradictions of Lily's brilliant character—her refined aestheticism, lacerating wit, and heedless passion—are matched by Davies's rapturous yet rueful display of the era's sumptuous fashions and furnishings, which quietly shudder with the crushing power of the unwritten laws that sustain them. The movie, long unavailable, is streaming on Showtime and Prime Video.—*Richard Brody*



TABLES FOR TWO

Kingfisher
505 Rogers Ave., Brooklyn

You might describe my relationship with shrimp cocktail as delusional. If it's on a menu, I order it. It's almost always unexceptional, and yet I'm compelled by its raw-bar glamour, and by the slimmest chance of greatness. One night in the summer of 2021, this high-stakes calculation paid off like never before. I ordered shrimp cocktail at, of all places, a breakfast-taco window, called Mockingbird, briefly home to a pop-up oyster bar. It was the best iteration I'd ever had—the sweetness of the plump, chilled meat drawn out with salt (why is shrimp cocktail so often undersalted?) and lemon zest (a revelation), served with shaved horseradish and a fruity but balanced cocktail sauce.

I'm delighted to report that the shrimp cocktail of my dreams has signed a lease. Last month, in Prospect Lefferts Gardens, André Hueston Mack and Phoebe Damrosch, a married couple who met working at Per Se (he was a sommelier, she a server), opened Kingfisher. It's the latest addition to their growing neighborhood empire, which, along with Mockingbird, also includes & Sons Ham Bar and Buttery, a restaurant and shop specializing in domestic cured meats and cheeses; a wine store called VyneYard (Mack has his own label); and a bakery called Chickadee Bread.

If there's a through line to these diverse businesses, it's Mack's obsession with highly specialized kitchen machinery. His interest in cured meats arose partly from his first big purchase: a meat slicer manufactured in 1910. A Texas native, he got serious about making breakfast tacos only after he bought a top-of-the-line industrial tortilla press. In the spring of 2020, he woke up after an evening of drinking and said to Damrosch, "I think I bought a flour mill last night." Indeed, he had: custom granite, made to order in Vermont, now in use at Chickadee.

& Sons Hospitality Group's culinary director, Nico Bouter, who was the chef de cuisine at Ignacio Mattos's Flora Bar, can more than handle it all. At the Buttery, he devised a menu of simple but inspired sandwiches. (A standout features soft-boiled heirloom egg, anchovies, and pesto on sourdough.) Born in the Netherlands, he took to tacos with ease, overseeing the daily pressing of Mockingbird's superlative flour tortillas, which get filled with house-made chorizo and scrambled heirloom eggs, or Rancho Gordo black beans and Grafton Cheddar.

Kingfisher could be loosely categorized as a seafood restaurant, but "our concept was 'Let's just cook,'" Mack told me recently. It was time to let Bouter flex his chops: "I mean, this guy—I'm asking him to make sandwiches!" In a kitchen that's only slightly better equipped than the hot-plate setups at & Sons and Mockingbird, Bouter displays a nimble efficiency. The eggs that he uses at the Buttery and at Mockingbird—from Ameraucana chickens, a breed that produces beautiful blue shells and vibrant orange yolks—are here, too: in hollandaise, he tosses coins of fingerling potato, crunchy croutons made from stale Chickadee loaves, glossy trout roe, and tobiko, then crowns the intoxicating combination with two medium-boiled halves, egg on egg on egg on egg. Another dish exalts the potato: crushed kettle chips are folded into an earthy fingerling purée and topped with poached Purple Majesties, on a plate that also incorporates an emerald-hued herb purée, a dill-prominent herb salad, and tender medallions of monkfish loin.

The shrimp cocktail was as good as I remembered. Slabs of raw hiramasa, a type of yellowtail, brilliantly layered with XO sauce, Asian pear, and shiso leaves, gave me a similar thrill, and I was emboldened to break my ban on fluke crudo, a dish that's inexplicably omnipresent, and often phoned in, at upmarket restaurants of late. Satiny morsels of the mellow white fish were dressed with yuzu kosho, toasted pepitas, and raw cubes of pickled butternut squash, gone al dente in their brine—a sensationally bright, zippy, and textured composition that somehow also read as gentle and creamy, the familiar turned fresh. *(Dishes $6–$36.)*

—Hannah Goldfield

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THE TALK OF THE TOWN

COMMENT
SQUAWK ON THE WILD SIDE

Rats should take notice, pigeons ponder their options: wild turkeys have returned to New England. They're strutting on city sidewalks, nesting under park benches, roosting in back yards—whole flocks flapping, waggling their drooping, bubblegum-pink snoods at passing traffic, as if they owned the place. You meet them at cafés and bus stops alike, the brindled hens clucking and cackling, calling their hatchlings, their jakes and their jennies, the big, blue-headed toms gurgling and gobble-gobbling. They look like Pilgrims, grave and gray-black, drab-daubed, their tail feathers edged in white, Puritan divines in ruffled cuffs.

"There was a great store of wild turkeys, of which they took many," the Mayflower arrival William Bradford wrote in his journal, during his first autumn in Plymouth, in 1621. Bradford didn't eat turkey at that first Thanksgiving, because, really, there was no first Thanksgiving that fall. Also, much of the food that he and his band of settlers ate they had taken, like their land, from the Wampanoag, and at the harvest celebration in question he may have eaten goose. But turkeys abounded. And no reader of the annals of early New England has ever forgotten Bradford's recounting of the public execution, in 1642, of a boy, aged sixteen or seventeen, hanged to death for having had sex with "a mare, a cow, two goats, five sheep, two calves, and a turkey." (A turkey?) Benjamin Franklin, writing in 1784, thought the turkey "a much more respectable Bird" than the bald eagle, which was "a Bird of bad moral Character," while the turkey was, if "a little vain & silly, a Bird of Courage." Alas, by the end of the nineteenth century this particular fowl had nearly become extinct, hunted down, crowded out. The last known wild turkey in Massachusetts was killed in 1851, even as Americans killed passenger pigeons, by the hundreds of thousands, from flocks that numbered in the hundreds of millions. The last passenger pigeon, Martha, named for George Washington's wife, died in a zoo in Cincinnati, in 1914, and, not long afterward, heartbroken ornithologists tried to reintroduce the wild turkey into New England, without much success. Then, in the early nineteen-seventies, thirty-seven birds captured in the Adirondacks were released in the Berkshires,

and their descendants are now everywhere, hundreds of thousands strong, brunching at Boston's Prudential Center, dining on Boston Common, and foraging alongside the Swan Boats that glide in the pond of Boston Public Garden. They most certainly do not make way for ducklings.

Birds, over all, are not faring well. Ornithologically, these are dystopian times, an avian apocalypse. One recent study estimates that the bird population of North America has fallen precipitously since 1970, down nearly three billion birds, one lost for every four. Not wild turkeys, whose numbers in New England are still rising. They eat everything: worms, hot dogs, sushi, your breakfast, grubs. They are fairly flightless and eerily fearless, three-foot-tall feathered dinosaurs.

If they look like Pilgrims, petty, pious, they also bear an uncanny resemblance to a mouthwatering main course, perambulating. Cows don't walk down Commonwealth Avenue, but if they did would they give you a hankering for a hamburger? If lambs grazed on the outfield at Fenway Park, would the sight of them leave you licking your lips at the thought of lamb chops, roasted with rosemary and lemon? Or would making their closer acquaintance convert you to vegetarianism? People don't meet their food anymore, even if they go to farmers' markets and farm-to-table bistros. But a turkey sashays past your office window and a cartoon thought bubble pops up above your head, of that turkey on a platter, trussed, stuffed, roasted, and glistening,

ILLUSTRATIONS BY JOÃO FAZENDA

the bare bones of its severed legs capped in ruffled white paper booties. Do you forswear fowl? A fat tom walks by, proud as a groom. "If only I had a musket," you hear someone say. "I mean, or I could just grab it." Except, scofflaw, you can't.

In Massachusetts, you can hunt wild turkeys (since 1991, the state's official game bird), but only with a permit, only during turkey-hunting season, and only so long as you don't use bait, dogs, or electronic turkey callers. You are, to be fair, permitted to whistle. "Sit and call the birds to you," the Massachusetts Division of Fisheries and Wildlife advises. Yet beware: "Do not wear red, white, blue, or black," or the gobblers, the full-grown males, might attack. Franklin offered the same caution: if a turkey ran into a British redcoat, woe to the soldier. This, my fellow-Americans, may be how we won the war.

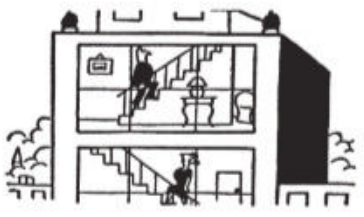
"Don't feed the turkeys," one city office warns civilians, of the non-hunting sort. They may attack small children. (Small children's approach, however, may prove difficult to deter.) "Don't let turkeys intimidate you." To daunt them, the henpecked advise, wield a broom or a garden hose, or get a dog. You sometimes see people standing their ground, a man chasing a squawking flock off his front porch, waving his arms. "Tired of the turkey shit on my steps," he snaps. A bicycle cop veers into a hen, on purpose, a near-miss, urging her away from a playground: "Scram, bird, scram!" And still the turkeys gain ground: the people of New England appear indifferent to the advice of the Division of Fisheries and Wildlife, recalling childhood afternoons spent in schoolrooms, placing a hand on construction paper and tracing the outline of splayed and stubby fingers to draw a tom, its tail feathers spread wide. A turkey seemed, then, an imaginary, mythical animal—a dragon, a unicorn. And here it is! Roosting in the dogwood tree outside your window, pecking at the subway grate, twisting its ruddy red neck and looking straight at you, like a long-lost dodo. What more might return in full force? Will you ever see a moose in Massachusetts? A great egret in Connecticut?

Thanksgiving looms, a much trussed holiday. Meanwhile, night after night, sitting under heat lamps on the sidewalk in front of every neighborhood pizza place, diners toss oil-shimmered crusts to a rabble of turkeys, a muster of toms, a brood of hens, a mob of poults. "A Pilgrim passed I to and fro," William Bradford once wrote. And there, a-gobbling, the new pilgrims go.

—Jill Lepore

INSULATION DEPT.

CAPTIVE AUDIENCE



Say you're a hybrid worker, the kind who spends time in Miami or New Jersey—a tech executive, perhaps, or the mayor of New York—living at the Set, a new apartment complex on Tenth Avenue for the pied-à-terre-inclined. Within a mile or so of your building, you could visit two of the world's greatest art museums, at least twenty Duane Reades, a couple of solid diners, the High Line, the Garden, Carnegie Hall, Central Park, an aircraft carrier, a giant structure shaped like an al-pastor-taco spit, formerly used to an alarming extent for suicides, four ice-skating rinks, a total of thirty-eight Michelin stars, three farmers' markets, some softball fields where a garment workers' league likes to play, all of the Broadway theatres, a few community gardens, some reliable bars, and many bodegas. Alternatively, you could not.

"Literally, you could spend morning to night here and never have to leave," Hailey Sarage, the Set's head of development, said one recent foggy morning in the mostly finished lobby. "You can wake up and have your coffee, you can go downstairs and do a yoga class with Equinox instructors, you can prep for your meetings, and then you go upstairs and have your meetings catered by Dan Kluger, who was the executive chef of ABC Kitchen." After work: room service (also by Kluger), a dip in the rooftop pool, then maybe a wine tasting.

The Set is the Related Companies' newest Hudson Yards project, a self-contained bubble within a self-contained bubble. The apartments are tiny (four hundred square feet or so for a studio; six hundred for a one-bedroom), but the amenities are lavish: communal desks, Zoom rooms, concierges, housekeeping, I.V. drips, after-work drinks, fridge stocking, dry cleaning. You can rent a unit for as short as six months. Sarage likes to think of the Set as a five-star hotel crossed with a luxury rental crossed with a techy workplace.

Sarage wore a black blazer, a bright-orange safety vest, and a hard hat; she was leading a tour of the construction site for some Related executives. Jeff Blau, the company's C.E.O. (suit: dark; face: Seinfeldian), tagged along. He said that you could forget the fifteen-minute city. "Hudson Yards was a five-minute community," he said. "This building is taking all of that and putting it into one space." Related planned to expand the concept across the country, as did at least one potential competitor. "Adam Neumann's next career is this," Blau said, of the WeWork co-founder, who is developing a vaguely sketched venture called Flow.

Sarage led the group to the forty-third floor. "This is the 'play' floor," she said. It will house a party space with a full kitchen ("If A24 hosts an event in the screening room, we can have a pre-reception here"), a game room, and a pool deck, for lounging and d.j. parties. Also: a private restaurant, run by Kluger, who will have a second, public restaurant on the ground floor. "The residents will have their own secret entrance," Sarage said.

"We're marketing it all as a private club," Blau said. "The new cool thing in New York is to be part of something."

Up a helical staircase was the "work" floor: grab-and-go Kluger snacks, tech-support desk, conference rooms, golf simulator, podcasting area. Some construction guys, with power tools and sheets of drywall, were in the co-working space, co-working.

The group took an elevator down to the residences: studios (around five thousand dollars a month), which include an option for a bed that descends from the ceiling, and one-bedrooms (seventy-five

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hundred). Both come with a small, but full, kitchen (and a copy of Kluger's cookbook), Matouk linens, art, pillows—the apartments are completely furnished. In one studio, the group found the design manager, Saemi Kim, in a corner, furnishing. A smell lingered. Sarage explained, "We have target demographics in mind, so each unit has its own scent. This is the senior executive."

"It's woody, it's very gentle," Kim said. It had a masculine-wealth vibe.

Sarage looked at Blau. "This is Jeff's apartment," she said.

Last stop: the wellness level. "We have part of a floor dedicated to a company called Solace, which is a healthcare provider," Blau said. It's open to the non-Set set, but there's a private entrance for residents. "It's emergency-room, twenty-four-hour service," Blau added. "So you *really* don't have to leave." (The Set shares the building with Coterie, a senior-housing and assisted-living venture; rent long enough and you really, *really* don't have to leave.)

Down the hall was a gym, with a giant screen for virtual exercise classes. "This has a scent, too," Sarage said, of a living green wall. She put her nose to a eucalyptus leaf. "It smells like eucalyptus." Then she led the group back outside and into the fog, whose smell (ozone and trash) might only be sniffed on the way into the cab to the airport.

—Zach Helfand

NEWS HOLE
PLAYING ANCHORMAN

Most people don't trust the news anymore, but everyone still seems to want a piece of it. Hedge funds are scooping up TV stations. Billionaires are buying newspapers and tech platforms. A few hours before Elon Musk finalized a deal to purchase Twitter, last month, a super PAC turned artists' collective launched a news network in the lobby of the Brooklyn Museum. (Mission statement: "News for creative emancipation. This is journalism made by the people making culture.") "I love things like 'The Daily Show' and Ali G, but we're trying to actually make news, and *be* the news," Eric Gottesman, an artist who is co-directing the project, said. He co-founded the collective, which is called For Freedoms. Its news program is more pastiche than parody: "We're appropriating the form and aesthetic of broadcast news as a way to build greater civic engagement through art." He added, "And we have a news desk!"

At 8 A.M., a group of gaffers, grips, lighting technicians, and caterers arrived to set up. Massive batteries were rolled into place; cameras, microphones, and stage lights were arranged.

An artist named Christina Caputo, one of the producers, arrived at ten. "I don't necessarily call myself an artist," she said. Caputo led the crew in a "grounding session." "Let's take a moment and appreciate each other," she said. "There are gonna be moments when there are challenges, and there are gonna be moments when we love each other." Inhale, exhale; the crew was restless. "Excuse me, where should we place the monitor?" a technician whispered to Gottesman. Soon the news desk, designed by the artist Harry Chadha and accented with purple starfish, was assembled; someone had accidentally printed part of the collective's logo upside down.

Gottesman didn't mind, he said, looking up at a huge canvas by Cecily Brown that was hanging above the newsroom. "We had to make sure that none of the lights would melt the painting," he added. He was eating a roasted-vegetable sandwich, and his mouth was smeared with mustard. "This is both an installation and a site of capture," he said.

A few crew members sat behind the news desk, joking around. "We need some diversity onscreen," a Black key grip named Che Roacher said. As a camera test, he decided to give an impromptu monologue: "They own everything. It's fucking impossible. This country is owned by the powerful and rich. It's been that way forever." Some of the artists had gathered near the monitors, holding ginger-lemon probiotic sodas, to watch.

For Freedoms was started in 2016 as an antipartisan super PAC; since then, the group has worked with more than a thousand artists, including Carrie Mae Weems, Ai Weiwei, Marilyn Minter, and David Byrne, on civic-minded art projects. In one, a flag designed by the artist Dred Scott, reading "A Man Was Lynched by Police Yesterday," was hung outside a gallery. Another placed more than five hundred artist-designed political billboards across all fifty states. The news program would feature dozens of artists doing broadcasts streamed online: Duke Riley giving a woman named Sandy a Hurricane Sandy-inspired tattoo, to mark the storm's tenth

"I'm his muse, which he says is even better than co-author."

anniversary; a monologue on intimate-partner violence and houseplants, delivered by Tanya Selvaratnam, one of three women who, in 2016, accused Eric Schneiderman, New York's attorney general at the time, of abusing them. "I like plants more than people," she said.

A few grips and gaffers appraised the catered lunch (a salad of greens grown in a vacant city lot) and headed out to get some Chinese. "That rabbit food is not cutting it," one said. Gottesman sat behind the news desk with an artist named Robert Sinclair, who would be one of the hosts. In the coming days, more serious subjects (mass incarceration, the sexual harassment of Black women, Vladimir Putin) would be discussed by more serious guests—formerly incarcerated artists, exiled Iranian artists, a teen-age transgender artist who has sold millions of dollars' worth of N.F.T.s—but the setup day was for having fun. "There has to be space for play in order for us to be creative, to rethink some of these big things," Gottesman said. "If we really are going to profoundly shift the foundations of the structures of society through culture, it's got to be playing with it, poking at it, experimenting with it, failing, and laughing."

Lights, camera, playtime! Sinclair summoned his best anchorman voice: "We're exploring the weather at the Brooklyn Museum with Eric Gottesman. Eric, what's the weather like—"

"At the museum?"

"Inside your head!" Sinclair said.

A grip in a pink hoodie watched them. "They're full of shit," he said. "Some of them gonna talk about what they know, but what they know is what they regurgitate from hearing it on the news."

—*Adam Iscoe*

THE MUSICAL LIFE

FOUR VALVES

A trombone with six valves? "I don't know if anyone played this *ever*," the Lebanese French trumpeter Ibrahim Maalouf said the other day at the Met, where he was taking in a display

Ibrahim Maalouf

of extravagant, even bizarre, brass instruments. Maalouf, who is forty-two, lives in Paris and was in town for a concert. He had been curious about the museum's horn collection, which includes not just the six-valve trombone—most have none—but also a vaguely bassoon-like thing (an ophicleide!) with a bell decorated to look like a dragon's mouth, and a tuba with two bells that resemble conjoined twins. In Maalouf's view, much of what was on display—arcane, intestinal-looking contrivances of coiled brass—was more a tribute to the metalworker's craft than anything a working musician might want to play.

Not that Maalouf is a fussy traditionalist. His own preferred instrument is a unique trumpet with four valves (one more than the usual three), which allows him to play the quarter tones of classical Arabic music. He studied European classical music at the Conservatoire de Paris, but made his name playing jazz. He has since embraced electronic music, R. & B., hip-hop, Arabic pop, and other styles, collaborating with such musicians as Wynton Marsalis, Sting, Angélique Kidjo, Juliette Gréco, Josh Groban, and the Kronos Quartet. He's a superstar in Europe, where he regularly sells out arenas; in American instrumentalist terms, he might be placed on a continuum between Kenny G and Jon Batiste, closer to the former in fame and to the latter in style and critical respect. At the Met, dressed in black, with a groomed beard, he could have passed for Rainer Werner Fassbinder's better-adjusted kid brother.

Maalouf's father, Nassim Maalouf, a renowned soloist in both European and Arabic classical music, invented the four-valve trumpet that both men play. Ibrahim grew up listening to his father practice. One day, he asked if he could try. "My father said, 'If you want me to teach you, you *will* be a trumpet player.' I was seven. I didn't know what that commitment meant." He quickly showed promise, but there were bumps along the way. For one thing, if you live with your trumpet teacher, you can't cheat on practicing.

"He gave me lessons every day, until I was fourteen or fifteen," Maalouf recalled. Home life was otherwise hard. He was born in Beirut in 1980, but the family soon fled Lebanon's violence for France; the loss and the upheaval, he said, affected his parents deeply. Nassim was a very strict father. "The only moments he was really soft were when I was taking trumpet lessons," Maalouf said. He laughed. "Maybe that's why I kept playing."

In a sad turn of family melodrama at least as old as "The Jazz Singer," Maalouf's embrace of more modern and popular music contributed to an estrangement between father and son. For Nassim, who had no formal education outside of music, the trumpet had been a way out of rural poverty. "It was his tool to escape his destiny," Maalouf said. "And he expected I would exactly continue his way of playing." Today, they exchange only the occasional text. "We disagree on pretty much everything."

Maalouf's latest album, "Capacity to Love," his seventeenth—not including the many French film scores he has composed, plus a couple of symphonies—may push his father even farther away. Overtly polemical, it is meant as a musical riposte to the right-wing nationalism gripping Europe and other places around the world. Maalouf enlisted a diverse array of collaborators, including the rappers Pos (of De La Soul) and Erick the Architect; the jazz singer Gregory Porter; musicians from South America and Africa; and, perhaps most daringly, Sharon Stone, a movie star not previously known for her musical gifts. On one track, over a mournful orchestral backdrop and Maalouf's trumpet, Stone recites an original poem, an angry

address to an unnamed American politician (we all know who).

Maalouf approached Stone, he said, because he admires her "strong voice" and her willingness to speak her mind even at the risk of sounding "stupid." He had wanted a Hollywood figure to help close the album, which begins with an audio clip of Charlie Chaplin's final speech from "The Great Dictator." The film, with its plea for tolerance and "universal brotherhood," had made an impression on Maalouf when he first saw it, in grammar school, as the only Arab in his class.

"When I do a concert, I like that there are all kinds of people listening to me, even people who don't believe in the same things as me," he said. "If they're moved, then we've shared something." Would he welcome even Marine Le Pen or Donald Trump as a fan? "Why not?" he said. "Sometimes little things can change opinions on big things. Maybe they would have some part of their mind that thinks, Maybe, you know, maybe—*maybe*—I'm wrong."

—Bruce Handy

JUVENILIA DEPT.
DIRECTOR'S CUT

Curtis Whitear, a thirty-five-year-old documentary filmmaker, was sitting in front of two monitors in his apartment in Ditmas Park recently, watching movies made by kids. He opened a file of a film made by a friend named Ash Sanders. "This is what she called 'The Putty Movie,'" he said. She made it when she was sixteen.

He clicked and the "Mission: Impossible" theme played. Two girls dressed in camouflage sneak around a house, arms aloft in victory. The soundtrack changes to nineties house music, and one of the girls sprints down a driveway and jumps on the hood of a moving car. "This whole section has such a good ambient quality," Whitear said. Finally, dialogue: "We have something that belongs to you," a voice says. "Recognize *this*?" Cut to a flesh-colored mound of Silly Putty with googly eyes, and a complicated discussion of why half the putty is being held captive at another location. The voice grants the putty a last wish, "a song to express her undying love for you." "Hold Me Now," by the Thompson Twins, is heard over a montage of pictures of a blond teen boy.

Whitear, who wears round, owlish glasses and has messy blond hair, was culling submissions for a special screening event—his birthday party, which he is calling the Childhood Delusions Film Festival. He had e-mailed a few dozen friends with a request to send him movies that they'd made when they were kids. "These cringey masterworks deserve to finally be seen on the big screen," he wrote. "So I am renting a movie theater and making that happen! It's like a gift from a 35 year-old me to a 12 year-old you, except not creepy at all." There were a few rules: submissions couldn't be longer than five minutes or be made after someone turned twenty-one.

Despite the time rule, not all of the people who sent in digital files (and DVDs and CDs) had edited down their juvenile masterworks. Some submissions were raw tape, hours of filmmaking attempts piled one on top of the other. In some cases, what the filmmaker thought would be the most interesting part wasn't. A podcast producer named Abigail Keel sent in one such VHS tape. "She was specifically asking me to look for this video of her and her Mexican exchange student," Whitear said. "They made some kind of kung-fu thing together." What he found more compelling is a scene that she and her girlfriends made about a diva-ish pop star. He clicked: Grainy footage of a tween girl holding a hairbrush as a mike, talking to another tween, who is the "mother." The "pop star" tells the mother that she's not even invited to her show and should think about "life—you need a new one!"

Next up, a black-and-white short of a pool game from the perspective of a shy cue ball, which whispers, "I didn't mean to break up your little pack." Then an eleven-minute epic, a spoof on "To Catch a Predator," made for English class. It depicts a dystopian plantation led by a high-school kid in a preppy pink shirt. Then an impressive stop-motion piece populated by Lego figures, showing a bank heist. Whitear planned to edit his final picks for time, but not for content. "You have to let them have the childhood logic," he said. He hoped to show something from everyone who submitted, except for a video composed of hand-drawn storyboards about the relationship between a child and his dolls. It was too long, but its creator had declared that it could not be touched.

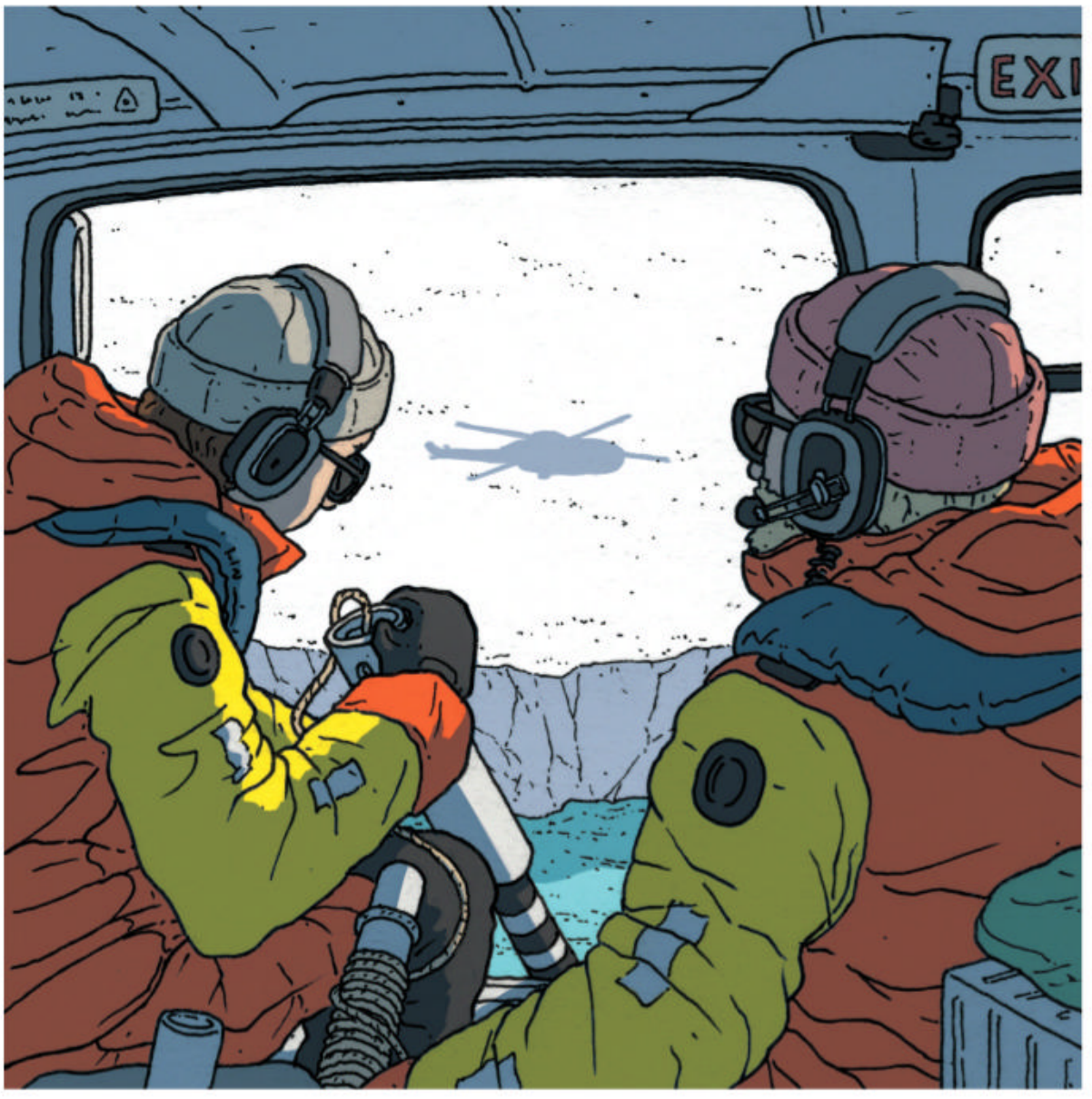
Finally, Whitear took a look at his own submission, a seventeen-minute film called "The Black Sun," which he made when he was twelve. The original cut was ninety minutes; watching it, he said, was "absolutely unbearable, like, five-minute sections of no dialogue,

Curtis Whitear

really bad." Shooting it with a handheld camera had made him so nauseated that his grandfather bought him a tripod. One of the film's stars, Whitear's cat, Mr. B, died during the six weeks of filming. Over the years, Whitear has reëdited it multiple times.

"I'm going to call this 'The Final Super Director's Cut,'" he said. Like the other young auteurs, he'd designed his own title card—in his case, a fake Twentieth Century Fox logo, with fanfare. The action begins with a boy rolling down a suburban hill; he is a federal agent exploring a private island that is inhabited by stop-motion dinosaurs. Whitear smiled at his younger self on the screen. "Every time I make a new version of this, I show it to a lot of people, and no one is, like, 'Yeah, Curtis, I see why you love this movie,'" he said. "But I'm still working on this. I can't quit it."

—Reyhan Harmanci



LETTER FROM ANTARCTICA

JOURNEY TO DOOMSDAY

How soon could a Florida-size glacier slide into the sea?

BY DAVID W. BROWN

I first saw our icebreaker, the RV Araon, when we were due to leave for Antarctica. The largest icebreakers are more than five hundred feet long, but the Araon was only the length of a football field; I wondered how it would handle the waves of the Southern Ocean, and how it would fare against the thick sea ice that guards the last wilderness on Earth. Its hull was painted a cheerful persimmon color, and its bow was conspicuously higher than the rest of the ship, with a curved shape suggesting that icebreakers don't so much carve through ice as climb and crush, climb and crush. It was January 3rd, summer in New Zealand. In the heat, ice was a little hard to picture, let alone icebreaking.

Our voyage would last two months. We would spend a week or so sailing from Christchurch to the edge of Antarctica, then break through the pack ice of the Amundsen Sea, before arriving at Thwaites Glacier—one of the fastest-retreating on the continent. Our expedition was led by the Korea Polar Research Institute, which had brought some forty researchers from around the world to the Araon. They would have a month at Thwaites to conduct their respective research projects before the return trip began.

I had been "on the ice," as Antarctic explorers say, once before, in 2019, while researching a book. There's no room for passive observers on the most remote expeditions, and so, on that trip and this one, I'd signed on as a field-research associate, sponsored by the University of Texas Institute for Geophysics and the G. Unger Vetlesen Foundation, an Earth-science nonprofit. For the second time, I would be working alongside Jamin Greenbaum, a forty-two-year-old scientist at the Scripps Institution of Oceanography, at the University of California, San Diego. We'd be hurling torpedo-shaped probes from a helicopter into cracks in the ice, with the aim of studying the warm ocean water that is melting Thwaites from below.

We had successfully placed sensors in the water during our first expedition, on the eastern side of the continent, throwing them from the back of a refurbished cargo plane from the Second World War. We weren't sure we could repeat this feat. Weather on Thwaites is notoriously hostile, and, because dense cloud cover makes satellite reconnaissance virtually impossible, we wouldn't be able to identify promising fissures until we were flying over the ice. Greenbaum's style of adventure is less romantic than world-weary. "Antarctica occasionally lets you pull something off," he told me. "But not often."

The continent is shaped like a hitchhiker's fist, its scraggly thumb pointing west. Thwaites, which is named for a late, eminent geologist, is on the southern side of the thumb, where it meets the hand. There are bigger glaciers elsewhere in Antarctica, and they are also showing signs of weakness, but Thwaites is especially concerning. Its adjoining ice shelf—a large floating expanse of ice, which extends from the glacier out over the water—acts like a cork in a wine bottle, holding much of the rest of the glacier in place. If the cork decays and gives way, the glacier could begin to flow rapidly, and eventually it and a larger stretch of surrounding ice in West Antarctica might slide or calve into the ocean. Thwaites is often known as the Doomsday Glacier, because, in this worst-case scenario, sea levels could rise by several feet or more, inundating many of the world's low-lying coastlines.

Thwaites is already retreating—that is, it is shrinking, as more of its ice flows into the sea. Glaciologists and geophysicists want to figure out whether a colossal "retreat event" is likely to happen in fifty years, a hundred years, or five hundred years. To investigate the sit-

Probes beneath the ice could shed light on the fate of the world's coastlines.

ILLUSTRATION BY OWEN D. POMERY

uation, our expedition would explore Thwaites by land, sea, and air. The Araon had seawater laboratories, underwater probes, and two helicopters; it also carried drones, snowmobiles, a disassembled hot-water drill, Zodiac watercraft, and a subsurface glider—a kind of robotic dolphin—that could take seawater measurements autonomously. Yet all of this would be useless if we couldn't get to Thwaites, which is one of the least accessible places on the planet. To reach the glacier by air, you must first travel overland to construct an improvised airport. Go by sea, and there's a good chance that your ship will get overwhelmed by ice and be forced to turn back. David Holland, a mathematician and an Earth scientist at New York University, and a member of our expedition, told me, "There are many bad ways to do this, and we've found all of them."

The Araon's science crew included three researchers—Lucas Beem, a geophysicist; Jamey Stutz, a geologist; and Christopher Pierce, a graduate student in engineering—who would fly in a specially equipped helicopter to scan Thwaites with radar. As we gathered at the Christchurch docks with our luggage, I looked between them, past bobbing sailboats, to where behemoths the size of oil tankers loomed. When I was a kid, my father worked on the Mississippi as a tugboat mechanic and pilot, and I sometimes tagged along as he sailed from the dock near our trailer, in St. James Parish, to the Port of New Orleans and back. I've seen big ships and small ones, and I could tell that the Araon was strikingly small.

"Are we sure this is the right boat?" I said, to no one in particular.

There were a few nervous laughs.

"Place your bags on the net," a Korean dockworker said. He'd covered the ground with thick cargo netting. We set our bags where we were told.

"This way," another worker said, waving us along like a traffic cop.

A gangplank stretched from dock to ship. Once I crossed, the Araon would be my home until March. I hesitated, then made my way across the chasm.

Earth's climate system has a single goal: to make the temperature the same everywhere. Hot air and water flow naturally from the equator to the poles. Because heat rises, one might expect currents of warm water to travel near the ocean's surface, but things aren't that simple: at tropical latitudes, the sun is stronger, evaporating more water than it does elsewhere, and the warmed seawater ends up slightly saltier and denser. It sinks. Near the poles, warm currents flow beneath cold ones.

Warm water, therefore, used to arrive at Antarctica safely stowed in the deep ocean, well below the level of its continental shelf—the portion of a continent that extends underwater. For the past fifty years or so, however, a changing atmosphere has been reorganizing the world's winds and currents. For a number of reasons, the warm, dense, salty water around Antarctica has begun creeping toward the surface. Antarctica has the only continental shelf whose interior is deeper than its periphery—it is essentially a bowl, shaped partly by the weight of miles-thick ice pushing down. The warm water is now slipping over the edge of the bowl, then sliding in and eating the ice from below.

Many scientists have investigated Thwaites. In 2019, Anna Wåhlin, of the University of Gothenburg, and her team used an autonomous submarine to collect data from beneath the glacier for the first time. Greenbaum's goal was to place sensors closer to the heart of Thwaites, studying ocean currents and other processes unfolding there. Before turning to Antarctic research, he had worked on Mars rovers and other missions for NASA's Jet Propulsion Laboratory; later, he earned his Ph.D. under Donald Blankenship, a polar geophysicist who built an informal, international network of researchers studying Antarctica. Greenbaum had learned to love the difficult work of building globe-spanning coalitions to gather data about remote and perilous places.

The morning after the Araon set off, I woke in the cabin that I shared with Greenbaum to find that the ship was skipping waves like a cigarette boat. I flossed, brushed, and tried to come to grips with the pervasive thrum of the engines. The ship's interior was utilitarian, with metal floors and walls; I anxiously eyed the chrome grab handles that studded the bulkheads as I walked in search of breakfast.

In the nearly empty galley, Holland sat with Clare Eayrs, a quick-witted research scientist at N.Y.U. Abu Dhabi who studies how snow affects ice-shelf thickness. I fixed a plate from the Korean buffet and joined them. Holland and Eayrs were prepping for an interview about their research, which Holland would conduct by satellite. They ran through subjects to cover—rapid sea-level rise, marine-ice-sheet instability, the ocean and the atmosphere—while Holland made notes on a flap from a cardboard box.

"This is a lot for four minutes," Holland said, chewing.

Eayrs agreed. "Marine-ice-sheet instability alone could take up the whole interview," she said. Holland crossed it off the flap.

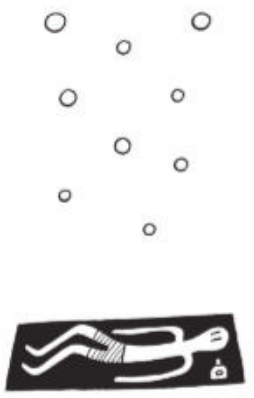
If humanity didn't exist, Antarctica's ice sheet—the layer of ice that covers the continent—would still expand and contract. The sheet, which is broadly dome-shaped, grows as snow falls upon it; over time, the continuously falling snow compacts, and the sheet expands outward, held in place by rocks and mountain peaks. In most of the world, glaciers grow on mountains and flow down. In Antarctica, they are moving parts of the larger ice sheet. When the ice expands beyond the land, at a point called the grounding line, it starts floating on the sea, becoming an ice shelf. As the ice shelf grows, it meets geologic features, such as islands, and these allow it to push back against the ice sheet from which it came. The shelf and the sheet help to stabilize each other, like a flying buttress and a cathedral arch.

As far as we understand it, problems start when warm ocean water gets into vulnerable places like Thwaites. The water eats away at the ice by the grounding line. This ice starts to thin and flow outward faster, becoming more fragile. The buttressing effect weakens. The grounded ice sheet loses mass and starts to float, and, gradually, more water enters the bowl. This process, which could potentially become irreversible, is marine-ice-sheet instability.

Eayrs and Holland would be working as part of a team that hoped to use the ship's helicopters to establish an ice camp on Thwaites. There, they would assemble the hot-water drill, and use it to punch through the glacier, in order to install permanent underwater probes for remote monitoring. The British Antarctic Survey had led the effort to build the drill, and the Koreans had partnered with British researchers to learn how to assemble and operate it. Meanwhile, other

scientists on board the Araon would study the Amundsen Sea's water and microbial life. Glaciologists and geophysicists would fly out to maintain an array of previously planted G.P.S. base stations, some vital to tracking the fast-spreading ice, which can sometimes move as much as five metres per day.

To place our sensors, which would collect data on the warm currents near the grounding line, Greenbaum and I would have to fly farther than any other team, putting us at constant odds with the weather and with our fuel supply. After we'd thrown our sensors into the ice rifts, our helicopter would then have to hover at risky low altitudes, staying within range until the probes had returned their data wirelessly. None of this was going to be easy.



Greenbaum is quiet and trim, and somewhat resembles the actor Daniel Radcliffe. He didn't stir when, during our second night at sea, a stainless-steel coffee cup I'd swiped from the galley clattered across the room. I stood to retrieve it and immediately fell to all fours as the floor lurched to starboard. Through the cabin's porthole, I saw inky waves rising higher than the window, painted in glittering moonlight. I envied Greenbaum his sleep.

The waves worsened the following day. That night, I lay in my rack rigid as a corpse. I tried to read, but my motion-sickness patch had made my vision blurry. My backpack slid across the room, collided with the cabin door, and then slid back.

"Dude," Greenbaum said. "Please don't make me get that."

Greenbaum was used to extreme conditions. Early in his career, he had applied to join NASA's astronaut corps, and had made it to a final round. This was his third sea voyage to Antarctica; he'd taken no seasickness medicine, which seemed superhuman to me. In his rack, he looked ashen.

I pulled the backpack into bed with me and peered through the porthole. The waves now topped thirty feet—great sheets of foamy black brine slapping the upper decks of the ship, rendering them off limits. We were heading toward the Antarctic Circle, where the sun would no longer set. We had six days of waves ahead of us—ceaseless, violent rolling and pitching, without rhythm or order.

The worst swells subsided as we approached Antarctica and reached the first ice packs of the Amundsen Sea—endless white plains floating on the water, smooth but for occasional penguin prints. The Araon smashed easily through the floes. The ship vibrated with the constant grinding of hull against ice; being belowdecks was like huddling inside a giant blender.

One morning, I brought a cup of coffee to the forecastle. Knots of ice the size of cars now drifted by, alongside the occasional parking-lot-size sheet. I peered over the rail, and a seal sunning on a strip of ice looked up at me. On another stretch of white, penguins flapped their wings in alarm and waddled away. I felt like a colossus, sailing on as though by divine right. But by midmorning fog enveloped us. The cold became otherworldly. I had pictured icebergs as diamonds jutting from the sea, but the ones we encountered were flat slabs a hundred feet high. Their craggy sides loomed above the ship, their upper rims barely visible. Icebreakers are typically built to push through low, flat ice floes. These were mountains in motion.

At home, the climate situation felt desperate, harrowing. It was hard to square that with what I was seeing. Nothing around me felt frail or endangered, though I knew it was; I never heard anyone on the ship talk about the environmental crisis. Beem, Pierce, Stutz—they were not activists but scientists, focussed mainly on the difficult, alluring task of data collection. "My whole attraction to the astronaut corps, for a long time, was the desire for exploration," Greenbaum once told me. "My interest has shifted to discovery—understanding something for the first time, versus seeing something for the first time." He wanted to know how the world worked—saving it was almost a by-product.

The icebergs crowded in. On deck, Pierce and Stutz explained that, thanks to cloud cover, satellite images could not offer a clear route through the maze; even when they did indicate a path, it might close while we were travelling through it. The captain, whom none of us had met, had no choice but to push ahead, trusting his instincts about which ways to turn. For centuries, ships had been getting trapped in Antarctic ice; some got crushed, never to be seen again.

"This is real Shackleton shit," Pierce said.

We were at a junction. To the left, open black sea yawned between icebergs that looked about a quarter mile apart. To the right, a channel between ice blocks was perhaps a hundred yards wide.

"He's trying to make a call," Stutz said, of the captain.

"No way he goes for it," Pierce said.

The engine whined to life and reached a roaring crescendo.

"Whoa," Pierce said. "He's going for it."

The boat turned right, pressing deeper into the labyrinth. Snow flurries came and went; when the sun shone, teal light pulsed from within scars and gashes in the icebergs. At one point, we entered a narrow channel defined on one side by an ice slab that Beem told me was nearly the size of Rhode Island. I didn't want to think about what might happen if our passageway closed. After coming all this way, I'd grown less afraid of getting stuck in the ice than of not seeing Thwaites.

I took to haunting the deck. On the next morning, the ship veered left, into a tight passage between ice walls. I looked up and, improbably, saw Greenbaum in Oakleys, standing on a catwalk adjacent to the bridge.

"How did you get up there?" I called, over the engines.

"There's a ladder around back," he shouted.

I cautiously made my way to him as the Araon rose and fell. High above the deck, Greenbaum looked relaxed, with his hands in his pockets. He seemed at home in the forbidding scene. (On our previous expedition, he'd often taken me for runs on the ice, choosing a direction at random.) We were about a hundred feet up, but the rims

of the icebergs still towered over us.

"I've never seen anything like this," I said, stupidly.

"No one has ever seen anything like this," Greenbaum said. It was a Heraclitean thought: no one ever visits the same Antarctica twice.

A day or two later, the engines eased to a simmering growl. The vibrations beneath our boots diminished, then died. A wall of ice blocked our way to the left. Ahead was another wall, smooth as marble. On our right, two gnarled icebergs intersected. There was no obvious way forward. It was January 23rd. We had been at sea for twelve days.

No one said anything. Only the ice spoke, grinding and moaning between sizzles and snaps.

"I could use a drink," I said. "Anybody else?"

Everyone nodded, so I climbed belowdecks to retrieve a bottle of wine from my cabin. I tried to accept the possibility that the ice had trapped us, and that we might not reach Thwaites. Back on deck, Stutz and Pierce were standing with Yalalt Nyamgerel, a Mongolian isotope geochemist from Ewha Womans University, in Seoul, whom I'd often seen writing in her journal. I handed out cups and poured generously.

People on the ice often make a toast to Ernest Shackleton. During the heroic age of Antarctic exploration, Shackleton, who was known to his crew as the Boss, failed to reach the South Pole despite several attempts; he survived a doomed expedition on the Endurance—a sunken ship, no way to call for help—without losing a single man. A well-known paean to him goes, "When things are hopeless and there seems no way out, get down on your knees and pray for Shackleton."

"To the Boss," I suggested.

"To the Boss!" everyone replied.

We clinked cups, pondering our situation.

"It's a good thing we have helicopters," Pierce said.

The Araon would not reach Thwaites. Neither would another ship we spotted in the maze one morning—a reddish pixel near a distant iceberg.

"That's the Palmer," Holland said—the Nathaniel B. Palmer, an American icebreaker, run by the National Science Foundation, which had no aircraft on board. "Drifting aimlessly, nothing to do."

Pierce was right: we'd made it within helicopter range. Once the clouds lifted, the pilots adopted a round-the-clock schedule, flying scientists and drill supplies to a base camp on the Dotson Ice Shelf, roughly ninety miles from Thwaites and ten minutes from our ship. The drill would be set up there instead, and the Korean engineers would still get the experience they needed to build it at Thwaites the next time around.

Severe weather descended. While we waited for it to lift, the boat sailed around in fog and snow, so that the teams studying seawater could deploy sensors in the Amundsen. When the skies cleared, Beem, Stutz, and Pierce started their work, flying thousands of kilometres in the course of five consecutive days, mapping the glacier down to its grounding line.

The helicopters on the Araon were a finite resource. Greenbaum, who sees coalition maintenance as a key part of his job, wanted to make sure that the Koreans got the next turn. (A child of divorce, he attributes his diplomatic habits to his experience managing mom and dad.) He suggested that he go last, giving priority to Lee Choon-ki, a member of the Korean Extreme Geosciences Group, who would fly with other researchers to their G.P.S. stations. Meanwhile, Greenbaum and I started prepping for our journey. "Bring all your survival gear," John Bishop, our pilot, warned us. Bishop, an aviator with Canadian Helicopters, spoke with seeming certainty that our helicopter, whipped by unpredictable winds, would crash, leaving us on the ice. Greenbaum and I stuffed fur-lined Michelin Man jumpsuits into our backpacks, along with gloves that resembled black oven mitts. From our lockers we pulled immersion suits, which were like wetsuits but more constricting. We'd tried them on before departure; mine was so tight on my upper body and neck that I almost felt as if I were being choked.

Finally, on February 12th, our flight day arrived. Our craft was a compact six-seater. On the ship's helipad, Bishop gave us a safety briefing. "If the helicopter loses altitude, emergency flotation devices will inflate here and there," he said, pointing at the skids. He indicated a large red canvas cube in

"I blame the government for everything. What do you do?"

the back: "This is our emergency raft. Only throw it out if I tell you to, or if the helicopter begins to submerge—do not inflate it inside!" He gestured to a panel of indistinguishable toggle switches near his seat: "This is the emergency beacon. If I am incapacitated, the first thing you should do is flip this switch." I squinted, unsure which was the right one.

In the Army, I'd rappelled from helicopters and leaped from them in parachutes; in Afghanistan, I'd run rotary-wing operations for my task force. But this was my first time in such a small helicopter. I recalled that, in 2013, someone had suffered major injuries when a helicopter crashed and burst into flames on the deck of the Araon, on the very spot where we now stood.

"O.K., load up," Bishop said.

Greenbaum transferred equipment—a rack of radio receivers, a dozen sensors encased in metal shells—while Bishop buckled in and toggled some switches. Soon the stentorian thump of the blades overwhelmed all other sounds. Pressing into the wash of the rotors, I walked around to the pilot's side to turn on a downward-facing camera that would take a photograph of the ice every six seconds. I climbed in, buckled up, and pulled on a noise-cancelling headset. Bishop mumbled some unintelligible helicopter-speak, then took us up as though gravity were merely a suggestion. It would be an hour's flight to the glacier.

Aviation in Antarctica is dangerous in part because there is often little visual difference between ice, water, sky, and mountain. Clouds cast dreamlike reflections on the ice and sea, and pilots can quickly lose their bearings. The sun loomed above us as we flew, and wispy clouds threw pale blue shadows on the ice below, which looked in some places like kneaded dough and in others like dragon scales. Swirls of fine crystals in the cerulean sea looked like cream poured into blue coffee; slush surrounding icebergs was in fact human-height chunks of ice, piled up. We were flying by dead reckoning. "Magnetic compasses are unreliable here," Bishop said, over our headsets. "We're too close to the South Pole."

We listened to the Dixie Chicks as we flew over the cracks and mesa-like formations of the Crosson Ice Shelf. We pushed against the forty-knot wind, the helicopter's movement a slow, prolonged shudder. At last, we reached the edge of Thwaites.

"Be on the lookout for any water or thin ice," Greenbaum said.

Near a stout, jagged white hill, we spotted an opening that might have been the size of an Olympic swimming pool—it was hard to tell from a hundred and fifty feet in the air.

We positioned ourselves over the hole, and Greenbaum opened the door and dropped a sensor. I activated a software program to begin real-time monitoring of the probe. Greenbaum fiddled with his receivers. Nothing happened. The first drop was a bust.

"Let's try another one," he said, uneasily.

We circled around again. "You guys ready?" Bishop asked.

We each gave a thumbs-up. Greenbaum unlatched the door and shoved it open a second time. Freezing wind whipped into the helicopter. He loosened his seat harness and leaned out. In his hands he held the probe—a ten-pound gray torpedo, about three feet long and five inches across. Ignoring the turbulence, he looked down at the target. Could he hit it?

"This is not fuck-around wind," Bishop said. His voice was pilot-placid, but the helicopter bumped and jolted. "This might not happen."

Greenbaum leaned even deeper into the rotor wash, drew the torpedo

back, and hurled it outward. As it fell, its drogue parachute deployed—crucial for keeping it upright. I activated the software again. Then the probe plunged through the opening and into the sea.

Greenbaum slid the door shut and, as Bishop brought the helicopter into a tight orbit, grabbed his laptop to check for a positive signal. For a few moments, we heard only the chop of the helicopter blades. Then a rack of radio receivers let loose the whistles, screeches, and crashes of a modem handshake. On Greenbaum's laptop, numbers suddenly sped across the screen. The sensor was plummeting through the water, returning data on salinity, temperature, and depth.

"Jesus, this water is hot!" Greenbaum said.

He began reading off the rising numbers, in Celsius. Three hundred and sixty metres down, the water was almost a degree warmer than at the surface. At nine hundred and ninety metres, the probe hit the seafloor, which turned out to be much deeper than previously estimated; the water there was close to three degrees warmer than at the surface.

"This is what is melting Thwaites!" Greenbaum said. There was triumph in his voice. We had captured data from beneath the Doomsday Glacier.

"We're done for fuel," Bishop broke in. "I know you wanted to do more torpedoes, but we have to head back." Greenbaum smiled, elated, as Bishop pointed the helicopter toward home.

The weather turned bad again. Two days later, on February 14th, Greenbaum, Bishop, and I stood on the bridge with Yun Sukyoung, one of the chief scientists of the expedition, and Dominic O'Rourke, its lanky, easy-going senior pilot. Through the windows, we could see ice and snow whisking across an iceberg. The drill project had been successfully completed, and its hardware and personnel had returned to the ship. Only a week remained until our departure. If Greenbaum wanted to place more than one probe, he needed to fly immediately.

The group pored over space-based reconnaissance maps, wind diagrams, and other reports. O'Rourke held a forecast he'd just received, written in notably purple prose.

" 'Quivering winds,' " he said, riffing on the report.

"Wrong," Bishop announced. He stood at the window, surveying a distant peninsula with binoculars.

" 'Shivering seas,' " O'Rourke added.

"Wrong," Bishop said again. The weather in Antarctica was change-

THE OLD PAINTER ON A WALK

In his pockets treats for local dogs
He sees almost nothing now
He almost doesn't notice trees suburban villas
He knows every stone here
I painted it all tried to paint my thoughts
And caught so little
The world still grows it grows relentlessly
And yet there is always less of it

—Adam Zagajewski (1945–2021)

(Translated, from the Polish, by Clare Cavanagh.)

able. In his view, it was changing in our favor.

O'Rourke, looking at the maps, concurred. "There's a clearing that way," he said, pointing. "A little bit of cloud, but we should be able to get a full day. Tomorrow looks pretty good down there as well." It appeared that we might have a brief window in which to deploy more probes.

Greenbaum and Bishop bent over a map of Thwaites and started sorting through possible waypoints, trying to account for wind resistance and fuel burn. They chose fifteen sites—a bombing run near the glacier's grounding line. To reach the eastern targets, we'd need to stop at an improvised refuelling depot, which the pilots had established a couple of weeks earlier and named Bishop's Knob.

We set out that morning. It took us an hour to reach the depot, which first appeared as a single red point in a featureless plain of white. Bishop landed; the engine grew quiet, and an imposing silence took hold. We were surrounded by Antarctic nothingness.

"You O.K. over there?" Bishop asked me. The flight had been very bumpy, and I had struggled to keep my light breakfast from glazing the interior of the aircraft.

"I'm O.K.," I said, lurching out of the helicopter in my immersion suit and pulling the hood off so quickly that some of my hair came out. I leaned forward with my hands on my knees.

"So, not O.K., eh?" Bishop said. A young Sergeant Brown would've been disgusted by middle-aged me. "This is a good place to throw up, if you're gonna," Bishop went on. He pointed to the helicopter. "But not in there."

The nausea passed, and I looked around. A fluttering scrap of sun-faded fabric tied to a bamboo stake marked the depot site. Gloomy Mt. Murray pierced the sky to the southwest. Seven red jet-fuel drums lay on their sides, half-buried. It took Bishop and me fifteen minutes to dig one out with our gloved hands. He ran a hose between the barrel and the helicopter and began refuelling. Then we resumed our trip.

Toby Keith sang through our headsets: "I should've been a cowboy / I should've learned to rope and ride." Below us, mile-long lacerations in the ice gave way to ever-larger gashes, as though some gargantuan creature had slashed into the ground with its claws. Eventually, we arrived at what glaciologists call "the mélange." There, the ice was crushed, geometric, with slabs surrounded by slush. Icebergs trapped by frozen ocean had piled up, and flat features the size of stadiums jutted from the landscape. Grounded ice was sliding into the sea, creating a chaos of lumpy alabaster mountains, valleys, canyons, foothills, and ice-sealed lakes. There were cliffs and outcroppings, chasms with shimmering blue interiors. It was a science-fiction wasteland, alien and appalling.

We hunted for openings that revealed the water, but spotted only areas where inch-thick ice covered tiny cracks a couple of feet across. Bishop headed toward one of them, descending into a narrow alleyway.

"Can we go lower?" Greenbaum asked.

"Yes, but I can't hover there for too long," Bishop said. "Keep an eye on the tail rotor."

He eased us down to about ten feet above the ice. I craned around to look: walls were encroaching on either side. I pulled open the door. Greenbaum leaned out to drop the torpedo. He squinted, aimed, and threw; the probe cracked the ice and descended into the water before its drogue chute could deploy.

We flew on. Bishop developed a clever technique, hovering over our targets and allowing the rotor wash to reveal the thinnest patches of ice. As we moved from drop to drop, I watched our supply of probes dwindle. They were ingeniously designed: when the devices were submerged, salt water completed an internal circuit, releasing the sensor, which plummeted downward. Meanwhile, a buoy bobbed to the surface. The sensor and the buoy were connected by a thousand-metre-long wire. The sensor used the wire to relay its findings to the buoy, which then transmitted the data to radio receivers on the helicopter.

We deployed eleven probes, with a mounting sense of exhilaration. But then Greenbaum frowned. He turned to the instrument rack and adjusted a few knobs. He looked with alarm at his laptop screen.

"Something is wrong," he said.

When Greenbaum confronts a difficult problem, he retreats inside himself to concentrate. He spent the rest of the flight in silence. It was only back on the ship, at a makeshift desk in our cabin, that he realized what might have happened. He pointed to a graph on his computer. "This shouldn't look like that," he said. "I think it's the ice. While the probe is falling deeper into the water, the buoy is supposed to float on the surface. But on some of the drops the ice was so thick that the probe could only punch a six-inch hole. When the buoy floats to the top, it hits ice instead of open water."

I saw the problem: I imagined a man falling through ice covering a lake, then finding himself trapped as he swam toward the surface.

Greenbaum sighed, then leaned

back, his face fallen. "I think the ice may have distorted the data," he said. The flight had been a failure.

The weather forecast for the next day was ambiguous. There was a chance that we could fly again and drop more probes. But we needed to solve the ice problem first—otherwise, we'd be dropping them for nothing.

Field geophysics is not a genteel science. You are more likely to reach for a screwdriver or a drill than for a microscope or a flask. In Antarctica, grit and muck get into your hands, which are cracked by the cold; you carry heavy equipment and turn wrenches to tighten ratchet straps around splintered wooden shipping containers. You are as far from civilization as it's possible to get, and you must figure things out for yourself.

David Holland, the mathematician, had an idea. On expeditions to Greenland, he'd used a cable to lower sensors into the water from the side of a helicopter; the helicopter then hovered, stationary, until the probes had returned their data. Greenbaum thought we might be able to learn from this approach. If we could find a way to break bigger holes in the ice, we could lower our sensors and buoys into them, on ropes. Holland had used large rocks as icebreakers; we had none on hand, and no way to carry them safely in our helicopter. But, Greenbaum suggested, we could remove the sensors from their torpedo casings, and then fill the empty casings with bottles of water. The torpedoes we'd dropped earlier had used drogue chutes to stay upright—but if Greenbaum hurled the modified casings onto the ice lengthwise, they would make much bigger holes.

The first step was to refashion our torpedoes. We'd brought a few types with us: the cheapest batch had fewer features but a heavy black torpedo tube, while the more expensive ones had lighter, thinner shells but superior sensors. We could break the ice with the black torpedoes, then deploy ropes to lower the fancy sensors into the holes.

On the main deck of the ship, in a laboratory filled with grimy camp gear, Greenbaum and I sat at a workbench with a black torpedo in front of us. We needed to open the casing. But we were brought up short by a note printed on the torpedo's side:

> WARNING
> DO NOT DISASSEMBLE SONOBUOY
> Potentially hazardous material contained herein.
> Unauthorized handling of the sonobuoy may cause personal injury.
> In case of any damage to the sonobuoy, do not handle.
> Call explosive ordnance disposal team.

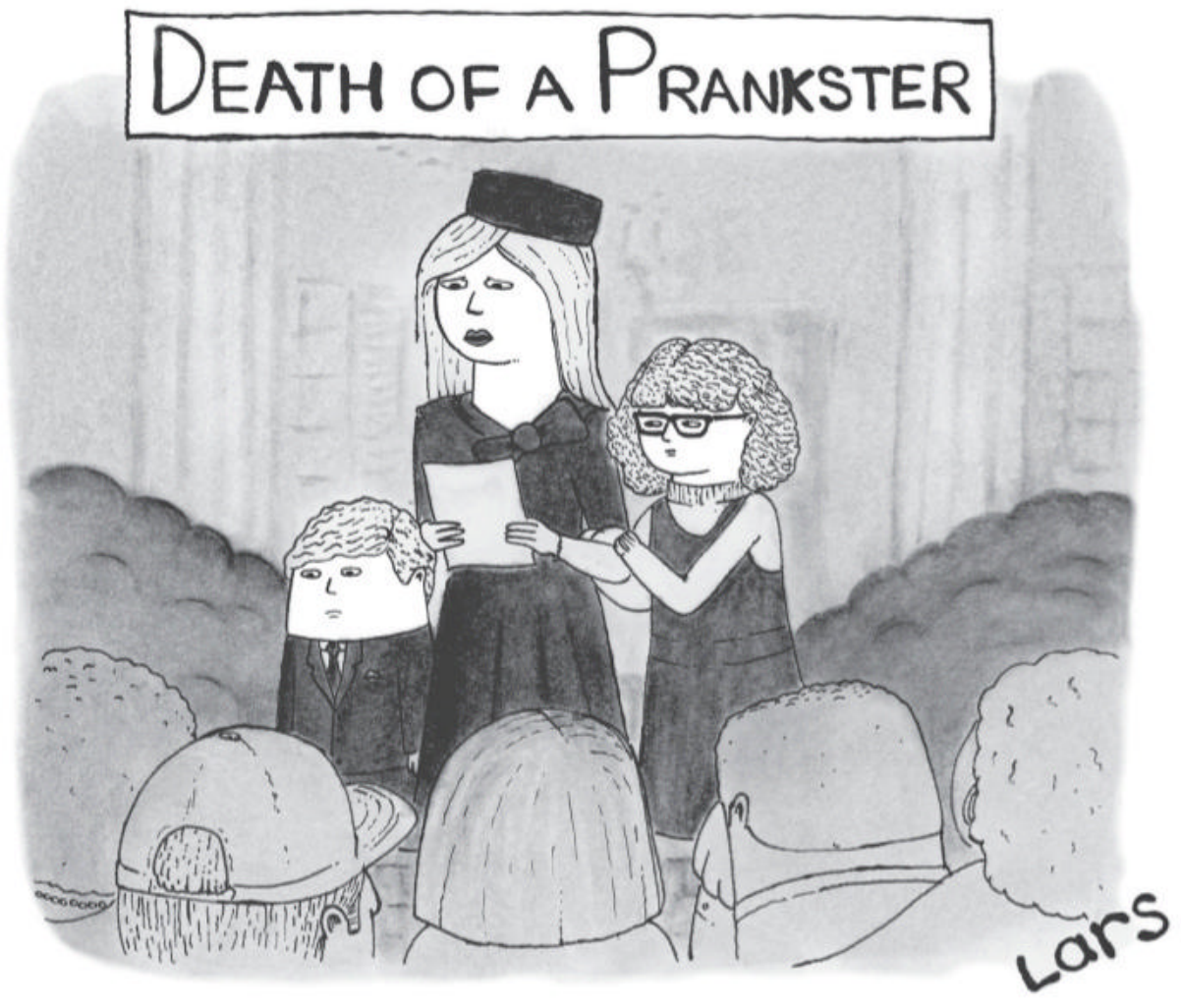
The last line gave us particular pause. If opening the probe required calling the same people who disarm mines, it was obviously unwise to do so by ourselves, on an isolated boat in the Southern Ocean. We weren't sure how the torpedoes worked. Was there a small internal explosive charge that detonated on impact, blasting open the casing? While in Antarctica, the Araon had only the sketchiest communications capabilities; with no Internet access, we couldn't even Google.

We started disassembling the torpedo, removing only the parts we knew wouldn't explode and joking nervously about blowing holes in the ship and ourselves.

By giving others first dibs on the helicopters, Greenbaum had earned substantial good will on board. Lots of people, on many different teams and from many different countries, had heard about his predicament and wanted him to succeed. An engineer named Scott Polfrey ambled in. He was part of the British Antarctic Survey, and had helped with the drill. He finished off a can of Cass beer, then set it down on the workbench, next to a pile of empty coffee cups and ice-cream wrappers.

"You mind?" he asked. He picked up the torpedo, turning it this way and that with alarming nonchalance as Greenbaum described our uncertainties. Polfrey didn't think the device would explode. "If this had an explosive," he said, "it would proba—Well, it does say 'explosive' on it, I'll give you that." But, he argued, maybe the "explosive" was just a cartridge of carbon dioxide, and wouldn't be that bad: "It's only going to detonate if you put it in water."

He laid the torpedo on the floor. He reached for a heavy-duty flathead screwdriver and locked eyes with Greenbaum.



"In lieu of flowers, please send twenty anchovy pizzas to Glen Rayburn, at 179 Warren Street . . ."

"Do you trust me, Jamin?" he asked.

"Of cou—" Greenbaum said.

Polfrey stabbed the screwdriver into the possibly explosive part of the torpedo and pried as hard as he could. The sensor slid out, sans explosion. We all backed away.

"Just go a bit steady with it, in case it does anything," Polfrey said. He nodded, satisfied.

Now we could see what an actual sensor looked like. It was about the size of a magnum bottle. We were excited—it would be easy to tie the sensor to some rope.

Greenbaum went to find Bishop to tell him about our plan to lower the sensors by hand.

"No," Bishop said, the moment he heard it. "No way in hell."

Safety was his priority. Hanging loose rope from a helicopter, he warned, was like playing Russian roulette. If the wind whipped the wrong way, or someone slipped, or the probe hit a skid and bounced up, the rope could be sucked into one of the rotors, and everyone could die.

"We'll figure something out, Jamin," Polfrey said.

We needed to maintain control of the rope, the way mountain climbers do when they lift and lower gear and people. We had plenty of rope—we were on a ship, after all—but didn't know how to arrange it. Pierce, who'd volunteered in mountain rescue, heard about our dilemma. He picked up an extracted sensor and wrapped a piece of rope around it, tying an elegant knot. He then demonstrated how the sensor could be controlled using a rope bag, which could keep the rope neat and contained.

We showed the setup to Bishop, who balked. It was clear that he wanted something more robustly engineered.

Polfrey and I headed to one of the seawater labs and began rummaging through unlabelled black plastic bins, which held supplies. We wanted to find something we could wrap the rope around, so that none of it was loose—in other words, a pulley. In one bin, we uncovered a stack of aluminum pipes that the Extreme Geosciences Group had used for their G.P.S. stations. We consulted Lee Choon-ki, who told us to help ourselves. From another bin, Polfrey extracted a hacksaw and a file. He started sawing the pipe. We took turns cutting it into ten-inch lengths. We could wrap the rope around and around the pipe, creating a spool, and then run another rope through the pipe's hollow interior, which would secure the pulley to Greenbaum's harness. We had enough pipe to make an individual pulley for each sensor, for maximum organization and safety.

We presented our handiwork to Bishop, who eyed it skeptically. We explained exactly why the system was safe. We pulled the rope this way and that, proving that it would always be in our control.

"O.K.," Bishop said at last. "It's fucking perfect."

The idea of stuffing the casings with water bottles had never sat well with Greenbaum. "We really didn't come all this way to throw plastic in the water," he told Yun Sukyoung. "We want something environmentally friendly. Something dense and heavy."

"I have something," Yun said. She disappeared into the ship and returned a few minutes later carrying a pair of large iron shackles. If the ship had made it to Thwaites, she would have used them to connect special sensors to a seafloor anchor. We weighed them in our hands.

"How many do you have?" Greenbaum asked.

"As many as you need," she said.

Yalalt Nyamgerel, the geochemist from Mongolia, arrived to help take apart the torpedoes. We filled the tubes with linked-together shackles, which we bolted to the tube interiors. I picked up one of the completed assemblies. It weighed around thirty pounds—heavy enough to smash a big hole in the ice. I set it down on the deck with a thud.

Holland walked into the room.

"This is the bomb," I said. "It's filled with shackles."

We named our creation the Shackleton Bomb.

Night was indistinguishable from day. Still, we had worked around the clock, and skids-up was fast approaching. It was with a sense of desperation that I realized I couldn't handle another nauseating flight over the end of the world. The mission needed to succeed; the probes needed to reach their targets; a great deal was at stake. Holland took my place.

I watched from the deck as the helicopter spun up. I walked into the rotor wash, started the camera mounted to the side, and stepped away. Bishop took the aircraft up. In an instant, it was gone.

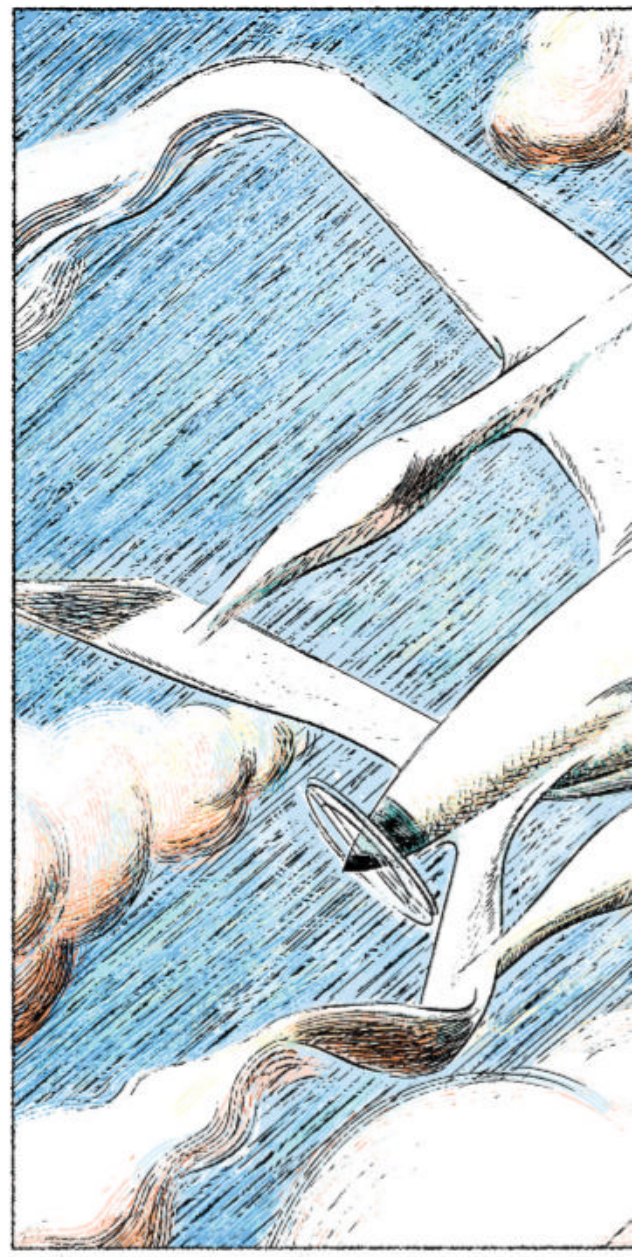
I stood in the silence. Eventually, I heard the songs of some snow petrels that were swooping around a familiar iceberg behind the ship. It was a massive ice mountain that, in its profile, evoked El Capitan. For days, a house-size hunk of ice at its peak had been threatening to collapse; each night, Beem, Pierce, Stutz, and I had watched it, waiting with cups of whiskey, beer, or wine. We wanted to be there when it fell. We imagined the tortured crack and the cataclysmic splash of its impact. Like everything else in Antarctica, it was doomed on its own timescale, yet seemed ancient and eternal.

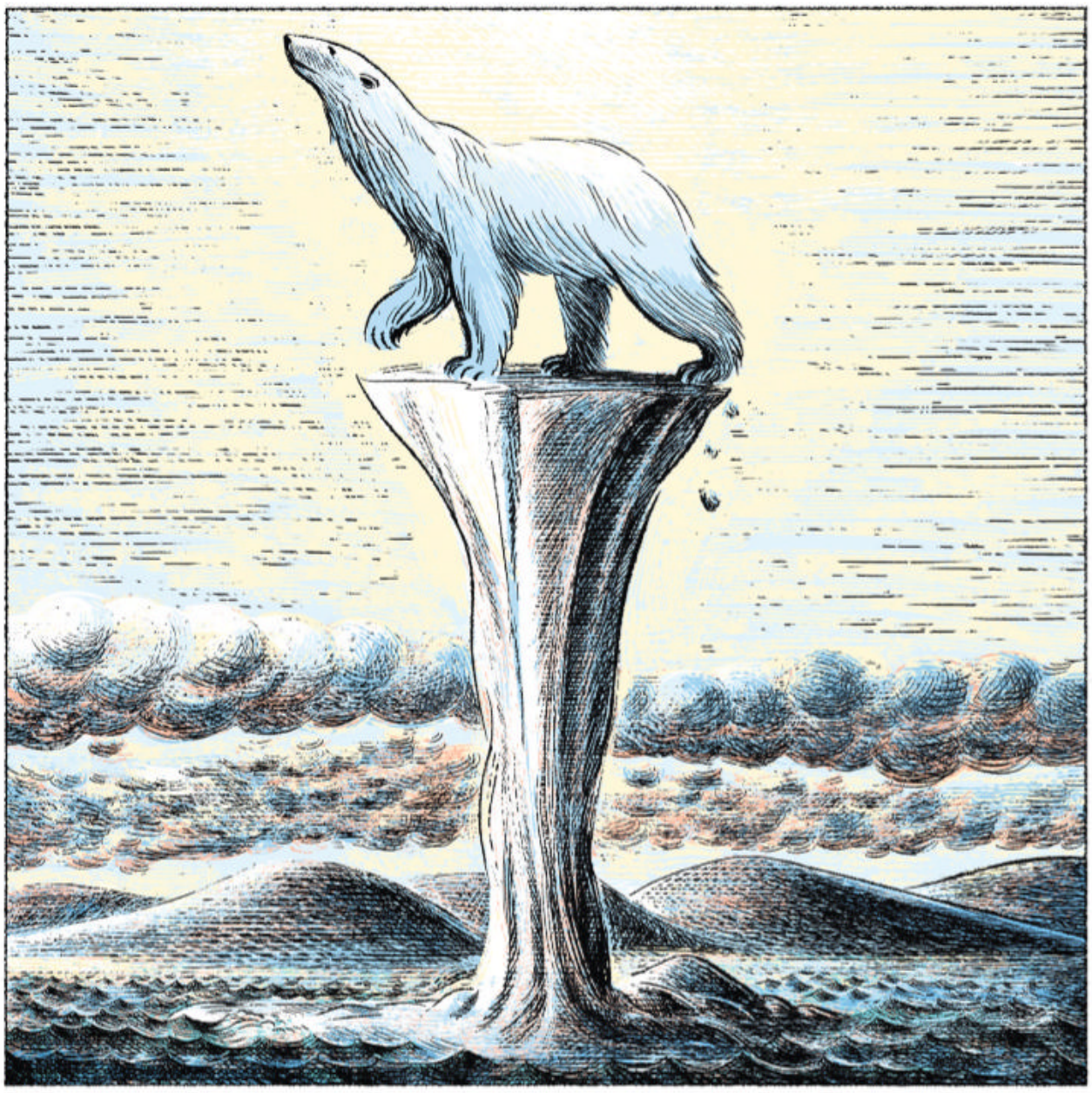
Around four hours later, the helicopter returned. I looked through the windscreen, where Bishop, his face calm, flipped switches to power down. To his right, Holland was gathering gear. A side door opened, and Greenbaum climbed down. He looked up, saw me, and offered a triumphant thumbs-up.

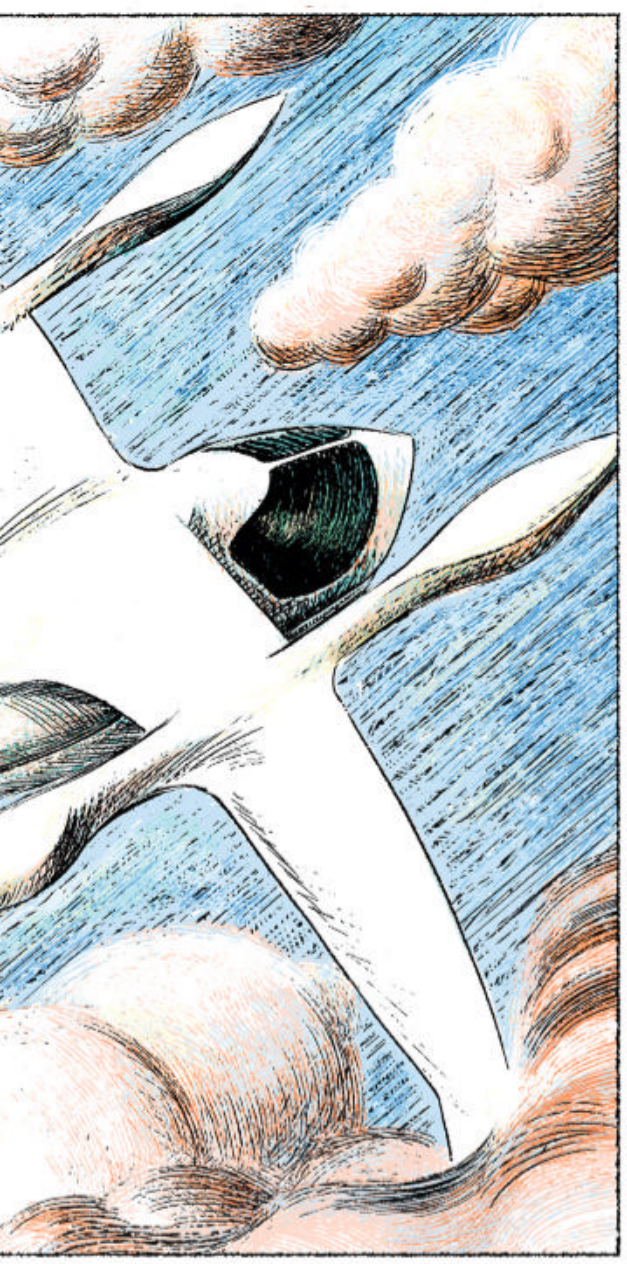
"Dude!" he said. "It worked. We got it."

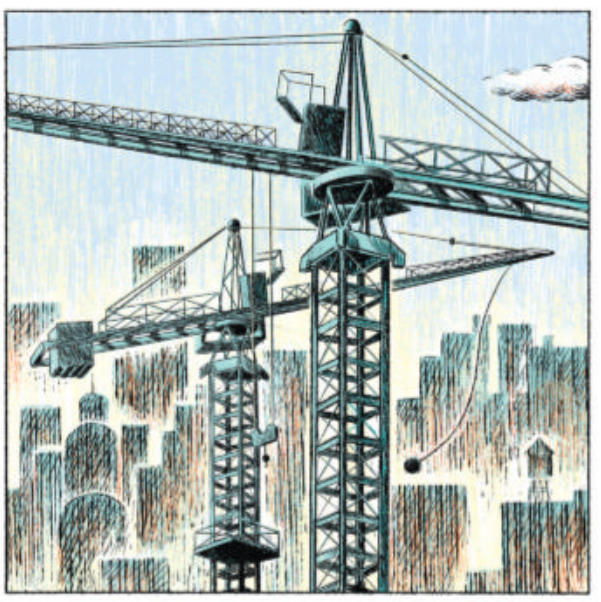
Climate scientists often feel a mixture of pride and foreboding. Pride because they can shed light on our collective future; foreboding because it's a future they fear. There will be years of analysis ahead—papers to write, models to improve—and there will be more data to collect. But we may soon know whether Thwaites has fifty, a hundred, or five hundred years left.

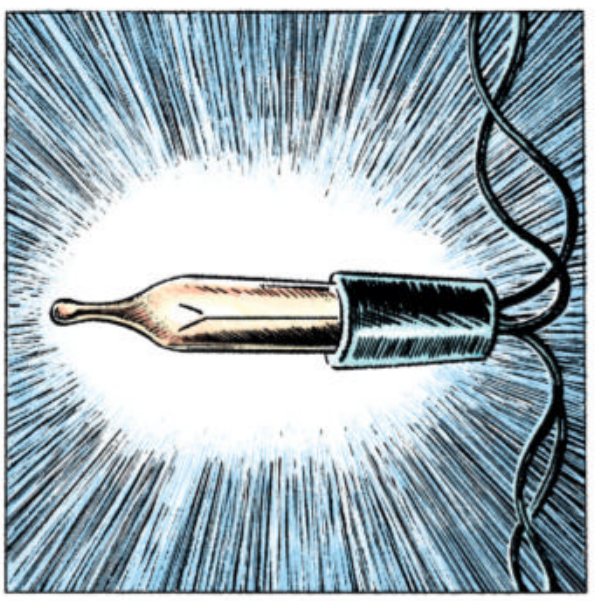
I thought about the glacier's fate during the trip home, tossed by twenty-foot waves. Outside my porthole, the sea was heaving and subsiding, unstoppable; we've made our choices, and now it will decide how much our continents will shrink, and when. Exhausted and seasick, I felt the ocean's obliviousness to us. All the more reason to attend to it. ♦

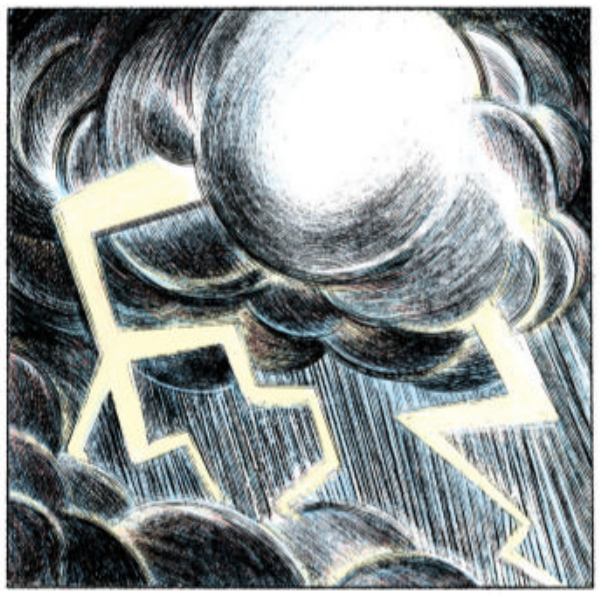










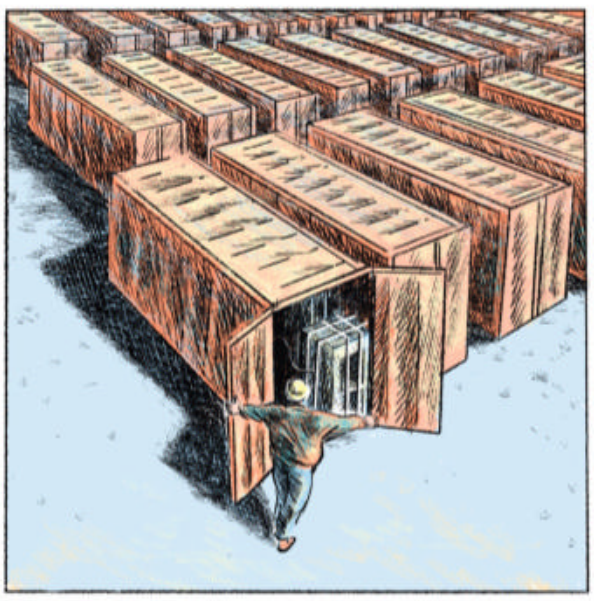


ANNALS OF A WARMING PLANET

A VAST EXPERIMENT

The climate crisis from A to Z.

BY ELIZABETH KOLBERT



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Svante **Arrhenius** was, by nature, an optimist. He believed that science should—and could—be accessible to all. In 1891, he got his first teaching job, at an experimental university in Stockholm called the Högskola. That same year, he founded the Stockholm Physics Society, which met every other Saturday evening. For a fee of one Swedish crown, anyone could join. Among the society's earliest members was a Högskola student named Sofia Rudbeck, who was described by a contemporary as both "an excellent chemist" and "a ravishing beauty." Arrhenius began writing her poetry, and soon the two wed.

Physics Society meetings consisted of lectures on the latest scientific developments, many delivered by Arrhenius himself, followed by discussions that often lasted well into the night. The topics ranged widely, from aeronautics to volcanology. The society devoted several sessions to considering the instruments that would be needed by Salomon August Andrée, another early member of the group, who had decided to try to reach the North Pole via balloon. (Whatever the quality of his instruments, Andrée's voyage would result in his death and the death of his two companions.)

A question that particularly interested the Physics Society was the origin of the ice ages. All over Sweden lay signs of the glaciers that had, for vast stretches of time, buried the country: rocks with parallel scrapings; strange, sinuous piles of gravel; huge boulders that had been transported far from their source. But what had caused the great ice sheets to descend, carrying all before them? And then what had caused them to retreat, allowing the rivers to flow once again and the forests to return? In 1893, the society debated various theories that had been proposed, including one linking the ice ages to slight variations in the Earth's orbit. The following year, Arrhenius came up with a different—and, he thought, better—idea: carbon dioxide.

Carbon dioxide, he knew, had curious heat-trapping properties. In the atmosphere, it allowed visible light to pass through, but it absorbed the longer-wave radiation that the Earth was constantly emitting to space. What if, Arrhenius speculated, the amount of CO_2 in the air had varied? Could that explain the glaciers' ebb and flow?

The math involved in testing this theory went far beyond what was possible at the time. Arrhenius didn't have a calculator, let alone a computer. He lacked crucial information about which wavelengths, exactly, CO_2 absorbs. The climate system, meanwhile, is immensely complicated, with feedback loops nestled within feedback loops.

Arrhenius, who would later win a Nobel Prize for an unrelated discovery, plunged ahead anyway. On Christmas Eve, 1894, he began constructing a climate model—the world's first. He assembled temperature data from around the globe and made ingenious use of a set of measurements that had been taken a decade earlier by an American astronomer, Samuel Pierpont Langley. (Langley had invented a device—a bolometer—for gauging infrared radiation, and had used it to determine the temperature of the moon.) Arrhenius performed thousands of computations—perhaps tens of thousands—and often labored over this task for fourteen hours a day. He was still calculating away as his marriage fell apart. In September of 1895, Rudbeck moved out. In November, without having seen Arrhenius again, she gave birth to their son. The following month, Arrhenius finished his work. "I should certainly not have undertaken these tedious calculations if an extraordinary interest had not been connected with them," he wrote.

Arrhenius believed that he had unravelled the mystery of the ice ages, a riddle that had "hitherto proved most difficult to interpret." He was at least partly right: ice ages are the product of a complex interplay of forces, including wobbles in the Earth's orbit *and* changes in atmospheric CO_2.

His model turned out to have another use as well. All across Europe and North America, coal was being shovelled into furnaces that were bellowing out carbon dioxide. By thickening the atmospheric blanket that warmed the Earth, humans must, Arrhenius reasoned, be altering the climate. He calculated that, if the amount of carbon dioxide in the air were to double, then global temperatures would rise between three and four degrees Celsius. A few quadrillion computations later, vastly more advanced climate models predict that doubling CO_2 will push temperatures up between 2.5 and four degrees Celsius, meaning that Arrhenius's pen-and-paper estimate was, to an uncanny degree, on target.

Arrhenius thought that the future he had conjured would be delightful. "Our descendants," he predicted, would live happier lives "under a warmer sky." The prospect was, in any event, distant; doubling atmospheric CO_2 would, he reckoned, take humanity three thousand years.

It's easy now to poke fun at Arrhenius for his sunniness. The doubling threshold could be reached within decades, and the results are apt to be disastrous. But who among us is any different? Here we all are, watching things fall apart. And yet, deep down, we don't believe it.

B

On September 28, 2021, at the Youth4Climate conference, held in Milan, Greta Thunberg took the stage. Sitting near her was the city's mayor, Giuseppe Sala, wearing a mask. Thunberg, who is five feet tall, could barely be seen over the lectern. She had removed her mask and was smiling.

"Climate change is not only a threat, it is above all an opportunity to create a healthier, greener, and cleaner planet which will benefit all of us," she began. "We must seize this opportunity—we can achieve a win-win in both ecological conservation and high-quality development. . . . We need to walk the talk; if we do this together, we can do this.

"When I say 'climate change,' what do you think of?" she went on. "I think of jobs—green jobs." This received a round of applause.

"We must find a smooth transition towards a low-carbon economy," Thunberg said. "There is no Planet B. There

is no Planet Blah—blah, blah, blah; blah, blah, blah." Her listeners, including Sala, started to realize that they'd been had. The applause died down.

"Build Back Better—blah, blah, blah," Thunberg continued.

"Green economy—blah, blah, blah.

"Net zero by 2050—blah, blah, blah.

"Net zero—blah, blah, blah.

"Climate neutral—blah, blah, blah.

"This is all we hear from our so-called leaders: words—words that sound great, but so far have led to no action," Thunberg said. "Of course we need constructive dialogue, but they've now had thirty years of **blah, blah, blah**, and where has that led us?"

It was thirty years ago that the world's "so-called leaders" gathered in Rio de Janeiro for the so-called Earth Summit. Everyone agreed that radical change was needed. To avert disaster, global CO_2 emissions, which were then running at around twenty-two billion metric tons a year, would have to be reduced, eventually almost to zero. How this would happen, no one really knew. Still, the goal of preventing "dangerous" warming was enshrined in the United Nations Framework Convention on Climate Change, which President George H. W. Bush cheerfully signed.

"Some find the challenges ahead overwhelming," Bush said. "I believe that their pessimism is unfounded."

A follow-up conference of the parties, or COP, took place in Kyoto in 1997. By then, annual global emissions had risen to twenty-four billion tons. After much back-and-forth, it was agreed that something had to be done. The Kyoto Protocol, an addendum to the Framework Convention, laid out specific emissions-reduction targets for countries to meet.

"I am both determined and optimistic that we can succeed," Vice-President Al Gore told the diplomats gathered in Japan.

After Kyoto, global emissions kept on rising, only faster. By 2009, they'd climbed to thirty-two billion tons a year. That fall, President Barack Obama flew to Copenhagen for yet another conference of the parties—COP15. "I believe that we can act boldly, and decisively, in the face of this common threat," he declared.

By 2015, emissions had increased to thirty-five billion tons a year. At that year's COP—No. 21—held in Paris, it was decided that, at last, really and truly, it was time to get serious. "The decisions you make here will reverberate down through the ages," the United Nations Secretary-General, Ban Ki-moon, told the delegates. Nevertheless, emissions continued to rise. In the past thirty years, humans have added as much CO_2 to the atmosphere as they did in the previous thirty thousand.

At some point during all the "blah, blah, blah"-ing—it's hard to say when, exactly—climate change ceased to be a prospective problem and became a clear and present one. Since Rio, the Arctic ice cap has shrunk by two-fifths. Greenland has shed some four trillion metric tons of ice, and mountain glaciers have lost six trillion tons. Heat waves are now hotter, droughts deeper, and storms more intense. In some parts of the world, the wildfire season never ends.

One conclusion to draw from this pattern is that the world isn't going to avoid "dangerous" warming. Global leaders will continue to gather at COPs—this year's, in Sharm el-Sheikh, just concluded—and to speak loftily about "net zero" and "a low-carbon economy." But nothing will change, and, as a result, everything will change. There will be large-scale crop failures. The Greenland ice sheet will start to collapse—it may already be collapsing—and, owing to sea-level rise in some places and desertification in others, large swaths of the globe will become uninhabitable.

This conclusion is not, however, the one that Thunberg chose to draw when she spoke at the Youth4Climate conference. "Right now we are still very much speeding in the wrong direction," she told the crowd in Milan. "But, of course, we can still turn this around—it is entirely possible.

"The leaders like to say, 'We can do this,'" she went on. "They obviously don't mean it, but *we* do—we can do this. I'm absolutely convinced that we can."

Or, as Thunberg might put it, Blah, blah, blah.

C

What's the matter here? Why has so little progress been made on climate change, even as the dangers have become ever more apparent?

According to one school of thought, the problem has to do with incentives. There's a great deal of money to be made

"I lost my reading glasses, so pick something wordless."

selling fossil fuels—just in the first quarter of 2022, twenty-five of the world's largest oil-and-gas producers announced profits of close to a hundred billion dollars—and still more money to be made by burning fossil fuels to make stuff to sell, from sunglasses to steel girders. Meanwhile, the costs of climate change can be fobbed off on someone else. To use the technical term, they are a "negative externality." In the words of the Stern Review, a report commissioned by the British government in 2005, climate change "is the greatest and widest-ranging market failure ever seen."

By this account, the obvious solution is to realign the incentives—to internalize the externalities. If the cost of the damage caused by a ton of CO_2 was borne by the business (or individual) responsible for emitting that ton, then the business (or individual) would be motivated to cut back. "A carbon tax offers the most cost-effective lever to reduce carbon emissions at the scale and speed that is necessary," a 2019 statement signed by thirty-five hundred economists, including twenty-eight Nobel Prize winners, declared. Such a tax would move "the invisible hand of the marketplace to steer economic actors towards a low-carbon future."

According to a second school of thought, the trouble runs a whole lot deeper. Our political system is dominated by corporate money in general and fossil-fuel money in particular. (Last year, the oil-and-gas industry reportedly spent a hundred and twenty million dollars lobbying Washington, and it probably spent a great deal more via front groups.) It's therefore naïve to imagine that policies that cut into fossil-fuel profits will be enacted. And even if they were, they wouldn't solve the essential problem, which is that the "invisible hand" always grasps for more. If it's not more oil, it will be more lithium to build batteries, and if it's not more lithium it will be more cobalt, mined from the bottom of the sea.

"When it comes to global warming, we know that the real problem is not just fossil fuels—it is the logic of endless growth that is built into our economic system," Jason Hickel, an economic anthropologist at the Autonomous University of Barcelona, has written. Climate change can't be dealt with using the tools of **capitalism**, because it is a product of capitalism. It can be dealt with only by throwing off capitalism in favor of something else—a system aimed not at growth but at "degrowth."

"The difficult truth is that, to prevent climate and ecological catastrophe, we need to level down" is how the British environmental writer George Monbiot recently put it.

A third line of thought—perhaps too bleak and unpopular to be called a school—is that, if big change is hard, bigger change is even harder. How are we going to build a whole new economic system if we can't even enact a carbon tax?

D

Despair is unproductive. It's also a sin.

E

Let's try again, this time with feeling.

BIWF2 is a wind turbine that sticks up out of the Atlantic Ocean, about fifteen miles off the coast of Rhode Island. It's six hundred feet tall, which is higher than the Washington Monument, and its blades are more than two hundred feet long. I'm on a boat designed to transport crews to offshore wind farms. The captain maneuvers right up to the metal stanchions that hold the turbine in place, so the blades are rotating directly overhead. They make a fantastic whooshing sound that builds and fades, builds and fades. The effect is at once thrilling and terrifying, as if some gigantic bird were trying to land on the deck. "Ah," everyone on board exclaims as another blade descends.

BIWF2 has one neighbor half a nautical mile to the north and three more neighbors to the south. Together the turbines make up Block Island Wind Farm, America's first offshore wind operation. A dozen more wind projects are currently planned off the East Coast, from Massachusetts to North Carolina. The turbines that will be erected in these projects will make BIWF2 look puny.

Staring up at the blades, I am looking into the future—or at least *a* future—and it's inspiring. BIWF2 is a symbol of what can be accomplished when people put their minds to it.

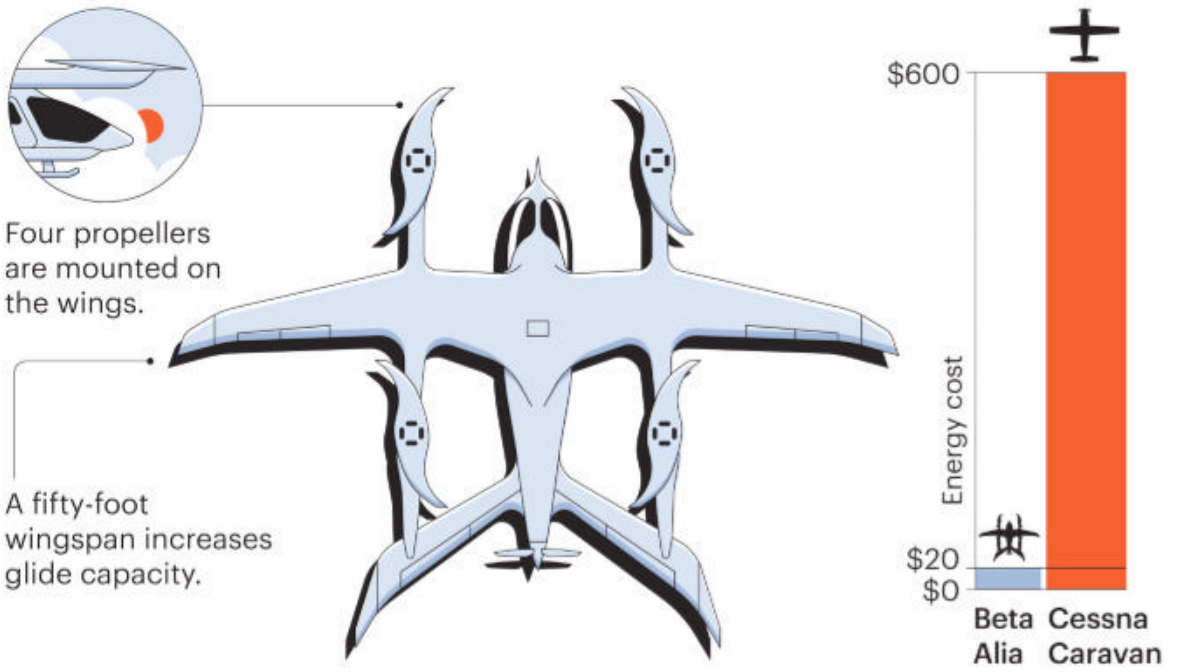
In 1992, the year of the Earth Summit, the world had exactly one offshore wind farm, called Vindeby. Situated off the Danish island of Lolland, it consisted of eleven turbines, which, collectively, produced less power than BIWF2 does today. Now there are scores of offshore farms, most of them in European and Chinese waters. The largest, known as Hornsea 2, is in the North Sea, off the English coast; it comprises a hundred and sixty-five turbines, each so massive that a single sweep of its blades can power a household for a day. Block Island Wind Farm and Hornsea 2 are owned by the same company, which used to be known as Danish Oil and Natural Gas, or DONG, but recently—and for obvious reasons—changed its name, to Ørsted. (It also owned Vindeby, which was decommissioned in 2017.) As more turbines have gone up, costs have plunged; just in the past decade, the price of offshore wind energy has declined by half.

Onshore wind has grown even faster, and its cost, too, has plummeted. In many parts of the world, it's now cheaper to put up turbines than it is to operate an existing power plant that burns natural gas. In places with a lot of wind, such as Denmark, Ireland, and western Oklahoma, there's sometimes so much power pouring into the grid that producers have to pay to get rid of it.

The price of solar power, meanwhile, has declined even more spectacularly. Since 2010, it's dropped by more than eighty per cent. According to the International Energy Agency, solar power now offers "some of the lowest-cost electricity ever seen."

The rapidly falling price of renewables makes it possible to imagine a not too distant future in which the U.S., indeed the world, generates all its electricity emissions-free. Already there are brief periods—on the order of minutes—when California can produce enough electricity from renewables to meet its demand. In Denmark, this happens for entire windy days. (It occurred two days in a row this past May.)

And, once it's possible to imagine a carbon-free grid, all sorts of other opportunities open up. Substitute electric motors for internal-combustion engines and cars, too, can run emissions-free. The same goes for trucks and buses,



The Beta Alia, which runs on battery power, can travel a hundred and eighty miles on about twenty dollars' worth of stored electricity.

ferries and forklifts. Plug them in! Tear out boilers and replace them with heat pumps! Swap gas ranges for induction stoves! Electrify as much as possible. Ideally, **electrify everything**.

F

The Alia, a sleek, all-white aircraft with angular wings, looks like the offspring of an F-16 and a seabird. It has four propellers mounted on poles that bisect the wings horizontally; these rotate ceiling-fan style. I'm sitting in the cockpit of a mockup of the plane which is used to train pilots. My flight instructor, Vince Moeykens, directs me to pull, very gently, on a lever attached to the floor. The four propellers start to spin, the floor vibrates, and the surprisingly convincing simulacrum of the ground that's being projected onto a screen in front of us begins to fall away.

"We're really starting to climb," Moeykens says, encouragingly. I lower the lever; the propellers on the top of the plane stop spinning, and one in the back takes over. We are now ostensibly moving forward, toward a large lake, which, since we're in Burlington, Vermont, I take to be Lake Champlain. Moeykens assures me that I am doing a great job, but soon the ground appears to be whizzing back toward us, and I tug on another lever to lift the plane's nose. I steer us out toward the simulated lake, and we glide peacefully over the simulated water. Just as I think I am starting to get the hang of things, it's time to turn around. I bank too sharply and, remarkably convincingly, the plane seems to pitch. As I attempt to land, the aircraft lurches, and we have a near-miss with what looks like a parking garage. The queasiness I feel on stumbling out of the cockpit is entirely genuine.

The Alia runs solely on electricity. It's manufactured by a company called Beta, which was founded, in 2017, by a former professional hockey player named Kyle Clark. (Clark studied mechanical engineering as an undergraduate, at Harvard; while there, he wrote a thesis about a plane that could be piloted like a motorcycle.) Beta occupies a U-shaped building overlooking a hangar at the Burlington airport. On the day I visited, several planes were parked in the hangar, including an Alia. The other Alia—only two exist—was wending its way back to Vermont from Bentonville, Arkansas, where it had been flown, in several hops, as a test. Clark had piloted the plane on some of the return-trip hops.

"Each one of those legs was about a hundred and eighty miles," he told me. We were sitting in a conference room one floor up from the flight simulator, overlooking the hangar. The Alia, Clark explained, had been shadowed by a Cessna Caravan carrying a crew collecting data. On each leg, Clark estimated, the Alia had gone through about twenty dollars' worth of stored electricity. To travel the same distance, the Cessna had burned about six hundred dollars' worth of jet fuel.

"The reason I bring that up," Clark continued, "is that, ultimately, what we are paying for in those two cases is energy. And the difference is a product of how much you're wasting."

Compared with internal-combustion engines, electric motors are extremely efficient; an electric car can travel at least twice as far as a conventional sedan on the same amount of energy. The challenge for electrifying **flight** is that batteries are heavy. (Jet fuel, too, is heavy, but it's a lot more energy dense, plus its weight drops as it gets burned.)

Yet, as the Alia shows, rapid progress is being made. Beta has already applied to the Federal Aviation Administration for approval to transport cargo. UPS has placed an order for up to a hundred and fifty Alias, the first of which are supposed to be delivered in 2024. There are also electric passenger planes in the works. Eviation, a company headquartered in Washington State, has produced a prototype of a nine-seater dubbed Alice. Cape Air, based in Hyannis, Massachusetts, has said it intends to buy seventy-five Alices. Wright Electric, headquartered in Albany, New York, is planning to transform a British Aerospace commuter jet, the BAe 146, into an electric hundred-seater. "All short flights can be zero-emissions starting in 2026," Wright's Web site proclaims.

G

"We are doing freeze-and-thaw tests here in this lab," Mehrdad Mahoutian said. He pried the lid off a plastic container of the sort usually used to store leftovers. Inside was a gray block about the size of a juice box. It was sitting in a half inch or so of ice-fringed water.

"This is cement-free concrete," Mahoutian said, indicating the block. "And this is salt water. For eighteen hours, they go into the freezer. And, for six hours, they get melted, basically."

It was the day after my journey in

INFOGRAPHICS BY FRANCESCO MUZZI

the flight simulator, and, following an unfortunate delay at the Canadian border, I had managed to find the headquarters of a company named CarbiCrete, in an industrial area of Montreal. Mahoutian, one of the company's founders, was showing me around the R. & D. facility. Every few minutes, he was interrupted by a very loud rumble. "That's the blocks being made," he shouted over the din.

We passed into a second room, where two test walls of cinder block stood perpendicular to each other. Both were equipped with a shower apparatus made from PVC pipe, which was dripping water. A fan blew the water toward the blocks. Mahoutian explained that one test wall had been constructed with ordinary cinder blocks, the other with a new kind of block fabricated by CarbiCrete. The shower arrangement was gauging how the two walls compared in terms of water penetration. "In a few hours, we'll measure the dampness and do some calculations," he told me.

Concrete represents one of the world's most obdurate carbon problems. Its key ingredient, Portland cement, is made by grinding up limestone, adding clay, and heating the mixture to more than two thousand degrees. The process demands a lot of energy, which is usually supplied by burning coal. But, more fundamentally, the issue with cement is its chemistry; heating limestone to the point that it transforms into quicklime unavoidably releases CO_2. In 2021, some thirty billion tons of concrete were produced worldwide, almost four tons for every single person on the planet. The associated carbon emissions accounted for roughly eight per cent of the global total—more than aviation and shipping combined. Producing cement-free concrete, or what is sometimes referred to as **green concrete**, isn't sexy, but it's essential.

In place of cement, CarbiCrete makes use of a waste product—the slag left over from steel production. It pounds the slag into powder and mixes in crushed rock and water. The resulting slurry, which looks a lot like conventional concrete, can then be molded into blocks or tiles.

CarbiCrete bills its product, which for the time being is also known as CarbiCrete, not just as carbon-neutral but as carbon-negative. Mahoutian led me to a row of machines that resembled rice cookers. Each one was attached to a cannister of CO_2. Inside the machines, little blocks of damp CarbiCrete were reacting with carbon dioxide; instead of releasing the gas, the blocks were soaking it up.

"Please touch," Mahoutian instructed. The machines were hot. This, he explained, was because the reaction, rather than requiring heat, generated it.

For now, CarbiCrete buys its CO_2 from a supplier. The plan, though, is eventually to use carbon that's been captured at, say, a power plant or a steel mill.

"What we are doing basically is killing three birds with one stone," Mahoutian told me. "We are not using cement. We are permanently capturing CO_2. And we're reducing the need for landfills." As I was getting ready to leave, Mahoutian asked if I wanted a CarbiCrete tile or cinder block to bring home with me. I thought for a while and then decided to take both.

"O.K., let's go over it one more time. It's Thanksgiving at my house, Christmas at Little Jimmy's, New Year's at Frankie's, and we're out."

H

"Hope is the pillar that holds up the world," Pliny the Elder is supposed to have observed. "**Hope** is the dream of a waking man." Go looking for hopeful climate stories and they turn up everywhere.

Not long ago, I came across one in a defunct wine distributorship, in Somerville, Massachusetts. The cavernous warehouse had been taken over by a company called Form Energy, whose waking dream concerns rust. Rusting usually proceeds in one direction, and the end result is a corroded nail or screw that winds up in the trash. But, as iron oxidizes, it gives up electrons. Therefore, if a current is applied to rust in solution, the process will run in reverse. At Form, the goal is to use this reverse-rusting trick to make a new kind of battery, one so cheap and durable it could power an entire city.

Billy Woodford, Form's chief technology officer, studied material science at M.I.T. "Batteries have cool technical problems," he told me as we descended into the warehouse turned research lab. The huge room was lined with experimental chambers that re-

sembled glass-fronted refrigerators. Each was labelled, according to an inside joke that I never quite got, with the name of a different Oreo variety, like lemon or s'mores or gluten free. (I was surprised to learn that there had been a Lady Gaga Oreo, which consisted of pink wafers and green cream.)

Inside the chambers were collections of some kind of high-tech Tupperware, with wires poking through the lids. The containers, in turn, held plates of iron bathing in liquid. Woodford explained that these were test batteries: "We'll put in different iron—there's different versions, depending on whether it's produced, say, in Texas or Germany—and then different electrolytes."

Form's full-scale batteries are going to be packaged in modules of fifty. Each module will be about the size of a washer and dryer placed side by side, and ten of them will be big enough to fill a shipping container. The first thirty shipping containers' worth have been promised to Great River Energy, a Minnesota-based utility that buys a lot of wind power. The idea is that on blustery days the batteries will soak up energy. Then, on calm days, the plates will rust and feed current back into the grid.

Form's C.E.O., Mateo Jaramillo, studied theology and later became a Tesla executive. While at Tesla, he worked on lithium-ion batteries, which are the sort used in most electric vehicles (and in the Alia), and also, in a slightly different form, in laptops and cell phones.

"Lithium-ion is fantastic," Jaramillo told me. "And yet, if that's the only tool you have, you still have a really hard time replacing high-capacity coal and natural-gas plants. To replace those, you need something that's at least an order of magnitude cheaper than lithium-ion." The materials needed for reversible rusting—air, salt water, and iron—are available in practically limitless quantities. "Besides coal, iron is the most-mined mineral on earth," Jaramillo said. "So it scales."

"I can say with confidence that I have never been more optimistic about America." So tweeted President Joe Biden shortly after signing the **Inflation Reduction Act**, on August 16th. The bill, which authorizes federal spending of more than three hundred and fifty billion dollars on climate initiatives, had, Lazarus-like, sprung from the dead in late July, stunning just about everyone, including most members of the U.S. Senate.

Biden came into office vowing sweeping action on climate change. His first day in the White House, he announced that the U.S. was rejoining the Paris agreement, from which it had withdrawn under Donald Trump. Biden subsequently pledged to the world that, by 2030, the U.S. would cut its emissions by fifty per cent, compared with 2005.

Biden's pledge wasn't quite as ambitious as it seemed. The U.S.'s emissions peaked around 2005; since then, thanks largely to a shift from coal to natural gas, they have declined by about twenty per cent. Still, Biden's promise was a reach. To have any hope of making good on it, the President needed to get legislation through Congress. To get legislation through Congress, he needed all fifty Senate Democrats. And to get all fifty Democrats he needed Joe Manchin.

Manchin, the senior senator from West Virginia, has made millions of dollars off a business that sells a kind of low-grade coal known as "gob." During the last election cycle, he received more donations from the oil-and-gas industry than anyone else in Congress. Manchin strung the White House along for six months before killing off a $2.2-trillion legislative package that, among many other things, would have rewarded utility companies that reduced their emissions and fined those that didn't. Seven months later, he rejected a pared-down version of the plan. "Joe Manchin to Planet Earth: Drop Dead," the headline in Slate ran.

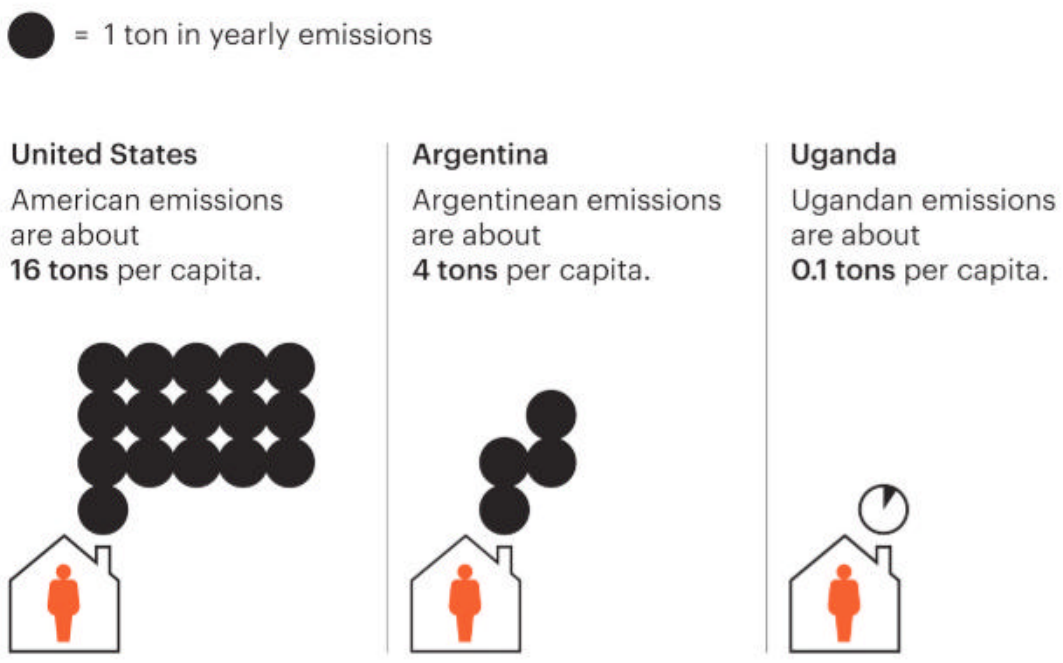
The surprise deal came after weeks of secret talks between Manchin and the Senate Majority Leader, Chuck Schumer. When the two men announced it, the Politico headline read "Manchin's Latest Shocker." The bill was predicated on a long list of concessions. It contained tax breaks for putting up wind farms and solar parks, for purchasing electric cars, and for developing energy-storage facilities. It also included tax breaks for aging nuclear plants, and for factories and power stations that continue to burn coal but capture the resulting carbon. It stipulated that, in order for the federal government to lease tracts for offshore wind development, it must lease at least sixty million acres a year for offshore oil and gas exploration. It relied almost entirely on incentives rather than penalties.

The Inflation Reduction Act is the first real piece of climate legislation to make it through Congress. If it does what it's supposed to, it will further reduce the cost of clean energy and spur the growth of whole new industries. Many environmental groups lamented the concessions that had been made to Manchin and the fossil-fuel industry but cheered the bill anyway. The I.R.A. was called "historic," "transformational," and "the best news anyone who cares about the fate of the planet had heard in a very long time."

Six years ago, Beta and Form didn't exist, and CarbiCrete consisted of four men holding meetings at a Starbucks. Today, more than four hundred people work for Beta, three hundred work for Form, and forty work for CarbiCrete. Ørsted's operations in North America employ more than six hundred people directly and thousands indirectly, through contracts for components, shipping, and logistical support.

Study after study has concluded that cutting emissions creates jobs. Recently, a Princeton-based team issued a report detailing how the U.S. could reduce its net emissions to zero by 2050. The researchers considered several possible decarbonization "pathways." The one labelled "high electrification" would, they projected, eliminate sixty-two thousand jobs in the coal industry and four hundred thousand in the natural-gas sector. But it was expected to produce nearly eight hundred thousand jobs in construction, more than seven hundred thousand in the solar industry, and more than a million in upgrading the grid.

"For too long, we've failed to use



Annual emissions in the U.S. run to roughly sixteen metric tons of carbon dioxide per capita. Lower-consuming countries emit a fraction of that amount.

the most important word when it comes to meeting the climate crisis," President Biden declared last year. "**Jobs, jobs, jobs**. For me, when I think climate change, I think jobs."

K

If you add up all the energy America uses in a year—to produce electricity and also to perform the many tasks that have yet to be electrified, like driving and flying and making concrete—and you divide that by the total number of Americans, the result is per-capita consumption. The figure comes to about eighty thousand **kilowatt** hours. Toss in the energy used to manufacture the goods imported into the U.S., and the number rises to almost a hundred thousand kilowatt hours. To put this in terms of power, Americans are consuming roughly eleven thousand watts every moment of every day. A string of incandescent Christmas lights uses about forty watts. It's as if each of us had two hundred and seventy-five of these strings draped around our homes, burning 24/7.

Owing to this every-day-is-Christmas level of consumption, annual emissions in the U.S. run to sixteen metric tons of CO_2 per person. Americans don't have the world's highest per-capita emissions—that dubious honor goes to Kuwaitis and Qataris—but we're up there. Per-capita consumption in Thailand and Argentina runs to around two and a half thousand watts and emissions to around four tons. Ugandans and Ethiopians use a hundred watts and emit a tenth of a ton. Somalis consume a mere thirty watts and emit just ninety pounds. This means that an American household of four is responsible for the same emissions as sixteen Argentineans, six hundred Ugandans, or a Somali village of sixteen hundred.

These figures rarely feature in conversations about climate change in the U.S.; they were hardly mentioned, for instance, in the debate over the Inflation Reduction Act. But to the world's low-consuming countries the inequities are impossible to ignore. They represent yet another way the Global North has exploited the Global South; call it atmospheric imperialism.

"These disparities chart the rise of developed countries at the expense of others," Mohamed Adow, the director of Power Shift Africa, a Nairobi-based think tank, has written. "The history of climate change is one of compounding injustices."

L

In 1947, the year India gained its independence, telephones were a rarity in the nation; there were fewer than a hundred thousand in the entire country. In the decades that followed, they remained scarce; as late as 1989, India had just four million phones for eight hundred and fifty million people. Three-quarters of rural villages lacked any phone connection at all; the official wait time for a line was almost four years, and, when one was finally installed, service was often dismal.

Then, practically all at once, phones were ringing everywhere. In 1994, the country auctioned off its first round of cellular licenses. The auction process was deemed "a mess"; nevertheless, cell service exploded. By 2010, six hundred million Indians were subscribers. (The country's 2011 census revealed that more households had phones than had toilets.) In 2015, cell subscriptions hit a billion. India effectively skipped fixed-line phones and went straight to wireless, a process that's become known as **leapfrogging**.

Today, India is home to 1.4 billion people. They consume a thousand watts per person, less than one-tenth of what Americans use. Were India to follow the fossil-fuel-slicked development path pursued by China, Europe, and the U.S., the result would be planetary disaster. Yet asking India to forgo prosperity on the ground that prosperous nations have already consumed too much is obviously impossible. Fewer than half of all households in the country own a refrigerator. Only one in ten owns a computer. And, even though temperatures in Delhi reached a hundred and twenty-one degrees this past spring, just one in four has air-conditioning.

Leapfrogging represents a way—maybe the best way, maybe the only way—out of this dilemma. India is sun-drenched. Instead of building out a grid that relies on coal and natural gas, it could shift to one that relies on solar power and iron-air batteries. Most Indians have never owned a car, so the country could skip over gas-guzzlers and go straight to E.V.s. Ditto for flying. The vast majority of Indians have never been on a plane; the first one they board could be an electric aircraft like the Alice. The same holds true even for stoves. More than five hundred million people in India still cook with wood or dung; instead of transitioning through gas, they could jump straight to induction. In other words, electrify everything!

"India is in a unique position to pi-

SOURCE: "PER CAPITA CO2 EMISSIONS," OUR WORLD IN DATA

oneer a new model for low-carbon, inclusive growth," the International Energy Agency recently declared. And what goes for India, the I.E.A. noted, also goes for "a whole group of energy-hungry developing economies."

India "hasn't contributed much to the climate problem," Ashish Gulagi, a researcher at Finland's Lappeenranta University of Technology, told me. "But it can contribute to the solution."

M

Carbon dioxide hangs around in the atmosphere for a long time. How long, exactly, is complicated; what matters in terms of the **math**, though, is not annual but aggregate emissions. This is where the notion of a carbon budget comes from: for every increment of warming, there's a certain amount of CO_2, in total, that can be emitted.

The budget for warming of 1.5 degrees Celsius—almost three degrees Fahrenheit—has, for all intents and purposes, been spent; at current emissions rates, it will run out entirely by 2030. Even the budget for two degrees Celsius—more than 3.5 degrees Fahrenheit—is going fast. It could easily be exhausted within the next few decades.

The U.S., with less than a twentieth of the globe's population, accounts for a quarter of aggregate emissions. Europe, with about six per cent of the world's population, is responsible for another fifth. At this point, there's no way to shove all that CO_2 back underground, so no way—or at least no safe way—for the rest of the world to catch up. This ethical challenge is as big as, or perhaps even bigger than, the technical challenge posed by climate change. But let's try to stay positive.

The North grew wealthy by burning fossil fuels. It could use that wealth to help other nations leapfrog to renewables. In 2009, at COP15, in Copenhagen, the world's richest countries took a first step in this direction. They pledged to create a fund to finance clean energy and climate adaptation in countries such as India, Uganda, and Somalia. The fund would grow steadily until, by 2020, it was disbursing a hundred billion dollars a year. Hillary Clinton, who was then the Secretary of State, said in Copenhagen that the U.S. recognized the need for "generous financial and technological support," particularly for the "poorest and most vulnerable."

N

"**Narratives** are socially constructed 'stories' that make sense of events," thereby lending "direction to human action." So observes a paper published recently in the journal *Climatic Change* by a team of European researchers. Climate-change narratives, the team notes, typically foreground "doom and gloom." Often they emphasize risk. If they're not retailing the latest warming-related disasters (fires, floods, food shortages), they're predicting a future filled with even grimmer warming-related disasters (bigger fires, more severe flooding, famines that threaten entire regions).

This approach, the researchers argue, can be counterproductive: "Narratives of fear can become self-fulfilling prophecies." If people believe that things will only get worse, they feel overwhelmed. If they feel overwhelmed, they're apt to throw up their hands, thus guaranteeing that things will only get worse. A diet of bad news leads to paralysis, which yields yet more bad news.

What's needed instead, the paper goes on, are narratives that "empower people to act." Such narratives tell a "positive and engaging story." They "articulate a vision of 'where we want to go'" and outline steps that could be taken to arrive at this metaphorical destination. Positive stories can also become self-fulfilling. People who believe in a brighter future are more likely to put in the effort required to achieve it. When they put in that effort, they make discoveries that hasten progress. Along the way, they build communities that make positive change possible.

Particularly compelling, by the researchers' account, are "win-win" narratives. Some win-win narratives demonstrate how people can reduce emissions and, in the process, make money. Others center on more intangible goals, such as creating a better world. In a 2008 speech pressing for a "global green new deal," Achim Steiner, then the administrator of the U.N.'s Environment Programme, described the "enormous economic, social, and environmental benefits likely to arise from combatting climate change." One of the key proponents of the Green New Deal in the U.S., Representative Alexandria Ocasio-Cortez, of New York, has argued that a crucial step toward building a more just, more environmentally sustainable future is imagining what this future would look like. "We can be whatever we have the courage to see," she has said.

"Optimism is a choice," notes Christiana Figueres, the Costa Rican diplomat who led the effort to get the Paris climate accord approved.

"Do you know of any challenge that mankind has had in the history of humankind that was actually successful in its achievement that started out with pessimism, that started out with defeatism?" Figueres asked at a conference a few years ago. "There isn't one," she said, answering her own question.

O

"The gap between wishful thinking and reality is vast." So observes Vaclav Smil, a professor emeritus at the University of Manitoba. The observation could apply to almost anything; Smil, who has written more than a dozen books about energy and society, is concerned with the gap between the aspiration to fight climate change and the immense on-the-ground effort entailed in actually doing so. Studies that purport to show how the world could radically reduce or eliminate its carbon emissions by one date or another tend, he argues, to presuppose what they claim to be proving. To arrive at their foregone conclusions, they rely on a variety of unreliable assumptions—that existing technologies will be deployed at fantastic rates, or that nonexistent technologies will be deployed at fantastic rates, or that humanity's ever-growing appetite for energy will suddenly be curbed, or some combination of all three. Smil labels such studies "the academic equivalents of science fiction."

Everything I have written, from "despair" onward, is vulnerable to Smilian **objections**. Consider "flight." It's possible that, in a few years, Alias ferrying pallets of cargo will zip between regional airports. It's also possible that

electric passenger planes will one day make short hops, between, say, Boston and Hyannis. But that could be the limit. The world's best-selling passenger plane, the Boeing 737, can transport some two hundred people coast to coast. To electrify such a flight would require more than eight hundred tons' worth of current-generation lithium-ion batteries, or four hundred tons of lithium-ion batteries functioning at their maximum theoretical capacity. To get off the runway, though, a 737 can't weigh more than eighty tons, passengers and crew included. A recent paper by researchers at Carnegie Mellon concluded that the demands of larger aircraft lie beyond the "feasibility limits" of known battery technologies.

Or consider "green concrete." As promising as CarbiCrete may be, the niche it fills, much like the Alia's, is a narrow one. Since it has to be cured in chambers filled with concentrated CO_2, CarbiCrete can't be poured at a work site; it can be used only for pre-cast products, such as cinder blocks or patio tiles. Meanwhile, though the blocks and tiles absorb CO_2 as they harden, a great deal of CO_2 is released in the process of producing the slag that went into them; globally, the steel industry is responsible for roughly the same number of tons of emissions as the concrete industry—around three billion.

To say that amazing work is being done to combat climate change and to say that almost no progress has been made is not a contradiction; it's a simple statement of fact. At the time of the Rio summit, fossil fuels provided roughly eighty per cent of the world's primary energy. Thirty years later, fossil fuels still provide roughly eighty per cent of the world's primary energy. In the meantime, total global energy use has increased by almost two-thirds. As Smil puts it, "The inertia of large, complex systems is due to their basic energetic and material demands—as well as the scale of their operations."

P

The U.S.'s **power** grid has been called "the largest machine ever built by man." It comprises more than eleven thousand generating plants, more than six hundred thousand miles of high-voltage transmission lines, and some six million miles of distribution lines. Several recent studies claim to show that decarbonizing the grid in the nearish future is feasible. All of them, as per Smil, involve a certain amount of "science fiction"; they describe what is technically possible while glossing over the potential barriers to implementation. These barriers, though, are myriad. Some are economic, some are legal, some are logistical, some are political, and some, to paraphrase Polonius, are legal-logistical or economic-legal-logistical-political.

Q

Take what's been called the "transmission **quagmire**." To clean up America's grid, it's not enough to build new generating capacity, or even new generating capacity plus new storage capacity. Power has to be transported from places that have a lot of wind and sun to urban centers that use a lot of electricity. Decarbonizing the grid will, by one estimate, demand more than a million miles of new transmission lines, and the cost of stringing all these lines will, by another estimate, come to more than two trillion dollars. Managing such a gargantuan project would be difficult enough if someone were in charge. But thanks to the way the grid was put together—bit by bit, over many decades—jurisdiction over transmission lines is divided among an electoral map's worth of competing authorities.

Whenever lines cross state borders, the mire becomes particularly quaggy. In that case, each state's utility commission has to sign off. In some states, every affected county does, too. Then there are the local utility companies, which may, officially or unofficially, hold veto power.

"Let's say I'm a local utility, and you tell me all this low-cost power is going to come in from out of state with a new transmission line," Steve Cicala, an economics professor at Tufts, said to me. "My reaction is 'Absolutely not. It's a threat to my business model.' And a lot of public-utility commissions are pretty much captured by the local utilities."

The seven-hundred-and-twenty-mile Plains and Eastern Clean Line was supposed to link wind farms in Oklahoma to customers in Tennessee; it was killed by opposition from Arkansas. The Grain Belt Express was designed to run from southwest Kansas to Indiana; it's been delayed for a decade thanks to resistance from Missouri. The TransWest Express is intended to bring wind power from Wyoming to cities on the West Coast; construction has been held up for years, in good part owing to a single litigious family in Colorado.

Northern Pass was a transmission line designed to bring hydropower from Quebec to Massachusetts via New Hampshire. After New Hampshire rejected the project, in 2018, Massachusetts announced that it would try going in a different direction. It would build a line, dubbed New England Clean Energy Connect, that would cut through Maine instead. Work on NECEC was already under way when, in the fall of 2021, Maine voters approved a referendum effectively killing it. Much of the money spent on campaigning in favor of the referendum—and against NECEC—was supplied by NextEra, which owns the Seabrook Nuclear Power Plant, a potential competitor to the hydro project.

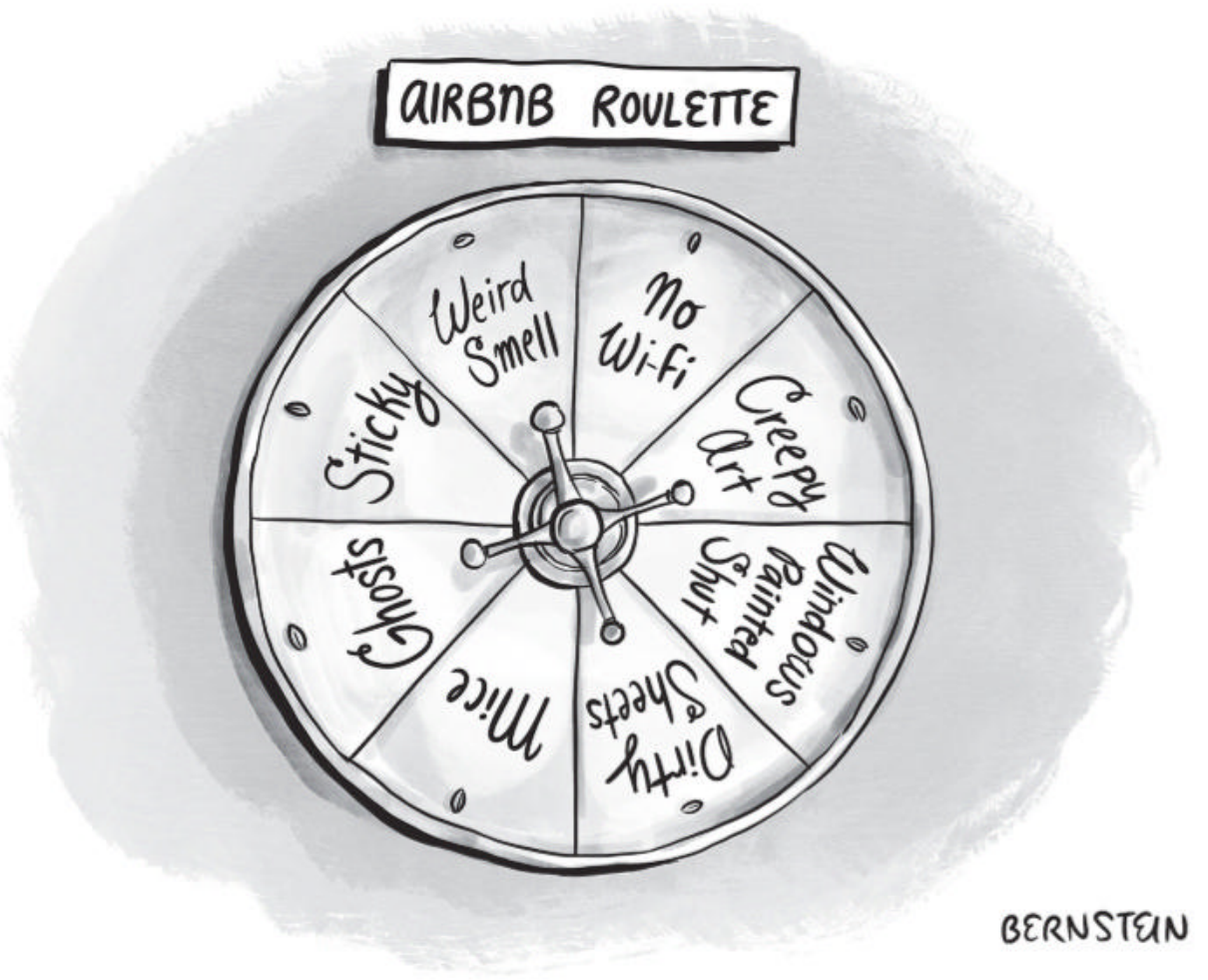
R

Reaching net zero in the U.S. will require putting such wrangling aside. It will require building out the transmission system while, at the same time, expanding its capacity so that hundreds of millions of cars, trucks, and buses can be run on electricity. It will require installing tens of millions of public charging stations on city streets and even more charging stations in private garages. Assembling the electric cars and trucks will, in turn, necessitate extracting nickel and lithium for their batteries, which will mean siting new mines, either in the U.S. or abroad. The new cars and trucks will themselves have to be manufactured in an emissions-free manner, which will involve inventing new methods for producing steel or building a new infrastructure for capturing and sequestering carbon.

The list goes on and on. The fossil-fuel industry will essentially have to be dismantled, and millions of leaky and abandoned wells sealed. Concrete production will have to be reëngineered.

The same goes for the plastics and chemicals industries. Currently, ammonia, a critical component of fertilizer, is produced from natural gas, so the fertilizer industry will also have to be refashioned. Practically all the boilers and water heaters that now run on oil or gas, commercial and residential, will have to be replaced. So will all the gas stoves and dryers and industrial kilns. The airline industry will have to be revamped, as will the shipping industry. Farming is responsible for roughly ten per cent of America's greenhouse-gas emissions, mostly in the form of nitrous oxide and methane. (Nitrous oxide is a by-product of fertilizer use; methane is released by rotting manure and burping cows.) Somehow, these emissions, too, will have to be eliminated.

All of this should be done—indeed, *must* be done. Officially, the U.S. is committed to reaching net zero by 2050. But a task of this scale has never been attempted before. Zeroing out emissions means rebuilding the U.S. economy from the bottom up. Perhaps Americans recognize this, perhaps not. In early July, at a time when much of the country was baking in ninety-five-degree-plus heat, the *Times* took a poll of registered voters. Asked to name the most important problem facing the nation, twenty per cent of the respondents said the economy, fifteen per cent said inflation, and eleven per cent said partisan divisions. Only one per cent said climate change. Among registered **Republicans**, the figure was zero per cent.



• • •

And what goes for the U.S. goes for the rest of the world. China is currently the world's biggest emitter on an annual basis. It has said that it will reach net zero by 2060. In the early months of 2022, Beijing approved five enormous new coal-fired generating plants. In August, when a punishing drought cut into hydropower production along the Yangtze River, the country hit a new record for daily coal consumption. Climate Action Tracker, an independent research group based in Berlin, rates China's climate policies as "highly insufficient" and notes that the country has recently "reneged" on promises to shift away from coal.

India, which is now the world's third-biggest emitter—one rung behind the U.S.—has declared that it will reach net zero by 2070. Meanwhile, its emissions are rising fast. This past spring, when India was hit with a devastating heat wave and power use surged, its Coal Ministry announced plans to reopen a hundred mines that had been closed as unprofitable.

Russia is the world's fourth-largest emitter. It is aiming, on paper at least, to reach net zero by 2060. But it has taken almost no action to rein in its emissions, and this seems unlikely to change anytime soon. In 2003, President Vladimir Putin joked that warming would enable Russians to "spend less on fur coats"; more recently, he has blamed climate change on "some invisible shifts in the galaxy."

The European Union's pledge to hit net-zero emissions by 2050 is written into E.U. law. But, after Russia cut gas deliveries to the bloc, several countries, including Germany and the Netherlands, announced plans to fire up old coal plants or extend the lives of plants that had been slated to close. "The war in Ukraine is putting climate action on the back burner," the U.N. Secretary-General, António Guterres, lamented last month. A recent study by a consortium of research institutes in Europe and the U.S. concluded that only five per cent of the hundred and twenty-eight countries that have set the goal of reaching net zero have taken the requisite first steps. It found an "alarming lack of credibility" to most of the commitments.

The broken promises extend in all directions. At last year's COP, held in Glasgow, a hundred and forty countries vowed to put a stop to "forest loss," another major source of greenhouse-gas emissions. (A single full-grown tree can store as much as seven tons of carbon.) Among the signatories of the declaration was Brazil; in the six months following the conference, deforestation rates in the country soared to new highs.

The Democratic Republic of the Congo also signed the forest pledge. In July, the D.R.C. announced that it was opening thirty huge tracts, encompassing an estimated twenty-five million acres of rain forest and two million acres of peatlands, to oil and gas exploration. (Some of the tracts overlap Virunga National Park, a refuge for critically endangered mountain gorillas.)

Then there are the pledges of financial support. The hundred billion dollars a year promised in Copenhagen to

"I can't believe it's only four-thirty and it's already dark, the year's already almost over, and I'm already in my forties."

developing nations have yet to materialize. By some estimates, the **shortfall** runs to twenty billion dollars a year; by others, it's four times that amount.

"To be charitable, this is a manifestation of the inability of the developed countries to deliver," Saleemul Huq, the director of the International Centre for Climate Change and Development, in Dhaka, Bangladesh, told me. "To be uncharitable, they just don't give a damn. Unfortunately, the uncharitable interpretation seems to be more valid."

The Institute for Exercise and Environmental Medicine, in Dallas, offers a hyperbaric chamber where divers can recover from the bends, a pool equipped to continuously measure swimmers' oxygen use, and a climate-controlled vault that can be programmed to test the limits of human endurance. Not long ago, I swallowed a thermometer the size of a pill and had myself sealed in the vault.

Formally known as the environmental chamber, the vault resembled a walk-in freezer, with metal walls and a pressed-metal floor. Pretty much every available surface was occupied by machinery—computer screens, thermocouples, an electrocardiogram monitor, a treadmill, and a sort of stationary bicycle that looked like a suitcase with pedals. In the center sat a lawn chair, which a technician indicated I should take.

With me in the chamber was a researcher named Josh Foster. Before he allowed me to enter the vault, Foster had asked for a urine sample—a first in my reporting career. He'd also stuck some electrodes on my chest and performed an ultrasound scan of my heart, which, he said, was unusually low and hard to find.

Foster, who is British, is interested in the effects of extreme heat on the body. To this end, he creates miniature heat waves and solicits volunteers to sweat their way through them. On the day I volunteered, the temperature in the vault was a hundred and six degrees and the humidity forty per cent.

"Temperature regulation is one of the most important variables the body will try to protect," Foster told me. "Because as soon as you start to stray from what's normal, outside of a given quite small range, our ability to tolerate that is very, very low."

Once a topic of marginal academic interest, the physiology of heat stress is now a subject of widespread practical concern. According to a recent study, two hundred and seventy-five million people around the globe are subjected to life-threatening **temperatures** at least one day a year, and this number could easily grow to eight hundred million by the middle of the century. According to another recent study, the incidence of "extreme humid heat" has doubled in the course of the past forty years. Some parts of the world, particularly in South Asia and around the Persian Gulf, are already experiencing temperatures close to the human "survivability limit." This past summer, heat record after heat record fell. In Pinhão, in northern Portugal, temperatures topped a hundred and seventeen degrees. In Sacramento, California, the mercury hit a hundred and sixteen degrees. Yanjin City, in southwestern China, saw a hundred and eleven; Abilene, Texas, a hundred and ten; and London a hundred and four.

The human body reacts to such temperatures by sweating and directing more blood toward the skin. Problems arise when people become dehydrated, or their hearts get overtaxed, or it's just so sweltering that they can't dissipate enough heat. The elderly are particularly vulnerable to heat stress, Foster told me, because they sweat less than young people, and their hearts don't pump as efficiently. (Humidity impedes the evaporation of sweat, which is why extreme humid heat is so dangerous.) One consequence of prolonged heat exposure can be a kind of blood poisoning.

"Increased blood flow to the skin means that less blood is being directed toward the gut," Foster explained. "And, if that happens for a long enough time, it can damage the cells that line the gut, and bacteria that are normally housed in the gut can leak out. It's basically the same as having sepsis." The heat wave that affected most of Europe this past summer is estimated to have killed more than fifteen thousand people.

Sitting in the environmental chamber, with the pill-size thermometer in my stomach, would, I hoped, be edifying without being too edifying. Until the U.S. and the other big emitters reach net zero—indeed, until the entire world reaches net zero—the planet will continue to warm. What is the future we're creating actually going to feel like?

Every quarter of an hour, I was supposed to ride the stationary bicycle for five minutes; this was to simulate the sort of effort a person would have to make in the course of completing ordinary household chores. I started off strong but after a few rounds began to flag. The humidity made the air seem strangely solid. I tried to imagine what it would be like to perform real work under these conditions but found it difficult to hold on to a thought.

A few days later, when I got back home, Foster sent me the data that had been collected by the various instruments. I had sweated out almost a pint of water every hour. My heart rate had increased by thirty beats a minute and the blood flow through my brachial artery had more than tripled. Despite all the (admittedly involuntary) effort I had made to thermoregulate, my core temperature had risen to a hundred degrees.

U

During the past billion years, the Earth's temperature has fluctuated wildly. Around seven hundred million years ago, in the period known as the Cryogenian, the entire planet was covered with ice. "Snowball Earth" thawed, only to be plunged into another global glaciation. About ninety million years ago, during what's known as the Cretaceous Thermal Maximum, breadfruit trees grew in northern Greenland and the tropical oceans were as toasty as a hot bath. In our own period, the Quaternary, the swings have been spectacular; at least twenty times in the last two and a half million years, glaciers have pushed south from the Arctic and then retreated again. The ice ages themselves were marked by dramatic temperature oscillations. The last one, which ended about twelve thousand years ago, went out, in the words of one glaciologist, in a "drunken stagger."

You can't prepare for a future you can't imagine. The trouble is, it's hard to picture the future we are creating. As the climate swings of the past suggest, even subtle and gradual forces—tiny variations in the Earth's orbit, for example—can have world-altering consequences. And what we're doing now is neither subtle nor gradual. In little more than a century, humans have burned through coal and oil deposits that took tens of millions of years to create.

Climate change is characterized not just by **uncertainty** but by something risk analysts call "deep uncertainty." There are known unknowns to worry about, and unknown unknowns.

V

Climate surprises keep popping up. Starting in 2007, for example, methane levels in the atmosphere took an unexpected jump. Methane is a far more potent greenhouse gas than CO_2, so scientists were alarmed. They eventually figured out, on the basis of the methane's isotopic composition, that the source of the increase couldn't be fossil-fuel production, even though oil and gas wells often leak methane into the air. Instead, the culprit must be microbes, either the sort that live in a marsh or the sort that live in a cow's gut. Recent research suggests that the bulk of the extra methane is coming from the Sudd, a huge wetland in South Sudan, and that warming itself is responsible for the uptick in microbial activity. If that's the case, then a spiral is likely to ensue: more methane will produce more warming, which will produce yet more methane, and so on.

How many positive feedback loops like this have already been—or are about to be—initiated? Despite the best efforts of climate modellers, no one can say. Several enormous Antarctic glaciers rest on bedrock that's below sea level; as these glaciers retreat, water is starting to seep underneath and to melt them from the bottom up. This, in turn, is leading to more retreat and still more melting. One retreating glacier, formally known as Thwaites, has informally become known as the Doomsday Glacier. A recent paper in *Science* observed that the "eventual collapse" of Thwaites, which is the size of Florida, "may already be inevitable." Even after global emissions reach net zero—whenever that is—ice sheets will continue to melt and sea levels to rise for hundreds or perhaps thousands of years.

All the way back in 1965, the authors of one of the first reports on global warming, which was not yet known as global warming, warned that humanity was "unwittingly conducting a **vast** geophysical experiment." As Marcia Bjornerud, a geologist at Lawrence University, has written, the irony of our oversized impact on the Earth is that we have "put Nature firmly back in charge, with a still-unpublished set of rules we will simply have to guess at."

W

The National Oceanic and Atmospheric Administration tracks **weather**-related disasters in the U.S. that cause more than a billion dollars' worth of damage. According to NOAA, in the nineteen-eighties the U.S. saw an average of three such disasters per year. In the nineteen-nineties, the average was five per year; in the two-thousands, it was six; and in the twenty-tens it jumped to twelve. (The figures have been adjusted for inflation.) In 2020, a record-shattering twenty-two disasters costing more than a billion dollars struck the country. This year is nearly on pace to match that record, with fifteen such disasters by October, including Hurricane Ian, which is likely to prove one of the most expensive storms in American history. Adam B. Smith, a NOAA researcher, has written that a disastrous number of disasters "is becoming the new normal." The rise is partly a function of more people living in vulnerable areas, such as floodplains. But increasingly it's a function of climate change.

In the future, the costs may climb steeply or they may climb precipitously. All our infrastructure has been built with the climate of the past in mind. Much of it will have to be rebuilt and then, as the world continues to warm, rebuilt again.

To protect the Houston area (and its many petrochemical plants) from rising

seas and storm surges, the U.S. Army Corps of Engineers is planning to erect a huge system of gates at the mouth of Galveston Bay. The price tag for the project, known as the Ike Dike, is estimated at thirty billion dollars. Norfolk, Virginia, is hoping to stave off the water with a $1.5-billion series of barriers, levees, and tidal gates, and Charleston, South Carolina, is looking to build a billion-dollar floodwall. Some places—large swaths of Miami, for instance—may prove impossible to defend, meaning that real estate now valued in the hundreds of billions of dollars will have to be written off.

X

One of climate change's many compounding injustices is that the highest costs will be borne by those who have contributed the least to the problem. Several low-lying island nations, including Tuvalu and Kiribati, are destined simply to disappear. In Bangladesh, some two thousand people arrive every day in the capital, Dhaka, many driven by storms or rising seas that have made village life difficult. In Pakistan, this past summer, flooding caused by supercharged monsoon rains killed a thousand people and forced six hundred thousand more into relief camps.

In 2016, the United Nations High Commissioner for Refugees estimated that, globally, an average of twenty-one million people were being displaced by weather-related events every year. The U.N.'s International Organization for Migration has projected that by 2050 as many as a billion people may be on the move. In the coming decades, "huge populations will need to seek new homes," Gaia Vince, a British journalist, has written. Either "you will be among them, or you will be receiving them."

Almost as much as climate change itself, this great displacement will test national and international institutions. One possibility is that climate refugees will be welcomed. This could happen because it's the right thing to do, or it could happen for less high-minded reasons. As Akka Rimon, a former foreign secretary of Kiribati, has observed, "Countries like Australia need workers," while the citizens of countries such as Kiribati will soon need a different place to live. These needs are complementary. The E.U., too, faces a labor shortage. A communiqué issued by the European Commission in April noted that there's a strong "economic case" for allowing in more legal immigrants, especially since "the transition to a climate-neutral economy" will require "additional labour and new skills." Climate migrants could play a key role in decarbonization, providing a new kind of win-win narrative.

Another possibility is that climate migrants, like millions of migrants before them, will be despised. Rich countries—including those in the E.U.—will try to keep refugees out, and those who manage to slip in will be herded into camps. In an effort to gain power, right-wing politicians will vilify them, and this will encourage yet more racism and **xenophobia**—a social feedback loop. Giorgia Meloni, who recently became Italy's Prime Minister, has said that her country ought to "repatriate the migrants back to their countries, and then sink the boats that rescued them."

Both the effort to limit climate change (by replacing the world's energy systems) and the effort to adapt to climate change (by erecting dikes and seawalls) will take place in the context of climate change, which is to say as cyclones, drought, fire, and sea-level rise force millions of people to flee. It's possible that cascading crises will accomplish what thirty years of climate negotiations have not, and unite the world to seek the best way forward. Or it's possible that the same forces that have prevented coöperation in the past—nationalism, corporatism, sectarianism, fear—will, under the stress of climate change, only intensify.

"Let me look at your hand."

Y

So far, average global temperatures have risen by 1.1 degrees Celsius—two degrees Fahrenheit—and the budget for 1.5 Celsius is nearly gone. How hot will it get? Will temperatures climb two degrees Celsius? 2.5? Three? A study published a few years ago, by Veerabhadran Ramanathan, a climate scientist at the Scripps Institution, and Yangyang Xu, of Texas A&M, defined a temperature increase of 1.5 degrees as "dangerous," an increase of three degrees as "catastrophic," and an increase of five degrees as "unknown, implying beyond catastrophic." A second study, by a group of American and European researchers, determined that, if we were to burn through all known fossil-fuel reserves, global temperatures could rise by as much as eleven degrees Celsius, or twenty degrees Fahrenheit. (How humanity could keep the oil flowing even as the world drowned and smoldered was a question the researchers did not address.)

There are good reasons to opt for optimism. (See "narratives.") It could be argued that the passage of the Inflation Reduction Act this past summer was possible only because so many people believed in a better future.

At the same time, there are good reasons to wonder whether optimism lies at the heart of the problem. For the last thirty years—more if you go back to 1965—we have lived as if someone, or some technology, were going to rescue us from ourselves. We are still living that way now.

"**You** can't just sit around waiting for hope to come," Greta Thunberg observed in a speech scolding E.U. politicians. "Then you're acting like spoiled, irresponsible children. **You** don't seem to understand that hope is something **you** have to earn."

Not long ago, I rented a car in Las Vegas and drove out to Hoover Dam. There I signed up for a tour that began with an educational video. Construction of the dam, the narrator of the video intoned while grainy black-and-white footage jittered across the screen, entailed pouring more than three million cubic yards of concrete. Put to a different use, this much concrete could pave "a four-foot-wide sidewalk around the earth's equator." When the dam was completed, in the middle of the Depression, it "gave new life to the desert Southwest" as well as "to the nation's spirit." The Colorado River began backing up behind the massive structure to form Lake Mead, the country's largest reservoir, which can store enough water to "cover the entire state of Pennsylvania to the depth of one foot."

After the video, my tour group took an elevator down thirty stories, into the dam's hydroelectric plant. Here we were regaled with more facts: Hoover Dam is equipped with seventeen generators—eight on the Nevada side of the river and nine across the border, in Arizona. Each generator can produce enough electricity—a hundred and thirty megawatts—to power sixty-five thousand homes. Each contains five miles' worth of copper wire and a hundred and sixty tons' worth of electromagnets. The tour ended on an observation deck where an audiotape of yet more dam-related facts—the structure weighs 6.6 million tons and is twelve hundred and forty-four feet long—was issuing from a loudspeaker. The narrator of the audiotape sounded an awful lot like the narrator of the video. "It has been said that in the shadow of Hoover Dam one feels that the future is limitless, that we have in our grasp the power to achieve anything, if we can but summon the will," he concluded. Then the tape started over.

The Colorado River basin has been called "ground **zero** for climate change in the United States." If this is the case, then Hoover Dam might be described as ground zero's ground zero. Since 1998, the basin has been stuck in a drought; this drought has lasted so long and grown so deep that it's now routinely referred to as a megadrought.

From the observation deck, the drought's effects are scarily apparent. An abandoned dock lies, in pieces, high above the lake's edge. Instead of being submerged, the power plant's four intake towers stick up into the air, like lighthouses. The steep walls of the reservoir, which in pre-dam days formed Black Canyon, are lined with an enormous white stripe—a geological oddity known as the bathtub ring. The ring, composed of minerals deposited by the retreating water, runs as straight as a ruler, mile after mile. At the start of the drought, the stripe was as high as a giraffe. By 2015, it had grown as tall as the Statue of Liberty. This past summer, it had reached the height of the Tower of Pisa.

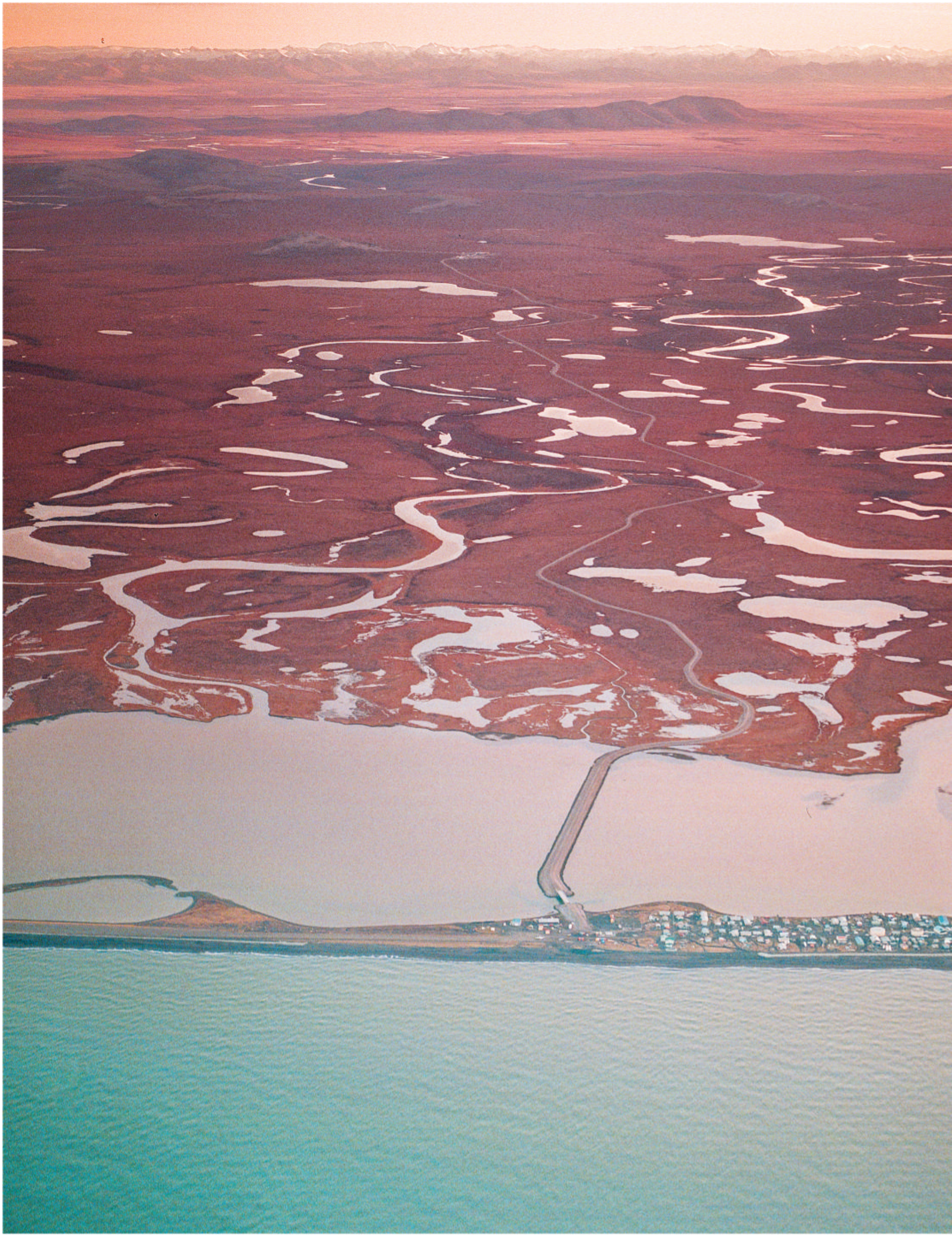
I had wanted to talk about the dam, the megadrought, and the future of the Colorado basin with a representative of the Bureau of Reclamation, which built and still operates Hoover Dam. But when I got in touch with the bureau's office in Boulder City, Nevada, a town created to house the workers who erected the dam, I was told that no one there was giving interviews. I was, of course, welcome to take a public tour. I ended up taking two. On the first, no mention was made of the drought; on the second, I tried to force the issue. I asked the guide whether she got any questions about Lake Mead, which is now only about a quarter full. She said she did, but she wasn't supposed to answer them. "We're not to comment too much on it," she told me.

"You know, I haven't been on the lake at all this year," she added. "It's just sad when I go out there. It's a little depressing. To save my sanity, I don't go." Lake Mead used to be lined with boat launches; most of these are now closed.

The construction of Hoover Dam was authorized in 1928, just a year after Svante Arrhenius died. The project reflects the same faith in progress that he held to—a faith in humanity's power to improve on nature. This is still the faith that the Bureau of Reclamation is pushing even as the logic of the dam comes undone. In April, the reservoir dropped so low that one of the intake pipes for Las Vegas, which gets practically all its water from Lake Mead, poked above the surface. In August, the Interior Department announced what's officially called a Tier 2a shortage; the shortage means that Arizona's water allotment for next year will be cut by almost two hundred billion gallons and Nevada's by eight billion gallons. Owing to the shortage, the dam's seventeen turbines operate only sporadically.

Following my second tour, I climbed back up to the observation deck for a last look around. It was almost noon, and the desert sun was high overhead. A couple of tour groups came and went as the tape played in the background: "In the shadow of Hoover Dam, one feels that the future is limitless . . . limitless . . . limitless." What I felt standing in the dam's shadow was something different.

Climate change isn't a problem that can be solved by summoning the "will." It isn't a problem that can be "fixed" or "conquered," though these words are often used. It isn't going to have a happy ending, or a win-win ending, or, on a human timescale, any ending at all. Whatever we might want to believe about our future, there are limits, and we are up against them. ♦



Kivalina, a barrier island north of the Arctic Circle, is one of seventy-three Alaska Native villages threatened with destruction

because of climate change.

PHOTOGRAPHS BY ASH ADAMS

A REPORTER AT LARGE

THE COMING STORM

An Alaskan town is losing ground—and a way of life.

BY EMILY WITT

Typhoon Merbok began forming in the central Pacific Ocean during the second week of September. Fuelled by unusually warm waters, the storm system moved north and east toward Alaska, and by the time it crossed the Aleutian Islands weather buoys were recording forty-foot waves and winds of seventy-five miles an hour. On September 17th, Merbok, which had been downgraded to an extratropical storm, reached the Yukon-Kuskokwim Delta and the Bering Sea inlet of Norton Sound, one of the strongest storms to hit the area in fifty years. In the barrier village of Shaktoolik, Merbok wiped out a protective berm. In Golovin, streets were flooded with seawater and sewage. A house floated up a river in Nome, and a sixty-two-pound mammoth femur was unearthed near Elim.

As Merbok headed north, residents of Kivalina, an Inupiat village of about four hundred and fifty people situated on a fragile barrier island eighty-three miles north of the Arctic Circle, received a National Weather Service report, warning of winds of up to sixty-five miles an hour. On Friday, Janet Mitchell, a village elder and a field reporter for Kivalina's volunteer team of first responders, drove out to the beach on her four-wheeler with her phone. Mitchell posts videos on TikTok and Facebook under the name Storm Swan. That afternoon, Mitchell recorded video of the rising waters of the Chukchi Sea and the sound of roaring wind. "Oofta!" she captioned her footage. "Batten down the hatches!"

For years, Kivalina has been cited—like the Maldives, in the Indian Ocean, or the island nation of Tuvalu, in the Pacific—as an example of the existential threat posed to low-lying islands by climate change. In the past two decades, stormwaters have overtopped Kivalina at least once, threatening lives and infrastructure. In 2003, the Government Accountability Office reviewed nine Alaskan villages and identified Kivalina as one of four in "imminent danger." (Of those four, only one, Newtok, a Yupik village near the Bering Sea, has been able to move some of its residents.) A more recent report designated Kivalina as one of seventy-three Alaska Native villages threatened with destruction because of erosion, flooding, and permafrost degradation. On a visit to the state in 2015, President Barack Obama flew over Kivalina and posted a photograph of the island on social media from the air. "There aren't many other places in America that have to deal with questions of relocation right now," Obama wrote, "but there will be." He described what was happening in the village as "America's wake-up call."

Seven years later, Kivalina's move is still mostly in the future, even though the island continues to lose ground. Building housing is an expensive and laborious process in the remote Arctic, and no single federal agency is responsible for relocating communities facing environmental threats. After more than a decade of navigating government bureaucracies, tribal members successfully lobbied for the construction of a bridge from Kivalina to the mainland. Its completion, in 2021, created a vital evacuation route where once the only possibility of escape was by water or air. The bridge is part of an eight-mile road that zigzags across the tundra, which is covered in snow in winter and prone to flooding in spring and fall. It ends at the foot of a large hill, where a newly constructed school forms the heart of the future village. More years are likely to pass before homes are built there, even as engineers predicted, in 2013, that Kivalina

will be fully under water by 2025. The new site is a desolate and rocky place, but, at an elevation of a hundred and twenty-five feet, it is a safe distance from Kivalina's receding beach and eroding riverbanks. Until the community can move inland, residents live with the worry that the right storm at the right moment could wipe out everything.

With Merbok, at least, the waters of the Kivalina Lagoon, which separates the island from the mainland, rose but did not flood their banks. A rock revetment, completed in 2010 on the island's sea side, held strong. On the lagoon side, Janet Mitchell recorded footage of a bulldozer shoring up a house at risk of losing its foundation, then posted a glimpse of calm seas. Kivalina had made it through one more storm.

I arrived in Kivalina a few days after Merbok. The commercial jet from Anchorage to the Arctic city of Kotzebue carried a mixture of Alaska Native families, seasonal mine and construction workers, and engineers wearing canvas pants and XTRATUF boots. The plane to Kivalina was a vintage Cessna, and the passengers sat in a single column on its right side. The seats on the other side were loaded up with cases of Pepsi and boxes of Puffs Ultra Soft tissue. Like dozens of similarly isolated villages, Kivalina is not accessible to the rest of Alaska by road or connected to a regional electric grid. Electricity is produced by a diesel generator, and fuel is delivered by barge before the sea ice forms. For the rest of the year, everything arrives by air.

We hugged the shoreline as we flew north above the treeless expanse of the tundra, with its boggy tuffets, its sinkholes and ponds, its snaking rivers, the places where the black soil of the permafrost has crumbled into the sea. At times, the tundra's agatine surface took on an almost fractal pattern of brown, gold, and green. Midway through, we passed over a cluster of red and white storage buildings by the sea. This was the port from which the Red Dog Mine, one of the largest producers of zinc concentrate in the world, has shipped millions of tons of processed ore since it opened, in 1989. Its haul road—which runs from the De Long Mountains to the port—was the only rectilinear imposition across the vast landscape.

After thirty minutes, the village of Kivalina appeared: eighty-odd houses spread across twenty-seven or so acres on the bulbous southern end of a barrier island between the mouths of the Kivalina and the Wulik Rivers. The island, which stretches five and a half miles, is only seven hundred feet wide in most places, and maxes out in altitude at ten feet above sea level.

The Cessna flew over the village, then banked, circled, and nosed into an easy descent onto Kivalina's gravel runway. Several all-terrain vehicles and a pickup truck were waiting in a spitting rain. The passengers got off, the boxes of goods were passed down, then the pilot climbed back into his seat, turned his propellers on, and flew away.

"We used to hibernate, but then we got the matching scarves."

One afternoon, I set off to visit Janet Mitchell at her house, a wooden building in the center of the village. It was a brilliantly sunny day, with clear skies and temperatures in the mid-forties. The equinox had just passed; the snow that blankets the island for most of the year had not started falling, but the change of seasons was in the air. I walked past houses with snowmobiles parked haphazardly outside, and dogs chained to fenceposts. A family were putting away a harpoon, used to hunt beluga in the summer, and readying their boat for seining, the net fishing that happens in the fall. Another family rolled past on A.T.V.s. They were bundled up in parkas, with rifles strapped to their backs, heading inland to look for moose and caribou. (Before the bridge was built, people had to travel upriver by boat to hunt in the interior.)

The caribou, part of the Western Arctic herd, were late showing up this year, a much discussed subject in the village. The seining had also been delayed. In Kivalina, fish are traditionally left to age on the riverbanks for at least several days before being eaten or stored in freezers. ("The Western people call them stinky fish," a villager explained to me, "but here we call them ambrosia.") If the fish are caught too early in the season, before the frost, they spoil. The fall had been warm, and the thin layer of ice known in Inupiat as *qinu*, which used to begin forming over the lagoon in late August, had not yet appeared by the last week of September. The puddles in the road which froze overnight would melt by midmorning.

Mitchell, who has gray hair and a friendly demeanor, welcomed me into her living room. Dressed in a black T-shirt and sweats, she was seated on a couch beneath a large photograph of her grandfather Clinton Swan, a whaling captain, a member of the tribal council, and a minister in the Episcopal Church, from whom she had inherited the house. In the picture, the elderly Swan looks dapper in a red lumberjack shirt, suspenders, and nineteen-fifties-

style glasses with black-topped rims; in his left hand, he holds a small whale's tail carved out of walrus ivory. The Swans are one of several families who are active in village politics. (Captains of whaling crews, which are typically organized by family, are also integral to the community, even though a bowhead whale has not been caught in Kivalina in more than two decades.) Above the photograph, wolf and wolverine furs were draped over a clothesline—they belonged to Mitchell's mother, who died in 2019. A computer and headphones lay on a coffee table, and on a shelf was a large pile of hard drives, evidence of Mitchell's years of digital documentation, which include audio recordings with older relatives and video footage of major storms.

Mitchell grew up in a sod house on the site of the house she now lives in, part of a multigenerational compound presided over by her great-grandmother Regina, who was born in 1870. In the summer, the family would move into tents on the beach, where it was much cooler. It is common in Inupiat families for grandparents to adopt a grandchild to help them around the house as they age. When Mitchell was eight or nine, her grandmother chose her to come live with her and her husband, just as today Mitchell's grandson Aaron lives with Mitchell. Her youth was one of physical labor—chopping wood, lugging ice, and hanging the slabs of *ugruk*, or bearded seal, that her grandmother butchered. Mitchell's family followed the subsistence food-gathering patterns of the seasons, and in the spring she would sometimes join her father's whaling crew at their encampment on the ice, to hunt bowhead whales. Mitchell reminisced about the years when the arrival of *qinu* marked the time to dig whale out of underground caches, "the permafrost freezers, if you will," she said. "That's when they would pull out the *maktak* and distribute it to the whole village. They always waited for *qinu*."

According to oral histories recorded in the late nineteen-sixties and early nineteen-seventies, the region that Kivalina occupies today was known in the nineteenth century as Kivalliñiq, and the people who inhabited the area, the Kivalliñigmiut, were considered their own nation. Until the mid-nineteenth century, they had only minimal contact with Westerners. Then American whalers came to the region, decimating the bowhead and walrus populations and contributing to the spread of deadly epidemics. The Kivalliñigmiut nation was scattered by famine in the early eighteen-eighties, but for Mitchell's great-grandmother's generation the barrier island of Kivalina remained a summer base from which to hunt marine mammals: *ugruk*, walrus, and beluga whales. In late summer and fall, when the caribou arrived and fish migrated upriver, families would travel inland, setting up camp with winter supplies of meat and oil.

Kivalina remained a sparsely populated seasonal hunting ground until 1905, when the federal government constructed a school there. Like many Alaska Native villages situated on shorelines and riverbanks around the state, Kivalina was presumably chosen because of its accessibility by water. The government, in mandating the attendance of the region's children, began a project of forced settlement in a place that was seen as precarious from the outset. Mitchell maintains a history of Kivalina on a Web site, which references the oldest known written request for relocation. A teacher named Clinton S. Replogle wrote an official report in 1911: Kivalina "is very beautifully situated when the weather is nice and calm, but when the wind blows from the south it raises the water in the ocean until it sometimes almost comes over the banks. . . . We believe that to move would be the wiser if not the safer plan."

The subject of relocation was raised again many times during the next century. In 1963, the tribe voted on the issue, and a split vote resulted in the community's staying on the island. It was in the nineteen-seventies that the village's wooden houses replaced the sod ones. There were other changes, too. Snow machines (as snowmobiles are known in Alaska) replaced dogsled teams. Outboard motorboats and Hondas (regional shorthand for the four-wheel A.T.V.s that everyone in Kivalina uses to get around) replaced skin boats. Stove oil replaced driftwood for heat. An airstrip, completed in 1960, connected Kivalina by air to the rest of Alaska and beyond. Electrification arrived in 1971.

Today, Mitchell works as the shareholder-relations coördinator in Kivalina for the NANA Regional Corporation, which is owned by Inupiat shareholders who live or have roots in Northwest Alaska. The corporation was formed after the passage of the Alaska Native Claims Settlement Act, in 1971, which ceded some forty million acres of land in Alaska to Native-owned corporations (in exchange for their relinquishing claims over the rest) and offered Native Alaskans a stake in the sale of oil and mineral leases on their land. The act gave Native Alaskans greater self-determination, but it also linked their economic well-being to the commercial exploitation of their lands.

By the nineteen-nineties, as the population grew, discussions about relocation in Kivalina focussed more on overcrowded homes and a lack of water and sewer systems. But in the early two-thousands a series of weather events made the need to move a matter of urgent survival. It has become a well-known fact that the Arctic is warming nearly four times faster than the rest of the planet, making the weather increasingly unfamiliar. Some shifts were gradual, like the loss of sea ice: according to one study, the ice-free period in the Chukchi Sea increased from three months to five months between the nineteen-eighties and the early two-thousands. Others were sudden: Mitchell recalls the first time she saw lightning over the village, around 2010. (Lightning needs warm air to form.) "We were running outside because we didn't know any better," she said. "We had never seen lightning before." When she submitted a video still to the local weather station, she was asked if it was real. Thunderstorms have now become more common.

Mitchell is one of many village residents who cite as a turning point October, 2004, when forty feet of shoreline eroded during a single storm. "It

was pretty intense, man," she said. "The water was coming to the school. The principal's trailer was on the ocean side, and it was hanging over the edge." Two years later, the village built an emergency erosion-control barrier, but a storm later destroyed it, with water coming within six feet of the electricity plant's oil tanks.

Mitchell still remembers the day in 2005 when, at the height of summer, the temperature, which typically averaged in the mid-fifties at that time, topped ninety degrees. "I don't recall anyone making a big deal out of it, but this is the freaking Arctic!" she told me.

Between 1992 and 2010, the village's tribal administrator was Mitchell's older sister, Colleen Swan. Mitchell is in awe of her sister, whose advocacy, forming connections with activists in the Lower Forty-eight and welcoming journalists who wanted to visit, helped put Kivalina's climate-change story on the map. It was Swan, Mitchell told me, who encouraged the villagers to document the weather. The previous day, I had met Swan in the offices of the Kivalina City Council, where she was doing volunteer work for the Fire Department and the search-and-rescue team. Where Janet is open and vivacious, Colleen is more taciturn. Swan described the 2004 storm as the impetus for her desire to hold someone responsible for the situation Kivalina finds itself in. "I wanted to file a lawsuit against someone so bad for that land failure," she told me. "Our elders were saying they've never seen anything like that."

In 2008, seven years after Swan met Luke Cole, a lawyer from the Center on Race, Poverty, and the Environment, in Kotzebue, the village sued a consortium of twenty-four oil, energy, and utility companies, alleging damages from climate change. The court dismissed the lawsuit, citing, among other reasons, the difficulty of holding companies responsible when "virtually everyone on Earth is responsible on some level for contributing to such emissions." The lawsuit also alleged that the companies had conspired to mislead the public about the impact of fossil fuels. For Swan, it was important to make the statement that Kivalina understood the forces that had put it in such a precarious position. "We're more educated now than our people ever were in the past," Swan said. "We have access to news, we have the education we need." And, she added, "it was not our people's decision to move to this little sand spit."

In Kivalina, I stayed at an after-school club, which, in the absence of a hotel or a guesthouse, has a spare room for visitors. The island has no playground, and the BnG, as the club is known, gives kids a warm and informal place to hang out after school. It has an Xbox, games, books, and a basketball hoop. Hand-painted signs on the wall read "DO NOT BULLY BE NICE" and "BE GOOD, GOD IS WATCHING." When school let out, the children arrived in shifts, the younger ones in the afternoon and high schoolers during the evening. In the morning, when the BnG was empty, I would lie in my sleeping bag and listen as crosstalk came through on a VHF radio, which acts as a kind of Facebook wall—a place for villagers to exchange birthday wishes, ask if anyone is selling moose meat, or announce that the Pepsi shipment has come in.

"Where you're walking, it used to be graves," a woman said to me one morning, as I let myself out of the clubhouse. She explained that the black gravel road on which we had stopped to chat was built on the village's former cemetery; as the island lost width through the years, a new cemetery opened near the airstrip.

I was heading to a meeting of the Kivalina IRA Council. IRA is the acronym for the Indian Reorganization Act, which, in 1936, recognized the governing bodies of Alaska Natives. The Native Village of Kivalina is a federally recognized tribe. In Kivalina, at least, "the IRA" now refers both to the tribal council and to its headquarters, a green, two-story wooden building that also houses the city council.

In a wood-panelled room, members of both councils, mostly age sixty and above, sat around a conference table to discuss the next phase of relocation with engineers from an Anchorage-based firm. On the table were bottles of Vitaminwater and mini cans of Pringles, and also tangerines and bananas. Official visitors often bring fresh fruit.

The debate that morning, which began after a moment of prayer, was about where to put the relocated village's landfill and a new dump site for the makeshift toilets known regionally as honey buckets. These are plastic pails lined with garbage bags and fitted with toilet lids. Kivalina has piped water only at its school, its health clinic, and the communal laundromat and bathhouse called the washeteria. Instead of flush toilets, most homes use honey buckets. Waste is emptied into communal receptacles, then taken to a site at the edge of town. In addition to many sanitary risks, the frustration of living in such conditions prompted one villager to describe them as "the dark ages."

That the relocated village will finally give Kivalina residents running water and sewer services is a large part of its great promise, but the council members reluctantly conceded to the engineers that a new honey-bucket dump site would probably be necessary anyway. It could be years before a new sewer system was built. The discussion then turned to the placement of the landfill, in an area known for its salmonberries. "I sure would hate to look at that dump site and smell it when I'm picking berries," a council member said. Others expressed concerns about flooding.

The plans weren't ideal, but the mood was one of resignation: the sooner the new landfill was approved, the sooner the village could relocate. The council members voted in favor of going ahead.

Relocation in a place like Kivalina does not proceed in a linear fashion. Funding comes from a wide range of government agencies, each with its own processes. In Kivalina, all of this is managed by Millie Hawley, the IRA tribal administrator. Hawley is a pragmatic and blunt woman of sixty with glasses and gray hair trimmed in a neat bob. A sign posted outside her office reads "IN A TELECONFERENCE MEETING ALL DAY, NOT IGNORING YOU, MILLIE."

After tribal officials, who are elected, arrive at a consensus about what to do, it is up to Hawley and her staff to keep track of the complicated logistics of the village's move. Most of the construction funds for the new school came from the state after the settlement of a lawsuit, filed by parents in the Yukon-Kuskokwim Delta in 1997, which

claimed that Alaska's method of backing school construction discriminated against rural students. Money for the road came from the Northwest Arctic Borough and the Alaska Department of Transportation and Public Facilities. Financing for the housing at the new site has yet to be determined. In 2022, the U.S. Government Accountability Office recommended creating a federal entity to coördinate efforts to relocate Alaska Native villages, which would, in theory, make the lives of administrators such as Millie Hawley easier.

In the meantime, there are obstacles all around. A house in rural Alaska can cost as much as five hundred thousand dollars to build, in part because skilled laborers like electricians and plumbers typically must be flown in from elsewhere. Getting materials here is onerous and expensive; sourcing them is another challenge. Much of the existing housing in Kivalina is incompatible with the Arctic climate and riddled with black mold. Building on permafrost requires gravel pads that protect the ice from melting, and aboveground pipes. One calculation estimated the cost of moving Kivalina to be as high as four hundred million dollars, or almost a million dollars per resident. The village does not have a conventional tax base. A majority of people in Kivalina are on public assistance, and many residents supplement income earned from part-time or seasonal labor with food they acquire through hunting, fishing, and harvesting. Houses tend to be transferred to family members rather than purchased through the real-estate market.

Moreover, the problems faced by Kivalina are the same ones facing as many as a hundred other villages around Alaska. A report by the Alaska Native Tribal Health Consortium and other organizations concluded, "The magnitude and severity of this problem can be difficult to comprehend. In jeopardy are not just buildings, but the sustainability of entire communities and cultures." And compelling residents of Alaska Native villages to move into cities far from their land risks perpetuating the United States' legacy of genocide and the forced movement of Native peoples, and could subject the displaced to a range of poor outcomes, including homelessness, racial discrimination, and a loss of social support systems.

After his first hunt, a Kivalina teen-ager learns to skin a caribou.

"At some point, the state and federal agencies did suggest we move to different towns," Hawley told me. "It was, like, 'Hello?' That's not going to happen. We're our own tribal community. We have our own ways, our own customs." Hawley said that in another village, even one in the same borough, she would be an outsider. "We're just family, one big family." In the village, children from families undergoing hardship are often taken in by relatives—Hawley, whose children are grown, is currently raising three of her grandsons, who are under the age of ten—and the subsistence way of life is tied to a hyper-local understanding of the land and its intricacies. But the number of people involved is small, and the price tag so high that some in Alaska have questioned whether keeping such communities intact is worth the cost.

"We are actually starting to think more proactively when it comes to how we make our coastal communities more resilient in the face of climate change," Lisa Murkowski, the senior senator from Alaska, was quoted as saying in the Nome *Nugget* after a visit to Western Alaska following Merbok. "But for communities like Shishmaref, Shaktoolik, or Golovin that are sitting on ground as flat as this table with no protection around them—is that the safest place for those people?" she continued. "Even though their families have been there for generations?"

Newtok, the village that has progressed furthest toward relocation, has become as much a warning as a case study. Its population is split between two villages that are nine miles apart, neither of which is fully functional. To avoid some of the same pitfalls, other villages have pursued strategies of "managed retreat" or "protection in place." Managed retreat focusses on moving structures away from hazardous areas; protection in place focusses on reinforcement in order to buy time. In Kivalina, several people I spoke with preferred not to use the word "relocation." They call it, instead, an "expansion."

One evening, I walked across the road from the BnG to the village's community center, to visit a sewing class, one of the IRA's social programs designed to teach young people traditional

practices, including needlework, fishing, and hunting. Since July, a woman in her sixties named Bertha Adams had been instructing seven teen-age girls in how to sew fur-trimmed parkas. The parkas are made from padded nylon fabric, with ribbon-and-bias-tape embellishments in patterns designed by Adams. Everyone in the class had finished her coat except a high-school student, who sat silently stitching fox fur onto her parka, a thimble on one finger. The large room was cozy and smelled faintly of Lysol. Adams wore a T-shirt with a husky sporting a mining hat from the Red Dog Mine, where she used to work. On the radio, which was playing through a CD-cassette boom box, an announcer read the temperatures and wind speeds of various villages over a gentle hiss of static.

After the student finished sewing, she and Adams brushed bits of thread from the coat using a coffee filter. "Drumroll!" Adams said, beaming, as the student tried it on. Adams told me that she had another reason to celebrate: her nephew had just killed his first moose. In Inupiat tradition, a young hunter's first kill is given to elders and people in need, and the nephew had given the moose to Adams to help distribute it. She had passed on the best parts to his grandmother but kept the ribs, to make into a soup.

Kivalina has few social spaces. There's a Friends Church in addition to the Episcopal Church; they both hold services on Sunday. The Kivalina Native Store, which is owned by the tribe, and three small, family-run stores are the only places to shop. Other opportunities for public gathering happen at the school gym, which is open to adults for basketball at night, or at bingo, which happens every night of the week except Sunday and Wednesday.

The bingo hall sits across from the village's water tanks. It is a large room with scuffed linoleum floor. On the evening that I went to play, the man calling the numbers, in the front of the room, was a member of the volunteer search-and-rescue squad named Carl Swan, a cousin of Janet Mitchell's. The bingo was relaxing: the soft whirr of the balls in the air machine, the mild concentration of applying the ink dabber to the newsprint bingo card, the smell of cigarettes that wafted in from the entryway between games. Alcohol is banned in Kivalina, although it finds its way in. (When I asked one resident if alcohol was "a problem," he laughed. "Yeah, it's a big problem," he said. "It costs too much.") A water-stained notice on the wall displayed the liquor ordinance, and the bingo players drank sodas and energy drinks. People in Kivalina are suspicious of their drinking water because of the mine.

The Red Dog Mine is some fifty miles to the east of Kivalina. Every spring, when the ice begins to melt, the mine discharges its wastewater into Red Dog Creek, which flows into the Wulik River, from which, downstream, Kivalina draws its drinking water. Many of the houses I visited had Brita or Berkey water filters on the kitchen counters. (A spokesperson from the mine said that the wastewater is treated and discharged under strict water permits that comply with the Clean Water Act.)

Kivalina has a complicated relationship with Red Dog. In lieu of taxes, the mine makes annual payments to the Northwest Arctic Borough, which provides most of the municipality's operating budget. Teck Resources, the Canadian company that owns the mine, also pays NANA a share of its revenue. Every Native corporation in Alaska

TO THE REALIZATION OF PERFECT HELPLESSNESS

Lately, every morning, after a night
of lucid insomnia, my first thought is always
the same: *fourteen billion years*—

our planet began fourteen billion years ago.
I just lie there.
Thinking.

•

Then I move—slowly—forward,
millennium by millennium, trying
to see everything

that has taken place until
I arrive at the present moment—me
lying in my bed.

Lately, I think about all of the other humans—
now extinct—whose DNA spirals
inside of our own DNA.

Then I remember
that we will one day—soon—be extinct, too.
Fourteen billion years.

I am terrified by the idea
of my own death, but my cells scoff
at the idea of four paltry *centuries*.

•

Sometimes, instead of going
forward, I try to go farther back—
beyond fourteen billion years.

I try fifteen billion, sixteen
billion, sixty billion—long before
our planet was ever created.

Sometimes, the small girl in me wonders
if all of our universes are a roux roiling inside
a large stone cauldron,

inside the warm midnight-blue
kitchen of the infinite Black Sorceress
alive inside my cells.

•

I have been
thinking about you
again today,

as I do—
so often—think of you,
wondering

if people can see the sky
of our childhood
the way we still see (the sky)
whenever we think
of each other.
Well, not see, but feel—

the way
every feeling
has a trillion eyes.

—Robin Coste Lewis

gets a cut of the revenue, but Kivalina bears a disproportionate environmental impact. I heard residents blame the mine's haul road for interrupting the migration of the Western Arctic caribou herd, and its ships for altering the paths of belugas and bowheads. (The mine spokesperson said that leaders from Kivalina are on a subsistence committee that meets regularly with mine representatives to develop procedures and policies designed to minimize potential wildlife impacts.) Relocating a few miles inland will not alleviate these concerns, however, as Kivalina's drinking water and hunting grounds will remain the same.

The mine's assurances that the drinking water is clean have not eased fears that something is affecting the villagers' health. Hawley teared up as she described babies in the village who had been born with severe congenital anomalies. "I don't like to talk about this, because it just gets to me," she said. "The only thing we had when we were growing up was snotty noses and sore throats."

In 2004, a group of six villagers filed a lawsuit against Red Dog for violations of the Clean Water Act. A federal judge found that the mine had violated the act more than six hundred times. In a settlement, the company agreed to build a discharge pipeline directly from the mine to the sea, but it later paid an eight-million-dollar civil penalty to the U.S. instead, citing feasibility issues. In 2017, the village, NANA, and Teck signed a memorandum of agreement to jointly address environmental concerns. The village has also pushed for more local hires, and it is only recently, Hawley told me, that enough people in Kivalina have found steady work at the mine to more than fill a nine-person prop plane.

One afternoon during my stay in Kivalina, representatives from the mine participated in the first in-person community-relations meeting to be held with the village since 2019. In the school gym, under the banners of the Northwest Arctic Borough athletic league (Kivalina's mascot is the *qavvik*, or wolverine), the villagers, who ranged from toddlers to the very old, sat on bleachers. A wide array of habitats were depicted in their camouflage outerwear: winter birches, spruce forests, marshy rushes. Representatives from Teck and NANA, wearing business-casual clothes, set up tables with various mining-related brochures and greeted the Kivalina residents with an upbeat air.

The villagers had plenty of questions. One wanted to know why the loader that handles the mine's ore wasn't covered, to contain hazardous dust. Another asked about a moose that had recently been hit by a mining truck—weren't the trucks supposed to stop? A former employee at the mine questioned whether budget cuts were the real reason that he'd been let go a couple of weeks before his probation period was supposed to end. Few of these questions received direct answers, although they were logged into a laptop by a woman sitting at a folding table. (The mine spokesperson has since explained that the loader does have dust covers, and that the truck driver was unable to brake in time.)

Red Dog's days are numbered. In nine years, the source of more than eighty per cent of the Northwest Arctic Borough's operating budget will tap out. While exploration is under way at several sites nearby, they are not all on NANA-owned lands. A slide-show presentation, given by a Teck representative named Rachel Wallis, focussed on Teck's past approach to mine closures and reclamation, the process

by which the environmental effects of a closed mine are minimized. Wallis, who is from Canada, had blondish hair and wore a red plaid dress and knee-high boots.

"Does anyone know how much Red Dog has put aside for reclamation at this point?" Wallis asked. Nobody responded.

"Six hundred million," she said. "I think it should help give some comfort that these things have been planned ahead so that it isn't a burden to the taxpayer, to the community, to the environment, and to the animals." The money that had been set aside was less than the mine's revenue for 2021.

The mine officials explained part of the plan in shorthand: the waste rock would be covered with a layer of impermeable plastic, and then a layer of soil, which would be planted with what one mine representative described as "native seed." This process is meant to prevent what is known as acid-rock drainage, which happens when waste rock—what the mine removes in order to reach the ore—is exposed to oxygen and water and releases sulfuric acid into the environment. The acid can change the pH balance of a watershed, causing die-offs of aquatic life and leaching heavy metals from rocks which, in turn, can accumulate in plants and make their way up the food chain. One way to prevent this is to keep the waste rock permanently protected from the elements.

"Reclamation plans are a big part of the community," Wallis said at one point. "Some people even want certain kinds of medicines planted there, certain kinds of berries, people might want to open up a campsite—there's a whole range of things that you can do when you close a mine."

She showed a before-and-after photograph of the reclamation of a lead, silver, and zinc mine in British Columbia. The first image, taken at the turn of the twentieth century, showed an industrial site. The second picture had the vivid green grass of a Microsoft Windows screen saver.

"What kind of fertilizer do you use to make it so green?" Alice Adams, an elder who serves on the Kivalina City Council, asked.

"Have you ever been to British Columbia?" Wallis asked. "It is very, very green in British Columbia. It's like an emerald jewel."

The meeting went on, and the questions became more contentious. Discussion turned to allegations by the villagers that the mine was discharging its wastewater too early in spring, before the ice on the river had fully melted, and that the increased flow of water was breaking up the ice and curtailing their ice-fishing season. A slide show had paused on a photograph of a large herd of caribou roaming the hills near the mine. Someone asked when it was taken; she couldn't recall the last time she had seen a herd that big in the area. (The mine spokesperson said that before the mine discharges its wastewater Kivalina residents are taken up in a helicopter to see the state of the ice.)

Another elder raised his hand and was given the microphone. "I've been here from the beginning of the mine," he said. "They told me, 'We leave the land like it is when we first come in. If we leave in 2036, that's the last day, we leave it like we come in.' Broken promise! Broken, broken promise!"

The meeting concluded with a hurried raffle. The company gave away an Amazon tablet, a Bose speaker, and vouchers for stove oil and gasoline. Alice Adams won a coffee gift bag. "I don't drink coffee," she said, as she collected it. Then the mine representatives packed up their projector and their collapsible screen and their brochures and caught their plane out of town.

Janet Mitchell, the storm chronicler, had good news later that night: her grandson's hunting party had travelled up the Wulik River by boat and killed a caribou, a straggler isolated from its herd. The next morning, her nephew Clinton sat outside the community center with the carcass, teaching her grandson Aaron and another teen-age boy how to skin it as older relatives had once taught him. "The liver makes a great breakfast with pancakes," Clinton told me. Mitchell rolled up on her Honda four-wheeler and snapped some photographs. The caribou's hind legs were unceremoniously placed in a cardboard box on the ground, hooves up. As the boys used their fists to separate the animal's skin from the carcass, other villagers stopped by on their Hondas to get intel: *You guys just see that one*? *There's gotta be more coming.*

"Up in the hills, maybe," Clinton said,

referring to an area farther east of the new village site, where the tundra and the floodplains give way to the foothills of the De Long Mountains.

Later that afternoon, I was having coffee with Carl Swan, the bingo caller, when Aaron came to the door holding the caribou's heart and some ribs, a gift from his first hunting trip. Swan broke apart a Dr Pepper box and laid the meat on it before returning to our conversation, and the teen-ager went back outside. Swan told me that two of his own children were studying at a public boarding school in Kotzebue, where he hoped they would get a better education than they could in Kivalina.

"Kivalina is a very hard place to live in, not just because of the massive snowstorms and blizzards and rain and those kinds of things but everything from our history," Colleen Swan had said to me. "Poor living conditions are a contributing factor to juvenile delinquency. The doctrine of discovery is a major contributor to the social problems in a lot of Native communities," she continued, using a term that refers broadly to the justifications of colonization. "Because of the climate issue, many of our young people won't experience life as I have lived it." In recent years, Swan has immersed herself in a writing project about what she calls "the ancient ways."

"My dad would hunt with dog teams. They had skin boats to hunt in the water. The kids are not going to experience this ever, because even the bearded seals are suffering. Everything that swims in the ocean is feeling the impact."

In Kivalina, there was little illusion of a separation between damage to the environment and damage to humans. Relocation might ease overcrowding, and the arrival of running water in rural Alaskan homes has been correlated with reductions in respiratory, skin, and gastrointestinal infections, but Kivalina has other problems, too. Rates of obesity and diabetes have risen, and they might worsen as environmental changes continue to affect subsistence hunting and fishing practices. Some impacts of climate change, such as the long-term outlook for the area's permafrost, are still unknown. One villager expressed worry about a crack that had already appeared in the new road.

Still, Millie Hawley told me that the road and the promise of relocation had improved morale. "People started relaxing when that road was built, because now they have an escape plan," she said. "Before that, you could feel the doom and gloom in the village for many years. It was, like, hopeless. People were wild, they did anything. They would say things like 'We're gonna die anyway.'"

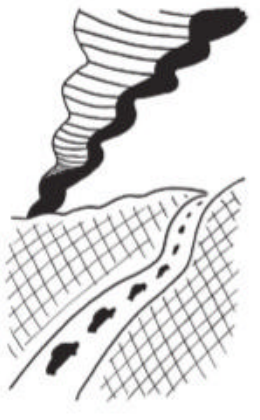
One afternoon, Janet Mitchell asked if I wanted to see the new school site with her youngest brother, Replogle (Reppi) Swan, Sr., who is a whaling captain, the fire chief, and the president of Kivalina's search-and-rescue team. Because of his civic duties, Swan has a white pickup truck. It was one of a total of four cars I saw in Kivalina, something that might change now that the village has a road, even if it's only eight miles long and ends, for now, at a construction site. When we stopped by his house, Swan turned off the reality TV show "Alaskan Bush People," and we got into the truck. Also along for the ride was his wife, Dolly. The Swans are avid hunters, and the trip doubled as a chance for them to scout for caribou. As we drove, Willie Nelson's "Seven Spanish Angels" played on the radio, and Dolly scanned the horizon with her binoculars.

"Those mountains in the back are white," Dolly said, looking at the De Long range in the distance.

"I'm not ready for winter," Mitchell said.

Swan drove slowly, protecting his tires from the road's sharp gravel rocks. The landscape was golden and strewn with ponds and occasional tracks where Hondas had passed through. The name of the hill that the new village site abuts is Kisimigiuqtuq, but many people refer to it as K-Hill. It was not a place with a known history of permanent habitation—the ancestral Kivalliñigmiut had kept their dwellings near the coasts or the rivers, for purposes of transportation and access to water. At the end of the road was the new school, a large building with gray metal siding and accents of lime green and teal, built on piles in order to keep piping above ground and prevent the permafrost underneath from melting. There was a small, bright-colored playground in front of the school, and two yellow school buses, brought from Anchorage by barge, were parked nearby. One of Millie Hawley's many headaches was finding someone who was willing to get a commercial driver's license to operate them. The weather at K-Hill is harsher than it is by the coast, and, because of the prevailing winds, snowdrifts can reach thirty or forty feet high. The school was planning to build a snow fence. The buses looked as though they'd been designed for another universe, one of paved roads, gas stations, and crossing guards. Next to the school was a construction camp housing some of the workers I'd seen on my flight from Anchorage. They mostly kept to themselves, their food brought in from elsewhere. Starting in November, when the school opened, everything would need to be transported here, eight miles from the airport: the students, the food for their lunches, heating oil to keep the building warm, water.

Reppi Swan did a wide loop around the school and continued up the hill, revving past the point where the road petered out to reach a crest, four hundred feet above sea level. We got out of the truck and stood looking out at the tundra, which unfolded before us, brown and untroubled, far into the mountains. It was freezing, and winter had not even started. Mitchell and Swan exchanged stories of the Little People, a parallel tribe who, Mitchell told me, lived among the Inupiat people before deciding that they preferred to live in isolation. Some say that Little People still visit Kivalina. On his phone, Swan showed me a zoomed-in photograph that featured several white dots outside a cave. In the next photo, the dots had disappeared, and Swan suggested that they might have been Little People. Swan and Dolly spotted a couple of musk oxen in the distance, but nothing they cared to pursue. We stayed there for a while, in the whipping wind, then returned to the warmth of the truck and drove back to Kivalina, which in this empty, open place seemed to be all there was of the known world. ♦



PORTFOLIO

BLADE RUNNERS

In West Virginia, some energy workers spend their days up in the air.

PHOTOGRAPHS BY
PHILIP MONTGOMERY

Three hundred feet above the ground, two Pinnacle workers, Tyler Simmons (top) and Isaiah Smith (bottom), inspect the inside

of a wind turbine. Cleanliness is essential for such a delicate apparatus. Each turbine blade spins up to sixteen times a minute.

The Pinnacle wind-power plant extends for roughly four miles in the northeastern corner of West Virginia. Twenty-three turbines dot the spine of the Appalachians, irregularly spaced along the mountain ridges. The towers, supplied by Siemens Gamesa, rise three hundred feet, looking like giant pinwheels amid a rolling landscape of small towns and windy roads. The rotating blades can be seen from Maryland and Pennsylvania. Down below is Mineral County and its county seat, Keyser, a former manufacturing and railroad hub that overlooks a branch of the Potomac.

Five full-time employees maintain the turbines. Each tower has an internal ladder. After climbing to the top, the workers can investigate errant temperature readings—the gearbox can overheat—or worrisome signals from the tower's sensors. Once a year, the team adjusts the calibrations of the blades, checks the tension on bolts, and tests the structural integrity of the equipment. Cleanliness is important to the successful functioning of such a delicate apparatus, and the employees take pride in their work. They often lug up a trash bag filled with rags, and use Simple Green cleaner to leave the towers gleaming in the sun. This is the first generation of West Virginians to trade work underground for work up high.

The state, once shackled to a coal economy, now has about four hundred turbines, which collectively can produce about seven hundred and fifty megawatts—enough to power more than two hundred thousand homes. The crew in Keyser is managed by James Adkins, a forty-six-year-old who used to work in a big-box store. Though the turbines require only a small crew to keep them running, Adkins emphasized that Pinnacle's installation of the wind farm "created hundreds of jobs—local people and unionized jobs." Pinnacle's parent company has a program that takes laid-off coal-industry workers and retrains them for clean-energy jobs. The company also stops by schools, giving children a chance to try on hard hats and to learn about the advantages of wind energy. Extracting coal is dirty work—in 1993, the Baltimore *Sun* quoted conservation officials as saying that runoff from mines had made the Potomac branch as toxic as battery acid.

All the same, Adkins and his four colleagues have had trouble convincing their neighbors of the value of wind farms. The newest member of the crew, Andrew Cosner, is twenty-one, and the grandson of a coal miner. "People are, like, 'I don't understand why this is such a big thing,'" he said. "They say it ruins the landscape and it's ugly." Brandon Kisamore, a thirty-nine-year-old who joined the Pinnacle team after his job at a coal-fired plant was eliminated, has decorated his desk with a "Friends of Coal" decal, to remind visitors that locals are in this together. But he sometimes faces hostility when he goes into town wearing a Pinnacle uniform. "They think the power's going somewhere else," he said. "It goes into the power grid, but they don't understand." One time, Adkins was waylaid by an older woman in Keyser, who insisted that the turbines were blowing snow from the mountains onto the town's streets. "I tried to explain, 'That's not how they work,'" he said. "She wasn't angry, but she was confused."

This collection of photographs, by Philip Montgomery, calls to mind Lewis Hine's famous images of laborers constructing the Empire State Building, and also the iconic 1932 shot of ironworkers casually dangling their feet off an I-beam, far above Rockefeller Center. At the Pinnacle facility, however, many of the workers deal with an initial fear of heights. Kisamore says that it took him three months before he could go up a tower without feeling sick, and Adkins urges students at the local community college who hope to work at Pinnacle to do a test climb of a tower. "You could waste two years of your life and find out you just can't handle the job," he said.

For workers who can conquer their fear, though, it's beautiful up there. Cosner said, "I'm never afraid of looking out, because you don't realize how high up you are." The team's day often starts at around 6 A.M. "It's real nice then," Kisamore said. "You can see the sun come up."

—D. T. Max

Roughly forming a straight line, the turbines swivel in the wind, which usually comes from the west. The blades are a hundred and seventy feet long, and James Adkins, the lead wind technician, says that from the top you can hear "a swishing noise."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Left: Brandon Kisamore inspects a hose attached to a hydraulic pump used to tighten bolts. Right: Kisamore notes that, from the top of a tower, you can "see how small the cars are."

Kisamore (left) and Smith. "We can reset the turbines from our desks," Kisamore says. The pitch of the blades can also be altered

remotely. The Lamborghini poster was a gift from his son; the "Let's Go Brandon" flag came from his mother-in-law.

Above: Smith stands in the nacelle of one of the turbines just before daybreak.
Right: A view of Keyser, West Virginia, from the top of one of the turbines.

Simmons emerges into a turbine's nacelle. To get to the top of a tower, workers must climb an internal ladder. They wear a safety

harness connected to a rail. "It's like climbing a tunnel straight up," Adkins says.

THE HOLLOW CHILDREN

LOUISE ERDRICH

ILLUSTRATION BY KEVIN LUCBERT

At the Tabor Bar, around beer No. 4, the men sometimes got into history farming, trading stories of their antecedents' exploits and agonies. In the long ago, wheat prices had plunged and most of the bonanza farms had broken up. That was when their great-greats had bought the land. The men talked about old plagues, old equipment, old swaps of ownership, crops, land, and dire weather. John Pavlecky's great-grandmother, at the age of nine, had survived the blizzard of 1923 by burrowing into a nearby haystack when the school bus didn't show up. Diz remembered his grandfather telling stories about an Uncle Ivek, who had also endured that blizzard, which was particularly lethal because it happened on a misty and mild April day. Around eight that morning, the bus had been almost full of children and headed toward the school, when out of the northwest a wind of sixty miles per hour had dropped the temperature instantly to minus twenty and filled the air with a blistering-cold curtain of powder. Such a snow could blind your eyes and scour the features off your face.

Ivek was a farmer, a part-time schoolteacher, and one of the bus drivers. He was taking his turn behind the wheel. In the back of a school notebook, not long after the blizzard, he wrote about what happened.

Ivek was bouncing down the muddy road when the mist dissolved and he saw it—a boiling white mass rolling at him like annihilation. He drove straight in at full speed, hoping to make it the rest of the way on sheer momentum. But in the whiteout he slowed to a crawl. Then crept along, feeling through the tires for the road. The children had gone dead silent.

The silence lasted until Ivek lost his feel of the road and knew that they had left it. The earth on either side of the Red River had been rolling-pinned by a vast and ancient glacier. The flat fields and prairie were of a time eternal, and the human presence in that expanse was slight. The children knew it, and he knew it. They had to keep moving or die. Luckily, he'd filled the gasoline tank.

"How about a song?" Ivek shouted.

"What shall we sing?" the Viveky boy called out from a few seats back. His voice trembled. Perhaps he thought that a church hymn would insure their admittance to Heaven.

"We shall sing 'Wild Clover.'"

Ivek hadn't noticed the girl. She touched her hand to his shoulder. It was Agnid Awbrey, daughter of a Welshman and an Irishwoman, a steady girl of eleven years, whose upbringing had been of the finest sort. From her mother, fearless good cheer, and from her father, a soldier who'd fought in Mesopotamia, drinking songs adapted for childish ears. She began. And she taught the other children the words as she went along, just the way Ivek taught his students to learn poems and stirring speeches by heart:

> I've been a wild clover all summer long
> And I've spent all my money on sunlight
> and song
> But now I am falling asleep under snow
> So I can return as wild clover once more.
>
> And it's yes, yea, ever
> Yes, yea, ever and more
> Shall I be the wild clover
> Yea, ever and more.

The song went on, amended verse after verse, with clapping and stamping on the chorus. It roused Ivek's heart and he roared the chorus, too. When the children were tired of that song, there was another:

> Fiery pillar on our journey
> Lead us through the snow
> Fire, fire, fire, fire.

This one was also accompanied by stamping, pounding, clapping, and roaring. Agnid had probably made it up to keep them warm. But the children eventually quieted, spent.

Ivek kept the school bus moving, sometimes jerking across the prairie and at times gliding on roads, determined not to drive into a ravine or be stopped by any means other than a warm house or a barn. His heart sped up so fast that he could hardly breathe. He thought of a child—Mary Wacha, so quiet and so good at math. Or Warwick, the boy who chopped wood for the school stove. Or small-boned Morris, only five years old, whom he'd directed Agnid to bundle in the blanket that usually draped his lap. He would get the children out of his mind only to have their parents crowd in. He knew the parents were praying that the bus had reached the schoolhouse before the worst hit. He thought of his friend John, whose child, the last on his route, he hadn't picked up. Was she wandering in the blizzard? And Agnid's father and mother, and his own wife, her dark hair all in a braid down to her waist. She was at home, and he was glad now that their children had been ill that morning and stayed with her. She would be praying, too. He put her out of his mind and drove on. And on. There was no telling. No telling which direction he was going and he knew not where he was. He knew only that he must not stop.

"The others are hungry," Agnid said at last. "I myself have a meat pie so great I cannot eat the whole. Shall I direct us to surrender our lunches and divide the food?"

"Yes." Ivek spoke without taking his eyes off the nothingness.

"Then I will," she said, "and fairly, in spite of the Spiral boys."

Ivek smiled even in their peril. "Have they given you trouble?"

"I have them in hand."

Ivek heard the sounds of negotiation and discussion, voices kept low. He was in a cold sweat because, after a long stretch of flat surface, which he'd thought was possibly the Meridian Road, the bus was bumping over hummocks that didn't feel like snow. For some reason, he imagined that it was a graveyard, although of course that was absurd. But then he felt a terrible slickness beneath the wheels. The bus skidded and his heart dropped. He was either farther south or farther west than he'd thought. They hadn't gone down a steep riverbank, so he understood that they were on one of the arms of the deep lake that curved intimately below Tabor. And now, though he knew that it was unlikely in the extreme, his blighted mind reviewed the recent stretch of mild days and seized on the vision of the bus plunging to the bottom. He knew that the ice should still be sound throughout the lake,

yet his unruly thoughts continued.

Agnid tapped his shoulder and he nearly shrugged her off, but she reached around with the meat pie and let him know that the children had agreed he must have it. The instant he bit into the pie, his wheels found purchase. The roads were all straight section roads, though often little more than trails. Reading the way the snow was settling, he renewed his commitment to steering within a few degrees of center, creeping along even more slowly, peering down through the edge of his window, which he'd been forced to open a crack. He nosed at the drifts and used a bit of speed to grind through them, always returning to the central line. He went on, on, and on.

The wind toyed with the bus, sometimes booming at its sides, sometimes sliding with a low whistle along the window tops. At times, it reached below the hood and shook the engine like a baby's rattle. Ivek would shout to the children, "Sing that song! Sing that song about the fire!" The children sang for as long as they could. His sweat froze on his forehead. His leg shook as he pressed and let up on the brake. He blinked quickly so he wouldn't run into a tree, few though they were. His mouth was so dry that his tongue was swelling. Staring desperately hard, he wondered about snow blindness. When the light assumed the flat bluish cast of skim milk, he knew that dusk was upon them, and they fell into the lake.

It wasn't, as he'd imagined, an icy plummet. The water seized them so swiftly that there was no fear or pain, and the fall was surprisingly gradual. They rocked and swayed, lakeweed swirling around their necks and ears. Startled fish swam to the door and by instinct he let them in. He knew that he and the children were all lost forever. He didn't like his thoughts, but he was still glad that his son and his daughter were safe at home in the warmth of a good stove. He thought of them burning the wood that he'd chopped. There was plenty. But then he heard their voices behind him and realized that they had got on the bus after all.

Sorrow cascaded over him as the bus settled on the bottom of the lake. When there was no use steering any longer, he rose in his grief and turned to the children. He meant to apologize and hoped to recommence the singing, but the children had changed. By unknown means, on the way down to the bottom, the children had become hollow. They were transparent and so frail that they were almost unbearably weighted down by their clothing. Sagging and faint, they listed in the seats, their skin membranous and glistening. Ivek knew that he must not allow them to guess how precarious their existence was, so he went down the center aisle collecting their coats. Once they'd shed their coats, some shot through the windows to the surface, while others would, he realized, spend their days at the bottom, waiting for their families to come to the lake and let down a line they might grasp—

—hold of?

Ivek's eyes were open but somehow they opened. He was once again driving on the surface of the blinding earth. He caught a glimpse of the school to the left of the bus before snow slammed shut over the sight. He doubted what he'd seen, but his arms had faith. His hands guided the wheel according to his vision. He sensed that they were in the shadow of something large, a building. He pulled closer to the side. Idled the bus. It was the school. In the lee of the storm, he could see the familiar boards that he himself had painted.

He stopped the bus. Opened the door. Wind almost sucked them out. He closed it again and instructed Agnid to sort out her classmates. They lined up in the aisle and made a chain of themselves behind the largest boy, a Spiral, with the smaller children in the middle, and, at the end, Ivek, with Morris grappled to his chest.

The wind wrestled with them as they labored around the side of the school to the door, tumbled in. The children scrambled up and rushed to the stove. Ivek, who always set up the next day's fire before he went home in the evening, unclenched his fingers, clumsily opened the tin matchbox, lighted a cone of newspaper. Fire leapt from the paper, snapped to the splinters of bark. Ivek stood back behind the children, as they crowded close, and the blaze rose up.

Or did it?

The chill in Ivek was far deeper than the fire could touch. The reality of the cold world beneath the ice was stronger than the warmth of the school. He turned away from the stove so the children wouldn't see his tears. What was up and what was down? If he turned back, would the children still be warm and alive? Gritting their teeth in pain and happily whimpering as their numbed feet and fingers prickled to life? Or would they be frail blue human bubbles he'd failed to rescue? Would his son and his daughter be among them? Dissolved to froth? He closed his eyes. Again, he was down there with the fish darting in and out, lakeweed clogging the children's mouths, each seat inhabited by a small, vanished life. And who was he? The driver or the one driven from existence by relentless snow? He reached—

Agnid pressed into his open hand a cup of snow she'd melted. He looked at her. She was sturdy. The water was hot, steeped with a piece of boiled wool she'd cut away from her coat. This was, she said, an old cure that her mother used for wind sickness, times when the mind could no longer bear the wind's moans and mumbles and a person started hearing human voices.

He took the cup, drained it down. It tasted horrible, and he was cured.

Or, rather, he was better. For the drive would leave its mark upon him in a way that someone who had not seen those children, blue and hollow under the lake, would never understand. That was why he wrote it down. ♦

Constabulary Notes from All Over
From the Shelter Island Reporter.

On Silver Beach, repeated anonymous email complaints on May 21 that a dog was barking, that it had stopped barking, that it was barking again, prompted police to do an on-site evaluation during which the dog barked for one minute and 37 seconds; no violation was found.

BOOKS

LITTLE HOUSES ON THE PRAIRIE

In "Cheap Land Colorado," Ted Conover goes off the grid in search of another America.

BY KATHRYN SCHULZ

"In the United States," Gertrude Stein once observed, "there is more space where nobody is than where anybody is." That was true in 1936, when she wrote "The Geographical History of America," and it remains so today. The numbers are startling, and not only if you live someplace like the Upper East Side of Manhattan, with your hundred thousand neighbors per square mile. Add up all the developed areas in the fifty states—the cities and suburbs and exurbs and towns, the highways and railways and back roads, the orchards and vineyards and family farms, the concentrated animal feedlots, the cornfields and wheat fields and soybeans and sorghum—and it will amount to a fifth of our nation. What is all the rest? Forests, wetlands, rangeland, tundra, glaciers, barrens, bodies of water of one kind or another. If you don a blindfold, throw a dart at a map of the country, and commit to living where it lands, you will most likely end up alone, in the middle of nowhere.

All that open space has an enduring

Though roughly the size of New Jersey, the San Luis Valley is home to fewer than fifty thousand people.

ILLUSTRATION BY EMILIANO PONZI

hold on the American imagination. There's a reason it serves as the backdrop for so many political ads and pickup-truck commercials: it represents the ill-defined notion of liberty that we claim as our founding ideal, and functions as a kind of collective backup plan should some crucial opportunity or exigency arise—a place to prove our mettle, a place to start over, a place to which, if push came to shove, we might flee and never be found. Most of us do not put this proposition to the test. But, by choice or chance or lack of any other option, a handful of people really do wind up trying to make a life somewhere in the almost eighty per cent of America that is essentially undeveloped land.

Some of those people are the subject of Ted Conover's "Cheap Land Colorado: Off-Gridders at America's Edge" (Knopf). Conover, who was raised in Denver and is now a professor of journalism at New York University, might be thought of as a reporter in the George Plimpton mold; to write about his subjects, he prefers to spar in their rings and scrimmage on their fields. Unlike Plimpton, however, he sticks around for months or years, often under distinctly uncomfortable circumstances. For a book about modern-day hoboes ("Rolling Nowhere"), he learned to hop freight trains and spent months riding the rails; for a book about undocumented immigrants ("Coyotes"), he lived with Mexicans on both sides of the border, picking fruit in citrus orchards and travelling across the Sonoran Desert and the Rio Grande; for a book about the New York State prison system ("Newjack"), he got a job as a corrections officer and worked for a year inside Sing Sing.

Then came November 8, 2016. The day before the election, Conover had declared on a radio program that Donald Trump would never win the Presidency; afterward, like countless other members of the media, he was stunned into the conviction that he no longer understood his compatriots and needed to embark on a grand reëducation. In keeping with a long tradition of believing that the immensity and wildness of our nation hold the key to its essential character, he found himself thinking about the least populated parts of his home state. "The American firmament was shifting in ways I needed to understand," he writes in the new book. And so, eager to learn more about his fellow-citizens, Conover headed west, to a place where almost none of them live.

The cheap land of "Cheap Land Colorado" is in the south-central part of the state, in a region known as the San Luis Valley. The largest alpine valley in the world, it has an average elevation of more than seven and a half thousand feet, a couple of thousand feet higher than the Mile High City. Although it is comparable in size to New Jersey, which has a population of 9.3 million, the valley is home to fewer than fifty thousand people, around ten thousand of whom live in a single town, Alamosa. Most of the remaining residents live in other, smaller towns, but some of them—maybe around a thousand people, although no one seems to know for sure—live scattered across an enormous area of the valley known as "the flats." Nearly all the people Conover meets on the flats are poor, yet they generally own their own land. In fact, most of them were drawn to the area because it is possible to buy a piece of America there for rock-bottom prices—typically, somewhere between five hundred and a thousand dollars per acre, or roughly half what you're likely to pay for a single square foot in Manhattan.

There is a hitch, of course. The flats possess almost no infrastructure: no electricity, no water, no sewer system, no pavement, precious little Internet or cell service, and a long drive on dirt roads unknown to most mapmakers for jobs or schools or medical care or a gallon of milk. Most of the people Conover meets live in trailers, sometimes augmented with sheds and shacks; they buy tanks of propane and two-hundred-and-seventy-five-gallon drums of water, rely on generators or solar panels for electricity, burn their trash in barrels, and use outhouses for human waste. A significant number of them, taking advantage of Colorado's lax drug laws (if also frequently bending them), grow marijuana.

All this is somewhat surprising, because the San Luis Valley has many of the hallmarks of a lovely—and pricey—place to live. It has a dry climate, enjoys nearly two hundred and fifty days of sunshine a year, and boasts spectacular views: to the east, Great Sand Dunes National Park, and, towering behind it, the Sangre de Cristos; to the west, the snowcapped peaks of the San Juan Mountains. The weather is cold, but not atypical for the Rocky Mountain West, and the water resources are plentiful by desert standards. Nothing, in other words, makes the valley intrinsically less appealing than, say, the desert land around Joshua Tree, in California, where five acres might run you a quarter of a million dollars.

Conover keeps his readers waiting for too long, almost half the book, before saying anything about how the San Luis Valley came to be a magnet for the dispossessed. That story—about greed, grift, credulity, and the great American yearning to own things—begins after the Second World War, when developers started acquiring undeveloped land, rebranding it as residential, and subdividing it into lots for single-family homes. The honest ones made the land livable before selling it off, putting in everything from roads and utilities to houses, swimming pools, and golf courses. The dishonest ones did not, which is how people around the country, dreaming of retiring in sunny Florida, wound up buying a piece of uninhabitable swampland.

This subdivision craze reached southern Colorado in the nineteen-seventies, when developers began buying up enormous swaths of the valley and giving them names like Rio Grande Ranches. One pair of savvy businessmen staked out property lines for an estimated forty thousand five-acre lots, graded the roads meant to connect them, and then did absolutely nothing else, except profligately promote their product. They placed ads in *TV Guide* and in newspapers nationwide, promising "spectacular sports and outdoor adventure," "game galore," and "Healthful Sunbright Skies"; they bought up lists of people who had purchased rifles or Western novels or subscriptions to hunting magazines, then sent them mailers hawking five

acres for under two grand in cash, or thirty dollars a month at six-per-cent interest. These tactics worked: a stunning number of people bought land in the flats sight unseen. One salesman recalled, "That guy in Illinois would tell his neighbors, 'Yep, I just bought a ranch in Colorado. I'm gonna run out there this summer and check it out.'"

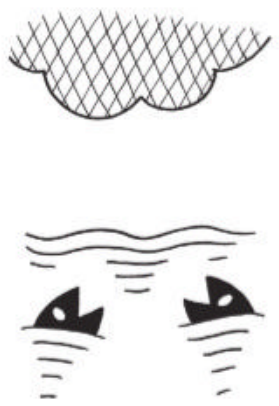
Those neighbors might have been impressed, but the Federal Trade Commission was not. The advertisements suggested that land in the San Luis Valley was a good investment, which, given the absence of amenities, was plainly untrue: unhappy buyers could not sell their parcels for what they had paid, if they could sell them at all. In 1979, under pressure from the federal government, the developers agreed to cancel all outstanding debts and refunded as much as fourteen million dollars. But they never made any further improvements, with the result that, a half century after those original lots were surveyed, land in the San Luis Valley, unlike the vast majority of real estate in America, has appreciated almost not at all.

"Cheap Land Colorado" opens with a problem. Conover wants to meet the off-gridders of the San Luis Valley, but many of them live there precisely because they do not want to be met—a preference they sometimes broadcast, he writes, "by closing their driveway with a gate, or by chaining a dog next to their front door, or by posting a sign with a rifle-scope motif that says, 'If you can read this you're within range!'" As a way around this prevailing suspicion of strangers, he starts volunteering for an outreach program run by a social-service organization called La Puente, based in Alamosa and widely respected around the valley. In this capacity, he drives around the flats in a pickup truck with the group's insignia on its side, visiting properties, introducing himself to their owners, and, as a more or less literal icebreaker, offering them free firewood. (In the valley, as in an Annie Proulx story, freezing to death is an ever-present possibility.)

This strategy pays off, in that Conover's book is full of remarkable characters. These include Frank and Stacy, who live in threadbare but cheerful chaos in a mobile home with their five home-schooled daughters, a cockatoo, various dogs, and, outside, goats, a pig, ducks, and, soon enough, Conover himself, who pays them a hundred and fifty dollars a month to park his newly acquired trailer on their land. There is also Paul, a gay guy who has lived in the flats for more than a quarter of a century—long enough to raise up from sapling-hood a little grove of Chinese elms, the envy of other residents in a part of the valley almost entirely devoid of trees. There is Zahra, who moved from the Chicago area to help start an African-nationalist group, got fed up with the would-be leader's dishonesty and his half-finished home, squatted elsewhere in the flats for six months, and then fell in love with a white rancher who grew up in the valley. There is Luke, who identifies as having Asperger's syndrome, excels at fixing anything electronic, pans for gold in the nearby mountains, and dreams of making money by selling goat milk, heirloom tomatoes, and homemade cheese. There is Nick, a representative example of a local species known as a prairie rat: "a person who could probably get a minimum-wage job somewhere if he wanted to but preferred just to hang out, subsist, keep a low profile, and do the drugs that made him happy." There is a nameless gender-nonconforming couple who are widely disliked, partly for their self-presentation but also because they are rumored to be cooking meth in their trailer and are caught pumping water from the Rio Grande, which is illegal and, in the valley, almost the greater infraction. There are people it is impossible not to despise, like Zane, a tattoo artist from Alabama who, together with a friend, flaunts his disregard for government and law enforcement until they are both arrested on charges of sexually abusing their daughters; people it is impossible not to pity, like Geneva, whose husband and son die within six months of each other, the latter after coming too close to an electrical line; and people it is impossible not to admire, like Teotenantzin Ruybal, stern, steady, and compassionate, who runs a homeless shelter that serves residents of the flats when a crisis strains their already meagre resources or a trailer proves no match for the high-desert winter.

Ruybal grew up in the San Luis Valley, but most of the other people in "Cheap Land Colorado" arrived there later in life, generally propelled by the kinds of forces—grief, destitution, divorce, addiction, inability to fit in, outstanding warrants—that produce either

profound inertia or a tendency to drift. One such person is Matt Little, a La Puente employee who, in addition to the many other ways he helps Conover—training him for his volunteer work, hitching up the trailer he buys and driving it out to the flats—provides the title for his book. An Iraq War veteran and a native of a moribund West Virginia steel-mill town, Little married a home-town girl, had two sons, then won the state lottery and bought a house for his family. One of his sons turned out to have paranoid schizophrenia; the house, which was not insured, burned down. Three months later, his wife died, of chronic obstructive pulmonary disease. Little, desperate to get away and dreaming about images he'd seen in old *Field & Stream* magazines, went online and Googled "cheap land colorado."



All of these people are fascinating, but none of them is the main character of the book. That role goes to Conover, who calls the second chapter "My Prairie Life, Part I" and the third "My Prairie Life, Part II." The titles change after that, but the gist remains the same. As a writer, Conover is most at home in the first-person present tense; he prefers the closeup to the wide-angle shot, action to exposition, the immediate moment to context or history.

The virtue of this approach is that it brings the San Luis Valley into relief. Conover has a good eye for the particularity of life on the flats: a kid out riding her bike crashes into an antelope; a family dresses its pet Chihuahua in a leopard-skin sweater to keep it from getting eaten by hawks; a man uses crushed beer cans to landscape the area outside his trailer, as a suburbanite might use mulch. All along, the scale and the solitude of the valley quietly assert themselves. By day, on the long dirt roads, locals roar into intersections at top speeds, knowing that if a vehicle were heading toward them its dust plume would be visible from afar; by night, the sky above those same roads is dense with stars, while rabbits and nighthawks appear like fleeting motion-picture shows in the headlights.

Still, all this immediacy comes at a cost, one I felt acutely throughout the book: off to the side of Conover's own high beams, a great deal lies in darkness. The tens of thousands of other people living off the grid elsewhere in America are acknowledged in a single parenthetical aside, and the scope of rural poverty in this country goes entirely unmentioned. You would not know from "Cheap Land Colorado" that life in the San Luis Valley, presented here as extraordinary, looks a lot like life in countless other impoverished places. Nor does Conover pay much attention to the structural problems that have swept his characters out onto the flats, like so many Joads on the road. Although he wrote an entire book, "Whiteout," about Aspen, which is a few hours away and has a median home price upward of three million dollars, we get no consideration of that town here, no sense that the lives of the rich have any bearing on those of the poor.

The cumulative effect of all this is that "Cheap Land Colorado" reads less like "Evicted" or "The Warmth of Other Suns"—two other books about the quest to find a home in America—and more like a travelogue. The San Luis Valley we encounter in the book exists mostly insofar as Conover is there exploring it; only occasionally do we see the place or its people without the writer in the frame. Sometimes this author-centric perspective serves the story well. After his first night alone in his trailer, Conover wakes up in the morning to discover that everything inside it is iced over—including his toothbrush, left damp the night before, and, more pressingly, his door, which has frozen shut, trapping him inside. It is a classic fools-rush-in moment, light with a sharp-edged shadow, and it tells us all we need to know about the chronic proximity, in such a place, of disaster.

But on the whole "Cheap Land Colorado," although consistently interesting to read, is hamstrung by the hovering presence of its author—not because Conover isn't good company on the page but because his book never finds another focus. It is full of so many compelling people that he could have assembled a truly stellar ensemble cast—or, conversely, picked a few of them and stuck with them long enough to make their own prairie lives vivid, expansive, and illuminating. Instead, most of the characters wander in and out of the book without leaving much behind, except for the impression that potentially captivating stories have gone untold. After meeting a mother and daughter, Rhonda and Kea, who came to the San Luis Valley by way of Chicago and California, Conover writes, "They were among the few Black people I had seen out there, and I was curious about what forces had attracted them to this place—or pushed them from somewhere else." If he ever sated that curiosity, he doesn't tell us; they show up just once more in the book, and are gone again in the space of two paragraphs.

What makes this distractible style of storytelling particularly frustrating is that it is at odds with what Conover claims to do. This is something he calls "immersion journalism," a method he teaches at N.Y.U. and writes about in another book of his, "Immersion: A Writer's Guide to Going Deep." As he explains in those pages, immersion journalism is "work that grows out of a writer's efforts to learn about somebody else's world by placing himself in it for a while." Thus defined, it is basically indistinguishable from participatory journalism, as it was called in Plimpton's day, and from New Journalism, whose practitioners—Tom Wolfe, Hunter S. Thompson, and so on—threw themselves into other worlds with gusto. For that matter, it is also difficult to distinguish from a lot of plain-old-journalism journalism, at least of the book and magazine varieties.

Why, then, the new term? Blame journalism schools, which, like nineteen-seventies real-estate developers, are in the business of creating subdivisions and selling them to the public. Immersion journalism, long-form journalism, literary journalism, investigative journalism, narrative nonfiction: all this was once the open rangeland known simply as "reporting." No matter what other name you gin up for the work, it has always been the case that the best way to tell a story is to get as close to it as possible and learn as much about it as you can. Whether the result is short or long, shallow or deep, bare-bones or brimming with scenes has nothing to do with how you characterize the process of writing

it, and everything to do with familiar constraints: the outlet, the editor, the budget, the nature of the story, the proclivities and abilities of the author.

Still, calling a work of nonfiction "immersion journalism" does matter in one respect: it shifts the emphasis away from the story and toward what the writer is doing to tell it. Conover has no difficulty convincing us that the flats are a fascinating place, but when he muses on how they "felt like a perfect complement to my life in New York City" he makes his own time there seem like rural cosplay. Nor is it useful to learn that, since 2017, he has availed himself of the flexibility of his academic career to make "more than twenty trips to the valley." Details like that are meant to convey his commitment and bolster his credibility, but journalism is not junior high school. You don't need to prove that you did your homework; you just need to know your stuff.

In this case, Conover tells us, what he wants to know is why Trump won the 2016 election. Yet "Cheap Land Colorado" contains no consideration of that state's electoral politics, although they are noteworthy: in the last two Presidential elections, an increasingly blue Colorado gave its electoral votes to Hillary Clinton and Joe Biden, while the six counties that make up the San Luis Valley were more divided, with three of them voting for Trump both times, two of them voting Democratic both times (by up to eighty-one per cent of the vote in some of the towns), and one of them flip-flopping. Nor does Conover reflect on the challenges of voting in a place like the flats. Colorado has been a vote-by-mail state since 2013, but rural delivery doesn't exist out on the flats, and it's unclear how many people, in a community disproportionately characterized by poverty, transience, and distrust of government, would travel to a designated polling station to cast their ballots in person.

All of this raises a question: Did the Trump voters Conover went west to meet actually vote for Trump? He never asks, and we never learn. When, in the course of the book, we do cross paths with MAGA types, they are already familiar to us—from our own communities, and from years of diner journalism. We witness an exchange between a conservative couple and a liberal volunteer who has come as part of a church group to help fix up their property; we sit in on a visit with some particularly out-there conspiracy theorists (the C.I.A. is run by the Vatican, John McCain donated a billion dollars to Al Qaeda, etc.); we watch as the coronavirus and Black Lives Matter protests reach the San Luis Valley, both with tragic results; we learn that Matt Little and Luke—the one who dreams of selling goat milk and heirloom tomatoes—have grown convinced that the 2020 election was stolen.

Conover presents all this almost without comment. Although he doesn't hide his own views, he also makes no real effort to account for those of his subjects, and, despite his stated goal, I began to suspect that he didn't really care all that much about how, or if, his new neighbors had voted. This change of heart, if that is indeed what happened, renders the frame of "Cheap Land Colorado" somewhat wobbly. Yet it also comes as something of a relief, after years of tedious Trump-era journalism in which certain lives suddenly commanded attention for purely instrumental reasons and those farthest removed from power were expected to illuminate its inner workings. It is, after all, extraordinarily difficult to explain this immense country and its millions of citizens. We are frustrated by anecdotes because they seem arbitrary and unrepresentative, frustrated by statistics because something urgent and human always escapes them, frustrated by the past because it is not reliably predictive, frustrated by the future because it remains stubbornly unknowable.

But, although our national character might be elusive, we are, as "Cheap Land Colorado" regularly reminds us, a nation full of characters. Conover's book is bursting with dreamers and druggies, drifters and grifters, the deluded, the dangerous, the salt of the earth. It is difficult not to experience some fellow-feeling for almost all of them, and for the place itself, which offers up to even the poorest of the poor its astonishing grandeur. And so it is strange but not altogether surprising when, in the end, Conover simply succumbs to the allure he set out to explain and decides to buy land in the flats: five acres, plus a trailer, in the middle of a nowhere that, for him, is now the center of something. ♦

BOOKS

THE EVOLUTIONISTS

How the Huxleys helped make our world.

BY MANVIR SINGH

A family of scientist-writers recast religion and ethics in light of evolution.

Thomas Henry Huxley almost skipped the showdown of his life. It was the fourth day of the 1860 meeting of the British Association for the Advancement of Science. He was tired. He had spent the earlier part of the conference mingling, attending talks, and defending his friend Charles Darwin's new book, "On the Origin of Species." He was keen to escape the Oxford bustle and relax with his wife at her sister's home, near Reading.

He knew that the fourth day would be charged. Everyone did. The Bishop of Oxford, Samuel Wilberforce, was scheduled to appear. The son of the abolitionist William Wilberforce, the Bishop was considered one of the greatest orators of his time—part viper, part soapbox parliamentarian. He had been armed with anti-evolution arguments by one of Darwin's rivals, the anatomist Richard Owen, and arrived in Oxford ready to deploy.

"I trust you will not allow yourself to be in any way disgusted or annoyed by the considerable abuse and misrepresentation which, unless I am greatly mistaken, is in store for you," Huxley had written Darwin just before the publication of "The Origin." "I am sharpening up my claws and beak in readiness." And indeed, in the seven months since the book's publication, Huxley had showed up slashing and pecking. He wrote reviews and rebuttals for the London *Times*, *Macmillan's Magazine*, and *The Westminster Review*. In a public lecture for the Royal Institution, he not only defended "The Origin" but also explored its most sacrilegious implication: our kinship with apes.

Still, he expected a confrontation with the Bishop to be trickier. Huxley later recalled that Wilberforce "had the reputation of being a first-class controversialist." He could hardly "see the good of giving up some peace and quietness to be episcopally pounded." But peer pressure got to him. He explained that a fellow-evolutionist had accused him of deserting the Darwinians: "So, I said, 'Oh! if you are going to take it that way, I'll come and have my share of what is going on.'"

The resulting face-off is now legendary. It was included in Hal Hellman's book "Great Feuds in Science: Ten of the Liveliest Disputes Ever" (1998). It was reënacted in the PBS documentary series "Evolution" (2001) and the BBC television show "The Voyage of Charles Darwin" (1978). It inspired Crispin Whittell's play "Darwin in Malibu" (2003), which imagined Darwin, Huxley, and Wilberforce meeting in a beach house in the afterlife more than a century after their deaths. And, like one of those enormous mama spiders carrying an ungodly number of spiderlings, it continues to spawn a relentless stream of scholarly papers, including an article published last year titled "Enough of Galileo and the Huxley-Wilberforce Debate."

Today, the showdown is remembered less for its scholarly arguments and more for one of the zestier Victorian comebacks on record. After railing against "The Origin," the Bishop addressed Huxley and, according to the London weekly *The Press*, "asked the Professor whether he would prefer a monkey for his grandfather or his grandmother." There are different versions of Huxley's response, although the one he reported a few months later is (no surprise) the most eloquent: "If then, said I, the question is put to me would I rather have a miserable ape for a grandfather or a man highly endowed by nature and possessed of great means and influence and yet who employs these faculties and that influence for the mere purpose of introducing ridicule into a grave scientific discussion—I unhesitatingly affirm my preference for the ape."

ILLUSTRATION BY MELINDA BECK

By this point, Huxley had eclipsed his upbringing. Born in 1825 and brought up in a lower-middle-class family, he received just two years of formal education before apprenticing to his rambunctious, opium-chewing brother-in-law, the doctor John Cooke. After pursuing more medical training, he was assigned to the Royal Navy's H.M.S. Rattlesnake as an assistant surgeon. The ship's voyage to Australia and New Guinea, which lasted four years, revealed Huxley's talents in natural history. He spent his spare time dissecting marine invertebrates and mailing manuscripts to England. While he stewed in self-doubt in the South Seas, his scientific work was attracting attention at home, appearing in *Philosophical Transactions of the Royal Society* and in *Proceedings of the Zoological Society*. When he arrived back in England, in 1850, Huxley learned that he had become a noted scientist. He was elected a fellow of the Royal Society in 1851, won its medal for physiology in 1852, and by 1854 had secured a lectureship in natural history at the Government School of Mines (now part of Imperial College London).

Even with his rising profile, the showdown with Wilberforce was a turning point for Huxley. He was, he later recalled, "the most popular man in Oxford for full four & twenty hours." More important, he gained a new perspective on public speaking, becoming convinced that he "should carefully cultivate it, and try to leave off hating it." While Darwin, forever sickly, stayed at home in the following years, Huxley fought as evolution's champion. He used his growing influence to expand scientific education, and he grappled with ethics and religion. (He coined the term "agnostic" in 1869.) From relatively modest beginnings, Thomas Henry Huxley became one of the most prominent public intellectuals in the English-speaking world.

It was fitting for a man known as "Darwin's bulldog" that his descendants inherited many of his traits—not just his talents but also his affinity for certain sweeping questions: Who are we? What is our place in nature? How can we design morality and religion in a world informed by science? In "The Huxleys: An Intimate History of Evolution" (Chicago), the historian Alison Bashford moves across the Huxley generations, tracing how Thomas Henry and his gifted brood struggled to answer these questions, in the process shaping outlooks we hold today.

Bashford focusses her chronicle on the two most evolutionarily minded Huxleys: Thomas Henry and his grandson Julian. The eldest child of Huxley's son Leonard—himself a notable writer and magazine editor—Julian enjoyed not one but two illustrious bloodlines. His mother, Julia, came from the Arnold family, a clan famed for its writers and scholars. (Matthew Arnold was her uncle.) After Julia's untimely death, in 1908, her sister, the best-selling novelist Mrs. Humphry Ward, both mentored Julian in his literary ventures and became a second mother to him and his siblings, Aldous, Trevenen, and Margaret.

Julian's bond with his paternal grandfather was special. "I like that chap!" Huxley said when Julian was four. "I like the way he looks you straight in the face and disobeys you."

Like his grandfather, Julian was a nerd for nature. As that four-year-old, he asked, "Why do all live things have natures?" Some three years later, when Huxley remarked that parental care was absent in fish, Julian interjected, "What about the stickleback, Grandpater?" Their connection is apparent in a letter Huxley wrote Julian close to his fifth birthday: "There are some people who see a great deal and some who see very little in the same things. When you grow up I dare say you will be one of the great-deal seers and see things more wonderful than water babies where other folks can see nothing."

Thomas Henry died in 1895, days after Julian turned eight. But, as an adult, too, Julian took after his grandfather. Both men were moral, extroverted, sometimes tortured, and sometimes arrogant. They were also ambitious synthesizers, wildly successful storytellers, and agnostic materialists dazzled by the expansiveness of nature. They were so alike that Bashford says they can even be thought of as "one very long-lived man, 1825–1975."

"The Huxleys" is an intimate history of evolution in several senses. First, it chronicles the understanding of evolution by two of the theory's most zealous apostles. In the decades after "The Origin" was published, a Darwinian brand of evolutionary theory spread, fuelled in large part by Thomas Henry's advocacy. By 1900, however, "the eclipse of Darwinism" (to use Julian's phrase) was setting in. Evolution was widely accepted, yet natural selection seemed a tad too fantastical. Was the Earth truly old enough for a process as slow as selection to have fashioned the diversity of life? Could the eyes of mammals and squids—so complex, so similar—really have evolved through blind tinkering? Reinforcing such objections was the fact that Darwin got some important things wrong, most notably inheritance. He believed that the traits of progeny were blended averages of their parents' traits, yet Gregor Mendel seemed to show that traits were passed down as discrete units. Biologists struggled to square new discoveries about inheritance with Darwin's ideas. When Julian studied zoology at Oxford, from 1906 to 1909, the discipline was in the process of abandoning natural selection.

Julian wasn't going to give up on Grandfather's credo. But neither—as he bounced from Oxford to Rice University to Oxford again, eventually landing at King's College London—was he eager to settle into a specialty. "For goodness sake do decide which branch of biology you are expert in," the marine biologist George Parker Bidder implored him in 1925. "A man now cannot be a universal expert. . . . You must not be led away by the notion of imitating your grandfather." Julian, defiant as always, ignored the advice. In 1927, he abandoned academia to write a sweeping summary of biology, "The Science of Life," with H. G. Wells and his son G. P. Wells. Widely popular—both David Attenborough and Walt Disney later gushed about it—the book buoyed Julian's passion for storytelling and synthesis.

His own crucial vindication of Darwinian theory appeared in the book "Evolution: The Modern Synthesis" (1942), which reanimated the program. "The death of Darwinism has been proclaimed not only from the pulpit, but from the biological laboratory,"

Julian wrote, but he meant to show that Darwinism was "very much alive." The book—notable for its breadth, its clarity, and its literary flair—articulated a new vision of evolutionary theory, reconciling natural selection with insights from a slew of subdisciplines, including genetics, paleontology, and cell biology. It was also a quintessentially Huxley project. In a review for *American Scientist*, the geologist Kirtley Mather called Julian's defense of Darwinism "amusingly reminiscent of bygone days when another Huxley championed the cause of evolution in a wholly different battle."

In the half century before his death, Julian wrote some forty other books. He also won an Academy Award, ran the London Zoo, helped found the World Wildlife Fund, served as UNESCO's first director-general, popularized the term "transhumanism," and coined the words "clade" and "cline." Along the way, he and his wife, Juliette, raised two sons—a botanist, Anthony, and an anthropologist, Francis. Truly his grandfather's grandson, Julian rose from being a disciple of Darwin to serving as a mouthpiece for science itself.

"The Huxleys" is more than an account of how two celebrity scholars fashioned and sold evolution. It is also about the implications that the men discerned in activities ranging from religion to conservation. The most important among these implications concerned ethics.

Two stories can be told about the Huxleys in this regard. According to one, they were progressive anti-racists who used science for good. The elder Huxley, a comparative anatomist, marshalled evidence to refute racist pseudoscience. His research countered common beliefs about Africans being more "ape-like" than Europeans. He railed against the polygenists, who argued that Europeans and Africans were akin to different species and whose writings served as justifications for slavery in the American South. His observations, demonstrating our common humanity, became buckshot in the war against slavery. The Ladies' London Emancipation Society gathered quotations from his lectures into an abolitionist pamphlet, "Professor Huxley on the Negro Question" (1864), declaring that his scientific work equated to "an earnest plea for Negro emancipation."

Julian carried on his grandfather's crusade against race science. With the anthropologist Alfred Cort Haddon, he published "We Europeans: A Survey of 'Racial Problems'" (1935), a book that debunked what its authors called a "vast pseudo-science of 'racial biology'" endorsed by fascist nationalists. The book's conclusions have since become common sense: The idea of a "pure" race is flawed. What we call "the Germans" or "the French" are in fact mixtures of many ancestral populations. The project of distilling a racially unpolluted people through reproductive policy is scientifically obtuse. Julian fought against Nazism and race science for years thereafter, most famously in the documentary "Man—One Family" (1946) and in his manifesto "UNESCO: Its Purpose and Its Philosophy" (1946).

And yet another story can easily be told: Thomas Henry was a racist and an imperialist. According to Bashford, he believed that human variation was organized hierarchically, with the white man presumably on top. Although he was an abolitionist, his rooting interest was with white people. "I have not the smallest sentimental sympathy with the negro," he wrote his sister Lizzie in 1864, within months of the publication of "Professor Huxley on the Negro Question." He advocated for emancipation, yes, but "for the sake of the white man"—for his politics, his morality, and his economy.

Julian doesn't come out looking much better. He was racially prejudiced and, despite all his talk about "the family of man," doubted non-Europeans' sophistication. More damningly, he was a eugenicist—not just vaguely sympathetic but a big-time proselytizer, waving the banner even after the Nazi atrocities, and eventually ascending to the presidency of the British Eugenics Society.

Both stories have their truth, of course, leaving modern interpreters unmoored. Should the Huxleys be celebrated or vilified? In 1969, Western Washington University named its new environmental college after the elder Huxley. Half a century later, in 2021, a task force recommended removing his name because his "white supremacist values" served to "dehumanize and harm many members of the Western community." The task force's report was riddled with inaccuracies, many of which were documented in a response from ten Western Washington University faculty members. Still, a more responsible group commissioned by Imperial College London arrived at a similar recommendation: rename Imperial's Huxley Building and exile Huxley's bust to the archives. (W.W.U. has removed his name; Imperial will consider adjoining the name of a scientist from a minority group.)

Although Bashford is avowedly sympathetic to Julian, she tends to avoid moral pronouncements, viewing the Huxleys' positions instead as artifacts of historical study: examples of the weight of cultural inheritance, snapshots of the ever-changing relationship between evolution and ethics, and paradoxes that illuminate a different way of thinking. She is especially fascinated by eugenics. For many readers, Julian's advocacy might seem incomprehensible. He was an opponent of biological racism and yet a spokesman for population-level genetic planning; a decrier of Nazi atrocities, yet a crusader for sterilization.

But Julian's position was far from unusual. In the nineteen-twenties and thirties, he joined a squad of biologists, including Hermann Muller and J.B.S. Haldane, who combined progressive and sometimes socialist agendas with eugenic fervor. For them, genetic planning was a facet of a modern utopian state: a tool for good that needed to be severed from the corrosive evils of ethnonationalism and racial prejudice.

They laid out their vision in a 1939 manifesto titled "Social Biology and Population Improvement." Published in *Nature* two weeks after Nazi Germany's invasion of Poland, the manifesto called for radical reforms: Establish equality of opportunity. End racial and national discord. Legalize and develop birth control. Provide social welfare, and alleviate burdens on women. Teach people that heredity and the environment interact to affect well-being. Institute a social system that prioritizes

"the good of mankind at large." The manifesto was more leftist than was typical for Julian, but its anti-racism, internationalism, and birth-control advocacy were familiar Huxley stances.

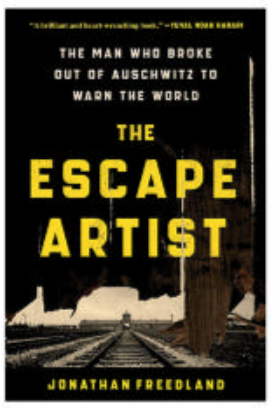
A key point of the Geneticists' Manifesto (as it is sometimes known) is that eugenic planning requires these reforms. Our understanding of genetics remains impoverished, it asserted; there is "no valid basis" for assessing the genetic component of individuals' intelligence or temperament as long as they come from unequal social backgrounds. Even so, Julian campaigned for eugenic policies, particularly those connected to health. He was convinced, he said, by data showing that "mental and physical defect runs in families" and that small measures, mostly voluntary sterilization, "could enormously reduce the burden of defective humanity." This advocacy was striking because Julian and his family were members of the targeted group. Not only did they suffer from mental illness—Julian considered it their genetic burden.

The Huxleys had many names for the dark spells that afflicted them. Thomas Henry called them "paroxysms of internal pain." Julian used the phrase "the malady of thought." His brother Aldous preferred "accidie," Chaucer's term for a "hevy, thoghtful, and wrawe" state. Whatever it was called, Julian deemed it a hereditary scourge.

Bashford locates haunting passages in Julian's private writings. After the birth of his firstborn, he grieved the torture that his son would inherit: "Your mind . . . will maybe collapse & leave you shelterless, will be ugly, will be so bewitched as to turn (when least expected) from a palace of an Arcadian bower into a pigsty or a prison." Bashford notes that the words read almost like a curse.

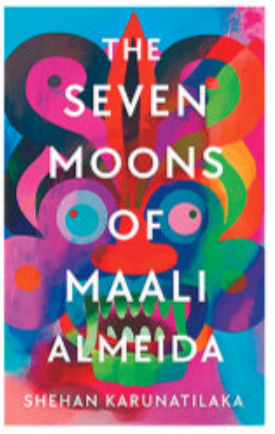
The malady could be crippling. Julian suffered a nervous breakdown before he was supposed to start at Rice, delaying his departure for America by some four months. During another episode, he became near-catatonic—a sad, still, silent facsimile of his usually ebullient self. All the same, he fared better than some other Huxleys did. Thomas Henry's daughter Marian was despondent after giving birth, and later

BRIEFLY NOTED

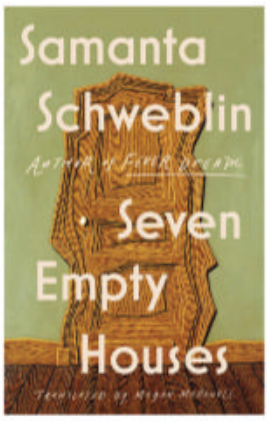


The Escape Artist, *by Jonathan Freedland (Harper)*. In 1944, the Auschwitz escapee Rudolf Vrba, intent on piercing the "veil of ignorance" surrounding the Nazis' crimes, related his and others' experiences of the camp in the Vrba-Wetzler Report. Disseminated in the midst of the war, the report catalyzed an international response that would ultimately spare two hundred thousand Hungarian Jews. With the propulsion of a historical thriller, Freedland, a journalist, tracks Vrba's work collecting the "data of the dead" even while imprisoned, driven by his conviction that facts could perhaps derail the Nazi extermination plan. As Freedland depicts world leaders' failure to act expeditiously, he observes, "A horror is especially hard to comprehend if no one has ever witnessed anything like it before."

Shirley Hazzard, *by Brigitta Olubas (Farrar, Straus & Giroux)*. This biography of an acclaimed novelist follows Hazzard from her early years in Australia and postwar Hong Kong through her adulthood among storied literary circles in New York City and Italy. Olubas traces the development of Hazzard's longtime preoccupations with "mobile protagonists and their shifting worlds," and with questions of truth, goodness, knowledge, and perspective. Carefully crafted—a page could be revised as many as thirty times—and signalling a "deep investment in destiny," Hazzard's richly layered novel "The Transit of Venus" led her husband, the biographer and Flaubert scholar Francis Steegmuller, to remark, "No one should have to read it for the first time."



The Seven Moons of Maali Almeida, *by Shehan Karunatilaka (Norton)*. In this magic-realist satire, the title character—a self-described "photographer, gambler, slut"—wakes up in the afterworld and has a week to discover who killed him. Set during the civil war in Sri Lanka in 1989, the novel follows Almeida as he attempts to find his murderer and help two friends obtain a cache of photographs incriminating those on all sides of the conflict, before they are purloined by others searching for them. The group includes government officials, separatist Tamil Tigers, communist rebels, Indian peacekeepers, and arms dealers, all of whom are willing to kill to accomplish their mission. When Almeida tracks down his murderer, he realizes that "every death is significant, even when every life appears not to be."



Seven Empty Houses, *by Samanta Schweblin, translated from the Spanish by Megan McDowell (Riverhead)*. The seven stories that make up this haunting book, by an Argentinean novelist, feature characters confronting their own estrangement—from their families, their neighborhoods, and themselves. In one story, the narrator and her mother rearrange parts of strangers' homes, an act that encapsulates the sense of alienation inspired by the houses of the book's title. In several tales, children die or disappear, leaving behind adults incapable of coping with loss. While Schweblin's shorter stories often rely too heavily on elision, the longest, about an elderly woman with dementia who observes her mind's deterioration, is deeply affecting.

died in psychiatric care. Julian and Aldous's brother Trev hanged himself at the age of twenty-four.

Julian, in his autobiography "Memories," speculated that the malady was genetically inherited, and Bashford offers no alternative explanation. But other observers stress a different inheritance: the heavy expectations levied on the Huxley children and grandchildren. Julian thought that his brother's suicide was triggered by a failed love affair, but Trev's "desperate fits of melancholia," as one biographer put it, began months earlier, after a disappointing performance on the Civil Service exam. "There is something really devastating about having a grandfather (Grand-pater as they called him) who was a god in the family," Juliette, Julian's wife, said in a 1985 interview. "These children grew up with that atmosphere: 'Worthy of Grand-Pater—right! You must be worthy of Grand-pater.'"

The sense of unfulfilled potential comes across in Julian's writings. After his first son's birth, he wrote, "It is the eternal wish of fathers to instruct their sons in the art of living. They make so many mistakes themselves, they regret so much of life wasted, such energies dissipated, so many hopes on the rocks. Such exquisite possibilities crumbled into nothing."

If Julian and his grandfather are the stars of Bashford's book, Aldous Huxley is the celebrity who makes the occasional cameo. Best known for his books "Brave New World" (1932) and "The Doors of Perception" (1954), Aldous might seem like a Huxley outlier. Where Julian and Thomas Henry easily fuse into a single long-lived spokesman for evolution, Aldous appears to be something else entirely: a mystical, half-blind novelist; an aloof stork—he was famously tall and gawky—who escaped to the American desert. The English biographer Ronald W. Clark promoted this image in a 1968 book, also titled "The Huxleys." Comparing the brothers in the early nineteen-tens, he wrote that Julian, then a twentysomething zoologist, "showed to formidable degree the traits of TH." The teen-age Aldous, by contrast, was already "so different from the rest, so curiously adult, so like an Arnold."

Yet Aldous was just as much Thomas Henry's grandson. He planned to become a physician until an infection compromised his eyesight, and he maintained a lifelong interest in biology. In 1948, the writer Osbert Sitwell recalled Aldous's knack for talking about arcane biological subjects, including "the incestuous mating of melons, the elaborate love-making of lepidoptera, or the curious amorous habits of cuttlefish." In the final years of his life, Aldous still considered himself "a cheerleader for evolution." And his intellectual companionship with Julian—which unfolded through a decades-long correspondence—was so consequential that the work of each can partly be understood as a dialogue with the other.

Bashford offers glimpses of how Julian and Aldous shaped each other's views, although the better book on the topic is Richard Deese's "We Are Amphibians: Julian and Aldous Huxley on the Future of Our Species" (2015). The brothers, Deese showed, were gripped by similar trends: the centralization of state power, the growth of industrialized society, the transformation of human nature through scientific discovery. Yet they often disagreed about what these trends meant. For Julian, they were engines of progress. For Aldous, they foreshadowed tyranny.

These differences were apparent in projects they worked on in 1931. Julian, a fan of rationally planned societies, invited his younger brother on a tour of the U.S.S.R. Aldous declined. He had to finish a novel, he said, and, besides, he saw evil designs in the U.S.S.R.'s utopian schemes. The next year, Julian published his observations from the trip in "A Scientist Among the Soviets," a honey-tongued account of the country's economic and scientific achievements. Aldous, meanwhile, published "Brave New World," his vision of a rational utopia gone wrong. The books drew on similar images of state power—athletic bodies, state-sponsored nurseries, community singing—even as they came to opposite conclusions about the significance of such power.

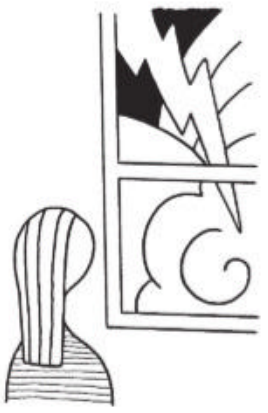
Julian influenced "Brave New World" beyond supplying an ideological sparring partner. The novel explored futurist speculations that Julian had put forward in "What Dare I Think?" (1931), including a designer drug that would one day be taken by millions. The novel further drew on Julian's work in having Mustapha Mond, the face of the dystopian government, come across a paper arguing that evolution favored expanded consciousness, a view that Julian had expounded in several recent books. H. G. Wells considered "Brave New World" an attack on his own utopian daydreams, but the book can also be read as an extended letter from one future-obsessed brother to another.

"I'm turning back. This is landfill."

Thomas Henry Huxley and Bishop Wilberforce debated evolution that day in 1860 because Darwinism was dangerous. By explaining the origin of species without divine intervention, it threatened to destabilize Christianity. God was elbowed out of the picture, replaced by an impersonal process of survival and reproduction. When we extrapolate this conflict to the modern day, it is easy to see evolution and religion as fundamentally incompatible, especially since some of

evolution's most vocal apostles, like Richard Dawkins, rank among religion's most fiery opponents.

The irony is that Huxley was a fan of religion. When running for the London School Board in 1870, he proposed that two hours be allocated weekly to religious instruction. He supported Bible readings in school, which he thought useful for cultivating morality. He also studied Biblical history with rabbinic care. Although he is remembered for his research on crayfish, gorillas, and marine invertebrates, his notes on the Old Testament far exceeded what he compiled on any of those critters. He devoured Jewish history and trawled Biblical scholarship, producing his own "Genealogy of the Horites and Genealogy of the Edomites." An agnostic through and through, he believed that the generations and chronologies of Genesis made no sense but thought that other statements in the Old Testament might be true.



For Huxley, evolution meant not the end of religion but, rather, religion's reconstruction—"a new ethical formula, a new set of beliefs, a new pattern of rules by which humanity might live," in Ronald Clark's words. His heirs Julian and Aldous took up this pursuit, seeking traditions that were both compatible with science and resonant with humanity's religious impulses. Predictably, though, the brothers ended up with different creeds.

Julian developed what he called "evolutionary humanism," a mashup of his favorite progressivist themes. It featured in many of his lectures and books, although he discussed it in greatest detail in "Religion Without Revelation" (1927). Central to the ideology was humanity's purpose: we are the children of a cosmic process that produces ever-greater intelligence and complexity. There could be no more important common aim than to take control of that process—to overcome our individual and tribal identities and achieve the more advanced mode of collective existence he called transhumanism. Evolutionary humanism, given its focus on the betterment of the species, became welded to eugenics. This might explain why, as eugenics lost legitimacy, evolutionary humanism became all but forgotten.

Where Julian focussed on unity and transhumanism, Aldous turned to experience. As an undergraduate at Oxford, he wrote to Julian about his conviction that the higher states of consciousness described by mystics were achievable. The fascination persisted, and, by the nineteen-thirties, Aldous believed that society's aim should be to nurture the pursuit of enlightened consciousness. By the time he published "The Doors of Perception" (1954), which connected his experience on the drug mescaline to the universal urge for self-transcendence, he had been writing and lecturing on mystical experiences for decades. Through this commitment, Aldous helped pioneer a form of secular mysticism that suffuses modern attitudes, showing up in things like New Age yoga and psychedelic-assisted therapy. An inheritor of evolution, the half-blind stork wrested sublime experience from the caverns of institutionalized religion.

The history of the Huxleys reveals a paradox in how we think about evolution. On the one hand, it exemplifies our impulse to find answers in cosmology. As organized religion declined, people sought guidance and justification in the scientific narratives taking its place. From race science to eugenics, progress to spirituality, the Huxleys combed our deep past for modern implications, feeding an ever-present yearning.

On the other hand, the Huxleys expose how diverse and historically contingent those implications can be. Evolution is a messy, nuanced, protean picture of our origins. It offers many stories, yet those which we choose to tell have their own momentum. It can serve as a banner of our common humanity or as a narrative of our staggering differences. It can be wielded to fight racism or weaponized to support oppression. It can inspire new forms of piety or be called on to destroy dogma. The social meanings of evolution, like so much else, are part of a grander inheritance. ♦

THE CURRENT CINEMA

TROUBLE IN MIND

"Glass Onion: A Knives Out Mystery," "White Noise," and "The Son."

BY ANTHONY LANE

The big difference between "Knives Out" (2019) and its sequel, "Glass Onion: A Knives Out Mystery," is one of climate change. In many respects, the two movies are twins. Both are directed by Rian Johnson; both star Daniel Craig as Benoit Blanc, the sybaritic sleuth; and both present Blanc with a puzzle to solve. The first film was centered on a Massachusetts mansion, amid the rustle of autumn leaves, whereas the new one largely unfolds on a Greek island, in charring heat. The downside is a lack of shadows—a bummer for anyone who believes that murder is most foul, and most gratifying, when draped in gloom. The upside is that we get to see Craig, who rose from the waves like a dripping god in "Casino Royale" (2006), step gingerly into a swimming pool wearing a two-piece bathing costume, in striped seersucker, that even the shyest Victorian gent would have deemed too modest by half. Oh, and a buttercup-yellow cravat, knotted and spotted. Nice.

Nattier still is the scene in which Blanc lounges in his bath, crowned with a tasselled smoking cap, sucking on a cigar, and bored out of his giant mind. "I need a great case," he says. And here it comes. He is summoned to the island in the sun; other invitations, each cached within a cunning box, are sent to his fellow-guests. From the top: Duke (Dave Bautista), who has found fame, if you can call it that, on YouTube, and his inamorata, Whiskey (Madelyn Cline); Claire (Kathryn Hahn), the flustered governor of Connecticut; Birdie (Kate Hudson), once a model, now an entrepreneur, always a fool, plus her assistant, Peg (Jessica Henwick); a scientist named Lionel (Leslie Odom, Jr.); and, to general consternation, Cassandra Brand (Janelle Monáe). Their host is Miles Bron (Edward Norton), a reclusive billionaire who used to be Cassandra's business partner before casting her adrift. Reputedly, Miles is a master of new technologies. Demonstrably, he is a dick.

The opening twist, in the pretzel of a plot, is that Miles lures these folk to his domain and dares them to unpick "the mystery of my murder." One obvious model here is Agatha Christie's "A Murder Is Announced," published in 1950. In both instances, an apparently lighthearted game morphs into a crime with no heart at all; those familiar with the book, indeed, will have a head start in identifying the slayer in the film. Where Johnson scores over Christie is in the whiplash of his storytelling. We get flashbacks, switchbacks, a darting shoal of red herrings, and scenes whose meaning is upended when viewed from another angle, with fresh information at our command. As Whiskey pours herself all over Miles, say, does she know that Duke is watching through the window? Does he know if she knows?

The title swings two ways. First, toward a track on the White Album, in which fans who read too much into Beatles lyrics are waggishly ribbed by John Lennon. "The walrus was Paul," he sings. Only by such obsessive detail-sniffing, of course, can you hope to decode a movie like this one. Second, there is an actual glass onion: a stately dome, sitting atop Miles's island lair, and a telling symbol, I would say, for this extravagant but none too sturdy film. It is shiny with mischief, crafted with guile, and performed with eager wit—not least by Kate Hudson, who turns the tweeting Birdie into the empress of faux pas. (On "Oprah," we learn, Birdie compared herself to Harriet Tubman; she also thinks that sweatshops are where sweatpants are made.) Why, then, should the whole enterprise feel so curiously thin and cold to the touch?

The clue lies in Agatha Christie. Her gang of suspects, in "A Murder Is Announced," was a mixture of young and old—as it was in "Knives Out," which was thoroughly warmed by the friendship, fond and non-creepy, between an elderly author (Christopher Plummer) and his nurse (Ana de Armas). No such good will exists in "Glass Onion," which is stiff with unlikable souls, all of them Miles's pals, and thus of the same generation. Frankly, who cares who assassinates whom? Also, in the novel, as Miss Marple observes, "nobody *knows* any more who anyone is." In the messy wake of war, one could forge not only a new identity but a fictitious past. That covering of tracks isn't so easy in the digital age, and you can sense Johnson

Daniel Craig plays the dapper sleuth Benoit Blanc in Rian Johnson's new film.

ILLUSTRATION BY KRISTIAN HAMMERSTAD

bending the evidence to fit the tale. At one point, somebody is killed before he or she can share a fact that just popped up on Google Alerts. What a way to go.

As for the climax, I will reveal only that it involves major mayhem. In line with "Parasite" (2019) and this year's "Triangle of Sadness," "Glass Onion" is bent on smashing the wealthy, together with all their toys—which, coming from a star-stuffed Hollywood spectacle, on a plump budget, strikes me as a bit rich. I wonder what Daniel Craig makes of it all. He clearly relishes the languid brain work, and savors the character of Blanc as if it were ripe Brie, yet here he is, with everything exploding in fireballs. Isn't that what he was running away from, when he fled the world of Bond?

Tall and black-gowned, with a paunch and a pair of blue-tinted spectacles, Jack Gladney (Adam Driver) is the chairman—and the proud founder—of the department of Hitler studies at the College-on-the-Hill, a pleasant cradle of learning. And here's the fun part: Jack doesn't speak German. He tries, but he just can't get his all-engulfing American mouth around the Teutonic tongue. This frustrated figure, inclined to be hopeful yet pestered by intimations of doom, and brought to life by the tireless Driver, is the hero of "White Noise," written and directed by Noah Baumbach.

The movie is based on Don DeLillo's novel of the same name, from 1984, and is set in that decade. (Hands up: who is instinctively on the side of any film that is smartphone free?) As so often with Baumbach, we are ushered into the bosom of a family. This bosom is busier than most, because Jack and his wife, Babette (Greta Gerwig), not only have a child of their own but also house kids from their previous marriages; two of the siblings, Steffie and Heinrich, are played by a real-life sister and brother, May and Sam Nivola, thus adding to the lived-in domestic texture of the story. If, like me, you enjoy watching smoothly choreographed sequences of people weaving in and out of rooms, chattering and snacking, or rallying one another to the TV ("Hurry up, plane-crash footage!"), then the everyday crackle and hum of "White Noise" will be enough.

But this is DeLillo, so we must brace ourselves for narratives—or, at any rate, for occurrences that are so dense with the gaseous air of conspiracy that you can barely breathe. Hence the pills that Babette takes, in secret, or the "Airborne Toxic Event" that shrouds the landscape and causes the townsfolk, including the Gladneys, to evacuate. Baumbach, too, is taking flight, away from his regular zones of operation and into Spielberg country, where the highways seize up in mass panic, beneath a storm cloud as loomingly vast as a spaceship. And, all the while, everyone converses in fluent DeLillo: "Maybe there's no death as we know it, just documents changing hands." What husband has ever said that to his wife? On the page, the fact that the characters sound like the author somehow deepens the ominous charm of the spell that he casts. Onscreen, it's too weird for words.

Nevertheless, even if you grow impatient with "White Noise"—an intimate black comedy that dreams of becoming an epic—stick with it, for the sake of the end credits. Unfolding in wide shot, against the background of a seething supermarket, like an Andreas Gursky photograph, these are a miniature masterpiece unto themselves. Given the chance, Baumbach can't help making a song and dance of things. Someone please put him in charge of a musical, and soon.

There is more than one son in "The Son." The first son we see, at the start of Florian Zeller's new film, is a baby named Theo. He is doted upon by his mother, Beth (Vanessa Kirby), and his father, Peter (Hugh Jackman), who live comfortably in New York. Discomfort arrives at the door, in the shape of the anxiety-shredded Kate (Laura Dern). She is Peter's ex-wife, and she brings news of *their* son, Nicholas (Zen McGrath), who is seventeen. "He scares me, O.K.?" Kate says.

Nicholas is hardly the spawn of Satan. He seems a mild and dreamy boy; his gaze is misted over, as if his mind were drifting elsewhere, and it's no surprise to learn that he has been skipping school. What did he do all day? "I walked." And what's his problem? "It's life. It's weighing me down." The simplicity of these replies exasperates his father, a lawyer with political ambitions. (Not that the film is remotely interested in work; it's merely an arena for private pain.) Peter's response to the revelation that Nicholas has been self-harming is typical. "I forbid you to do this," he says. That should do the trick.

Nicholas, who has hitherto lived with Kate, moves in with Peter and Beth, and appears—though only appears—to be on the mend. He is loved by those around him, and yet, as a doctor says, "Love will not be enough." Advice that chills the heart. Many viewers, with experience of mental-health crises in their own homes, may decide that the plot of this movie cuts all too close to the bone. (Few of them will be wealthy professional New Yorkers with ready access to psychiatric care.) If "The Son" lacks the grip of Zeller's previous film, "The Father" (2020), it's because the fable of Nicholas and Peter has the brittle feel of a setup. Over and over, as situations are constructed, you can spot the payoff coming; when Peter dances with Beth, in their apartment, do we get a shot of Nicholas looking on, shut out from others' pleasure? Check. Likewise, the finale relies on a detail that's been planted, with maximum implausibility, a while before. The shock is blunted on impact.

This is not to scorn the skill of the actors, and Dern is on especially wrenching form. It is neither fair nor wise, however, to land Jackman with a role of ceaseless anguish, which, dancing aside, siphons off his natural geniality. The irony is that "The Son" is unceremoniously stolen by Anthony Hopkins, who won an Oscar as a man felled by dementia in "The Father." He now plays Peter's father, a power-monger with his wits intact and blazing, who, in a single scene, proceeds to torch the fragile emotional sympathies on which the whole film depends. His recommended cure for the suffering of his son and his grandson is as follows: "Just fucking get over it." Is that not a monstrous thing to say? It is. Does the monster stay in your head, as the rest of the movie recedes? Completely. ♦

NEWYORKER.COM
Richard Brody blogs about movies.

THE THEATRE

SALT OF THE EARTH

Will Arbery's existential comedy mines our dark moment.

BY HELEN SHAW

There are four vibrant actors in Will Arbery's bracing play "Evanston Salt Costs Climbing," at Pershing Square Signature Center, but the show also has two stars *not* listed in the program: a pair of immense garage doors. The designer Matt Saunders has filled the proscenium, from the floor to the grid, with a huge wall—an expanse of what looks like corrugated steel pierced by those twin roll-up garage doors, with a single human-size door standing between them. This is the industrial warehouse where the city of Evanston, Illinois, keeps its piles of road salt, but it's also where the audience stores its dread. The doors grind up and down, slow-opening mouths that reveal an interior as black as a throat. (Isabella Byrd lit the darkness; Mikaal Sulaiman did the chill-inducing sound design.) There's a thin strip of playing area in front of the wall, where the characters—most of them employees of the Evanston municipal-works department—can stand and chat, and some scenes happen on black platforms inside the warehouse. But, even when the gates are rolled down tight, you sense the pull of that cold, lightless abyss behind them, dragging at the characters' fragile human warmth like the vacuum of space.

"Evanston Salt Costs Climbing" tells the tale of three frozen Januaries—2014, 2015, 2016—and of the two guys who drive Evanston's salting truck, the mentally unstable Peter (Jeb Kreager) and the secretive Basil (Ken Leung). Their casting is canny: Kreager played a creepy cop on "Mare of Easttown"; Leung starred on "Lost" for years. "Evanston" exists somewhere between those two shows, toggling from "Easttown"'s gritty, wintertime realism to "Lost"'s Manichaean, allegorical menace.

Arbery is the playwright of the moment—both our fascism-adjacent political one and the global-existential climate-crisis one. He was a Pulitzer Prize finalist in 2020 for "Heroes of the Fourth Turning," his portrait of the right-wing faithful; this production, staged by the New Group and directed by Danya Taymor (she also directed "Heroes"), is the second major production of his to appear in New York this year. ("Corsicana" was at Playwrights Horizons over the summer, and its relative sweetness might linger for some audiences.) Taken together with his more experimental play "Plano," these works display the components of the Arbery style. He employs a sense of the hidden, whether as a supernatural presence or as some coincidence that goes beyond the rational. He's rhythmically very free, switching between long stretches of text, realistic talk, and rapid, language-as-sound exchanges. And there's a single drumbeat driving his work: things are bad, the badness is out there, and, sorry to say, the badness is getting closer.

Taymor, as before, explores all Arbery's delicate shadings. Peter and Basil communicate in a shorthand built during their long nights on the roads, and the wonderful Leung and Kreager infuse a few pages of sophomoric back-and-forth ("Fuck you. No fuck you ha-ha") with complex dramatic layers. Their boss, "assistant public works director in charge of city snow removal operations" Jane Maiworm (Quincy Tyler Bernstine, honored by the Obies in 2019 for sustained excellence), likes to pop by in the predawn hours before the men head out on their rounds. She rallies their spirits and reads them articles from the local paper. Will the climbing salt costs lead to layoffs? Are the roads safe? Maiworm is the conscience of the play, ready to defend her incremental, effortful, im-

In "Evanston Salt Costs Climbing," two men set out on an icy road.

ILLUSTRATION BY JAMES HEIMER

possible work, even when she's challenged on it. "Administration is *service!* Every day! That's what I *do!*" she cries.

Maiworm has an adult stepdaughter, Jane Jr. (Rachel Sachnoff), who lives on a narrow ledge between debilitating anxiety and function, and she panics when her mother leaves her alone. "There's something under everything and it's making us all want to die," she says, in one of Sachnoff's most gripping scenes. Peter, too, senses this awful psychic pressure, and his joshing exchanges with Basil in their truck's cab—they have a hilarious bit about the heat finally coming on and not wanting to "over-celebrate," since it might offend the truck—cannot keep his depression at bay.

PETER: Thanks for trying to cheer me up but it takes a while to sink in. My toes are cold.

BASIL: It's a cold day.

PETER: Negative seventeen. Butta time. Suppa time for us. Butta time.

BASIL: Butta time.

PETER: Okay but have you thought about what it would be like to die?

BASIL: Like what, or like what, the feeling?

PETER: The feeling, yeah, of the dying, when it happens, what's going on in your heart or brain.

BASIL: Peter, are you asking me to go down into that feeling with you?

Everybody's scared. Maiworm is having horrible dreams about paving options. Basil misses his home in Greece, which he left for an unnamed reason, one possibly illuminated by the eerie short stories he writes. But Peter is the one who hums with threat. One moment, he's talking about an innocent enthusiasm, like the Domino's pizza tracker; the next, his overloaded emotional system throws off sparks. Melancholy is slow-creep contagious, but Peter also conveys a sense of immediate, crackling danger. Kreager is tall, and he uses his height effectively—he looms up suddenly next to Leung, like a tree that's jumped in front of a skidding car.

In a world of content warnings (one of which is included on the theatre's Web site) and careful phrasing, Arbery's bleakness and frank talk about the death urge are shocking. Characters connect because of shared hallucinations or coinciding suicidal thoughts. "You aren't actually gonna kill yourself silently one night outta nowhere," Peter says to Jane Jr., even though we have been worried about his capacity for self-harm for nearly the entire show. Perhaps one just likes "looking at the shadow body of it," he suggests, elliptically, and the play prompts just this sort of Greek-tragedy-style catharsis—of watching people say and think the worst, knowing that it isn't real.

"Evanston" premièred in Massachusetts in 2018, but it somehow contains much of the desperation of the past three destabilizing years: there isn't a flicker of sunshine in it, even though Arbery is reliably funny and, in an upside-down way, galvanizing. He broaches a host of hyper-relevant issues: a climate that grows less clement every year, the biome-destroying potential of road salt ("That's what happens to bunnies in the winter. They eat salt and die confused," Maiworm says), American municipal underinvestment, untreated mental illness. Maiworm is a devotee of the urbanist Jane Jacobs. (This is the play's third Jane; Fates, Graces, and Furies also come in threes.) She gives Jacobs's book "The Death and Life of Great American Cities" to the guys. Basil has memorized a quote, which he recites for Jane Jr.: "There is a quality even meaner than outright ugliness or disorder, and this meaner quality is the dishonest mask of pretended order."

Arbery's project as a playwright is to yank away that "dishonest mask of pretended order," using the means he has at hand—the empathetic tools of performance and the electrifying effects of wild unreality. Some very odd things happen in the deep nights and early mornings of "Evanston Salt Costs Climbing": figures escape from nightmares, the dead climb up from underneath the asphalt, people take comfort, paradoxically, in despair.

The reason for this, I think, is that Arbery is writing about issues that tend to lead to indulgent hopelessness. Look at what we're doing to the earth, we think—well, it's too far gone now to do anything. But what if looking right into the heart of catastrophe could actually get us to act? In "Evanston," something pulsing and dark and Lovecraftian wants us dead—got it. The weather is getting worse—*got it*. But Maiworm is certainly still going. What's so scary about some garage doors in the face of her sturdy labor? You couldn't make this point so well without Bernstine in the role. As she has done in countless beautiful performances, she anchors the show with her wry, rasping voice and her refusal to sentimentalize. At one point, she struggles in a gale against the screaming wind. She hasn't got her parka; she's vulnerable. But I tell you—I wouldn't bet on the wind. ♦

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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 Lonnie Millsap, must be received by Sunday, November 27th. The finalists in the November 14th contest appear below. We will announce the winner, and the finalists in this week's contest, in the December 12th issue. Anyone age thirteen or older can enter or vote. To do so, and to read the complete rules, visit contest.newyorker.com.

THIS WEEK'S CONTEST

“ ”

THE FINALISTS

“I gave you the wheel and this is what you did with it?”
Jenny Valladares, Surprise, Ariz.

“You won't believe how long I've been waiting for this train.”
Roger Volkema, Washington, D.C.

“How do you kill your lunch with that thing?”
Joseph Lyles, Greenville, S.C.

THE WINNING CAPTION

“Thanks for carving out a little face time.”
Carol Lasky, Boston, Mass.

With access to reproductive choice

THIS GIRL COULD

HELP FIND SOLUTIONS TO THE CLIMATE CRISIS

In some countries in sub-Saharan Africa, a girl is 50X more likely to give birth before she's 18 than finish secondary school. Early and unintended pregnancies rob girls of their education. MSI is working to change this.

We are providing access to services and information so that adolescent girls can make informed decisions about their bodies and their futures. Choice gives girls opportunities to stay in school which helps them, their families and their communities build resilience and better adapt to climate change to be part of the solution. And that's good for all of us.

WILL YOU HELP GIRLS STAY IN SCHOOL?

Your gift of $27 per month will provide ten girls with four years of contraception and the opportunity to continue their education and become engineers, doctors, teachers or whatever they choose.

MSI UNITED STATES | Make reproductive choice possible.

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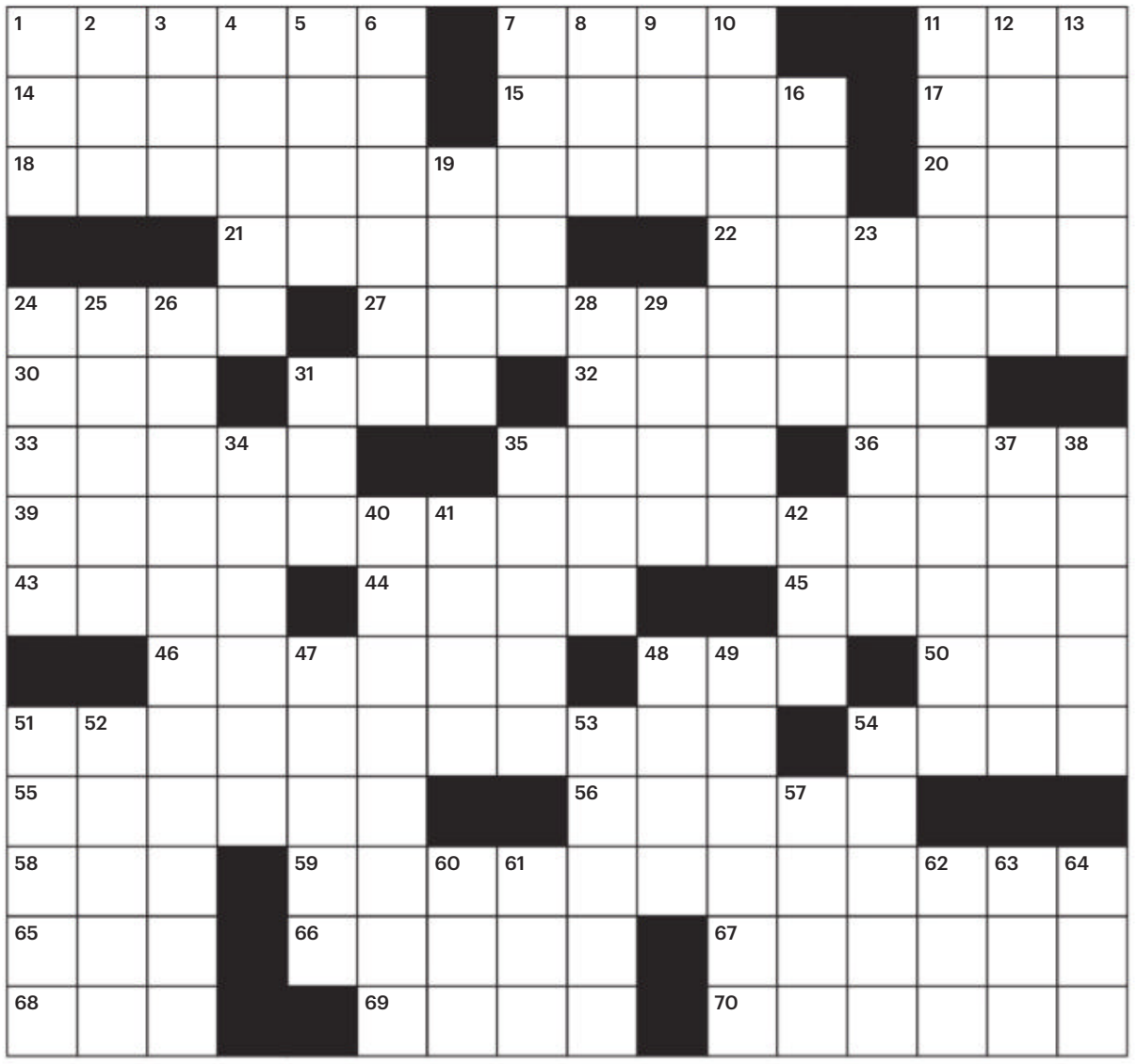
PUZZLES & GAMES DEPT.

ELEMENTAL CHANGE

A themed crossword.

BY PAOLO PASCO



ACROSS

1 Big game locations
7 Word after trans or before presenting
11 "Got ___ It's Gone" (Janet Jackson song)
14 Company that makes Beggin' Strips
15 "She-Hulk: Attorney ___"
17 "Patience ___ virtue"
18 "Consuming Pop Rocks and soda together will make your stomach explode," e.g.?
20 Dennings of "Dollface"
21 Li'l tyke
22 Eat like a bird
24 Gift givers in an O. Henry title
27 Competition to see who can grow a certain legume the fastest?
30 PC's "brain"
31 Like many a Pinterest project, briefly
32 Knocks the audience dead
33 Pressly who won an Emmy for "My Name Is Earl"
35 Prime position for a driver
36 ___ Heritage Month (May)
39 Potential Katherine Heigl sequel whose title replaces "27" with "10^{27}"?
43 Noggin
44 Radiate
45 Items turning inside a cartoon character's brain
46 Welcome, as the New Year
48 😱
50 Costello of Abbott and Costello
51 Recording at Sotheby's?
54 Thorn in one's side
55 It's going places!
56 Support a fellow rock climber?
58 Signs off on
59 Purported counterbalance for greenhouse-gas emissions . . . or a description of the wordplay in 18-, 27-, 39-, and 51-Across
65 Jennifer Affleck, ___ Lopez
66 "Thunder and lightning. ___ three Witches" (stage direction that opens "Macbeth")
67 Focus of some therapy
68 Chicago trains
69 Flaw in a metal water bottle
70 Emotionally wrecked

DOWN

1 Boston Marathon mo.
2 Lament
3 B.C.E. part
4 Rapper with the line "If you want a Minaj, I got a tricycle," to fans
5 Prefix for disestablishmentarianism
6 Gave a quick greeting
7 Centerpiece of an estate
8 Bill collector's spot?
9 Like a fox or a dog
10 Indie rocker with the 1998 album "Moon Pix"
11 Orange-colored dish often made with chicken or paneer
12 Biblical patriarch tricked by Jacob
13 The "L" in a Starbucks P.S.L.
16 Sharpens
19 Anita with the album "Anita Sings the Most"
23 Part of an origami figure
24 Low-paying position, flippantly
25 Quickly, in poetry
26 Money receptacles for some street performers
28 "You can't make me!"
29 What a sick burn is, counterintuitively
31 Mexican film star Dolores ___ Rio
34 Small-screen device that's especially small
35 Act impolitely, in a way
37 Last name in "Evita"
38 Climate change, for one
40 Attraction for blockheads?
41 "Let's do it!"
42 Silly Putty container
47 Jane Eyre, to Mrs. Reed
48 Solve, as a puzzle box
49 Slugger whose number (4) was retired by the Giants
51 Make things right
52 Steve played by Jaleel White on "Family Matters"
53 "Cancel the mission!"
54 Without question
57 Hair style protected by the CROWN Act
60 Way to go: Abbr.
61 Schwartz who voices Sonic the Hedgehog
62 Early riser?
63 Bird targeted in a 1932 Australian "war"
64 Water source

Solution to the previous puzzle:

A	S	T	R	O			L	T	D		R	I	D	E
S	K	I	E	R		S	O	H	O		E	V	I	L
S	I	N	A	I		S	P	I	N	C	L	A	S	S
	M	A	D	E	A	N	E	N	T	R	A	N	C	E
				N	A	S		C	H	E	X			
S	M	O	O	T	H		W	R	A	P		Y	A	M
C	A	I	N	E		H	A	U	T	E		E	L	O
A	L	L	E	X	P	E	N	S	E	S	P	A	I	D
R	T	E		P	L	A	T	T		S	E	R	V	E
F	A	D		R	E	D	S		T	U	N	N	E	L
			V	E	A	L		W	I	Z				
R	E	C	E	S	S	I	V	E	G	E	N	E	S	
A	R	T	I	S	A	N	A	L		T	O	L	L	S
G	I	R	L		N	E	R	D		T	U	L	I	P
E	E	L	S		T	R	Y			E	N	E	M	Y

Find more puzzles and this week's solution at **newyorker.com/crossword**

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