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GLADIATOR

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THE BONE-COLLECTING SPY

LIONS OR DONKEYS
WWI'S BLOODY BATTLE OF THE SOMME

THE FANTASTIC MR. DAHL
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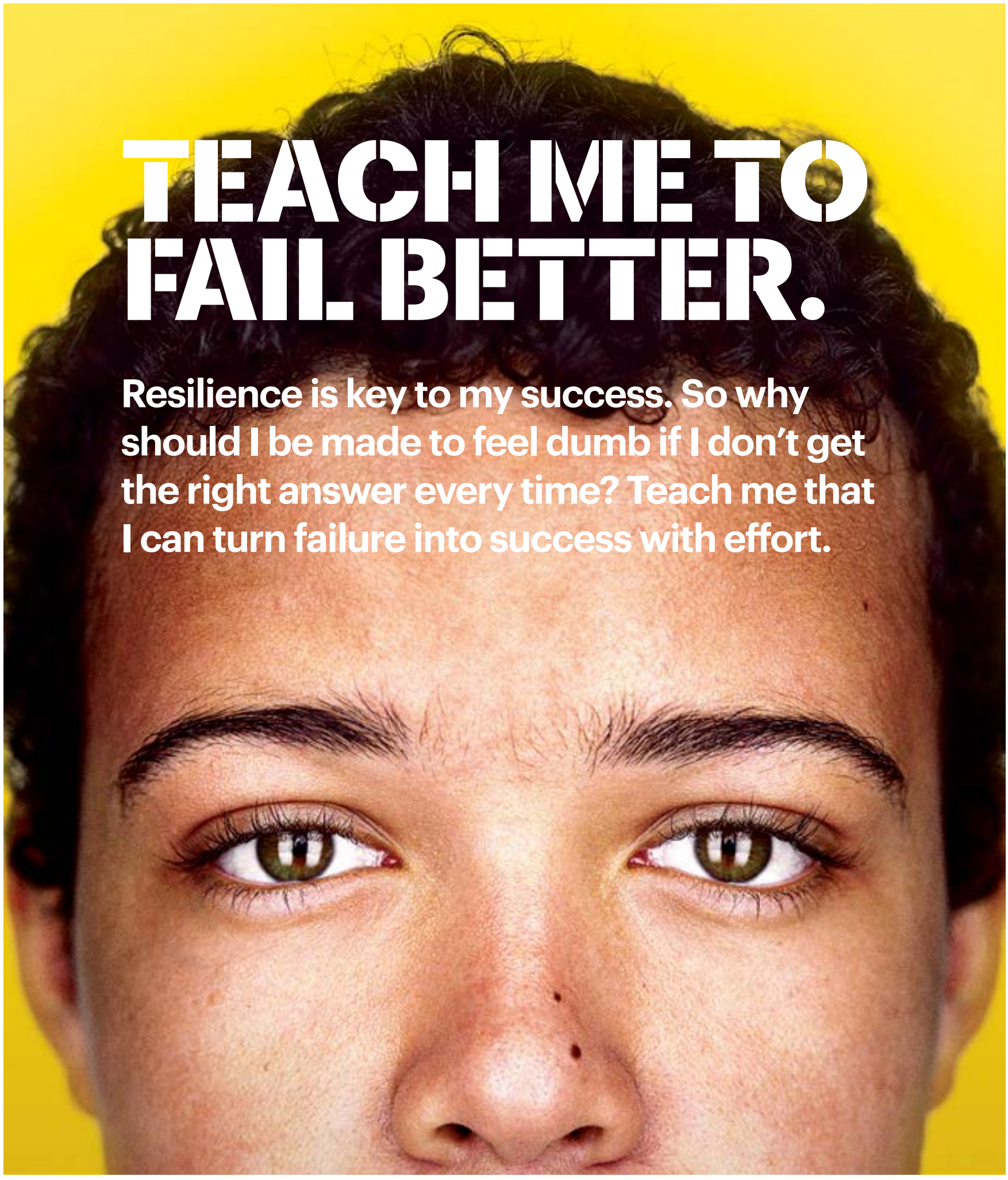
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JULY/AUGUST 2016

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The larger-than-life fighter pilot, Hollywood swell and children's author returns to the spotlight with Steven Spielberg's adaptation of *The BFG*

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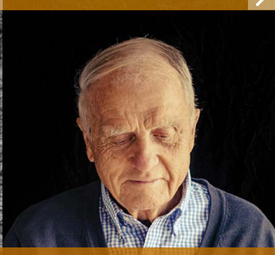
Battle Scars

British generals at the Battle of the Somme 100 years ago were seen as bunglers. But a revisionist historian argues they were nothing of the sort—and that a U.S. general was the real donkey
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Lost in Transylvania

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Fifty years ago, childhood leukemia was thought to be an untreatable fatal disease. Then a visionary young doctor came along and changed everything
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LEAVING HOME

AMERICAN EXILES Photo essays about the nation's other migrants—the displaced



DANIELLA ZALCMAN / *Two Nations*

Text by **Luci Tapahonso**

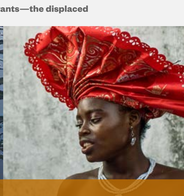
For more than 100 years, Navajo children were sent away to western schools, with profound effects still felt today



BEN DEPP / *The Drowning*

Text by **Thomas Beller**

Residents of a Louisiana island become the nation's first "climate refugees" as they lose their homes to the sea



GLENNA GORDON / *Antebellum Africa*

Text by **Clair MacDougall**

The Liberia created by freed slaves, with grand mansions and a ruling "settler" elite, is finally receding into the past

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Glenna Gordon

A photographer who has been working in Africa for over seven years, Gordon traveled on assignment for *Smithsonian* to remote Harper, Liberia, a town she first visited in 2009, to document life amid the ruined mansions (**"Antebellum Africa"**). "I've worked in more than 20 countries in Africa, and I'd never seen anything like this. I wanted to capture the beauty, but it's a difficult and broken beauty, still there despite the trauma or, perhaps, because of it." Gordon's acclaimed new photography book, *Diagram of the Heart*, is about romance novels written by Muslim women in northern Nigeria.



Hampton Sides

Sides is the author of five books, including the best-selling *Ghost Soldiers*, about a heroic U.S. rescue action in World War II, and *In the Kingdom of Ice*, about a calamitous 1879 expedition to the North Pole. The Memphis native had never stepped inside the city's celebrated St. Jude Children's Research Hospital until he visited a friend there recently. A chance meeting with the medical director led him to Donald Pinkel, the key to the hospital's groundbreaking success in treating childhood leukemia. Sides tells the little-known story of the man and his achievement in **"Anatomy of a Cure."**

Ben Depp

After five years living and working in Haiti, where he covered the aftermath of the earthquake and the cholera epidemic, the photojournalist moved to New Orleans, where he is renovating a 100-year-old house in the Seventh Ward. For **"The Drowning,"** about rising seas in Louisiana, he took to the air—in a motorized paraglider. "I have always had an interest in the relationship between communities and their physical environments," says Depp, whose work has appeared in *Newsweek* and the *New York Times*.



Andrew Roberts

The renowned British military historian is the author or editor of 19 books, many of which present new interpretations of major battles or figures, from Hannibal to Winston Churchill. In **"Battle Scars"** he argues that British leaders at the Battle of the Somme in World War I are badly misunderstood—and that the U.S. military leadership's failure to heed their lessons was tragic. "Walking the battlefield and visiting 14 of the cemeteries there gave me a sense both of the topography—which always matters so much on any battlefield, ancient or modern—and also the sheer extent of the pity and sacrifice involved." Roberts is a visiting professor in war studies at King's College, London. His Napoleon: A Life won the 2014 *Los Angeles Times* Book Prize for best biography. His latest work, *Elegy: The First Day on the Somme,* was published last fall.

Clair MacDougall

Based in Monrovia, Liberia, MacDougall contributed to the *New York Times*' coverage of the Ebola crisis, which won a Pulitzer Prize for international reporting in 2015. For **"Antebellum Africa,"** she traveled two days over muddy roads to Harper, a place she first visited in the 1990s. Then "I was only able to stay one night because the ATM hadn't been functioning for over a year and I was running low on cash." Today, she says, the town's elegant, dilapidated mansions "are a symbol of utopianism but also the impossibility of making a clean break with the past."

Thomas Beller

Beller is the author of four books, including *J.D. Salinger: The Escape Artist*, and a founder of Open City, a literary magazine and press. A longtime *New Yorker* contributor, he recently moved to New Orleans to teach English at Tulane University. When he drove to the edge of southern Louisiana to report **"The Drowning,"** he passed a cardboard sign covered in scrawled lines. "I slowed enough to read it: 'We are not moving off this island.'"

Hanna Rosin

Co-host of NPR's behavioral science program "Invisibilia" and author of *The End of Men*, Rosin is a contributor at *The Atlantic*. Having read Archie comics as a child, she has long been fascinated by the social dynamics of this stealthy cultural force (**"High School Confidential"**). "It's not that it was written by a secret radical feminist," Rosin says, but "it was always obvious that all the action is with Betty and Veronica."



Simon Norfolk

The photographer, who won the Foreign Press Club of America Award for his work in Afghanistan, specializes in landscapes that were once sites of violence, such as the Somme in northern France (**"Battle Scars"**). "I'm fascinated with the remains of battlefields—the kind of layered, stratified detritus left behind, like archaeological strata," says Norfolk, who lives in Brighton, England. His photographs have been collected by the Tate Modern.

Daniella Zalcman

The London-based photographer traveled to New Mexico and used an iPhone to record the images that she painstakingly transformed into composite portraits of Navajo men and women who were compelled to attend boarding schools as children (**"Two Nations"**). Previously Zalcman photographed First Nations people in Canada who were deeply affected by compulsory education; those award-winning portraits will be published this fall as Zalcman's first book, *Signs of Your Identity*.



Luci Tapahonso

Tapahonso was the first poet laureate of the Navajo Nation, a post she held for three years until 2015. Among her six books of poetry are *A Radiant Curve* and *A Breeze Swept Through*, and her poems have been collected in the *Norton Anthology of Literature by Women* and on Rhino Records' *"In Their Own Voices: A Century of Recorded Poetry."* For 27 years Tapahonso taught literature, most recently at the University of New Mexico. Like the men and women she writes about in **"Two Nations,"** Tapahonso was separated from her family as a child and sent away to school. "Although much was lost over the last 200 years and the generational effects of forced education persist," she says, "the unintentional result is that it strengthened our resolve to remain Diné," or Navajo.

Vanessa Veselka

She's the author of *Zazen*, a novel awarded the 2012 PEN/Robert Bingham Prize for debut fiction. Her *GQ* piece, "The Truck Stop Killer," about whether she'd eluded a famous serial killer when she was a teenage hitchhiker, was chosen for the 2013 *Best American Essays*. For **"Lost in Transylvania,"** Veselka retraced the footsteps of the forgotten dinosaur expert Baron Franz Nopcsa through Romania, Vienna and London. "He's one of those rare scientists who have an obsessive, relentless attention to detail that is matched with a wild imagination," she says.



Jeremy Treglown

The literary historian and biographer is the former editor of the Times Literary Supplement, a fellow of the Royal Society of Literature and the author of *Roald Dahl: A Biography*. In **"The Fantastic Mr. Dahl,"** Treglown reassesses the author's complex character on the occasion of the new big-screen adaptation of Dahl's novel, *The BFG*. "It's the warmest-hearted of his books for children," Treglown says, adding that "children know Dahl's books inside out, so I can talk to them as if I were a Shakespeare scholar talking to other experts about the First Folio."

Discussion

[“Wildlife Warriors”] is the best piece on smart force opposing poaching that I’ve seen. We need more of this.
@stillhigher ON TWITTER

FROM THE EDITORS *Our June cover story, “The Last Mosquito?”, by frequent contributor Jerry Adler, investigated gene-editing technology that could wipe out mosquitoes that carry diseases responsible for killing as many as 725,000 people per year worldwide. But should scientists cause the extinction of any species? Adler explored the question further on public radio, and readers debated the matter on Facebook and Twitter, and in letters and emails; some argued that the only good mosquito was a dead mosquito, while others cautioned against going too far.*



Blood Lust

Wiping out one or more species of insects to foster humankind’s own wellbeing is breathtakingly arrogant (“The Last Mosquito?”). We discovered too late, for example, that killing wolves increased the population of deer and the number of mice and deer ticks that carry Lyme disease. Will we ever learn that the earth is an ecosystem in delicate balance?

Jean Quinlan
STAUNTON, VIRGINIA

The stunningly powerful and disruptive CRISPR-Cas9 gene-editing tool portends both potentially great benefits and serious mischief, as do most leaps in technology. But when it comes to ending malaria, the risks versus the benefits seem obvious—wiping out malaria wins hands down.

Michael P. Rethman
PRESCOTT, ARIZONA

The article about mosquitoes was informative and thought-provoking, but your bar graph “When Animals Kill” had a significant omission: Humans are animals, too. Add up the average annual deaths due to genocide, war, murder, manslaughter, vehicular homicide, accidental gun deaths and other causes and you would get a large number. Are we more dangerous to ourselves than mosquitoes are?

Francis A. Hubbard
BERKELEY HEIGHTS, NEW JERSEY

Deadly Dolomites

Brian Mockenhaupt’s “Blood in the Clouds” was a very touching piece, enhanced by the perspective of more recent veterans. A timely reminder that, as Franklin said, “There never was a good war.” Still, we need to honor the virtues of those who are compelled to participate with valor.

Forrest E. Studebaker
PLATTSBURGH, NEW YORK

The Art Scenery

Jeff MacGregor’s article on Christo (“Art of the Impossible”) is one of the best-written accounts of any subject that I’ve seen, especially since Christo denigrates his own work as of no consequence. Besides the author’s appreciation of Christo’s works, we have verbal images of the artist’s late wife, which, in my opinion, make this article sing.

Jack Grenard
CAVE CREEK, ARIZONA

Civil Rights and Wrongs

Wil Haygood’s piece about civil rights activist Stokely Carmichael (“Power Player”) glosses over his later years when his revolutionary politics led him to support brutal human rights-abusing dictators. Those later years, while not negating his contributions, deserve more than a mere mention.

Jason Hoffman
WINDERMERE, FLORIDA

Clarification

“Love at First Sight” said the 1864 federal law setting aside Yosemite Valley was the earliest precursor of the national parks. Some readers objected, pointing to the designation of Hot Springs Reservation, Arkansas, 32 years before. We side with those scholars who give more weight to the Yosemite milestone because it specified that the land was to remain “inalienable.” In contrast, Hot Springs was earmarked “for the future disposal of the United States,” which left open the possibility of future development.

Corrections

In “The Last Mosquito?”, we mistakenly used the word “virus” to refer to the *Plasmodium* protozoan parasite that causes malaria.

In our March issue, the pygmy hippo was incorrectly said to live in Borneo. It inhabits West Africa.

CONTACT US

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High School Confidential

Those original teenage frenemies, Betty and Veronica, are now the real stars of Riverdale

In 1942 Archie Comics introduced the gang at Riverdale High School—Archie, the klutzy redhead; Jughead, the goofy sidekick; and Betty and Veronica, frenemies to the death—and for more than 60 years none of them aged, or even graduated. Storylines repeated, gags were recycled. The country marched ahead, but the tidy fictional suburb barely noticed. When a shaggy-haired interloper appeared in a late '60s strip, a perplexed Betty mused, "He doesn't even have a dime for a haircut!!"

The original teenage gang couldn't stay cloistered forever, though. Kevin Keller, a gay character, was introduced in 2010. Zombies invaded Riverdale in 2013's *Afterlife with Archie*. In a revamped *Archie* #1 last year, the kids got cellphones, suitors of all races and PG-13 hookup-era dilemmas.

Now comes the classic's trickiest makeover with a new *Betty & Veronica* #1 this July. The old Betty and Veronica, of course, spent all their time scheming to get Archie's attention, at the expense of any decency or personal ambition. But feminine wiles on that scale don't fly in the age of girl empowerment. So how will the girls remain true to themselves and yet time-travel to 2016?

They all seem so familiar to us today, but there was really no conception of "teenager" before Archie. The word came into use around the same time as the comic and evoked a mischievous yet harmless creature of the American future. Two years after a former newspaperman named John Goldwater and a teenage artist named Bob Montana created the comic in New York City, it was carried in 800 newspapers, and the books consistently sold about a half-million copies a month—more than *Superman*. Then, as now, its followers were not primarily teenagers but what we call tweens, for whom boy-girl stuff was still somewhat theoretical. And unlike superhero comics, *Archie* was popular among girls.

If the comic were a field guide to teenage-dom, what did Betty and Veronica teach these girls? At best they are complementary archetypes, saucy and sweet, like Ginger and Mary Ann. At worst they are poison to the developing female mind. For decades, all those two ever did was "accidentally" spill lemonade on each other's dresses. The duo conveyed that being an American teenage girl meant being a boy-crazy aspiring pinup who hated her best friend.

The new *Archie* doesn't entirely ditch this gag. Veronica was once the richer, sexier, more cosmopolitan girl every teenager secretly wanted to be; in the reboot she has tipped trashy, while Betty is a tomboy with big dreams. (The writer, Adam Hughes, has admitted he's on "Team Betty, all the way.")

More significantly, the two are now rivals in the fight to save Pop's Chocklit Shoppe, the gang's eternal hangout, which is being threatened by a soulless corporate chain. And what's at stake in their competition isn't Archie's affections but their friendship. Whatever the outcome, the broader message is that the modern teenage girl cares about her community, fights for what she believes in and worries about her female friends. For a franchise so resistant to change, that's a respectable feminist pose. And it turns *Archie* back into what it's always been—a mirror for mainstream sensibility.

The idea that Betty and Veronica truly cared about boring old Archie was always comically implausible. The real chemistry, and *all* the fun, happened between the two girls. The comedian Lena Dunham confessed a couple of years ago that she was a lifelong fan girl, and announced a deal to write a four-part *Archie* series. Fellow fans immediately suggested she make Betty and Veronica lesbians. That wasn't for sexual thrills, I believe. Fans were simply expressing what they'd known all along: Our titular hero was irrelevant. The girls were going to take over Riverdale all along. They just had to wait until the time was right. - BY HANNA ROSIN

The dueling heroines take the lead in a fight for the town's soul.

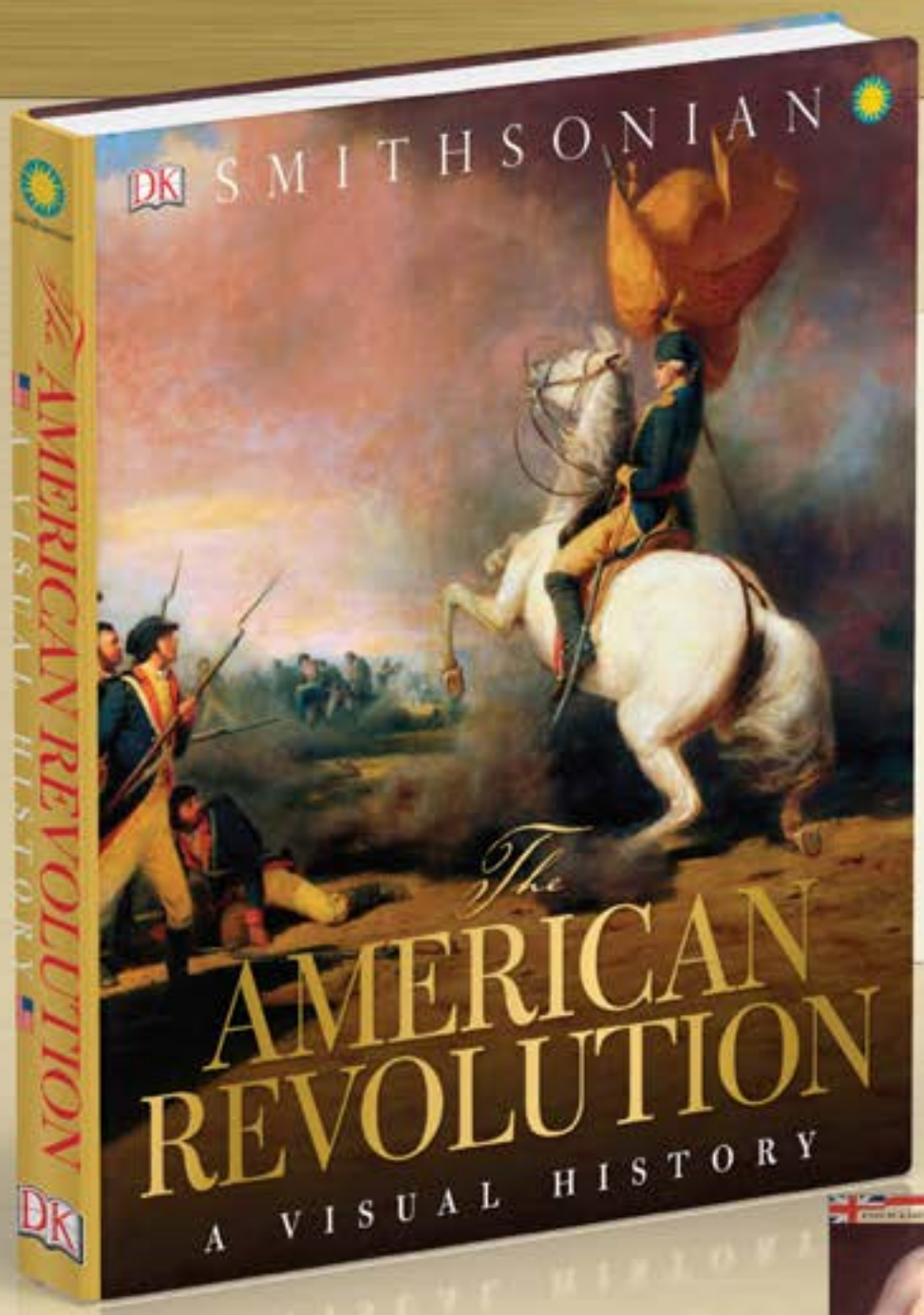
AMERICAN ICON

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Art for one of the *Betty and Veronica* #1 covers, designed by *Archie* artist Veronica Fish.

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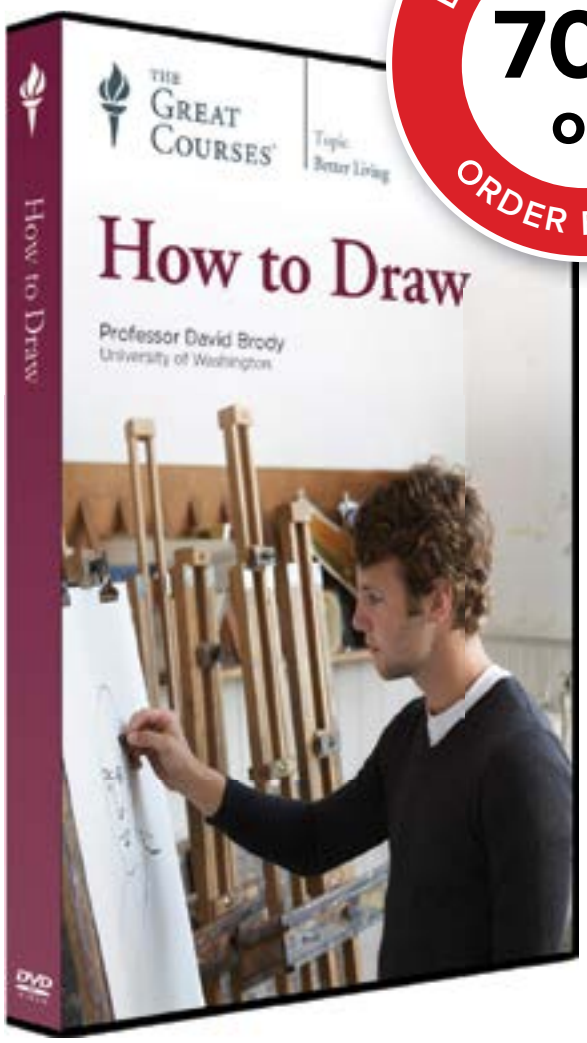


King penguins share parental duties after their chicks hatch.

Its unmistakable shape and crisp color scheme make the penguin one of nature's most effective ambassadors—a fact not lost on **Neil Ever Osborne**, whose photograph of king penguins in the Falkland Islands emphasizes the sinuous lines and sculptural form of this second-largest penguin species. "My primary focus was the geometry of these animals," Osborne says. This colony of kings, which the Toronto-based photographer visited at the height of breeding season in February, exists at the northern extreme of the species' range, where warming oceans threaten the krill that form the base of the marine food chain—and thus threaten the penguins, which mostly eat fish. Osborne is planning a speaking tour with the photos to spur conservation efforts. The scientific argument for tempering our impact on the planet is crucial, he says, but he prefers reaching out "in a way that's less about statistics and pie charts . . . and more about heartbeats and goosebumps."

–AMY CRAWFORD

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To Bee or Not to Bee

Do insects have consciousness? A new theory has scientists buzzing



ILLUSTRATION BY **Gert Albrecht**

Amid the usual parade of creeping horrors—super lice, mayfly plagues and a "troll-haired insect discovered in remote Suriname"—the exterminator news site PestWeb recently shared a piece of unsettling intelligence.

"Insects Have Consciousness, Self-Awareness and Egos," the headline read.

Whether or not the consciences of professional bug slayers were burdened by this revelation, other people were alarmed. We're a far cry from "insect rights," mused the bioethicist and animal rights advocate Peter Singer, but the prospect of bugs' inner lives ups the ethical stakes.

This moral hornet's nest was first stirred at a local meeting of the worldwide science and drinking club Nerd Nite in a Sydney, Australia, pub. Honeybee scientist Andrew Barron began chatting with philosopher Colin Klein, who initially swatted away the idea of insect consciousness. After all, insect brains are tiny and have just a million or so neurons, compared with a human's average of 86 billion. Like many of us, Klein had assumed that insects are just collections of reflexes—that they are "dark inside," he says—and this assumption jibed nicely with his habit of flushing the enormous cockroaches at his apartment down the toilet.

But then the two Macquarie University professors began to explore the research. One prominent theory holds that the core of human consciousness is not our impressive neocortex, but our much more primitive midbrain. This simple structure synthesizes sensory data into a unified, egocentric point of view that lets us navigate our world.

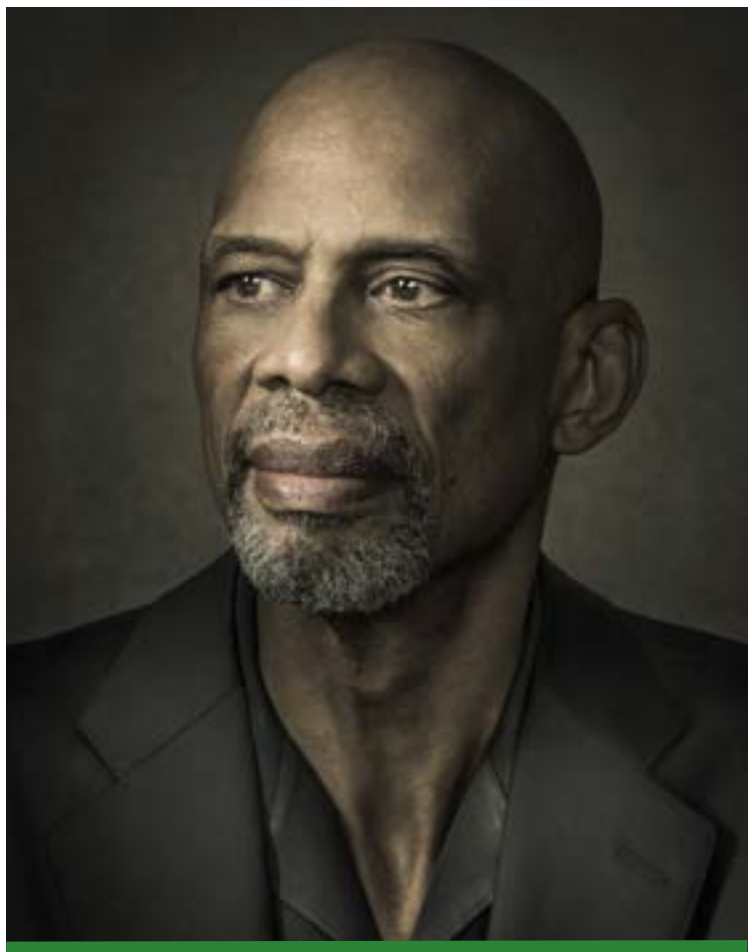
Insects, Barron and Klein now argue, have midbrain-like structures, including a "central complex," that seem to allow bugs to similarly model themselves as they move through space. They cite evidence ranging from a study that used microelectrodes to look at fly brain activity, to seemingly macabre research showing that when a jewel wasp injects venom into a cockroach's central complex, the zombiefied prey will allow itself to be led by the antennae into its predator's lair.

While the human midbrain and the insect brain may even be evolutionarily related, an insect's inner life is obviously more basic than our own. Accordingly, bugs feel something like hunger and pain, and "perhaps very simple analogs of anger," but no grief or jealousy. "They plan, but don't imagine," Klein says. Even so, insects' highly distilled sense of self is a potential gift to the far-out study of consciousness. Probing the insect brain could help quantify questions of what it means to think that vexed the likes of Aristotle and Descartes, and could even aid the development of sentient robots.

On the other hand, it complicates daily life. "I still flush," Klein says of his cockroaches. "But I hesitate." –ABIGAIL TUCKER

Kareem Abdul-Jabbar

The NBA's all-time leading scorer explores race, inequality and the media in his latest book, *Writings on the Wall*, out in August.



SMALL TALK

You worked as a journalist in Harlem when you were 17. What was your biggest story?

A news conference with Dr. Martin Luther King Jr. I was so excited to be there among all the veteran reporters. I tried to maintain my cool and pretend to be professional like they were, but inside I was shaking with admiration and fear that I would somehow screw up. However, I did fine, even asking him a question.

You say you would have been a history teacher had you not played in the NBA. What period of history most draws you in?

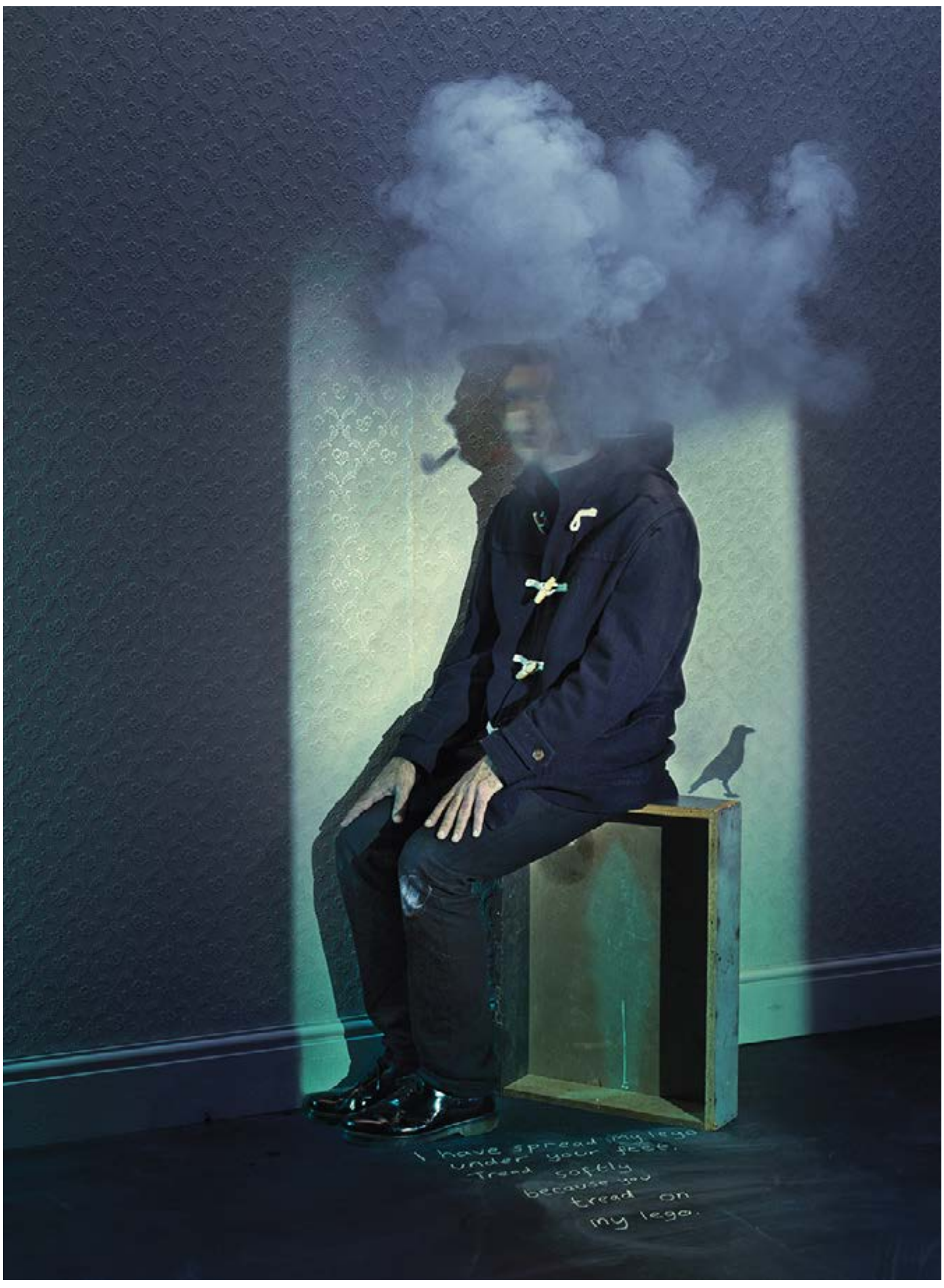
The American West brings out the little boy in me because it was a coming-of-age time for our country. Also, the Harlem Renaissance. It's one of those rare times in history when the arts, sports, social reform and politics form an intellectual tsunami that washes over an entire culture and changes it forever.

You've written about the lives of African-American inventors. Who doesn't get enough credit?

Frederick McKinley Jones changed the structure of America through innovations in refrigeration. He taught himself mechanics and electronics and in 1935 created an air-cooling device that allowed trucks to carry perishable foods. He received 61 patents, including those for portable X-ray machines.

Almost Famous

Twitter's "poet laureate" has 140 characters—but no face



"Brian Bilston" sits above his parody of a W. B. Yeats poem.

Back in the day, when J.R.R. Tolkien and C.S. Lewis pub-crawled through Ox-ford, the taproom at the Eagle and Child was so dark and smoky you could bring a rhinoceros in and nobody would notice unless it offered an untoward literary opinion. But on a recent spring night, the joint is bright, the air is clear and the mysterious Brian Bilston, a literary light of considerable wattage, nurses a pint of Hobgoblin Gold, unrecognized and happily anonymous.

Bilston's witty, accessible, surprising verse has been likened to Banksy's street art—satirical inversions of the status quo. The near rhyme, straggling line and wry take on modern life have made him Twitter's most celebrated new poet. He's also its most faceless. "Brian Bilston is a nom de plume I hide behind," he says, lubricating the idea with Hobgoblin.

No less an eminence than Ian McMillan, England's beloved Bard of Barnsley, has called him a "laureate for our fractured times." Elegant as algorithms and topical as skin ointments, Bilston's poems appear online as tweets, flowcharts, Venn diagrams, Scrabble boards, Excel spreadsheets and unwatered Christmas trees that dry up at the base and shed their word needles. An ingenious critic of absurdity, he takes aim at targets from LinkedIn to Penguin Awareness Day. His most powerful piece, "Refugees," can be read backward to subvert the angry rhetoric of Europe's migrant crisis.

In an era of total electronic recall, when every move is detailed on social media, Bilston inhabits a liminal space between spotlight and shadow. His avatar is a black-and white portrait of a smug academic, his gaze implacable, his pipe billowing smoke—a likeness his alter ego looks nothing like. In real life, this out-of-work marketing executive is a self-effacing father of three who laughs easily and often. "I struggle to regard myself as a poet," he concedes. "I spend more hours doing laundry than writing poetry."

He's partial to cryptic crosswords, the doggerel of Ogden Nash and titles like "No, You Cannot Borrow My Mobile Phone Charger." "I'm not particularly keen on abstract poems so willfully opaque that they can only be enjoyed by other poets or academics," he says. Bilston might as well be deconstructing the appeal of his own verse when he says his favorites "all have a magical blend of poignancy and accessibility. And they make me laugh."

In his tweet-length poems, he juggles entendres: "you took / the last bus home / don't know how you got it through the door / you're always doing amazing stuff / like that time / you caught a train." But the playful needling becomes a skewer in his longer fare.

Throughout history, pseudonymity has had many uses—whether allowing the likes of Mary Ann Evans ("George Eliot") and the Brontë sisters ("Acton, Ellis and Currer Bell") to transgress the gender conventions of their day or J.K. Rowling ("Robert Galbraith") to "publish without hype or expectation." For Bilston, it gives him a sense of freedom.

Still, it's somewhat ludicrous, says Bilston, to be famous-ish when no one knows who you actually are. The World Economic Forum has offered to make him its poet in residence, and a debut collection of his poems, the crowd-funded *You Took the Last Bus Home*, is due out in October. Is he tempted to cut it loose and publish under his own name? "I shall stick with anonymity," he says, firmly. "I couldn't bear the indifference that any unmasking might provoke." -FRANZ LIDZ

PHOTOGRAPH BY **Nadav Kander**

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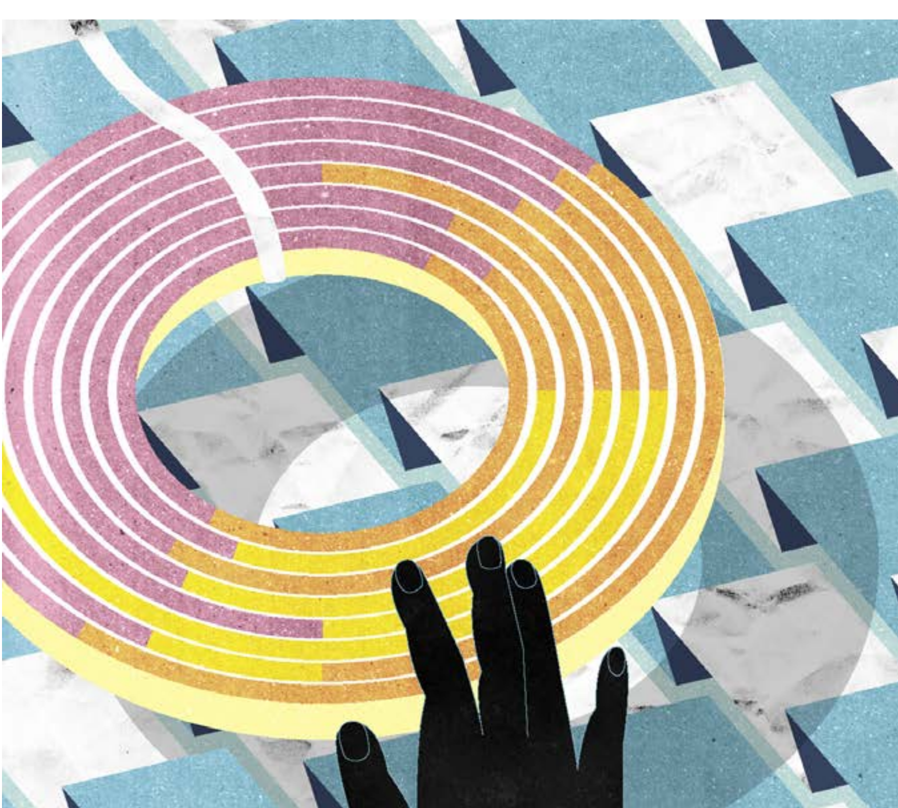


illustration by Kotryna Zukauskaite

How Data Won the West

Early infographics saved soldiers' lives, debunked myths about slavery and helped Americans settle the frontier

As the 2016 election approaches, we're hearing a lot about "red states" and "blue states." That idiom has become so ingrained that we've almost forgotten where it originally came from: a data visualization.

In the 2000 presidential election, the race between Al Gore and George W. Bush was so razor close that broadcasters pored over electoral college maps—which they typically colored red and blue. What's more, they talked about those shadings. NBC's Tim Russert wondered aloud how George Bush would "get those remaining 61 electoral red states, if you will," and that language became lodged in the popular imagination. America became divided into two colors—data spun into pure metaphor. Now Americans even talk routinely about "purple" states, a mental visualization of political information.

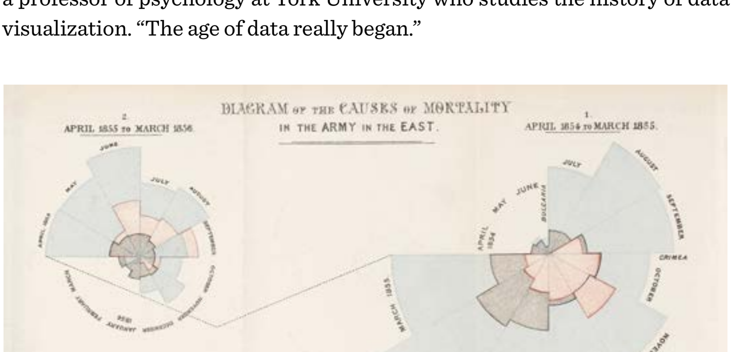
We live in an age of data visualization. Go to any news website and you'll see graphics charting support for the presidential candidates; open your iPhone and the Health app will generate personalized graphs showing how active you've been this week, month or year. Sites publish charts showing how the climate is changing, how schools are segregating, how much housework mothers do versus fathers. And newspapers are increasingly finding that readers love "dataviz": In 2013, the *New York Times*' most-read story for the entire year was a visualization of regional accents across the United States. It makes sense. We live in an age of Big Data. If we're going to understand our complex world, one powerful way is to graph it.

But this isn't the first time we've discovered the pleasures of making information into pictures. Over a hundred years ago, scientists and thinkers found themselves drowning in their own flood of data—and to help understand it, they invented the very idea of infographics.

The idea of visualizing data is old: After all, that's what a map is—a representation of geographic information—and we've had maps for about 8,000 years. But it was rare to graph anything other than geography. Only a few examples exist: Around the 11th century, a now-anonymous scribe created a chart of how the planets moved through the sky. By the 18th century, scientists were warming to the idea of arranging knowledge visually. The British polymath Joseph Priestley produced a "Chart of Biography," plotting the lives of about 2,000 historical figures on a timeline. A picture, he argued, conveyed the information "with more exactness, and in much less time, than it [would take] by reading."

> **Neurology was not yet a robust science, but inventor William Playfair seemed to intuit some of its principles. He suspected the brain processed images more readily than words.**

Still, data visualization was rare because data was rare. That began to change rapidly in the early 19th century, because countries began to collect—and publish—reams of information about their weather, economic activity and population. "For the first time, you could deal with important social issues with hard facts, if you could find a way to analyze it," says Michael Friendly, a professor of psychology at York University who studies the history of data visualization. "The age of data really began."



Florence Nightingale's "rose diagrams" showed deaths from disease (blue), war wounds (red) and other causes (black).

An early innovator was the Scottish inventor and economist William Playfair. As a teenager he apprenticed to James Watt, the Scottish inventor who perfected the steam engine. Playfair was tasked with drawing up patents, which required him to develop excellent drafting and picture-drawing skills. After he left Watt's lab, Playfair became interested in economics and convinced that he could use his facility for illustration to make data come alive.

"An average political economist would have certainly been able to produce a table for publication, but not necessarily a graph," notes Ian Spence, a psychologist at the University of Toronto who's writing a biography of Playfair. Playfair, who understood both data and art, was perfectly positioned to create this new discipline.

In one famous chart, he plotted the price of wheat in the United Kingdom against the cost of labor. People often complained about the high cost of wheat and thought wages were driving the price up. Playfair's chart showed this wasn't true: Wages were rising much more slowly than the cost of the product.

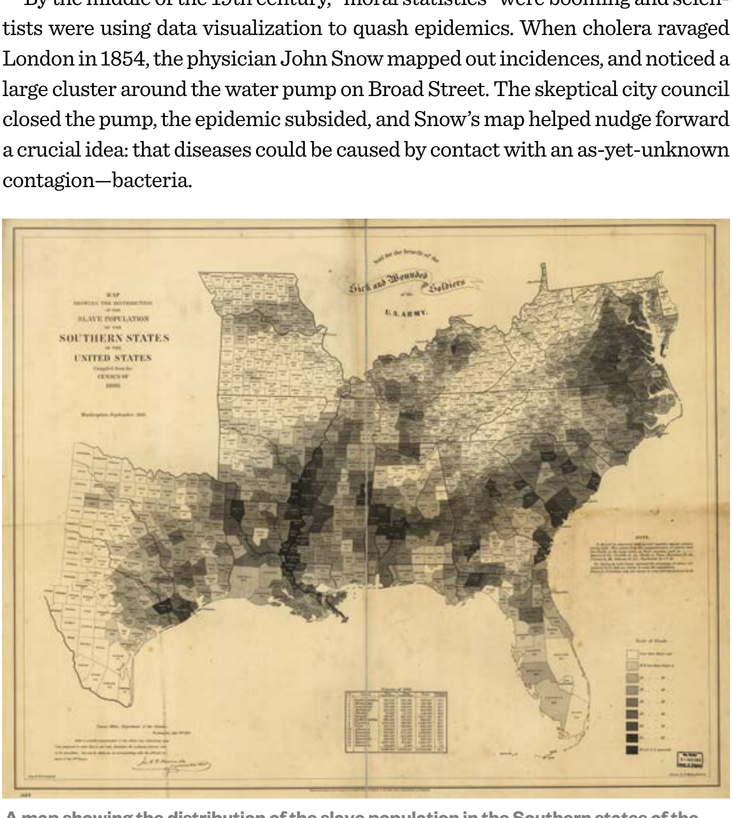
"He wanted to discover," Spence notes. "He wanted to find regularities or points of change." Playfair's illustrations often look amazingly modern: In one, he drew pie charts—his invention, too—and lines that compared the size of various country's populations against their tax revenues. Once again, the chart produced a new, crisp analysis: The British paid far higher taxes than citizens of other nations.

> **The age of data, it seems, has even created a new job: the data journalist, who's comfortable not only making phone calls and writing stories, but writing code and crunching data.**

Neurology was not yet a robust science, but Playfair seemed to intuit some of its principles. He suspected the brain processed images more readily than words: A picture really was worth a thousand words. "He said things that sound almost like a 20th-century vision researcher," Spence adds. Data, Playfair wrote, should "speak to the eyes"—because they were "the best judge of proportion, being able to estimate it with more quickness and accuracy than any other of our organs." A really good data visualization, he argued, "produces form and shape to a number of separate ideas, which are otherwise abstract and unconnected."

Soon, intellectuals across Europe were using data visualization to grapple with the travails of urbanization, such as crime and disease. In France in the 1830s, a lawyer named André-Michel Guerry created maps showing "moral statistics." He was among the first to use shadings to show data—darker where crime was worse or illiteracy higher, for example. His maps were controversial, because they rebutted conventional wisdom. French social critics believed that lower education led to crime, but the maps suggested this wasn't true. "Clearly," Guerry wrote, "the relationship people talk about does not exist." Data-based social science was born.

By the middle of the 19th century, "moral statistics" were booming and scientists were using data visualization to quash epidemics. When cholera ravaged London in 1854, the physician John Snow mapped out incidences, and noticed a large cluster around the water pump on Broad Street. The skeptical city council closed the pump, the epidemic subsided, and Snow's map helped nudge forward a crucial idea: that diseases could be caused by contact with an as-yet-unknown contagion—bacteria.



A map showing the distribution of the slave population in the Southern states of the United States, based on the 1860 census.

In mid-19th-century America, one of the biggest social issues was slavery. And it was slavery that propelled some of the country's most remarkable data visualizations: "slave maps."

When Southern states began to secede in 1860 and 1861, Union forces invaded Virginia to try to beat back the secessionists. But where should they concentrate their forces? In the midst of the fighting in June 1861, the federal government's Coast Survey department produced a fascinating map of Virginia that suggested a strategy. Using data from the latest census, the map showed the concentration of slaves in each county of Virginia: The darker the county, the higher the percentage of the population enslaved.

One trend immediately jumped out: eastern Virginia was the hotspot of slavery. The western region was comparatively slave-free. This suggested that the west would care less about fighting to preserve slavery; indeed, it might even switch sides and join the Unionists. The map was a deeply political data visualization, points out Susan Schulten, a historian at the University of Denver and author of *Mapping the Nation*. It was trying to show that only a relative minority of Virginians supported—and benefited from—slavery. It suggested military strategy, too: Try to pit the west against the east.

"It was a breakthrough map," Schulten notes. "It was an attempt to influence how the government saw the nation, and how the military understood it. It drove Lincoln's attention to where slavery was weakest."

Soon after, the U.S. Coast Survey produced yet another map charting slave density, except this one covered all the Southern states. President Lincoln was fascinated by this map, consulting it so frequently during the Civil War that it showed "the marks of much service," as an official portraitist, Francis Bicknell Carpenter, later recalled. One day Carpenter had borrowed the map to examine it, when Lincoln came into the room.

"*You* have appropriated my map, have you?" said Lincoln. "I have been looking all around for it." The president put on his spectacles, "and sitting down upon a trunk began to pore over it very earnestly," as Carpenter later wrote. Lincoln pointed to the position where Judson Kilpatrick's cavalry division of the Army was now fighting Confederate troops. "It is just as I thought it was," he said. "He is close upon ___ County, where slaves are thickest. Now we ought to get a 'heap' of them, when he returns." Much as with the Virginia map, Lincoln used the map to understand the country in a new way—to see where Southerners would be most, and least, eager to fight the North.

By the late 19th century, data visualization had created a new type of citizen. Educated individuals in the U.S. or Europe were increasingly comfortable thinking statistically. "The two dominant words of our time," wrote Oliver Wendell Holmes in 1860, "are law and average."

One true believer was the British nurse Florence Nightingale. As a child she was so bewitched by math that she organized information about her gardening in tables. Statistics, she said, were a tool to know "the thought of God"; when weary, a glance at a table of numbers was "perfectly reviving."

During the Crimean War she got a chance to wield her data skills. While in the field, Nightingale became appalled at the squalid conditions of army hospitals and soldier barracks, which were mired with feces and vermin. She persuaded Queen Victoria to let her study the issue, and Nightingale teamed up with her friend William Farr, the country's leading statistician, to analyze army mortality rates. They uncovered a stunning fact: Most of the soldiers in the Crimean War hadn't died in combat. They'd died of "preventable diseases"—precisely the sort caused by terrible hygiene. Clean up the hygiene and you'd save lives.

Nightingale adroitly realized that tables of numbers and text would be too hard to parse. They needed, she said, a data visualization—"to affect thro' the Eyes what we fail to convey to the public through their word-proof ears." Her invention was the elegant "polar area chart," a new variant of the pie chart: Each slice of the pie showed deaths for one month of the war, growing larger if the deaths increased, and color-coded to show the causes of death. Fans called it the "rose diagram," because it looked like a flower.

The queen and Parliament could see at a glance the importance of hygiene; they quickly set up a sanitary commission to improve conditions, and death rates fell. Nightingale became one of the first people to successfully use data visualization for persuasion—to influence public policy.

"She was an activist and she wanted to make a difference," says Lynn McDonald, a professor emeritus at the University of Guelph in Ontario and editor of *The Collected Works of Florence Nightingale*.

Visualization even governed how the U.S. territory expanded. Many Americans wanted to move westward, but elites were uncertain whether the interior was suitable for farming. Some believed it was a "Great American Desert"; Joseph Henry, a scientist and Secretary of the Smithsonian Institution, regarded the West as "a barren waste . . . unfit for agriculture," and he produced maps analyzing Army rainfall data to support his contention. Others fired back with their own data visualizations arguing the opposite: Rainfall patterns in the West were cyclical, they argued, so the land there could certainly support grazing animals. The expansionists eventually won out. The vision of Manifest Destiny was built not just with speeches, but with infographics.

This spring, the *Wall Street Journal* produced a fascinating data visualization titled "Blue Feed, Red Feed." On the *Journal's* website, "visual correspondent" Jon Keegan created an interactive page that shows what Facebook looks like for users who were "very liberal" or "very conservative." Because Facebook's newsfeed emphasizes stories friends are "liking," people with lots of liberal friends tend to get shown lots of left-wing news, and vice versa. Keegan wanted to help readers see just how loud it was inside the echo chamber.

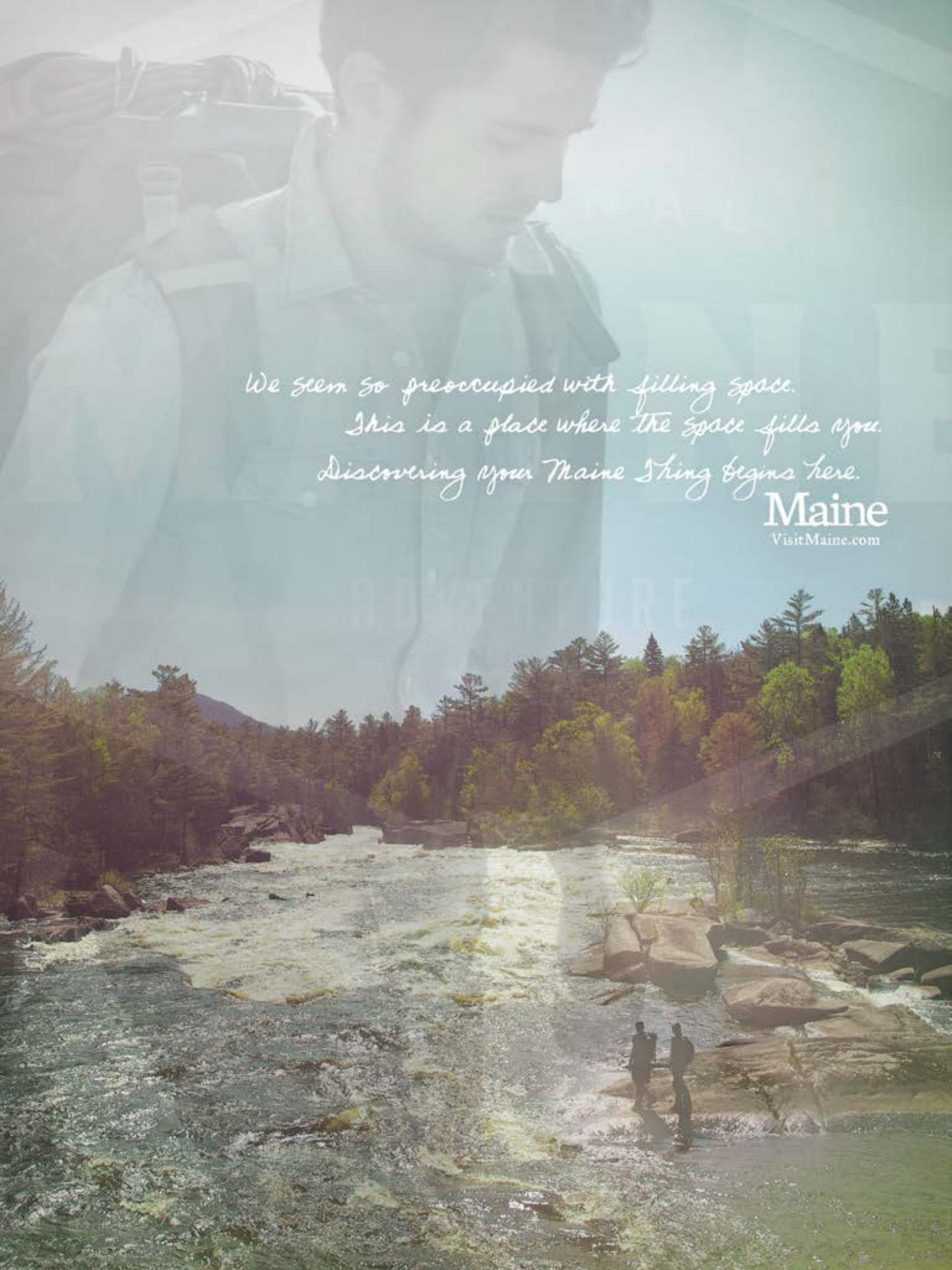
The results were stark: When you looked at the "blue feed," it showed photos of a strong, resolute-looking Hillary Clinton. The "red feed" showed a post about "Hillary's toxic plans for the Second Amendment" with the caption "downright evil."

The age of data, it seems, has even created a new job: the data journalist, who's comfortable not only making phone calls and writing stories, but writing code and crunching data. For the "Blue Feed, Red Feed" story, Keegan analyzed a large academic data set of Facebook postings. Thanks to programming languages like R or Python, today's data journalists can make a data visualization on a daily deadline.

"It didn't used to be even ten years ago that we could build a sophisticated data analysis at the same speed that someone can write a story," says Scott Klein, a data journalist with ProPublica. "And now we can." News outlets now often publish entire databases with a search interface, because readers enjoy poking around in the big river of data themselves.

"We can rely on a level of data literacy that we couldn't rely on 100 years ago, or even 40 years ago," Klein adds. Everyday people have tools to chart the info of their lives. Google, for example, recently upgraded its online spreadsheets application so that its users can automatically generate visualizations from any data they put inside.

The next step? Virtual reality. Alberto Cairo, a journalism professor at the University of Miami, imagines putting on a VR headset to read a report or watch TV, and watching visualizations swim around in front of him in 3-D. "How can you superimpose a data image over a real image?" he wonders. That'll be the question for the William Playfairs of this century.


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A Fanatic Heart

Celebrated for her novels about love, Edna O'Brien might finally win a Nobel Prize for something much darker

Love and Evil. Two great mysteries that have obsessed the greatest writers and thinkers for as long as people have thought and written. For a long time Edna O'Brien, the celebrated Irish-born, London-dwelling writer, has been known as one of the literary world's great chroniclers of love. Of love and longing and the desperate lives of souls in the pitiless grip of passion and doomed elation. A beautiful writer who has always been able to find beauty in life, even in despair. Some have likened her to Chekhov; others have compared her to James Joyce in his early *Portrait of the Artist* phase.

But in her latest novel, *The Little Red Chairs*, O'Brien shifts from love to evil. A wild and ambitious leap that takes us behind the headlines and home screens of the most tragic world news—war crimes, refugees, genocide—and which may garner her the Nobel Prize that she's often been mentioned for and long deserved.

It just so happens that her new novel was published in America just a few days after the bang of a gavel in the International Criminal Tribunal in The Hague. The evil character she'd written about in thin disguise, Radovan Karadzic—a.k.a. the Beast of Bosnia—had been found guilty of war crimes and genocide for ordering the mass murder of more than 7,000 mostly Muslim men and boys in 1995, an act that brought the terrifying term "ethnic cleansing" into common use. He was found guilty, too, of ordering the deadly shelling of women, children and civilian noncombatants in the years-long siege of Sarajevo, a thriving city Karadzic turned into a graveyard. Guilty as well of participating in a horde that committed horrific up-close and personal acts of torture, rape and mutilation.

The research sent her not only to The Hague but back to her origins in the wild, wind-swept counties of western Ireland, where she had grown up amid a sense of wonder.

Four thousand miles away, I met Edna O'Brien for lunch in a bistro near Central Park, on a side street blooming with early spring blossoms.

She is 85, a bit frail, but one of those women whose perfect manners, executed with subtle grace, give her an unexpected power. Despite surface delicacy, Edna O'Brien radiates a fierce and feminine energy, the kind of inextinguishably vibrant beauty that had suitors such as Marlon Brando, Robert Mitchum and Richard Burton following her wild red tresses through London in the swinging '60s and '70s.

"What did you think of the verdict?" I asked her when we were seated.

"I was overjoyed. So were my Bosnian friends. They kept sending me messages. 'In two more minutes! In one more minute!' "

"Were you surprised?"

"When I went to The Hague the last time, two years ago, Karadzic seemed very happy, very sure he'd be acquitted. The day of the sentence, it was different. I watched it on English television. And as the sentence was read out very slowly by the [South] Korean judge, I thought, 'All I wish to do is to get inside that brain for two seconds to see what he's thinking.' "

"That really is what your novel is about, isn't it, trying to get inside the monster's brain?"

"Trying to get inside the brain and understanding why he would never, ever admit to [his crimes]. And never, ever show [remorse]. Well, they do go insane eventually—but not soon enough."

It is a paradox of evil that stretches back at least as far as Socrates, who opined in one of his dialogues that no one commits evil knowing they are doing wrong—evildoers think they are doing the right thing. O'Brien can't abide that, or the psychological exculpation it offers.

She earned her steely attitude toward Karadzic the hard way: In researching the novel, she spent years hearing the stories of his victims and survivors. The name of the book, *The Little Red Chairs,* is taken from a commemoration of the start of the siege of Sarajevo. Eleven thousand five hundred and forty one red chairs were set out on the main street in the city—each one empty—one for every Sarajevan killed during the siege. "Six hundred and forty three small chairs," her epigraph notes, "represented the children killed by snipers and the heavy artillery fired from the surrounding mountains." There is a flood of emotion welling beneath every page of the book. "A lot of tears in that waterfall" is how she puts it.

What gets to her, in her novel and in life, is Karadzic's refusal to admit he knew what he was doing was evil. "That interested me greatly," she said coolly. "Is the person born like that? Or does the person become like that? And I don't think, and I said so in one chapter, that he's mad."

"I remember a passage where Fidelma [the unfortunate female protagonist] goes back and forth between blaming him as Lucifer or explaining his evil as the result of insanity."

"Is it fooling people?" she asked. "To say that they don't quite know what they are doing? I think he calculated that. It could have been about Hitler or Joseph Stalin or [West African dictator] Charles Taylor. They're all similar. They do not have the [remorse] gene. They only have, 'I am a hero, I am a martyr, I am fighting for my people.' That's their truth."

"Was there a moment when you decided you needed to write about this?"

"So [R.D. Laing] gave the LSD to me, quite a lot in a glass. I said to him, I have been told that if you hold my hand, I will be all right. And at that moment, he turned into a rat in a suit!"

"The impetus to write was twofold. I saw Karadzic taken off the bus in Europe [when he was captured in 2008] on CNN. And there was this formerly strutting man, you know, the soldier of great size. But he'd been on the run for 12 years and there he was transformed to looking like Moses or a Russian holy man. Long black garb, a pendant, crystals."

It turned out that for his 12 years on the run after his indictment, Karadzic had been disguising himself as, incredibly, a New Age healer who spoke of "human quantum energy" and other mumbo jumbo. He'd attended New Age conferences, even launched a New Age website.

"His metamorphosis was genius," she said, marveling. "He was 12 years on the run. But he knew time was running out. Because [Serbian President Slobodan] Milosevic, they all wanted to be part of the European Union [which had made the capture of war criminals a condition]. So up to then they didn't search very hard for him. He was right in [the Serbian capital] Belgrade, every night in his favorite bars, singing to this gusla [a Balkan stringed instrument] that they played with. There were photographs of him in his warrior mode on the wall behind him.

"The other inspiration," she remembered, "was when I was being filmed in Ireland and reading for the camera, and the director said to me, 'Tolstoy says there are only two great stories in the world.' I said, 'What are they?' He said, 'A man goes on a journey, like Hamlet—a man on a personal, philosophical quest.' And 'A stranger comes to town,' like, for instance, *The Playboy of the Western World* [the classic Irish play by J.M. Synge].

"And as he told me that I thought, I will bring that stranger [the Karadzic figure on the run, in disguise] to a small Irish hamlet where there is still a wonder about the stranger. A stranger represents hope rather than danger. A stranger represents, to some, a romance. So once I had that little nugget of inspiration, I knew all it needed was hard work. And a love of research."

The research sent her not only to The Hague but back to her origins in the wild, wind-swept counties of western Ireland, where she had grown up amid a sense of wonder. And which had cast her out as a stranger.

Her first novel, *The Country Girls,* about two young girls in the hard-bitten, "priest-ridden" (in Joyce's phrase) territory of County Limerick in southwestern Ireland, led to her books being banned, even burned for their what now seems to be rather mild sexual frankness. Clergy denounced her from the pulpit, the populace treated her like a wicked, sinful pariah. By then, O'Brien had already moved with her family to London, though she long felt hurt by the obloquy in her native land.

She became a literary star in London, and her career now spans some two dozen novels and short story collections, five plays and two collections of poetry, as well as four nonfiction books. One, a biography of the rogue poet Lord Byron, could be described as a thrilling hymn to the peaks and perils of the Romantic life. Another was a biography of James Joyce, who left Ireland forever in his early 20s and wrote about it the rest of his life. Like her country's most famous writer, O'Brien also has been shadowed by the loss of her home. No wonder the identification with refugees, exiles and migrants in the new novel.

Here's how she describes, in the opening pages of the book, the man who arrives on a wintry evening in a small, backward Irish village: He was "bearded and in a long dark coat" and "long afterwards," she continues, "there would be those who reported strange occurrences on that same winter evening; dogs barking crazily as if there was thunder, and the sound of the nightingale whose song and warblings were never heard so far west. The child of a gipsy family, who lived in a caravan by the sea, swore she saw the Pooka Man coming through the window at her, pointing a hatchet."

The Pooka Man is a creature of Irish folklore who can be a precursor of terrible tidings. Or sometimes a reversal in fortune for the better—but not often when he has a hatchet in his hand.

I asked O'Brien if she believed in the supernatural—in the seers and mystics, tarot readers and gurus and healers who appear throughout her fiction, and in her fabulous memoir, *Country Girl,* published in 2012.

"When I was a child, growing up," she replied, "every place around our house—windows and gates and roads and rivers—everything seemed to me to be more than reality. To have something other in them, which for want of another word, we can call supernatural. I don't think it's true in Ireland in general, but in our house and in the houses around, people told ghost stories and stories about people who had seen ghosts. And we loved telling them. It was like reading Edgar Allan Poe. There was thrill and terror combined. And then there was a local witch, Biddy Early."

"What did she do?"

"I work hard at the words, rewriting, finding the right words, the ones where no other word would suit, only those words. And that makes you a little bit mad."

"She did cures. Out of a blue bottle. She said [the poet W.B.] Yeats had visited her. She was dead when I came to know of her, but she was a legend. She was about three miles from where I lived, and Biddy Early could put curses on people, especially the clergy, because the clergy hated her."

I laughed. "They would have."

"But she existed in my mind as someone whose magic permeated the place. I would have loved to have met Biddy Early. To this day, they talk about her. She left the blue bottle somewhere. So older people talk, if they can find Biddy Early's bottle, they could become healers as well. Irish mythology and early Irish stories always have—as if it was totally natural and inevitable—elements of the supernatural, transformations and miracles. That was in my DNA. And I'm also very interested in the method of the fairy tale. I love the Grimm Brothers, I love Hans Christian Andersen. It's amazing the danger that shimmers over their stories."

She's had experience too, she told me, with more sophisticated modern seers and healers. R.D. Laing, for instance, the once famous Scottish psychoanalytic heretic who endorsed madness as true sanity in the mad, mad, mad world of the '60s and '70s. Laing believed madness was truth-speaking about a mad world. His influence on her emerged when I asked about an enigmatic line I recalled her saying about how her writing "was never the same" after one of her mid-career novels called *Night*.

What was the change, I asked, what kind of dividing line was that?

"Yes," she said. "I took LSD with R.D. Laing, whom I was seeing as a patient. I was also, as is not uncommon, a little smitten with him. He was quite a beguiling man. He was also nuts."

I had to laugh, she said it with such charming nonchalance. But I sensed that the sinister "healer" in *The Little Red Chairs* owes something to Laing and his alchemical mixture of mysticism old and new.

"There was so much talk about LSD at that time," she recalled. "Timothy Leary and the San Francisco people. So I asked him to give me LSD. When I asked him, it was more to be, if you like, privy with him, or in with him than about my writing. To his great credit, he gave me [testimonies] of four people who had had very bad LSD trips. He watched over me. I didn't think, even though I know I'm a very highly strung person, I didn't want to leave him. I loved him, but I thought—'This is what will happen to me?' And he came to my house, and he was in a suit and tie, which he never wore. And in one of the many books I'd read about LSD, I had read that when you're taking it, to get someone to hold your hand. So he gave it to me, quite a lot, in a glass. And I began to feel a bit wobbly. I said to him, I have been told that if you hold my hand, I will be all right. And at that moment, he turned into a rat in a suit!"

"Uh! I hate when that happens."

"And my trip was very long and irretrievable," she added.

"Irretrievable?"

"I couldn't come back."

Once again, a loss of home, if not a loss of mind. In fact, in her memoir, she describes some fairly terrifying flashbacks.

"*Night* is the first book I wrote after that. There is this raveled deluge of feeling, image, of impression, of bawdiness, of anger that all came cascading in."

She once told the *Paris Review* her first influence was the unadorned, heartfelt simplicity of Hemingway's *A Farewell to Arms*. But lately, her prose gushes forth turbulently in a deluge of words like one of the wild rivers of Ireland's western coast. It's unashamedly rich and thrilling to read.

Some readers, though, weren't thrilled. "I was very attacked when I wrote it, because people wanted me to stay *The Country Girls'* scandalous woman or they wanted me to continue in the style I had been. I've had a very hard time as a writer," she continues. "Don't want to sound like Joan of Arc, but I have been attacked more than anyone. So this more charged, slightly berserk vision. . . . And here it is again in this new book."

There's certainly nothing safe or sedate about the writing in *The Little Red Chairs*. It takes you to places of pain, personal and historical, that can feel like bad flashbacks.

"But my luck turned," she continued. "I'm luckier now."

"How did your luck turn?"

"Well, maybe because I kept going. I persevered. And maybe I got even more—more precise and in another sense, more wild. *The Little Red Chairs* has had wonderful reviews in England."

One of the most surprising things she told me about the writing of the book is that she sent some chapters to Philip Roth while she was working on it. An unusual gesture since, although they are often described as great friends and he has called her "the most gifted woman now writing in English," they are also commonly depicted as rivals for the Nobel Prize in Literature. But when Roth professed his dissatisfaction with one of her chapters, she cut him off. She knew what she wanted. And who was he to say he knew better? In fact, I'd have said it would be better for Roth if he'd sent some of his chapters to her. Especially those about women. One reason I think she is to be valued is that she is able to write about love and its aftermath of sadness, while what we get most from Roth is not love at all, but sex and the aftermath of hatred. She is more complete.

"Is love the same for men and women?" I asked, figuring I may never have an opportunity to ask a wiser woman this question. "I remember a line from an interview you gave a long time ago in which you said of men and women and their inability to understand each other, 'I don't think there's any man who knows what I'm about,' or 'I don't know what any man is about.' Do you remember that?"

"Yes, I think it's true. How utterly impossible, it is, in hate or in friendship, to fully know another person. We don't. You don't know the person you live with even though you know a lot about them. The constant shuffling of change, and through everything the paradox of ambiguity. We know a version of them. And we know the facts. And that's another reason why literature is so great. Because in literature, in Zola, or Flaubert, or all the Russians, we know people inside out. We know Prince Andrei in *War and Peace*. We know Natasha. We know the wonderful Pierre. We know them far better than we know [real] people."

"Do you think we truly know Anna Karenina? Do we know whether she is in love with Vronsky when she betrays her husband? Was she in love or was it a dream, a romantic illusion?"

"I think she was in love," O'Brien replied definitively. "When Tolstoy describes the first dance—I'll never forget—and her dress and her necklace of fresh pansies, dark violet pansies. And he dances with her. One of the most beautiful commencements of love I've ever read."

Her memory of Anna's necklace led me to ask about one striking facet of her new novel, which draws on an unusual strength: writing about flowers. There is a profusion and an enthusiasm in O'Brien's writing about flowers that is, well, sexual. She captures the force of nature as it blossoms into exquisite sweetness, without losing its overpowering strength.

"When you write about flowers," I said, "it seems to have within it the cream of your best writing—cascades of words and beauty. You write about flowers in a way that people rarely do anymore."

"My publisher said to me once, 'Edna, I think you love flowers more than you love people!' " she laughs. It's the most excitement she's displayed in the whole conversation. "And I think it has to do with more than the beauty of flowers. I grew up on a farm, you know—rough, rough. Manure and cattle and horses. And I promise you, when I first saw primroses sprouting up out of a bit of mound of earth, all sorts of debris and mud, these primroses were like...you know the color of primroses? They're a pale yellow flower. When I saw these primroses, it was as if life itself was going to change. Not be as hard, and not be as frightening, and not be as dreary. So flowers are connected with emotion for me."

"I must admit, often when reading other writers, I skip flower descriptions."

"So do I," she admits. "I work hard at the words, rewriting, finding the right words, the ones where no other word would suit, only those words. And that makes you a little bit mad."

It's astonishing to me the combination of precision and "a little bit" of madness she has brought to her novels and collections of short stories. I found myself particularly attracted to her short stories, polished gems of loss captured in amber.

There are two collections that beginning O'Brien readers should not miss: *A Fanatic Heart* and *The Love Object*. Perhaps because both of these are marked by New York stories of obsession and heartbreak.

Yes, there is an Edna O'Brien moment that recurs—that of a woman waiting alone in a desolate hotel lobby, for a man who will not show up. Really her only competition for these stories are the works of Chekhov. But there is more to them than tear-jerkers; there is a kind of recognition of the emotional violence that love inflicts on both men and women.



"I don't know if I'll ever write another," says O'Brien (above in 1996). "I would like to. But I'm very tired. I'm exhausted."

And she has written about straight-up violence as well, showing rare courage in her reporting on the terrible cost of the Troubles. Too much love, you might say, for country or tribe, has been inflicted on her Irish homeland.

Hovering, shimmering above all of O'Brien's work is the shadow of loss. Rereading her memoir, I found myself shocked at the psychological violence inflicted upon her when she was virtually exiled from Ireland for writing *The Country Girls* and its two sequels (now published as *The Country Girls Trilogy*). You would think she was one of St. Patrick's snakes.

She was a 30-year-old first novelist whose book was being banned, burned and denounced as satanically, demonically wicked by all the authorities, sacred and secular. Despite her celebratory reception in London, it was as if she were a flower cut off at the roots.

Her recent memoir is structured around periods of her life that were defined by differing homes she tried to create in various parts of England and Ireland. Something almost always goes wrong and sees her seeking to establish a new place, a new sanctuary. She was married for ten years to Ernest Gébler, an Irish writer, and had two children. "Unhappy houses are a very good incubation for stories," she once said.

And I realize that, even more than love and evil, exile, and the desperate search for refuge in the instability of a world ruled by evil, is what drives her writing in *The Little Red Chairs*.

In one dramatic moment, she makes the point that the longing for rootedness and return can be twisted into patriotism. In the final pages of the book we're in The Hague, in the International Criminal Tribunal. It's the last day of evidence against the Beast of Bosnia. She writes: "He assumed a messianic calm, appealing to what was best and most reasonable in mankind. Suddenly and with great theatricality, he broke into English, his voice booming, pervading every corner of that chamber fortified with his own bravura—'If I am crazy then patriotism itself is crazy.' "

"You trace his actions to patriotism?" I ask her.

"Megalomania married to patriotism. In the court the other day when the verdict came against Karadzic . . . oh, in Serbia, there was outrage! That yet again, Serbia has been punished! But you know, that is really part of it. I wanted to write about evil, what evil does in the world, and how it spirals out not only to those who have been preyed upon by it, but to those who have to live to tell the tale of their own kith and kin who were slaughtered."

She's spent time with the survivors, with, among others, a group called the Mothers of Srebrenica, an organization of Bosnian women who lost loved ones in the massacres and lost their homes too—now exiled from their home in now-Serbian Bosnia. Mothers whose futile pleas to be allowed to return derives from one of the most primal urges: "They want a piece of their child's bone."

The bones buried in the mass grave. That for them is all that's left of their lost home.

It seems this became unbearable to her in the writing. Almost as if she is pleading with her own protagonist to admit he knew he was doing evil. And knowing she won't get that satisfaction, that fragment of bone.

I ask her about the book's last few pages, a description of refugees staging a ravaged production of Shakespeare's *Midsummer Night's Dream,* his play about the arbitrary beauty and cruelty of love. At the end of it, the refugees chant the word "home" in "thirty five tongues." O'Brien concludes: "You would not believe how many words there are for home and what savage music can be wrung from it."

It's breathtaking, a fusion of joy, loss and brutality.

"Well, everyone wants home," O'Brien said to me. "Maybe he wants home as well. But because I set it in that [refugee] center that I went to a lot, I could not finish with a false, cathartic, happy ending."

"Do you feel like an exile yourself?"

"I can't go home, I can't go home," she replied. "There's no home to go to."

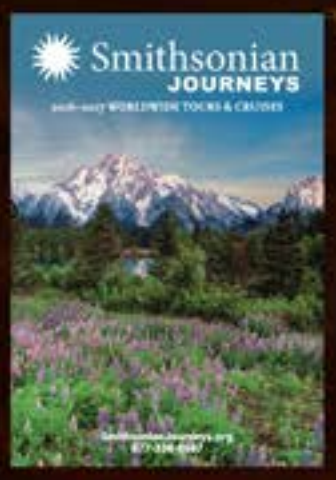
"What do you mean?"

"I couldn't live in the country I came from. So there's a perversity in it. I can see Ireland sitting here now as if I was there—the fields, the roads. I think exile has to do with a state of mind, a feeling of being alone on earth. So I'm in exile from a state of contentment or happiness. And I would feel that even if I lived in Ireland."

"People all over the world love your work," I said. "Does that matter to you?"

"It matters greatly to me," she said with a small smile. "It is my little inner, talismanic joy. I never thought I'd have it." ○

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BLOOD SPORT

A 2,000-YEAR-OLD GLADIATOR SCHOOL BRINGS THE MEN WHO FOUGHT IN ROMAN EMPIRE ARENAS BACK TO LIFE

BY FRANZ LIDZ

PHOTOGRAPH BY LUCA LOCATELLI



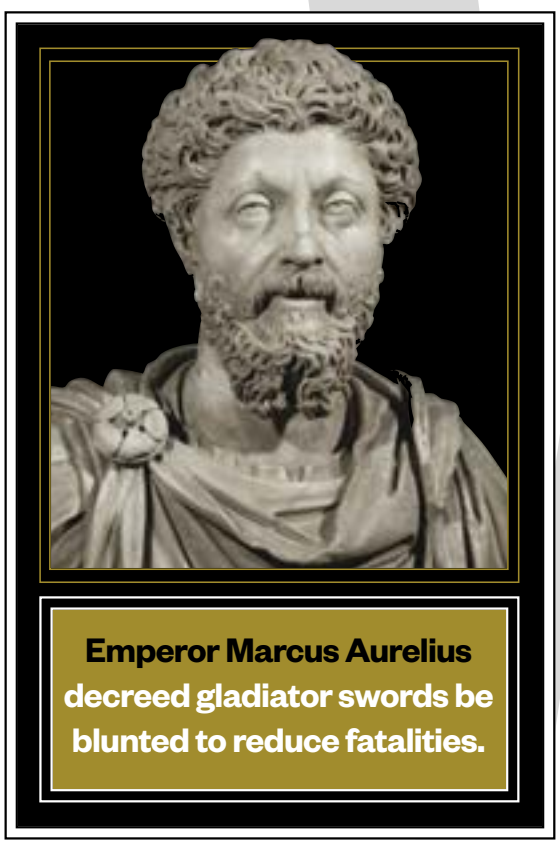
A modern-day gladiator in Rome readies for a staged battle in historic regalia.

WOLFGANG NEUBAUER

stands in the grassy clearing and watches a drone soar low over distant stands of birch and white poplar, the leaves still speckled with overnight rain. Vast fields of wheat roll away north and south under a huge dome of sky. “I’m interested in what lies hidden beneath this landscape,” says the Austrian archaeologist. “I hunt for structures now invisible to the human eye.”

On the edge of the meadow, two boys stand a long way apart, arms clenched by their sides, punting a soccer ball very slowly and carefully from one to the other. Neubauer studies them keenly. A professor at the Vienna Institute for Archaeological Science, he’s an authority on the first games played on this ersatz pitch, a blood sport popular a couple of millennia ago. “You see a field,” he tells a visitor from the United States. “I see a gladiator school.”

Way back in A.D. 6, during the expansion of the Roman Empire along the Danube and into present-day Germany, the future emperor Tiberius reached this spot and established a winter encampment. Carnuntum, as the camp would be called, flourished under the protection of the legions and became a center of the amber trade. The army and townspeople lived apart, but in symbiotic amity. “In the civilian city, large public buildings like temples, a forum and thermal baths were built,” says Neubauer. “The town had paved roads and an extensive sewage system.”



Emperor Marcus Aurelius decreed gladiator swords be blunted to reduce fatalities.

During its second-century prime, Carnuntum was a key Roman capital of a province that spanned the landmass of what is now Austria and much of the Balkans. The frontier town boasted a burgeoning population and a gladiator school whose size and scale was said to rival the Ludus Magnus, the great training center immediately to the east of the Colosseum in Rome. Toward the end of the glory days of the Roman realm, the emperor Marcus Aurelius held sway from Carnuntum and made war on Germanic tribes known as the Marcomanni. There, too, his 11-year-old son, Commodus, likely first witnessed the gladiatorial contests that would become his ruling passion.

After a series of barbarian invasions, Carnuntum was completely abandoned early in the fifth century A.D. Eventually, the buildings collapsed, too, and merged into the landscape. Though archaeologists have been digging and theorizing at the 1,600-acre site on and off since the 1850s, only remnants survive—a bath complex, a palace, a temple of Diana, the foundations of two amphitheaters (one capable of holding 13,000 spectators) and a monumental arch known as the Heidentor (Heathens' Gate) that looms in battered splendor at the edge of town.

Stretching for nearly three miles between the modern-day villages of Petronell-Carnuntum and Bad Deutsch-Altenburg, Carnuntum is one of the largest preserved archaeological parks of its kind in Europe. For the last two decades Neubauer has quarterbacked a series of excavations at the site with noninvasive techniques. Using remote-sensing and ground-penetrating radar (GPR) to peer through layers of earth, the researchers have located and identified the forum; the garrison of the governor's guard; an extensive network of shops and meeting halls; and, in 2011, the storied gladiator school—the most complete *ludus* found outside Rome and Pompeii.

"Never before had archaeologists made such important discoveries without excavation," says Neubauer, who is also director of the Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology (LBI ArchPro). His work is the subject of a new Smithsonian Channel documentary, *Lost City of Gladiators*. With the aid of three-dimensional computer modeling, his team has reimagined what the ludus looked like.

The subterranean surveys and a limited traditional dig, Neubauer says, have revealed a transfixing, mysterious underworld—



Wolfgang Neubauer (at Carnuntum's center) estimates the population at 50,000.

the ludus is teeming with unseen buildings, graves, armaments and other relics. "Our understanding of the schools has been totally reshaped," he says. "Until now, we knew very little about them because we never looked inside."

The discoveries—slow, careful, un-cinematic—are not the stuff Hollywood movies are made of. Digital archaeology isn't drama, but a gradual accretion of detail. By systematically mapping the terrain, Neubauer's researchers have provided a more detailed and vivid picture of the lives (and deaths) of the gladiators than was ever before available—and deepened our understanding of the terrifying power of Imperial Rome.

NEUBAUER IS 52—A BIT THICKening around the middle, a bit graying at the temples. A rumpled figure with hair parted down the middle and eyebrows like small hedges, he's a pioneer in remote sensing and geophysical prospection—noninvasive techniques that make it possible to identify structures and anomalies

underground without disturbing a site. “Most of the Middle European archaeological heritage is under a massive threat of destruction,” he says. “That threat has been dramatically accelerated by intensive farming and industrial transformation of landscapes.”

One of the challenges of traditional excavation is that archaeologists can focus only on isolated sections and that once they start poking around, the site is demolished and the possibility of further study eliminated. “Even when excavation is conducted with care, it’s still destruction,” says Neubauer. “The geophysical prospection we use at LBI ArchPro covers large expanses and leaves what is buried intact.”

Neubauer grew up at a time when an archaeologist’s toolkit consisted of a spade, a shovel and a toothbrush. (“No, I never used a divining rod,” he says.) He was born in the Swiss market town of Altstätten, near the border of Austria. Hiking in the Rhine Valley piqued young Wolfgang’s interest in Bronze Age peoples and their cultures. At the precocious age of 15, he went on his first dig.

Wolfgang drew early inspiration from the village of Hallstatt, a ribbon of land squeezed between a lake and mountains, where, in 1734, the Man in the Salt—a preserved body—was found. “Hallstatt was one of the earliest European settlements,” he says. “Its salt mine has been continuously worked since 1000 B.C.”

Because space is at a premium in Hallstatt, for centuries the crammed cemetery gained new ground by burying and then exhuming bodies. The graves were reused, says Neubauer, and disinterred skulls cleaned and exposed to the sun until they were bleached white. “Then they were arranged in a Beinhaus, or bone house,” he reports. Inside that little ossuary—piled with the neatly stacked remains of generations of Hallstatters—are more than 1,200 skulls, many gaily painted with the names of the former owners and the dates on which they died. Neubauer delights in the motifs that adorn them: roses, oak and laurel leaves, trailing ivy and sometimes snakes.

His unusual mixture of meticulous organization and free-ranging imagination proved invaluable at the University of Vienna and the Vienna University of Technology, where he dabbled in archaeology, archaeometry, mathematics and computer science. By age 21, Neubauer was developing his own prospection methods in Hallstatt. He spent a year and a half excavating the tunnels

in the salt mine. Over the last three decades Neubauer has been field director of more than 200 geophysical surveys.

LBI ArchPro was launched in 2010 to conduct large-scale landscape archaeology projects in Europe. At Stonehenge, the most comprehensive underground analysis yet undertaken of the Neolithic site found evidence of 17 previously unknown wooden or stone shrines and dozens of massive prehistoric pits, some of which seem to form astronomic alignments (*Smithsonian*, September 2014). "Stonehenge is more or less at the bottom of a really big national arena," Neubauer says. "Along the horizon, dozens of burial mounds look down at the stones."

He got involved with Carnuntum in the late 1990s through the University of Vienna's Institute for Archaeological Science. "The park is unique in that, unlike almost every other Roman site, it's mainly countryside that has never been built over," he says. Indeed, by the 19th century the ruins were still so well conserved that Carnuntum was called "Pompeii at the gates of Vienna." Despite subsequent looting by treasure hunters and deep plowing for vineyards, Neubauer says, the land is "ideal for exploration."

Aerial photography identified intriguing forms in a field outside the ancient civilian town, west of the municipal amphitheater that had been built in the first half of the second century and excavated from 1923 to 1930. Anomalies in the field (soil, vegetation) suggested structures below. In 2000, a magnetic survey found traces of the foundations of a large building complex, replete with an aqueduct. Based on the magnetometer's 2-D images, the site was then scanned using a novel multi-antenna GPR developed by Neubauer's university team.

Ground radar has been evolving for decades. Like its predecessors, Neubauer's "geo-radar" sent pulses of electromagnetic waves through the earth that generated details about depth, shape and location. Unlike them, the high-resolution device covered about ten times as much surface area in the same amount of time, enabling researchers to speed up the search process significantly.

The resulting 3-D images laid bare a sprawling forum. "We had discovered the main building of the city quarter of Carnuntum's military camp," says Neubauer. A computer analysis revealed foundations, roads and sewers, even walls, stairs and floors, as well as a cityscape whose landmarks included shops, baths, a basilica, the tribunal, and a curia, the center of local government.

ENVISIONING CARNUNTUM

Archaeologists' high-tech tools, including drone overflights and geo-radar imaging, have produced a detailed virtual reconstruction of the 30,000-square-foot gladiator academy.



GLADIATOR BARRACKS
The cells housing gladiators averaged an area of 53 square feet; the smallest compartments measured about 32 square feet. More spacious cells likely housed instructors or high-ranking combatants.

LANISTA QUARTERS
The school's owner lived on the premises.

GLADIATOR BARRACKS
The larger cells in this wing featured tiled floors.

KITCHEN, DINING HALL AND TOILETS

TRAINING ARENA
Spectators observed matches from wooden stands.

PALUS Fighters practiced by striking a wooden pole.

GARDEN

ADMINISTRATION BUILDING
All business dealings related to the school's thriving commercial enterprise were conducted here.

GARDEN

ENTRANCE Access to the gladiator school was controlled through a single entrance, which would have faced the municipal amphitheater.

ASSEMBLY HALL OR TRAINING ROOM
Archaeologists surmise that this structure served either of two functions. Ground-penetrating radar has revealed evidence of hypocausts, an under-floor heating system. A large furnace was also found here.

BATH COMPLEX
Gladiators had the use of a fully equipped Roman bath with fresh hot and cold water, heated floors and pools. When the gladiators were locked in their cells, the baths could be used by the lanista's family.

"The amount of detail was incredible," Neubauer recalls. "You could see inscriptions, you could see the bases of statues in the great courtyard and the pillars inside rooms, and you could see whether floors were wood or stone—and if there had been central heating." Three-dimensional virtual modeling allowed the team to reconstruct what the forum—all 99,458 square feet of it—might have looked like.

IN THE SPRING OF 2011, ANOTHER search of the Carnuntum underground was attempted by a team of archaeologists, geophysicists, soil scientists and techies from the latest iteration of Neubauer's organization, LBI ArchPro, with its international partners. Enhancements to sensors had increased their speed, resolution and capabilities. Strides had been made in electromagnetic induction (EMI), a method by which magnetic fields are transmitted into soil to measure its electrical conductivity and magnetic susceptibility. At Carnuntum, the soundings told researchers whether the earth underneath had ever been heated, revealing the location of, say, bricks made by firing clay.

Neubauer had been intrigued by aerial shots of the amphitheater just beyond the walls of the civilian city. On the eastern side of the arena was the outline of buildings he now reckons were a kind of outdoor shopping mall. This plaza featured a bakery, shops, a food court, bars—pretty much everything except a J. Crew and a Chipotle.

To the west of the amphitheater, amid groves of birches, oaks and white poplar, was a "white spot" that looked suspicious to Neubauer. Close inspection revealed traces of a closed quadrangle of edifices. "The contours were typical of a gladiator school," Neubauer says.

The layout spanned 30,000 square feet and conformed to a marble fragment showing the Ludus Magnus, found in 1562 on one of the ancient slabs incised with Rome's city plan. Fortunately for Neubauer's team, the Romans tended to construct new settlements in Rome's image. "Roman society built complex and very recognizable cityscapes with the global goal to realize outstanding symbolic and visual models of *civitas* and *urbanitas*," says Maurizio Forte, a Duke University classics professor who has written widely on digital archaeology. "Civitas concerns the Ro-



Archaeologist Geert Verhoeven uses drones to survey the site of an amphitheater.

man view of 'citizenship' and ways to export worldwide the Roman civilization, society and culture. Urbanitas is how a city can fit the pattern of the Roman central power."

From the empire's rise in 27 B.C. until its fall in A.D. 476, the Romans erected 100 or so gladiator schools, all of which were intensely stylized and most of which have been destroyed or built over. Radar scans showed that, like the Ludus Magnus, the Carnuntum complex had two levels of colonnaded galleries that enclosed a courtyard. The central feature inside the courtyard was a free-standing circular structure, which the researchers interpreted as a training arena that would have been surrounded by wooden spectator stands set on stone foundations. Within the arena was a walled ring that may have held wild beasts. Galleries along the southern and western wings not designated as infirmaries, armories or administrative offices would have been set aside for barracks. Neubauer figures that about 75 gladiators could have lodged at the school. "Uncomfortably," he says. The tiny (32-square-foot) sleeping cells were barely big enough to hold a man and his dreams, much less a bunkmate.

Neubauer deduced that other rooms—more spacious and perhaps with tiled floors—were living quarters for high-ranking gladiators, instructors or the school's owner (*lanista*). A sunken cell, not far from the main entrance, seems to have been a brig for unruly fighters. The cramped chamber had no access to daylight and a ceiling so low that standing was impossible.

The school's northern wing, the bathhouse, was centrally heated. During cold European winters—temperatures could fall to minus-13 degrees—the building was warmed by funneling heat from a wood-burning furnace through gaps in the floor and walls and then out roof openings. Archaeologists detected a chamber that they believe may have been a training room: they were able to see a hollow space, or hypocaust, under the floor, where heat was conducted to warm the paving stones underfoot. The bathhouse, with its thermal pools, was fitted with plumbing that conveyed hot and cold water. Looking at the bath complex, Neubauer says, "confirmed for the first time that gladiators could recover from harsh, demanding training in a fully equipped Roman bath."

MARCUS AURELIUS WAS A philosopher-king who, despite the border battles raging during his administration, was inclined toward peace. The third book of his *Meditations*—philosophical conversations with himself in Greek—may have been written in Carnuntum's main amphitheater, where circuses featured savage treatment of criminals. One could envision the emperor attending these brutal entertainments and turning aside to jot down his lofty thoughts. Generally, though, he was not a big fan of the mutual butchery of gladiators.

Nowadays, Marcus Aurelius is remembered less for his philosophizing than for being smothered by young Commodus at the start of the swords-and-sandals epic *Gladiator*. In reality, he succumbed to a devastating plague—most likely smallpox—that wiped out as many as ten million people across the empire. The film hewed closer to received history in its depiction of Commodus, an antisocial Darwinist whose idea of culture was to slaughter giraffes and elephants and take up crescent-headed arrows to shoot the heads off ostriches. True, he actu-



Roman baths were social centers: Carnuntum's reconstructions include a restaurant.

ally wasn't stabbed to death in the ring by a hunky gladiator, but his demise was no less theatrical: Commodus' dissolute reign was cut short in A.D. 192 when, after several botched assassination attempts, he was strangled in the bath by his personal trainer, a wrestler named Narcissus.

Commodus was a gladiator *manqué* who may have acquired his taste for the sport during a period in his youth (A.D. 171 to 173), some of which was misspent in Carnuntum. During the latest round of excavations, Neubauer concluded that the popularity of gladiating there necessitated two amphitheaters. "Nearly every other Roman outpost had a single arena," he says. "In Carnuntum, one belonged to the military camp and served the legionnaires. The other, next to the school, belonged to the civil city and satisfied the desires of ordinary citizens."

The gladiator era was a time of strict law and order, when a family outing consisted of scrambling for a seat in the bleachers to watch people be sliced apart. "The circuses were a brutal, disgusting activity," says LBI ArchPro senior researcher Christian

Gugl ("No relation to the search engine"). "But I suppose spectators enjoyed the blood, cruelty and violence for a lot of the same reasons we now tune in to 'Game of Thrones.'"

Rome's throne games gave the public a chance, regularly taken, to vent its anonymous derision when crops failed or emperors fell out of favor. Inside the ring, civilization confronted intractable nature. In *Marcus Aurelius: A Life,* biographer Frank McLynn proposed that the beastly spectacles "symbolized the triumph of order over chaos, culture over biology....Ultimately, gladiatorial games played the key consolatory role of all religion, since Rome triumphing over the barbarians could be read as an allegory of the triumph of immortality over death."

Neubauer likens the school in Carnuntum to a penitentiary. Under the Republic (509 B.C. to 27 B.C.), the "students" tended to be convicted criminals, prisoners of war or slaves bought solely for the purpose of gladiatorial combat by the lanista, who trained them to fight and then rented them out for shows—if they had the right qualities. Their ranks also included free men who volunteered as gladiators. Under the Empire (27 B.C. to A.D. 476), gladiators, while still made up of social outcasts, also included not only free men, but noblemen and even women who willingly risked their legal and social standing by taking part in the sport.

It's doubtful that many fighters-in-training were killed at Carnuntum's school. The gladiators represented a substantial investment for the lanista, who trained, housed and fed combatants, and then leased them out. Contrary to Hollywood mythmaking, slaying half the participants in any given match wouldn't have been cost-effective. Ancient fight records suggest that while amateurs almost always died in the ring or were so badly maimed that waiting executioners finished them off with one merciful blow, around 90 percent of trained gladiators survived their fights.

The mock arena at the heart of the Carnuntum school was ringed by tiers of wooden seats and the terrace of the chief lanista. (A replica was recently built on the site of the original, an exercise in reconstruction archaeology deliberately limited to the use of tools and raw materials known to have existed during the Empire years.) In 2011, GPR detected the hole in the middle of the practice ring that secured a *palus,* the wooden post that recruits hacked at hour after hour. Until now it had been assumed



In Carnuntum's recreated gladiator ring, visitors try their hand at ancient combat.

that the palus was a thick log. But LBI ArchPro's most recent survey indicated that the cavity at Carnuntum was only a few inches thick. "A thin post would not have been meant just for strength and stamina," Neubauer argues. "Precision and technical finesse were equally important. To injure or kill an opponent, a gladiator had to land very accurate blows."

Every fighter was a specialist with his own particular equipment. The *murmillo* was outfitted with a narrow sword, a tall, oblong shield and a crested helmet. He was often pitted against a *thraex*, who protected himself with sheathing covering the legs to the groin and broad-rimmed headgear, and brandished a small shield and a small, curved sword, or *sica*. The *retiarius* tried to snare his opponent in a net and spear his legs with a trident. In 2014, a traditional dig in Carnuntum's ludus turned up a metal plate that probably came from the scale armor of a *scissor*, a type of gladiator sometimes paired with a retiarius. What distinguished the scissor was the hollow steel tube into which his forearm and fist fitted. The tube was capped: At the business end was

a crescent-shaped blade meant to cut through the retiarius' net in the event of entanglement.

One of the most surprising new finds was a chicken bone unearthed from where the grandstand would have been. Surprising, because in 2014 Austrian forensic anthropologists Fabian Kanz and Karl Grossschmidt established that gladiators were almost entirely vegetarians. They conducted tests on bones uncovered at a mass gladiator graveyard in Ephesus, Turkey, showing that the fighters' diets consisted of barley and beans; the standard beverage was a concoction of vinegar and ash—the precursor of sports drinks. Neubauer's educated guess: "The chicken bone corroborates that private displays were staged in the training arena, and rich spectators were provided with food during the fights."

Outside the ludus walls, segregated from Carnuntum's civilian cemetery, Team Neubauer turned up a burial field crammed with gravestones, sarcophagi and elaborate tombs. Neubauer is convinced that a gold-plated brooch unearthed during the chicken-bone dig belonged to a politician or prosperous merchant. "Or a celebrity," he allows. "For instance, a famous gladiator who had died in the arena." The man fascinated by the Hallstatt charnel house may have located a gladiator necropolis.

Top gladiators were folk heroes with nicknames, fan clubs and adoring groupies. The story goes that Annia Galeria Faustina, the wife of Marcus Aurelius, was smitten with a gladiator she saw on parade and took him as a lover. Soothsayers advised the cuckolded emperor that he should have the gladiator killed, and that Faustina should bathe in his blood and immediately lie down with her husband. If the never reliable *Scriptores Historiae Augustae* is to be believed, Commodus' obsession with gladiators stemmed from the fact that the murdered gladiator was his real dad.

Following in the (rumored) tradition of the emperors Caligula, Hadrian and Lucius Verus—and to the contempt of the patrician elite—Commodus often competed in the arena. He once awarded himself a fee of a million *sestertii* (brass coins) for a performance, straining the Roman treasury.

According to Frank McLynn, Commodus performed "to enhance his claim to be able to conquer death, already implicit in his self-deification as the god Hercules." Wrapped in lion

skins and shouldering a club, the mad ruler would galumph around the ring à la Fred Flintstone. At one point, citizens who had lost a foot through accident or disease were tethered for Commodus to flog to death while he pretended they were giants. He chose for his opponents members of the audience who were given only wooden swords. Not surprisingly, he always won.

Enduring his wrath was only marginally less injurious to health than standing in the path of an oncoming chariot. On pain of death, knights and senators were compelled to watch Commodus do battle and to chant hymns to him. It's a safe bet that if Commodus had enrolled in Carnuntum's gladiator school, he would have graduated summa cum laude.

LBI ArchPro is housed in a nondescript building in a nondescript part of Vienna, 25 miles west of Carnuntum. Next to the parking lot is a shed that opens like Aladdin's cave. Among the treasures are drones, a prop plane and what appears to be the love child of a lawn mower and a lunar rover. Rigged onto the back of the quad bikes (motorized quadricycles) is a battery of instruments—lasers, GPR, magnetometers, electromagnetic induction sensors.

Many of these gadgets are designed to be dragged across a field like futuristic farm equipment. "These devices allow us to identify structures several yards below ground," says Gugl, the researcher. "The way the latest radar arrays can slice through soil is kind of Star Treky, though it lacks that Hollywood clarity."

No terrain seems inaccessible to Neubauer's explorers. Your eyes linger on a rubber raft suspended from the ceiling. You imagine the Indiana Jones-like possibilities. You ask, "Is the raft used for plumbing the depths of the Nile?"

"No, no, no," Gugl protests. "We're just letting some guy store it here."

He leads you on a tour of the offices. On the first floor, the common room is painted some institutional shade unknown to any spectrum. There's an air of scruffiness in the occupants—jeans, T-shirts, running shoes; young researchers chat near a floor-to-ceiling photo of Carnuntum's topography or gaze at animated video presentations, which track the development of the town in two and three dimensions.

A FIGHTER'S TALE

Follow the rigorous training of a combatant in the Smithsonian Channel's documentary ***Lost City of Gladiators***, airing at **8 p.m. on August 15.**

ON A DESKTOP MONITOR, A specialist in virtual archaeology, Juan Torrejón Valdelomar, and computer scientist Joachim Brandtner boot up a 3-D animation of LBI ArchPro's surprising new discovery at Carnuntum—the real purpose of the Heidentor. Built in the fourth century during the reign of Emperor Constantius II, the solitary relic was originally 66 feet high, comprising four pillars and a cross vault. During the Middle Ages, it was thought to be a pagan giant's tomb. Ancient sources indicate that Constantius II had it erected in tribute to his military triumphs.

But a radar scan of the area provides evidence that the Heidentor was surrounded by bivouacs of legionnaires, soldiers massed by the tens of thousands. Like a time-lapse cartoon of a flower unfolding, the LBI ArchPro graphic shows Roman campsites slowly shooting up around the memorial. "This monumental arch," says Neubauer, "towered above the soldiers, always reminding them of their allegiance to Rome."

Now that LBI ArchPro has digitally leveled the playing field, what's next at Carnuntum? "Primarily, we hope to find building structures that we can clearly interpret and date," says archaeologist Eduard Pollhammer. "We don't expect chariots, wild animal cages or remains inside the school."

Within another walled compound that adjoins the ludus is an extended open campus that may contain all of the above. Years ago a dig inside a Carnuntum amphitheater turned up the carcasses of bears and lions.

The ongoing reconstructions have convinced Neubauer that his team has solved some of the city's enduring mysteries. At the least, they show how the march of technology is increasingly rewriting history. It's been said the farther backward you look, the farther forward you are likely to see. In Book VII of his *Meditations*, Marcus Aurelius put it another way: "Look back over the past, with its changing empires that rose and fell, and you can foresee the future, too."



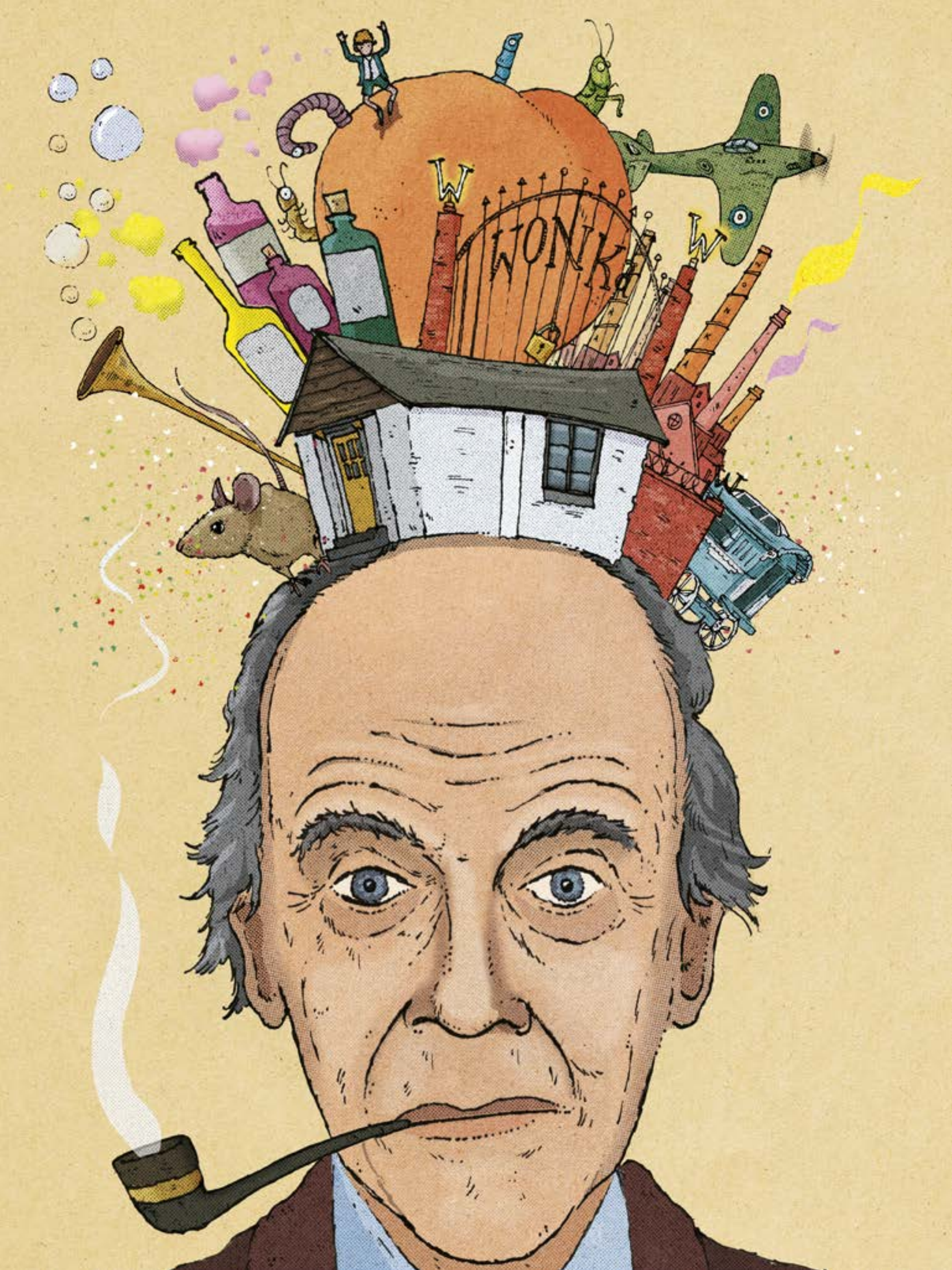
The Fantastic Mr. Dahl

THE BRITISH AUTHOR'S WORLD—ANTIC, SUBVERSIVE, WILDLY INVENTIVE AND MONSTROUSLY HUMANE—RETURNS TO THE SCREEN IN STEVEN SPIELBERG'S *THE BFG*

BY JEREMY TREGLOWN

PHOTOGRAPHS BY STUART CONWAY

ILLUSTRATION BY WESLEY MERRITT


WONKA

When he turned to children's books, Dahl at first asked: "What the hell am I writing this for?" Today his makeshift desk is enshrined in the museum dedicated to his work.

The garden shed.

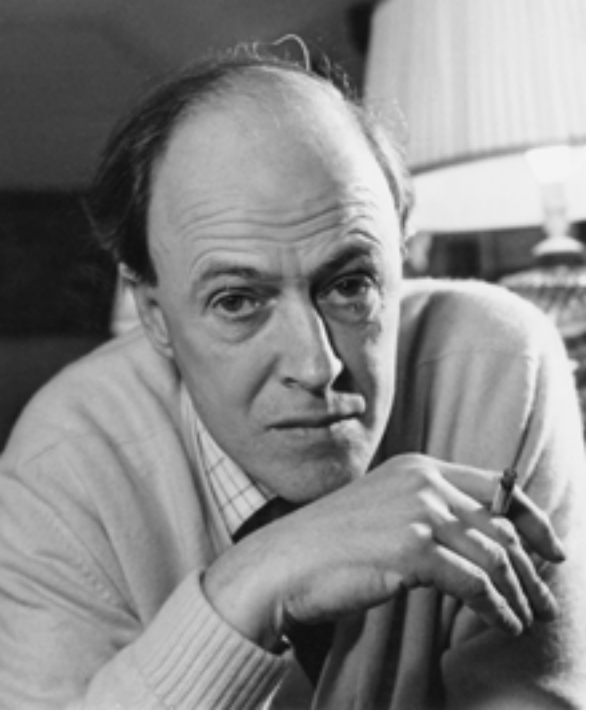
Different people know different things about Roald Dahl. You may recall his short story about a woman who clubs her husband to death with a leg of lamb and disguises the murder weapon by roasting it; or his marriage to Hollywood star Patricia Neal and the agonies that slowly destroyed it; or the first of his best-selling children's books, *James and the Giant Peach*, or the richer, fuller later ones written during his second, happy marriage, such as *The BFG*, a tale about a big friendly giant, adapted into the new Disney film directed by Steven Spielberg. And then there are the stories of his boasting, his bullying, his orneriness, his anti-Semitism, balanced over time by acts of kindness and charity, and by the posthumous work of a foundation in his name.

Almost everyone, though, knows about the shed. It has appeared in hundreds of articles and documentaries about him and

is a centerpiece of the Roald Dahl Museum and Story Centre. The shed was, Dahl said not wholly originally, a kind of womb: "It's small and tight and dark and the curtains are always drawn . . . you go up here and you disappear and get lost." Here, at the top of his garden, hunched in an old winged armchair, in a sleeping bag when it was cold, his feet on a box, a wooden writing board covered in green billiard cloth balanced across the chair arms; here, surrounded by personal relics, totems, fetishes (his father's silver paper knife, a heavy ball made out of the wrappings of chocolate bars when he was a clerk at Shell Oil, bits of bone from his much-operated-on spine, a cuneiform tablet picked up in Babylon during World War II, a picture of his first child, Olivia, who died when she was 7; a poster for Wolper Pictures, makers of the first *Willy Wonka* film, naming the company's star authors: DAHL, NABOKOV, PLIMPTON, SCHLESINGER, STYRON, UPDIKE)—here was where he worked.

Like painters with their studios, many writers have had versions of a garden shed. Dahl's was more than usually private, scruffy, obsessional, but why is it so memorable? To be sure, along with his height and his war service as a fighter pilot and his superstitious insistence on Dixon Ticonderoga yellow pencils, it has become—already was in his lifetime—part of the Roald Dahl brand. It's so much a trademark, in fact, that it's sometimes misremembered as a remote lakeside cabin like Thoreau's, as a tower like Montaigne's or W. B. Yeats', as a gipsy caravan such as the one where the boy narrator and his quirky single-parent father live in one of Dahl's best-loved stories, *Danny the Champion of the World*: "a real old gipsy wagon with big wheels and fine patterns painted all over it in yellow and red and blue." His own children actually had such a caravan in another corner of the same garden at what's still one of the family homes, Gipsy House, on the edge of Great Missenden, a village in a valley in the Chiltern Hills, west of London.

Yet there's a halo effect in all this that goes beyond image management, skillful though that has been, especially since his death in 1990. It's partly to do with austerity nostalgia, which in Britain is linked to the Blitz spirit and rationing, but also to more class-bound cults like those of country houses, boarding





During his first marriage, Dahl was devoted to his children and an unapologetic philanderer (from left, above: Dahl in 1971; with Pat Neal, Theo and Tessa in 1964; the writer at work).

schools and other habitats of "not complaining." In some ways, it's a northern European thing, not uniquely British: Dahl's origins were Norwegian.

His father emigrated to the coal-boom port of Cardiff, Wales, in the 1880s and made a modest fortune provisioning cargo ships there. Widowed in 1907, he found a second Norwegian wife; Roald was the third child and only son of this marriage. With the death of the eldest, at age 7, and of their father soon afterward, Roald became the family's pet (his nickname was "The Apple") and in his own eyes its protector. Much later, the American writer Martha Gellhorn, who dated him on the rebound from her marriage to Ernest Hemingway, remembered him as living among "a thousand sisters" and "a suffocating atmosphere of adoration."

The children were given a conventional English boarding-school education, spending their holidays in a comfortable house in the English country town to which their widowed mother had moved, and where she spent the rest of her life: "A young Norwegian in a foreign land," he wrote in his memoir for children, *Boy*, "she refused to take the easy way out." All her children remained close by. Cardiff has enterprisingly named a public space outside the Senedd, seat of the semi-independent Welsh National Assembly, after Roald Dahl, and is making a lot of his centenary, this year. In truth, though, his allegiances were to tough, cold Norway with its grass-topped wooden houses and its uncompromising mythology of giants, dwarfs and Valkyries; and, equally, to an England of scruffy villages, horrible schools and small-time crooks.

Good at sports, very tall, independent, not particularly bright academically but arrogant and somewhat isolated by that, the boy went straight from boarding school into the oil industry



His house (an aerial view today) remains in the family.

and soon found himself in colonial East Africa on what turned out to be the brink of World War II. He enlisted in the Royal Air Force and with next to no training was sent as a fighter pilot to take part in Churchill's quixotic defense of Greece. If any real-life adventure could outmatch the battle of Dahl's Big Friendly Giant against the even bigger and far from friendly giants of his children's story, it's that of the weeks the 25-year-old spent hurtling through the sky fighting the Luftwaffe and its allies above Athens and, immediately after that, at Haifa, in what was then British-ruled Palestine. The wartime Royal Air Force prided itself on a laconic modesty that in those days was still aspired to by the English in general, but self-effacement was one bit of Englishness Dahl didn't do. His official combat reports are full of braggadocio: "I followed [the enemy aircraft, a Vichy French Potez] for approx. 3 minutes after the others had broken off and left it with Port engine smoking and probably stopped. Rear gunner ceased fire. . . . It is very unlikely that this Potez

got home." Invalided out of action with back problems caused by an accident (he later claimed, and seems to have come to believe, that he was shot down), the loquacious flying officer was sent to boast for Britain in newly belligerent Washington.

America turned Dahl into a writer, and also into a star. Based in an embassy so glittering that the rising young Oxford political philosopher Isaiah Berlin was a mere staffer there, the handsome war hero talked up his country but above all himself, did a little secret intelligence work while keeping it anything but secret, and wrote stories about the RAF that attracted the Disney brothers' attention. A fable about the Battle of Britain, *The Gremlins*, went into development as an animated film, but did not make it to the screen.(Disney adapted the text and pictures into a children's book, Dahl's first.) The venture brought trips to Hollywood that, according to one of his children, permanently turned his head. He claimed Clare Boothe Luce and the Standard Oil heiress Millicent Rogers among his conquests, and began a lasting relationship with Tyrone Power's French wife, Annabella (Suzanne Charpentier).

Like many of those brought to prominence by the war, Dahl found the immediate post-1945 years difficult. Soon, though, *Collier's* magazine and the *New Yorker* were drawn to a new, terse, comic-vengeful element in his fiction, and the short stories later famous as *Tales of the Unexpected* began to appear. He got to know Lillian Hellman and through her met Pat Neal, then still involved with Gary Cooper.

The tragic story of their marriage—their son permanently injured in a traffic accident in Manhattan; a young daughter dead of measles in the rural haven to which they retreated; Pat's own disabling strokes when she was only 40, newly pregnant and at the height of her fame—all this, along with Dahl's own successes in Neal's world (he's credited with the scripts of *You Only Live Twice* and *Chitty Chitty Bang Bang*), has been told in articles, books and a movie, *The Patricia Neal Story*. Familiar, too, from obsequious journalists and, now, from the museum that commemorates him, is the narrative of his self-transformation into one of the leading writers of his day, of any day, or so he seemed to think. When U.S. publishers altered his spelling, he demanded

YOU DON'T HAVE TO BE A DREAMER TO SEE THIS AS IDEALIZED AUTOBIOGRAPHY. THE BFG IS HIMSELF BOTH A READER AND A WOULD-BE WRITER.

grandly: "Do they Americanize the *Christmas Carol,* or Jane Austen?" This was in a letter to Robert Gott-lieb, then editor in chief at Knopf, later editor of the *New Yorker*, and one of a handful of American publishers who played substantial roles in shaping Dahl's books—like Max Perkins with Scott Fitzgerald, Dahl observed—while putting up with his increasingly overbearing behavior. (Another Random House editor, Fabio Coen, radically reworked the plot for *Fantastic Mr Fox.*)

Or not putting up with it. Gottlieb eventually fired Dahl, telling him that his abusiveness and bullying had made "the entire experience of publishing you unappealing for all of us." Dahl's British publisher then offered *The BFG* to Farrar, Straus and Giroux, which would also come out with *The Witches*, *Boy* and *Going Solo*.

In all this Dahl and his family became rich, especially through films based on his books—projects that he made a point of despising (he called *The Witches*, with Anjelica Huston, a "stupid horror film" and told everyone not to go). The originally modest but frequently expanded white, four-square house he bought with Pat Neal in the 1950s grew opulent inside, well-furnished with the help of his younger, second wife, Felicity.

A stylist and designer, Felicity gave Dahl an Iberian-Catholic feeling for baroque that complemented his taste for modernism. As a collector and part-time dealer, he had done well in the loose 1940s art market—Matisse drawings, Picasso lithographs, Rouault watercolors—with a particular enthusiasm for the English colorist Matthew Smith, whom he befriended. The garden that he planned and worked in has handsomely matured, so that the house is now hidden by trees and shrubs.

The writing hut, though, was a throwback, a small shrine to tougher times: to the Norwegian wood houses of his parents' late 19th-century childhoods, and to the cramped cockpit of the Hawker Hurricanes into which the 6-foot-5 RAF pilot had crunched himself.

Now, front wall removed, the hut sits in a museum behind a glass screen, though nearby there's a user-friendly replica of an old chair of Dahl's where you can sit, put his green-felt board across the arms and photograph yourself writing.

Ascetic yet secure, the hermitage-shed and other aspects of Dahl's imaginative world mingle in the tale of a creative Neanderthal, the Big Friendly Giant, now reimagined by Steven Spielberg. Bullied by his still bigger neighbors (how many of Dahl's books involve bullying!), the relatively little big man retreats to a cave of his own where he mixes dreams that, like a butterfly collector, he has caught in a long net, turning them into happier creations to be blown into the minds of sleeping humans. "You can't collect a dream," the BFG is told by little Sophie (named for Dahl's now independently famous granddaughter, the writer and former fashion model). He is impatient with Sophie's lack of understanding but more so with his own incoherence—his malapropisms, his spoonerisms, modeled in part on Pat Neal's gratuitously beautiful speech muddles after her brain hemorrhage. Yet the giant also has a special gift. "A dream," he tells Sophie, "as it goes whiffling through the night air, is making a . . . buzzy-hum so silvery soft, it is impossible for a human bean to be hearing it," but with his huge ears, he can capture "all the secret whisperings of the world." You don't have to be a dreamer to see this as idealized autobiography. The BFG is himself both a reader and a would-be writer. Among the authors he most admires is the one he calls Dahl's Chickens.

Dahl's softness for hardship—the rigors of the shed, the ways in which his stories redeploy well-worn Victorian scenarios of poverty, orphanhood, brutal schooling—was connected to his belief in village values. Gipsy House is up a track at the northern end of Great Missenden. Below it, on the other side of the old London road, runs a stream, the Misbourne, and, beyond that, the parish church where Dahl is buried. The house was

close to where his mother and sisters lived (Pat and Roald's daughter Tessa called the neighborhood "The Valley of the Dahls"). The writer walked in the Chiltern beech woods, drank in the village pubs, employed local workmen, listened to their stories and used elements of all this in his fiction.

Living in a country village is a way of preserving something of a past that's itself inevitably a bit fictional, given that villages didn't always (for example) have cars and phones. Children's stories can be another kind of preservative, for writer as well as readers. If the houses outside the window are bent and crooked, as they are in *The BFG*, and the shop across the street sells buttons and wool and bits of elastic, and tall, alarming but kindly men wear collarless shirts, you know where you are, as the English like to say. Though where exactly that is, what with novels, films and the growth of Dahl's reputation, as well as the sheer passage of time, has become a complicated question.

***The BFG* begins at a version of No. 70 High Street, Great Missen-**den, a harmless, picturesque timbered house, but in Dahl's story a cruel orphanage. From an upper window the Big Friendly Giant snatches Sophie. (Spielberg's version moves the shocking opening scene to London.) Today, on the other side of the narrow street from this building and from Red Pump Garage—no longer a petrol station, though the pumps have been preserved in homage to *Danny the Champion of the World*, in which they figure—if you go through the archway of an ancient former coaching inn you come up against the gates of Mr. Willy Wonka's Chocolate Factory. Actually, they're a smaller-scale replica of the ones used in the 2005 Warner Bros. movie. You are about to enter the Dahl museum, simultaneously a biographical display, a playground, a celebration of and stimulus to reading and writing, and an unpretentious, cheerful kind of shrine.

It's one of a handful of such places that have sprung up in Britain, though they tend to be in writers' birthplaces more often than where they actually wrote. Charles Dodgson was born in a village in Cheshire, where, not long before last year's 150th anniversary of *Alice's Adventures in Wonderland*, a museum was set up in his memory, though there's not much in Lewis Carroll's writing you



At the museum, the BFG shrinks into a doll. The big-eared character, says Steven Spielberg, "has an acute awareness of all that goes on in the entire world."

can connect with the region. (Cheshire cats were known before he made them famous.) Peter Pan has more to do with London's Kensington Gardens than with Kirriemuir, the Scottish town north of Dundee of his author, J. M. Barrie, whose birthplace is now open to visitors. Birmingham's newly restored Sarehole Mill, where J.R.R. Tolkien played as a boy, has become a center of pilgrimage for Middle-earth questers, but its pizza-making demonstrations and conference facilities would not have appealed to the writer.

The well-thought-out Dahl museum, by contrast, belongs exactly where it is, in the middle of the village the author loved, and within walking distance of his home.

Gipsy House itself is unobtrusively well protected, and not just by trees. A free map available at the museum suggesting Dahl-related walks around Great Missenden doesn't show its whereabouts. In general the Dahls, while not all exactly publicity shy, have made a much better job of protecting their private lives and, especially, the reputation of Roald Dahl than he

did himself. Spielberg's executive producer, Kathleen Kennedy, worked closely with the literary estate, and the director himself gave family members a tour of the set during filming in Vancouver. But while a request for an interview with Felicity Dahl for this article was welcomed, it was simultaneously fended off with forbidding conditions, among them that the "interviewees would want copy approval of the finished piece, including but not restricted to direct quotes."

It seems relevant that Dahl was a collector—of paintings, wine, varieties of flowers and budgerigars, as well as more personal talismans—because the flip side of collecting is rejecting. Invited to take part in a local version of a British TV show about antiques, "Going for a Song," in which panelists identified and valued objects brought by the audience, he dismissed most of what he was shown as "total crap." Similarly, much of the energy in his stories can seem harshly misanthropic. I had an opportunity to speak with Spielberg about this, among other things, between near-completion of *The BFG* in April ("It's very, very close to the wire") and its May premiere at the Cannes Film Festival. He made the point that in the past, children's stories were less protective, more willing to expose the young to unpleasantness, indeed horror: "children being attracted by what scares them, and having to suffer nightmares through their formative years." He instanced the dark tales collected by the Brothers Grimm and suggested that Disney drew on but softened the tradition. "The darkness in *Bambi* is no more or less than the darkness in *Fantasia* or *Dumbo* or *Snow White and the Seven Dwarfs*, but Disney knew how to balance light and dark, he was great at it even before George Lucas conceived of the Force!" For Disney and, he implied, for Dahl, "There could be healing. There could be fear and then there could be redemption."

Context is important, of course: When children first encounter the world's dark side, they need the presence of adults to reassure them. Spielberg himself read *James and the Giant Peach* and *Charlie and the Chocolate Factory* to his seven children, he told me, and now reads to his grandchildren. "Reading aloud is, you know, sort of what I do best. I probably get more value hearing a story that I'm reading to my children and grandchildren but am

EARLY STORIES, AMONG THEM "KATINA," ABOUT A WAR-ORPHANED GREEK GIRL ADOPTED BY AN RAF SQUADRON, SHOWED A MARKED TENDERNESS TOWARD CHILDREN.

also reading to myself—I'm in the room, both the reader and the audience. It gives you an interesting double-mirror effect."

Still, some of Dahl's work is harsh by any standards: *The Twits,* in particular, with its mutual destructiveness between a bearded old man—"Things *cling* to hairs, especially food....If you looked closer (hold your noses, ladies and gentlemen)…"—and his ill-favored wife ("Dirty old hags like her always have itchy tummies…"), plays to readers' nastiest responses.

And there was Dahl's notorious proneness to anti-Semitic remarks, recently downplayed by Spielberg when asked about it by reporters at Cannes. Dahl's defenders insist that the man they knew was reflexively provocative and would express views he did not hold to cause a reaction. In my biography of Dahl, however, I quote a letter he wrote to an American friend, Charles Marsh, full of savagely violent "jokes" about Jews and Zionism, prompted by a request for support he had received while helping to run a charitable foundation of Marsh's. The appeal had come from the Stepney Jewish Girls' Club and Settlement in East London. This was in 1947, between the Nuremberg Trials and the founding of the state of Israel, and it goes way beyond the casual anti-Semitism common among certain kinds of English (and Americans) at the time.

Yet what lives on equally truthfully in today's memory of Dahl is the generous, hospitable, inclusive man who invited his jobbing builder in to play billiards with his famous guests, and who sought out and encouraged any glimmer of originality in anyone he liked: a support system that lives on. The shed he wrote in is surrounded by other stimuli to story-making. There are books to take down and read, dictionaries, pencils and paper, videos of living

writers talking about how they learned their trade and giving advice ("Read read and read"). One area is full of words and of vivid, potentially jokey phrases on wood blocks ("superstar," "the ghastly," "the toilet," "stumbled into"), which you can arrange in any order. The buildings also house Dahl's archive, and bits of his manuscripts are on display, pictures of people he turned into characters.

An older shrine, also connected with Dahl, lies farther along the London road, in the next village, Little Missenden. The church, some of which dates back to before 1066, is fabulous in its medieval muddle, and the writer loved it not least for an ancient wall painting that faces you as you go through the 14th-century doorway. It depicts St. Christopher, patron saint of travelers, as a scrawny giant carrying a diminutive figure on his shoulder, like an early, religious version of the BFG. Though the heroine of Dahl's story is named Sophie, the book is dedicated to his eldest child, Olivia. She died in 1962 of measles encephalitis, at age 7, and is buried in the churchyard. Dahl visited her grave obsessively in the following months, filling the site with rare alpine plants and, for once, was deprived of exaggeration: "Pat and I are finding it rather hard going," he wrote to his then friend and publisher, Alfred Knopf. His earliest stories, among them "Katina," about a war-orphaned Greek girl adopted by an RAF squadron, already showed a marked tenderness toward children. The vulnerability may have had one of its sources in the death of his elder sister Astri when he was 4.

In any case it was painfully deepened, later, by what happened to Olivia and, a couple of years before that, to his baby son, Theo, his skull fractured in multiple places when his pram was crushed between a Manhattan taxi and a bus. Ultimately, Theo survived and recovered more substantially than had been expected, although some of the damage was permanent.

Dahl's first successful book for children, *James and the Giant Peach*, came soon after Theo's accident; the second, *Charlie and the Chocolate Factory*, after Olivia's death. By the mid-1960s, despite all the efforts Pat Neal made after the stroke, he was in practice the single parent of four young children: Tessa, Theo, Ophelia and Lucy. Later, how he saw himself at this time emerges



Dahl's war record (a focus at the museum) enhanced his image. "Girls fell at Roald's feet," recalled a friend. "The uniform didn't hurt one bit. He was an ace."

in romanticized form in *Danny*, written when the marriage was still just about holding together but he had already begun a relationship with Felicity d'Abreu. She brought him happiness and also a degree of emotional steadiness and protection that, though it didn't prevent some startling outbursts, made possible his kinder, longer books of the 1980s: *The BFG*, *The Witches* and *Matilda*. Something of the change he went through was symbolized by what became a family ritual. After telling early versions of *The BFG* to his younger daughters at bedtime, he would climb up a ladder outside their bedroom window and stir the curtains for added effect.

His somewhat belated growth into emotional adulthood affected the construction of his stories, in turn helped by some hard-working editors. Matilda, in the version of the character we know through the 1988 book or the long-running, record-breaking musical first staged at Shakespeare's Stratford in 2010, is a "sensitive

and brilliant" girl, ill-treated by her gross parents. In the original typescript she's a little monster, constitutionally misbehaved and prone to using her magical powers to nobble, or rig, horse races. Matilda "was born wicked and she stayed wicked no matter how hard her parents tried to make her good. She was without any doubt the most wicked child in the world"—an off-shoot from the unforgiving *Charlie and the Chocolate Factory,* written a quarter of a century earlier. The new tone was already there in *The BFG,* a book that harmonizes the best in Dahl's writing.

At first sight it might seem a strange story for Spielberg to have taken on. Or anyone, really, in this anxious world. A gigantic, scruffy old man appears by night at a young girl's bedroom window and carries her away to a dark cave full of sinister equipment. Even worse versions of Sophie's captor, monsters of whom he himself is afraid, prowl the desert landscape outside.

The giant assures the little girl that he means her no harm, but some of his habits are obnoxious and his talk is confused and racist. He tells Sophie his cannibal neighbors enjoy eating Turks, who have a "glamourly" flavor of turkey, whereas "Greeks from Greece is all tasting greasy." He himself is a vegetarian, at least until his first experience of a Full English Breakfast, later in the story, but the poor soil of Giant Land yields nothing but what he calls "snozzcombers": "disgusterous," "sickable," "maggotwise" and "foulsome." The fun of the BFG's language is well aimed at children, as are the more boisterous aspects of his digestive system. But there's another aspect of the fantasy that may seem surprising in its patriotic appeal. When the unfriendly giants set off on a child-hunting expedition to England, Sophie persuades the BFG that Queen Elizabeth II, warned by a dream he is to concoct and blow through her bedroom window, will help stop them.

As it happens, the film appears in the year of the queen's 90th birthday, as well as Dahl's centenary. She is represented "very honorably," Spielberg assures me, "except for one little moment in our story that I hope is not too upsetting for the royal family." (Readers of the book may be able to guess what that comic moment is.)

The creative match between Spielberg and Dahl seems deeply consonant. A co-founder of DreamWorks, the director has often



Children scamper through Angling Spring Wood to the rear of Gipsy House, Dahl's idyllic home in Greater Missenden.

said "I dream for a living." As for the relationship that develops between Sophie and the BFG, it isn't far from the one between Elliott and E.T.: an at first frightening outsider and a vulnerable child, each learning from and in different ways dependent on the other. The first thing Spielberg mentioned when I asked what drew him to the book was that the protagonists, despite disparities, eventually "have a relationship completely at eye level." Never shy of the sentimental, he added, "The story tells us that it's the size of your heart that really is what matters." Each artist has a knack for showing the world from a child's viewpoint while achieving a connection also with adults. And Dahl's book, Spielberg pointed out, was published in 1982, the year that *E.T.* appeared, suggesting that there was something fortuitous in this, something in the air that he called "a kismet thing."

Like *E.T.*, the new film was scripted by the director's longtime friend Melissa Mathison, who finished it just before her

untimely death last year of neuroendocrine cancer. Mathison "related passionately" to the project, Spielberg said. John Williams returned as Spielberg's composer for a score that the director describes as "like a children's opera" that "retells the story but in a more emotional way."

The cast features Mark Rylance (most recently the wry, put-upon Russian agent Rudolf Abel in *Bridge of Spies*) as the BFG, and Penelope Wilton, transplanted from Downton Abbey (Mrs. Crawley) to Buckingham Palace, as the queen. Sophie is played by 11-year-old Ruby Barnhill in her first film role. The newcomer and the veteran Rylance, says Spielberg, "constantly inspired each other."

The BFG calls himself "a very mixed up Giant," and part of the story's charm and optimism come from Sophie's helping him, once the bad giants have been vanquished with British military help, "to spell and to write sentences." Literacy, and children who, for whatever reason, get mixed up acquiring it, increasingly concerned the aging Dahl. The last of his stories, about a tortoise that, in the old-fashioned phrase, is a bit backward, is called *Esio Trot*. Dahl had realized that good could be done by his books and the wealth they brought him. He was never any good at committees—his involvement in one of British officialdom's recurrent attempts to reform English teaching ended almost as soon as it began—but in his crotchety, stick-waving fashion he talked a lot of sense, not least about the value of nonsense and of what he called "sparkiness," its close cousin. After his death, Dahl's wife, Felicity, who had recently lost a daughter of her own to cancer, founded a charity in his name, devoted to encouraging reading and writing and, beyond that, to helping disabled and seriously ill children, their families and nurses.

Ten percent of Dahl's global royalties go to Roald Dahl's Marvellous Children's Charity, generating the bulk of its annual income of about $1 million. Spielberg is conscious that the release of *The BFG* will contribute to the charity. Even beyond that immediate effect, he says, it's crucial to keep in mind the transformative power of Dahl's tale transmuted into film. "It's very important," he says, "that all children are able to be not just entertained, but also that the stories can help them with the challenges in their personal lives."



Dahl's daughter Olivia is buried in Little Missenden (the church's 800-year-old St. Christopher mural, above). The loss, Pat Neal said, left her husband "destroyed."

As far as Dahl was concerned, this was a two-way process. More and more noticeably in his best work, from "Katina" in 1944 to *The BFG, The Witches* and *Matilda* four decades later, adults somehow or other rescue children and, in the process, are somehow or other rescued themselves. His daughter Lucy once told me that during her troubled adolescence, "All I had to do was say 'Help me'" and her father would sort something out "in an hour."

As time went on, the former misanthrope discovered, perhaps to his surprise, that his care was reciprocated, and since his death, the process has grown in many ways, direct and indirect. His own foundation apart, his activist daughter Ophelia, for example, co-founded the international humanitarian nonprofit Partners in Health, with physician Paul Farmer.

Dahl himself may not have found, as the BFG and Sophie do, that "There was no end to the gratitude of the world"—but quite a lot of people in the world are grateful to him, all the same.

BATTLE SCARS

A bold new history of the epic Battle of the Somme—and the pointless deaths of thousands of American doughboys afterward

BY **ANDREW ROBERTS**

PHOTOGRAPHS BY **SIMON NORFOLK**

The chalky hills of Picardy were easy to dig into—and, as British troops learned in July 1916, fatal to cross.

"ON JULY 1ST THE WEATHER,

after an early mist, was of the kind commonly called heavenly," the poet and author Siegfried Sassoon recalled of that Saturday morning in northeastern France. This second lieutenant in the Royal Welch Fusiliers and his brother officers breakfasted at 6 a.m., "unwashed and apprehensive," using an empty ammunition box for a table. At 6:45 the British began their final bombardment. "For more than forty minutes the air vibrated and the earth rocked and shuddered,"

he wrote. “Through the sustained uproar the tap and rattle of machine guns could be identified; but except for the whistle of bullets no retaliation came our way until a few 5.9[-inch] shells shook the roof of our dugout.” He sat “deafened and stupefied by the seismic state of affairs,” and when a friend of his tried to light a cigarette, “the match flame staggered crazily.”

And at 7:30, some 120,000 troops of the British Expeditionary Force rose out of their trenches and headed across no man’s land toward the German lines.

That attack 100 years ago was the long-awaited “Big Push”—the beginning of the Somme Offensive and the quest to crack open the Western Front of World War I. The Allied command hoped that a weeklong bombardment had shredded the barbed wire in front of the troops. But it hadn’t. And before sunset 19,240 British men had been killed and 38,231 more wounded or captured, an attrition rate of almost 50 percent. The ground they took was measured in yards rather than miles, and they had to cede much of it back almost immediately in the face of determined German counterattacks. This year’s doleful centennial commemorates by far the worst day in the long history of the British Army.

For many decades, blame for the debacle has been laid at the feet of British high command. In particular, the British overall commander on the Western Front, Gen. Sir Douglas Haig, has been made out as a callous bumbler—“undeniably a butcher, as his severest critics claim, but most of all a pompous fool,” in the judgment of the American author Geoffrey Norman (rendered in an article headlined “The Worst General”). By extension, his fellow generals are supposed, by their dullness and intransigence, to have betrayed the bravery of the soldiers in the trenches—the image of “lions led by donkeys” has been fixed in the British imagination for the last half-century. For most of that time, Haig’s American counterpart, Gen. John J. Pershing, was lionized as a leader whose tenacity and independence built the American Expeditionary Forces into a winning machine.

But that phrase, attributed to the German officer Max Hoffmann, was inserted into his mouth by the British historian Alan Clark, who then appropriated it for the title of his influential 1961 study of World War I, *The Donkeys*. Clark later told a friend he had “invented” the conversation he was supposedly quoting



British troops carried almost half their body weight in gear. Gen. Sir Douglas Haig (below, left) learned from his mistakes; Gen. John Pershing (right) did not.



from. And that blanket judgment is equally bogus. Recent scholarship and battlefield archaeology, previously unpublished documents and survivors' accounts from both sides support a new view of Haig and his commanders: that they were smarter and more adaptable than other Allied generals, and swiftly applied the harrowing lessons of the Somme, providing an example that Pershing pointedly ignored.

I want to go a step further here and argue that now it is time actually to reverse the two generals' reputations.

While most Americans may not focus their attention on World War I until the centennial of the U.S. troops' entry into the fray, in the fall of 2017, the contrast between Haig after the Somme and Pershing after that violent autumn offers a sobering study. Despite the British example, Pershing took an astonishingly long time to adapt to the new realities of the battlefield, at the cost of much unnecessarily spilled American blood. Too many American generals clung to outdated dogma about how to fight the Germans despite plenty of evidence

about how it had to be done. A great debate beckons about who was more mulish on the Western Front.

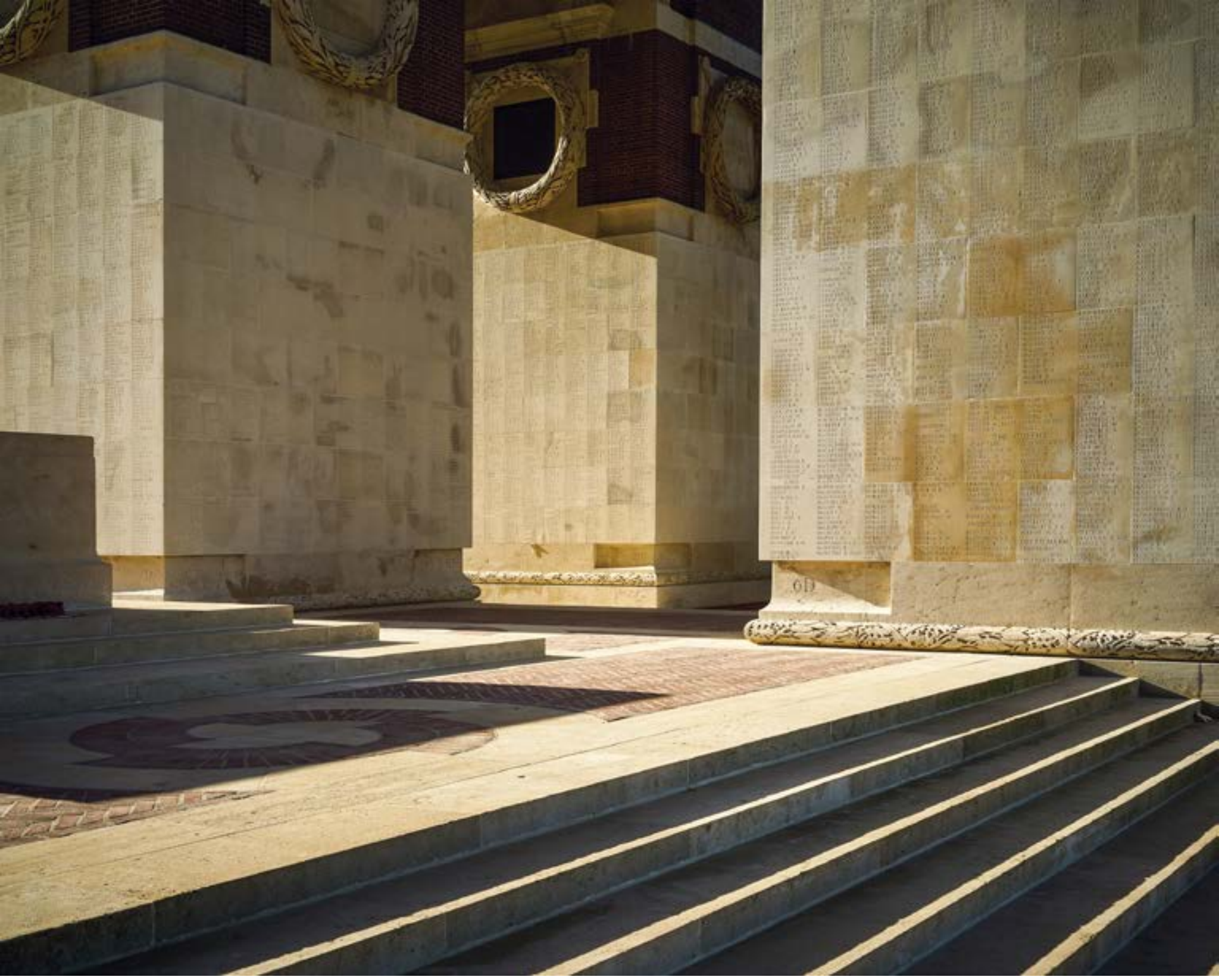
Douglas Haig was the 11th and last child born to a prominent Scotch whiskey distiller and his wife. He was prone to asthma attacks as a child, but his ancestors included several notable warriors, and he came of age when a soldier of the British Empire was the paragon of manliness. He became a soldier.

Dutiful, taciturn and driven, Haig fought in senior roles in two full-scale wars—the Sudan campaign of 1898 and the Boer War of 1899-1902—and then became central to the reform and reorganization of the British Army; his superiors believed he had "a first-class staff officer's mind." He spent the decade before the Great War in the War Office, thinking about how Britain might deploy an expeditionary force in France and Belgium if it had to. Still, he was slow to grasp the vicissitudes of mechanized warfare.

Within months after the conflict broke out, in August 1914, the war of maneuver both sides desired was replaced by a system of trenches stretching 400 miles like a gash across northwestern Europe, from the English Channel coast to the Swiss frontier. "War sank into the lowest depths of beastliness and degeneration," wrote the British Gen. Sir Ian Hamilton. The "glory of war" disappeared as "the armies had to eat, drink, sleep amidst their own putrefactions."

Both sides spent 1915 trying to break through and re-establish the war of maneuver, but the superiority of the machine gun as a defensive weapon defeated this hope time and again. Never in the field of human conflict could so many be mown down so quickly by so few, and the Germans were earlier adopters than the French and British. On the Somme, they deployed a copy of the weapon devised by the American inventor Hiram Maxim—a water-cooled, belt-fed 7.92mm-caliber weapon that weighed less than 60 pounds and could fire 500 rounds per minute. Its optimum range was 2,000 yards, but it was still reasonably accurate at 4,000. The French nicknamed it "the lawnmower" or "coffee-grinder," the English "the Devil's paintbrush."

On February 21, 1916, the German Army took the offensive at Verdun. Within just six weeks, France suffered no fewer than 90,000 casualties—and the assault continued for ten months,



A memorial in Thiepval names more than 72,000 Allied men who died on the Somme but have no known grave.

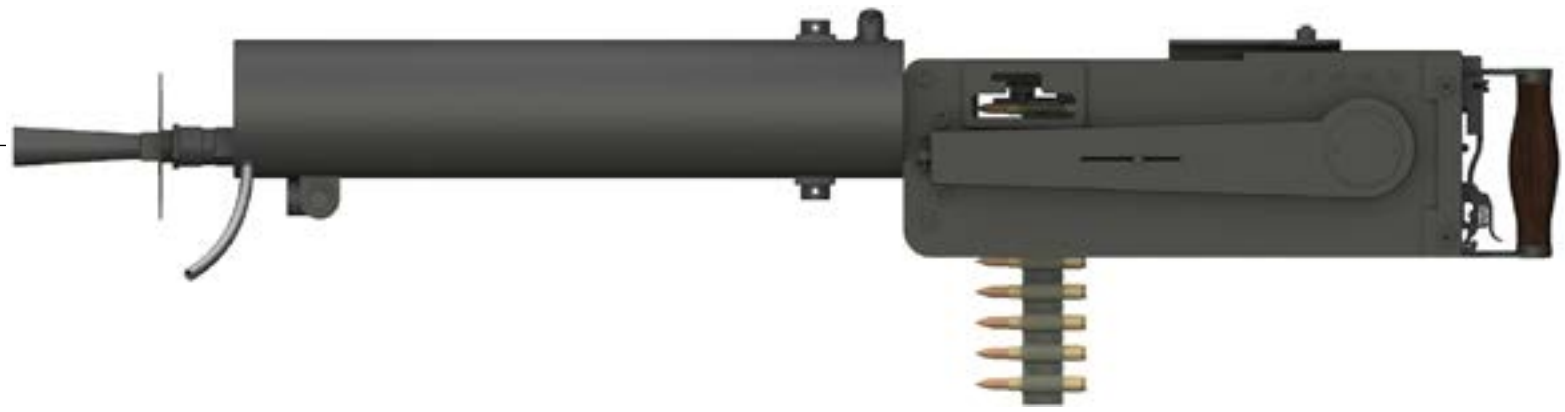
during which French casualties totaled 377,000 (162,000 killed) and German 337,000. Over the course of the war, some 1.25 million men were killed and wounded in the Verdun sector. The town itself never fell, but the carnage nearly broke the French will to resist and contributed to widespread mutinies in the army the following year.

It was primarily to relieve the pressure on Verdun that the British and French attacked where and when they did on the River Somme, nearly 200 miles northwest. When the French commander in chief, Gen. Joseph Joffre, visited his counterpart—Haig—in May 1916, French losses at Verdun were expected to total 200,000 by the end of the month. Haig, far from being indifferent to the survival of his men, tried to buy time for his green troops and inexperienced commanders.

THE DEVIL'S PAINTBRUSH

The Germans' MG08 machine gun offered fearsome firepower

Graphic by **Haisam Hussein**



MUZZLE DISC

Filled with ~1 gallon of water, which boils off as it cools the barrel
BARREL JACKET

STEAM TUBE

CIRCLE SIGHT HOLDER

FEEDER

After trigger pull, each successive round is fired using the recoil action from the previous shot
SHORT-RECOIL SYSTEM

HAND GRIP

NOZZLE

TRIGGER

STEAM EXIT TUBE

DRAIN VALVE

BARREL

EJECTION TUBE

TRIGGER LEVER

FIRING PIN

TRIGGER BAR

SAFETY



FIRING RATE:
400-500 rounds/min

OPTIMUM RANGE:
2,000 yards

MUZZLE VELOCITY:
2,953 ft/sec

EMPTY WEIGHT:
58.42 lbs

He promised to launch an attack in the Somme area between July 1 and August 15.

Joffre replied that if the British waited until August 15, "the French army would cease to exist."

Haig promised Saturday, July 1.

The six weeks between July 1 and August 15 would probably have made little difference to the outcome. Haig was facing the best army in Europe.

Nor could Haig have appealed to the British war minister, Lord Kitchener, to alter the date or place. "I was to keep friendly with the French," he noted in his diary after meeting with Kitchener in London the previous December. "General Joffre should be looked upon as the [Allied] commander-in-chief. In France we must do all we can to meet his wishes."

Still, Haig proved to be a good diplomat in a Western coalition that would include the French, Belgian, Canadian, Australian, New Zealand, Indian and, later, American armies. Strangely enough, for a stiff-upper-lipped Victorian and devout Christian, Haig as a young officer had been interested in spiritualism, and had consulted a medium who put him in touch with Napoleon. Yet it is hard to detect the hand of either the Almighty or the emperor in the ground that Joffre and Haig chose for the attack of July 1.

The undulating, chalky Picardy farmland and the meandering Somme and Ancre rivers were pitted with easily defended towns and villages whose names meant nothing before 1916 but afterward became synonymous with slaughter. The Germans had been methodically preparing for an attack in the Somme sector; the first two lines of German trenches had been built long before, and the third was under way.

The German staff had constructed deep dugouts, well-protected bunkers, concrete strongpoints and well-hidden forward operation posts, while maximizing their machine guns' fields of fire. The more advanced dugouts had kitchens and rooms for food, ammunition and the supplies most needed for trench warfare, such as grenades and woolen socks. Some had rails attached to the dugout steps so that machine guns could be pulled up as soon as a bombardment ceased. Recent battlefield archaeology by the historians John Lee and Gary Sheffield, among others, has



shown how the Germans in some areas, such as around Thiepval, dug a veritable rabbit warren of rooms and tunnels deep under their lines.

Against these defenses, the British and French high command fired 1.6 million shells over the seven days leading to July 1. The bombardment "was in magnitude and terribleness beyond the previous experience of mankind," wrote the official historian of the 18th Division, Capt. G.H.F. Nichols.

"We were informed by all officers from the colonel downwards that after our tremendous artillery bombardment there would be very few Germans left to show fight," recalled Lance Cpl. Sidney Appleyard of Queen Victoria's Rifles. Some British commanders even thought of deploying horsemen after the infantry punched through. "My strongest recollection: all those grand-looking cavalrymen, ready mounted to follow the breakthrough," recalled Pvt. E.T. Radband of the 5th West Yorkshire Regiment. "What a hope!"

Yet a large number of British shells—three-quarters of which had been made in America—were duds. According to German observers, around 60 percent of British medium-caliber

shells and nearly every shrapnel shell failed to explode. British sources suggest it was closer to 35 percent for each kind. Either way, War Office quality controls had clearly failed.

Historians still debate why. Shortages of labor and machinery, and overworked subcontractors probably explains most of it. Over the next century farmers would plow up so many live, unexploded shells across the battlefield that their gleanings were nicknamed the "iron harvest." (I saw some freshly discovered ones by the roadside near the village of Serre in 2014.)

Thus when the whistles blew and the men climbed out of their trenches at 7:30 that morning, they had to try to cut their way through the barbed wire. The morning sun gave the machine gunners perfect visibility, and the attackers were so weighed down with equipment—about 66 pounds of it, or half the average infantryman's body weight—that it was "difficult to get out of a trench . . . or to rise and lay down quickly," according to the official British history of the war.

The British 29th Division, for example, mandated that each infantryman "carry rifle and equipment, 170 rounds of small arms ammunition, one iron ration and the rations for the day of the assault, two sandbags in belt, two Mills Bombs [i.e., grenades], steel helmet, smoke [i.e., gas] helmet in satchel, water bottle and haversack on back, also first [aid] field dressing and identity disc." Also: "Troops of the second and third waves will carry only 120 rounds of ammunition. At least 40 percent of the infantry will carry shovels, and 10 percent will carry picks."

That was just the soldiers' personal kit; they also had to carry an enormous quantity of other materiel, such as flares, wooden pickets and sledgehammers. Small wonder the official British history said the men "couldn't move quicker than a slow walk."

Most of the day's deaths occurred in the first 15 minutes of the battle. "It was about this time that my feeling of confidence was replaced by an acceptance of the fact that I had been sent here to die," Pvt. J. Crossley of the 15th Durham Light Infantry recalled (wrongly in his case, as it turned out).

"A steam-harsh noise filled the air" when the Germans opened up on the 8th Division, recalled Henry Williamson. "[I] knew what that was: machine gun bullets, each faster than sound, with

its hiss and its air crack arriving almost simultaneously, many scores of thousands of bullets." When men were hit, he wrote, "some seem to pause, with bowed heads, and sink carefully to their knees, and roll slowly over, and lie still. Others roll and roll, and scream and grip my legs in utmost fear, and I have to struggle to break away."

The Germans were incredulous. "The English came walking as though they were going to the theatre or were on a parade ground," recalled Paul Scheytt of the 109th Reserve Infantry Regiment. Karl Blenk of the 169th Regiment said he changed the barrel of his machine gun five times to prevent overheating, after firing 5,000 rounds each time. "We felt they were mad," he recalled.

Many British soldiers were killed just as they reached the top of the trench ladders. Of the 801 men of the Newfoundland Regiment of the 88th Brigade who went over the top that day, 266 were killed and 446 wounded, a casualty rate of 89 percent. The Rev. Montague Bere, chaplain to the 43rd Casualty Clearing Station, wrote to his wife on July 4, "Nobody could put on paper the whole truth of what went on here on Saturday and during Saturday night, and no one could read it, if he did, without being sick."

In Winston Churchill's judgment, the British men were "martyrs not less than soldiers," and the "battlefields of the Somme were the graveyards of Kitchener's Army."

Siegfried Sassoon's men were already calling him "Mad Jack" for his reckless acts of bravery: capturing a German trench single-handedly, or bringing in wounded men under fire, a feat for which he would receive the Military Cross on July 27, 1916. He survived the first day of the Somme unscathed, but he would recall that as he and his unit moved out a few days later, they came across a group of about 50 British dead, "their fingers mingled in blood-stained bunches, as though acknowledging the companionship of death." He lingered on the scene of tossed-aside gear and shredded clothing. "I wanted to be able to say that I had seen 'the horrors of war,'" he wrote, "and here they were."

He had lost a younger brother to the war in 1915, and he himself would take a bullet to the shoulder in 1917. But his turn away from the war—which produced some of the most moving antiwar poetry to come out of the Great War—began on the Somme.



France has some 280 burial grounds for men killed in Somme combat (the Lonsdale Cemetery in Authuille).

As the official British history of the war put it: "There is more to be learnt from ill-success—which is, after all, the true experience—than from victories, which are often attributable less to the excellence of the victor's plans than to the weakness or mistakes of his opponent." If there was a consolation for the horrors of July 1, 1916, it is that the British commanders swiftly learned from them. Haig clearly bore responsibility for his men's ill success; he launched a revolution in tactics at every level and promoted officers who could implement the changes.

By mid-September, the concept of the "creeping barrage" had proved potent: It started halfway across no man's land to pulverize any Germans who'd crawled out there before dawn, and then advanced in a precisely coordinated fashion, at the rate of 100 yards every four minutes, ahead of the infantry attack. After a system of image analysis for the Royal Flying Corps photographs was developed, the artillery became more accurate. The Ministry of Munitions was revamped, and the ordnance improved.

Above all, infantry tactics changed. Men were ordered not to march line abreast, but to make short rushes under covering fire. On July 1, the infantry attack had been organized mainly around the company, which typically included about 200 men; by November it was the platoon of 30 or 40 men, now transformed into four sections of highly interdependent and effective specialists, with an ideal strength per platoon of one officer and 48 subordinates.

The changes in tactics would have been meaningless without better training, and here the British Expeditionary Force excelled. After July 1, every battalion, division and corps was required to deliver a post-battle report with recommendations, leading to the publication of two new manuals that covered the practicalities of barbed wire, fieldworks, the appreciation of ground and avoiding enemy fields of fire. By 1917, a flood of new pamphlets ensured that every man knew what was expected of him should his officers and NCOs be killed.

A galvanized British Expeditionary Force inflicted a series of punishing defeats on the enemy that year—on April 9 at Arras, on June 7 on the Messines Ridge, and in the September-October phase of Third Ypres, where carefully prepared "bite and hold" operations seized important terrain and then slaughtered the German infantry as they counterattacked to regain it. After absorbing the shock of the German spring offensives in March, April and May 1918, the BEF became a vital part of the drumroll of Allied attacks in which a sophisticated system combining infantry, artillery, tanks, motorized machine guns and aircraft sent the German armies reeling back toward the Rhine.

The effect was so glaring that a captain of the German Guard Reserve Division said, "The Somme was the muddy grave of the German field army."

The United States had sent observers to both sides starting in 1914, yet the British experience seemed lost on the American high command after the United States declared war in 1917 and its troops began fighting that October. As Churchill wrote of the doughboys: "Half-trained, half-organized, with only their courage, their numbers and their magnificent youth behind their weapons, they were to buy their experience at a bitter price." The United States lost 115,000 dead and 200,000 wounded in less than six months of combat.



Lochnagar Crater, which has been preserved as a memorial.

The man who led the American Expeditionary Forces into battle had little experience in large-scale warfare—and neither did anyone else in the U.S. Army. After winning the Spanish-American War in 1898, the United States spent 20 years without facing a major enemy.

"Black Jack" was the polite version of John Pershing's nickname, bestowed by racist West Point classmates after he commanded the Buffalo Soldiers, the segregated African-American 10th U.S. Cavalry, in battle against the Plains Indians. He showed personal bravery fighting the Apaches in the late 1880s, in Cuba during the Spanish-American War, and in the Philippines up to 1903. But by 1917 he had little experience of active command in anything other than small anti-guerrilla campaigns, such as pursuing, but failing to corral, Pancho Villa in Mexico in 1916. Future Gen. Douglas MacArthur recalled that Pershing's "ramrod bearing, steely gaze and confidence-inspiring jaw created almost a caricature of nature's soldier."

The great tragedy of his life had struck in August 1915, when his wife, Helen, and their three daughters, ages 3 to 8, died in a fire that engulfed the Presidio in San Francisco. He had responded by throwing himself into his work, which crucially did not include any rigorous study of the nature of the warfare on the Western Front, in case the United States got involved. This is all the more surprising because he had acted as a military observer in the Russo-Japanese War in 1905 and again in the Balkans in 1908.

And yet Pershing arrived in France with a firm idea of how the war should be fought. He staunchly resisted attempts to "amalgate"

some of his men into British or French units, and he promoted a specifically American way of "open" warfare. An article in the September 1914 edition of the *Infantry Journal* distilled U.S. practice—which Pershing believed in passionately—this way: Infantry under fire would "leap up, come together and form a long line which is lit up [with men firing their weapons] from end to end. A last volley from the troops, a last rush pell-mell of the men in a crowd, a rapid making ready of the bayonet for its thrusts, a simultaneous roar from the artillery . . . a dash of the cavalry from cover emitting the wild yell of victory—and the assault is delivered. The brave men spared by the shot and shell will plant their tattered flag on the ground covered with the corpses of the defeated enemy."

Anything further removed from the way war was actually being fought at the time is hard to imagine.

"In real war infantry is supreme," official U.S. military doctrine held at the time. (It would not acknowledge that artillery had a big role to play until 1923.) "It is the infantry which conquers the field, which conducts the battle and in the end decides its destinies." Yet on the battlefields of Europe modern artillery and the machine gun had changed all that. Such dicta as "Fire-power is an aid, but only an aid" had been rendered obsolete—indeed, absurd.

Even into 1918, Pershing insisted, "The rifle and the bayonet remain the supreme weapons of the infantry soldier," and "the ultimate success of the army depends upon their proper use in open warfare."

When Pershing arrived with his staff in the summer of 1917, U.S. Secretary of War Newton D. Baker also sent over a fact-finding mission that included a gunnery expert, Col. Charles P. Summerall, and a machine-gun expert, Lt. Col. John H. Parker. Summerall soon insisted that the American Expeditionary Forces needed twice as many guns as it had, especially medium-size field guns and howitzers, "without which the experience of the present war shows positively that it is impossible for infantry to advance." Yet the U.S. high command rejected the idea. When Parker added that he and Summerall "are both convinced . . . the day of rifleman is done . . . and the bayonet is fast becoming as obsolete as the crossbow," it was considered heretical. The head of the AEF's training section scrawled on the report: "Speak for yourself, John." Pershing refused to modify AEF doctrine. As



Suzanne Communal Cemetery Extension, bordered by a low rubble wall.

historian Mark Grotelueschen has pointed out, “Only struggles on the battlefield would do that.”

These struggles started at 3:45 a.m. on June 6, 1918, when the U.S. 2nd Division attacked in linear waves at the battle of Belleau Wood and lost hundreds of killed and wounded in a matter of minutes, and more than 9,000 before taking the wood five days later. The division commander, Gen. James Harbord, was a Pershing man: “When even one soldier climbed out and moved to the front, the adventure for him became open warfare,” he said, though there had been no “open” warfare on the Western Front for nearly four years.

Harbord learned enough from the losses at Belleau Wood that he came to agree with the Marine Corps brigade commander there, John A. Lejeune, who declared, “The reckless courage of

the foot soldier with his rifle and bayonet could not overcome machine-guns, well protected in rocky nests." Yet Pershing and most of the rest of the high command held to open-warfare attack techniques in the subsequent battles of Soissons (where they lost 7,000 men, including 75 percent of all field officers). A subsequent report noted, "The men were not allowed to advance by rushes and take advantage of the shell holes made by our barrage but were required to follow the barrage walking slowly at the rate of one hundred yards in three minutes." The men tended to bunch up on these "old conventional attack formations . . . with no apparent attempt to utilize cover."

Fortunately for the Allied cause, Pershing had subordinate officers who quickly realized that their doctrine had to change. The adaptations, tactical and otherwise, of men like Robert Bullard, John Lejeune, Charles Summerall and that consummate staff officer, George Marshall, enabled the best of the American divisions to contribute so hugely to the Allied victory. It was they who took into account lessons the British and French armies had learned two years earlier in the hecatombs of the first day on the Somme.

After the war, Pershing returned home to a hero's welcome for keeping his army under American command and for projecting U.S. power overseas. The rank of General of the Armies was created for him. But his way of making war was dangerously out of date. O



LEAVING HOME

A Photographic

Journey



American Exiles

Not since World War II have so many

people been on the move. Violent conflict has displaced 38 million within their own countries and forced another 22 million to flee across a border, the United Nations says. Europe is the leading destination of today's refugees, but the United States remains home to more migrants than any nation, even if this year's presidential campaign finds the candidates arguing fiercely about just how many outsiders are too many. In truth, American society has often been inhospitable, as the photo projects in the following pages show. "Antebellum Africa" tracks the descendants of African-American slaves who left for Liberia before the Civil War. "Two Nations" renders the collective ache felt by Native Americans after they were forced to attend schools that tried to obliterate their language and culture. And "The Drowning" depicts a community in coastal Louisiana that is being inundated—the first American "climate refugees," with more likely to come in the future. Their displacement is new and yet also true to American history, always a restless back and forth between settling and un-settling.



For more than a century the U.S. government took Native children from their families to attend western schools, with devastating effects still felt today

text by **Luci Tapahonso**

photographs by **Daniella Zalcman**

Two Nations



Some Native children were sent thousands of miles away. Others, like Oreos Eriacho (pictured), were housed closer to home, in now-decaying dorms like this one, in Ramah, N.M.

“When I got there, I said, ‘I’m Native American, I’m from New Mexico, I don’t belong here, and I want to go home.’”

Sharon Henio-Yazzie, Mormon Placement

At the beginning of Navajo time, the Holy People (Diyin Dine’é) journeyed through three worlds before settling in Dinétah, our current homeland. Here they took form as clouds, sun, moon, trees, bodies of water, rain and other physical aspects of this world. That way, they said, we would never be alone. Today, in the fourth world, when a Diné (Navajo) baby is born, the umbilical cord is buried near the family home, so the child is connected to its mother and the earth, and will not wander as if homeless.



Henio-Yazzie (pictured with an abandoned school in Ramah) was one of roughly 40,000 children from 60 tribes placed in Mormon homes between 1947 and 2000.

“Our parents thought that because they sent us to school we’d know what to do and where to go after, but we left school completely lost.”

Bessie Randolph, Albuquerque Indian School

In 1868, five years after the U.S. government forcibly marched the Diné hundreds of miles east from their ancestral lands in Arizona and New Mexico and imprisoned them at Fort Sumner, an act of brutality we know as Hwéeldi, or “the time of overwhelming grief,” a treaty was signed that delineated the borders of present-day Dinétah: 27,000 square miles in New Mexico, Arizona and Utah, and three smaller reservations in New Mexico at Ramah, Alamo and Tohajiilee. The treaty brought devastating changes, including compulsory education for children, who were sent to faraway government and missionary schools.

For Diné families, sustained by kinship and clan connections that emphasized compassion, love and peacefulness, the separation was all but unendurable. It threatened our very survival, as it was intended to do. Our language—which retains our timeless traditions and embodies our stories, songs and prayers—eroded. Ceremonial and ritual ties weakened. The schools followed military structure and discipline: Children were divided into “companies,” issued uniforms and marched to and from activities. Their hair was cut or shaved. Because speaking Navajo was forbidden, many children did not speak at all. Some disappeared or ran away; many never returned home.

As a child at a mission boarding school in the 1960s, I was forced to learn English. Nowhere in our lessons was there any mention of Native history. But at night, after lights out, we girls gathered in the dark to tell stories and sing Navajo songs, quietly,



Albuquerque Indian School, which Randolph attended, was founded in 1881. It closed in 1982. In 2013, a charter school opened in the only building of 48 left standing.

so as to not wake the housemother. We were taught that if we broke the rules, we would go to hell, a place we could not conceive of—there is no Navajo analogy. As I learned to read, I discovered in books a way to assuage my longing for my parents, my siblings, my home. So in this way my schooling was a mixed experience, a fact that was true for many Native children.

“If you talked Navajo, you weren’t as good as the kids who talked English. I’d never known you could get in trouble for being who you are.”

Nixon Martinez, Ramah Elementary School and Dormitory

The stories of former students are captured in striking images by the photographer Daniella Zalcman, who uses multiple digital exposures to layer portraits atop landscapes with special meaning—the abandoned interior of a shuttered dormitory, a church atop a desolate hill. Today those students are parents and grandparents. Many hold onto a lingering homesickness and sense of alienation. Others are beset by nightmares, paranoia and a deep distrust of authority.

In time, injustices in the school system came under public scrutiny. The 1928 Meriam Report stated “frankly and unequivocally that the provisions for the care of Indian children in boarding schools are grossly inadequate.” Almost half a century later, a 1969 Senate report constituted, in the words of its authors, “a major indictment of our failure.” The report’s hundreds of pages were not enough to tell the story, the authors wrote, of “the despair, the frustration, the hopelessness, the poignancy...of families which want to stay together but are forced apart.”

Real reform began after the passage of the 1975 Indian Self-Determination and Education Assistance Act, though it would be several years before widespread changes would take hold. But by 1990, when Congress enacted a law to protect Native languages, tribal involvement in education had become the norm. Some boarding schools were shut down. Others operate to this day but are mainly community, or tribal, run. No longer are they designed to eliminate Native culture. Diné language is now taught alongside English. Navajo history and culture are embedded in the curriculum.



In 1970, Ramah opened one of the country's first Native-run schools. President Nixon sent a telegram pledging support for the "important new direction in Indian Education."

As a poet and professor of English, I conceive of my work in Navajo and translate it into English, drawing on the rich visual imagery, metaphorical language and natural cadences of my first language. My daughter, an educator herself, not long ago moved into my parents' old house, in Shiprock, New Mexico, when she got a job at nearby Diné College. Our children, once taken from Dinétah, have returned home.

LEAVING HOME

text by **Thomas Beller**

photographs by **Ben Depp**

A big picture view of the first place in America losing its battle against climate change

The Drowning



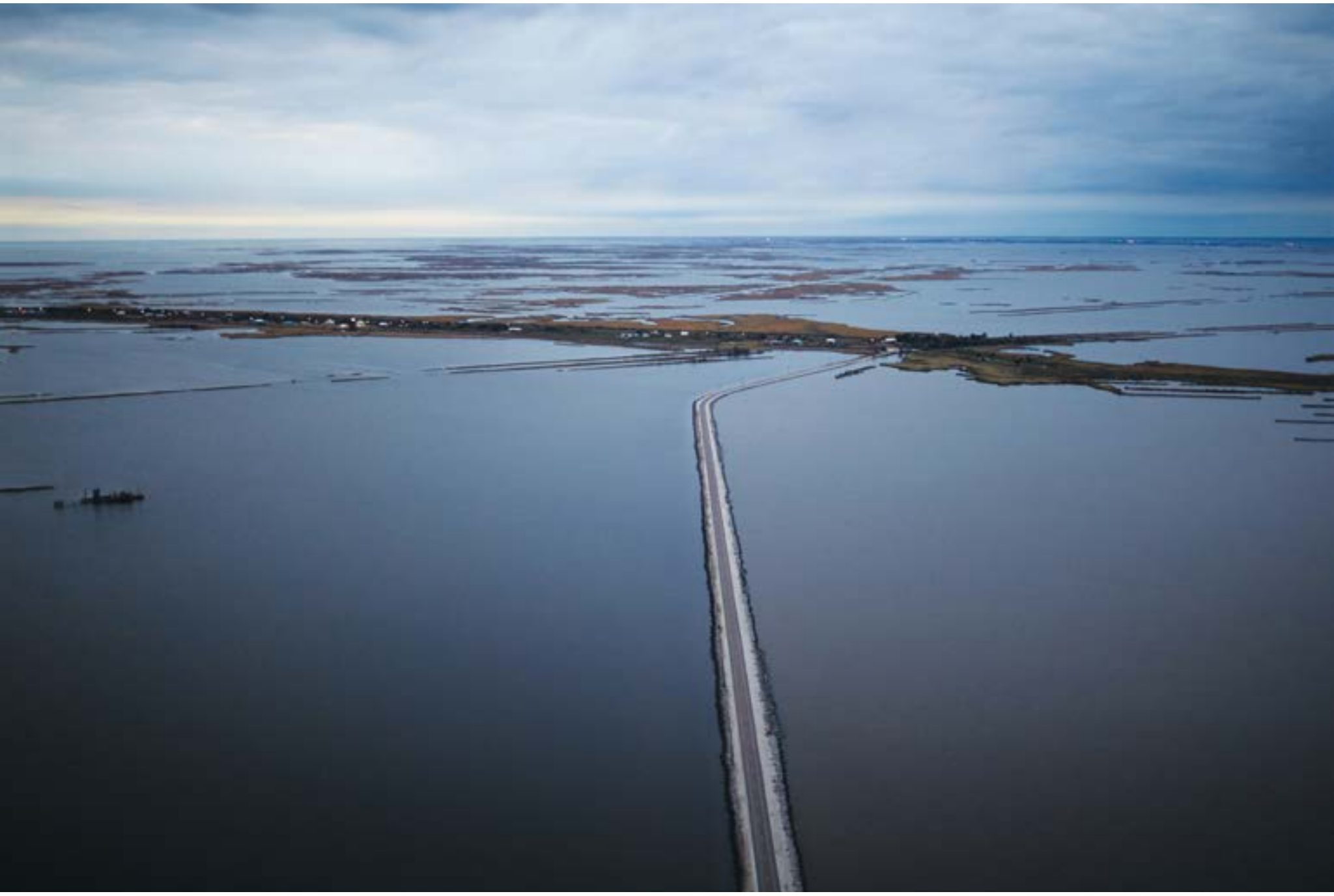
A fishing boat lies marooned near Venice, Louisiana, the southernmost town on the Mississippi River accessible by car. Venice was nearly destroyed by Hurricane Katrina.



Louisiana is spending $42.5 million to rebuild the marshes in the Grand Liard Bayou. Without the project, the land was expected to disappear entirely by 2050.

Isle de Jean Charles, in southern Louisiana, is linked to the mainland by a long, straight road. When I first set out across it, there was a strip of wetlands on either side. But as I continued, the water closed in, lapping at the edges of the asphalt.

The island is home to about 60 members of the Biloxi-Chitimacha-Choctaw Indian tribe. The land around them is rapidly disappearing. As I approached, I saw boats deteriorating in people's yards, the nautical equivalent of rusting washing machines. The houses were all on stilts. Some were intact. Others were in ruins, their walls blown away, their stairs leading up to wooden frames open to the sky.



The disappearing road to the Isle de Jean Charles. The U.S. Geological Survey has reported that Louisiana is losing a football field's worth of land every hour.

Louisiana is losing 75 square kilometers of coastal terrain every year, and the residents of this island have been called the first "climate refugees" in the United States. They're unlikely to be the last. Other Gulf Coast states are also surrendering land to the water at a rapid rate. And up north, the 350 villagers of Newtok, Alaska, are hoping to move to higher ground. But Isle de Jean Charles is the first American community to be awarded federal funding—$48 million—to relocate en masse. There are tentative plans to move the tribe to northern Terrebonne Parish; the state of Louisiana and the U.S. Department of Housing and Urban Development are still negotiating the details.

Rising sea levels are partly to blame for the island's disappearance; plus the process has been hastened by a century and a half of engineering the river with levees, which has deprived the delta of the very sediment that made it, and the many canals dredged by the oil industry, which let salt water into the marsh.



Struggling cypress trees on Pecan Island, about 140 miles west of New Orleans. After Hurricane Rita, salt water seeped into the marsh and killed most of the trees in the area.

This kills the plants at their roots, leaving the loose ground to erode into the bayou. Among the most striking sights I saw on the island were the denuded oaks reaching into the sky. Their bare branches stretched out in arabesques that evoked the human figure. They seemed especially alive in death, like something from Pompeii.

I approached a home belonging to Wenceslaus Billiot Sr., an 89-year-old former boat builder who has lived his whole life on the island. His house was intact, with a front porch and two rocking chairs. He greeted me in a voice heavily accented by his French dialect. The words were English, but the melody was something else entirely.

"Way back in the old days," he told me, throwing his arm out toward the sea that lay just beyond the road, "you had trees. There was no bay. All this water used to be marsh."

"The water, the marsh, having to move away—what do you



Oil from one of the 1,500 spills reported each year in Louisiana floats in a bayou.

make of it all?" I asked.

He told me he isn't sure he wants to go. "I built this house in the 1960s," he said. "I have another I built in '49. I built it all." But as we talked, the rain began to come down in sheets and he repeated a prediction he'd heard: By 2100, New Orleans itself will be underwater.

I had trouble grasping just how dramatically Billiot's surroundings were disappearing until I saw these photographs by Ben Depp. When you are driving through the flat terrain of southern Louisiana, it's hard to perceive the long stretches where water is encroaching. Some of the most vulnerable areas are also dense and swampy, which makes them hard to navigate on the ground. Depp realized that soon after he moved to New Orleans in 2013 after spending a few years in Port-au-Prince, Haiti. "Unless one is overhead," he wrote to me, "it is impossible to truly situate oneself."

Depp now photographs the coast from a 30-foot paraglider with a 19-horsepower engine that looks like it's "part lawn mower, part vacuum." A five-day course in Florida taught him to fly it in a way that, as he put it, "makes it most likely that you won't hurt yourself."

To take off, he runs with the motor strapped to his back while pulling strings on the wing so it fills with air. He can stay aloft for hours at a time. "It feels as though I am sitting in a patio chair suspended in the air," he told me. He prefers to shoot just after dawn or before dusk. This helps him achieve the nearly surreal effect seen in some of these aerial images: The sun is low enough that the water is in shade, but what lies above it is touched by the light—tall grass, a boat on its side, a toppled oak tree.

Studying Depp's pictures of the bayou, I saw them as a kind of war photography. These dreamy, surreal perspectives of a slowly submerging world are scenes of conflict. They exert a fascination from which we turn away, until we become personally engulfed in that reality. Most of us live on safe ground. But we live with the knowledge of an encroaching tide.

LEAVING HOME

text by **Clair MacDougall**

Antebellum Africa.

photographs by **Glenna Gordon**



Atop the Ducor Palace Hotel, a five-star destination in Monrovia that is a ruin today.

In the front parlor of a dilapidated mansion with a god's-eye view of the Atlantic a group of young men huddle around a light fixture that washed in from the sea and is covered in barnacles. They chip away at it with a hammer and a machete to open it and see if it can be made to work. They are not having much luck, a commodity that is in short supply around here. The building has no electricity or running water. Wind pushes through broken windows. There are holes in the roof. Rainwater has collected in puddles on the grand marble staircase and throughout the house,

The world created by former slaves in Liberia was a cruel paradox for more than 150 years. Now it's finally fading into history



The city's now-disused Masonic Lodge barred "native" members.

a faded yellow modernist structure on the edge of a cliff in the sleepy city of Harper in southeastern Liberia about 15 miles from the border of Ivory Coast.

The short iron fence that surrounds the regal mansion, known locally as "the palace," bears a monogram—"WVST," for William Vacanarat Shadrach Tubman, Liberia's longest-serving president, known for his 27 years of autocratic rule beginning in 1944. But the home of the man called "the father of modern Liberia" because he opened the nation to foreign investment and industry is now in ruins and occupied by squatters, a symbol of how decades of political turmoil have shaken up the old order established by freed American slaves.

Tubman was born in Harper but his paternal grandparents were slaves in Georgia. They were released in 1837 by their wealthy mistress, Emily Tubman of Augusta, and sent to Liberia, founded in 1822 by the American Colonization Society to serve as a haven for the once enslaved. But instead of creating a proverbial land of liberty that made a clean break from their brutal past, the settlers—called "Americo-Liberians" or, if they were Africans who had been trafficked but not to the United States, "Congos"—lorded over the "natives," denying them political rights and acting like the slave masters they'd escaped. They forced natives to labor in the fields and on rubber plantations, and taxed communities for merely existing. Well-off settlers donned hoop skirts and tailcoats, opened Masonic lodges and built Methodist churches in a conscious effort to emulate the American South. Tensions between Americo-Liberians and natives smoldered for decades, and though Tubman's administration granted natives the right to vote, among other benefits, the conflict exploded nine years after he died, with a violent coup led by the native soldier Samuel Doe, ending the Americo-Liberians' dominance.

"Nineteen eighty was clearly a response to 133 years of rule that wasn't inclusive enough and didn't provide enough economic opportunities for everyone," says Aaron Weah, the Liberia country director for Search for Common Ground, a U.S.-based nongovernmental organization.

Today, no place captures the ambiguous world of the Americo-Liberians better than Harper, whose oldest neighborhoods are reminiscent of New Orleans. Once occupied by the ruling elite,



Squatters occupy a mansion in Harper built for high-living President Tubman, whose father, a stonemason, made him sleep on a pallet as a child to build character.

houses in the style of plantation mansions now stand silent and ghostly. “I was always fascinated by the American antebellum South—how plantation culture seemed so genteel on the surface but was so deeply cruel and built on the exploitation of others,” says the photographer Glenna Gordon, a Southern California native who has traveled in Liberia regularly over the last seven years. “I wanted to explore this tension, and in Harper some of the first freed slaves came and replicated the inequality that they had been subjected to. I sought traces of these systems, the artifacts of American wrongs replicated elsewhere.”

Americo-Liberians still wield political and economic influence, but they no longer enjoy the total control they once did. President Ellen Johnson Sirleaf, elected in 2006, is descended from natives, though she grew up in the Americo-Liberian world, attending the most prestigious schools before going to college in the United States.



In the former Tubman mansion, a boy stands in a makeshift schoolroom.



The Liberian flag's red and white stripes, on a boat in Harper, signal the nation's ties to the United States.

"Those who see themselves as pure settlers are very few though they retain a sense of unique identity," says Elwood Dunn, a Liberian historian.

For the older generation of Americo-Liberians, the 1960s and '70s were halcyon days. Caroline Dennis Costa, a diminutive 85- year-old, peers out of the attic window of the old country house built by her father, a settler, in Careysburg, northeast of Monrovia, the capital. Dressed in pajamas and a powder pink satin dressing gown, the former nurse speaks nostalgically about the decades under Tubman and his successor, William Tolbert, who was executed by Doe and his soldiers.

"We had *everything*," she says of the high level of development before the coup. She worked at John F. Kennedy Medical Center in Monrovia, then a state-of-the-art facility that attracted patients from all over. It has declined in quality and people now joke that JFK means "Just for Killing." Dennis lives



A once luxurious house is in Harper, named for U.S. Senator Robert Goodloe Harper, who advocated sending ex-slaves to Africa and proposed calling the place "Liberia."

alone and fears the natives who inhabit former settler houses on her street. "They still have a grudge," she says, but "they fail to realize that no matter what they do, they cannot keep the Congo man down."

George Yancy, a prosperous Americo-Liberian in Harper, is a 40-year-old financial administrator at William V.S. Tubman University. A Freemason, he zooms around town on a lime green motorcycle adorned with the Masonic square and compasses. To him, the distinction between settler and native isn't valid, given that the first "settlers" were descended from Africans. "I don't like to go the route of 'settler' and 'natives,' because the people you call settlers were natives sold by natives to those merchants that came to barter with salt and cloth," Yancy says angrily.

History, meanwhile, moves on. Most of the men, women and children squatting in Tubman's old mansion are native



Much of Harper resembles the American South, found photographer Glenna Gordon, who has been working on the project since 2009.

Liberians, though some of them had fled to Ivory Coast during the civil wars. What did they think of living in the great president's house? A young man named Masir replies, "Wasn't Tubman married to Queen Elizabeth?"

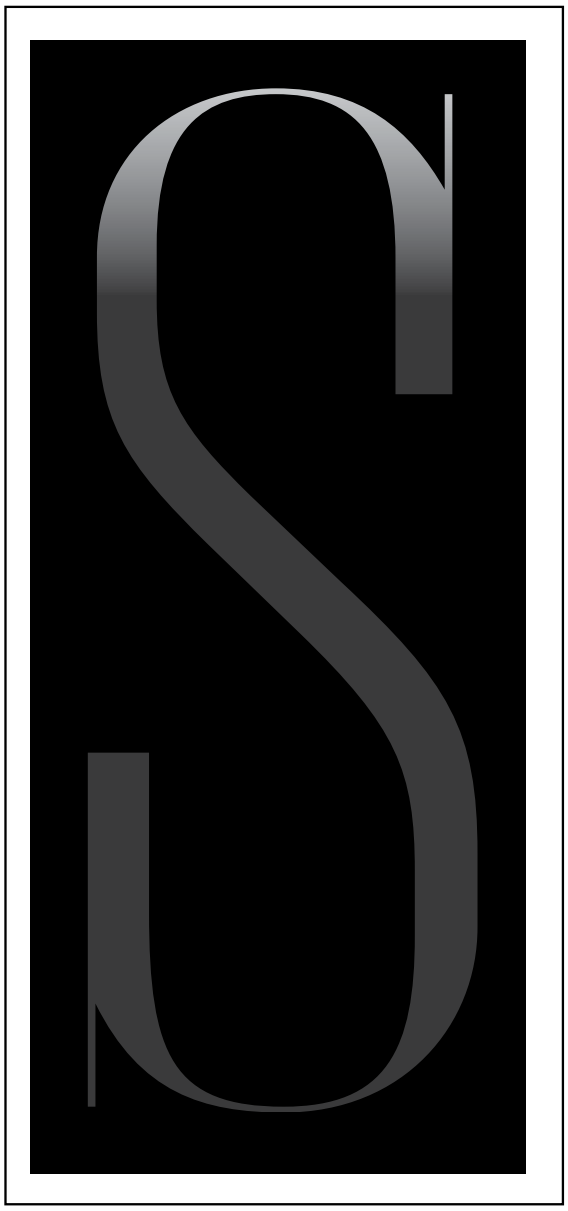
LOST IN TRANSYLVANIA

Baron Franz Nopcsa was a pioneering dinosaur expert and geologist—and a spy. Then **history forgot him.** Now the amazing life and tragic demise of a rogue aristocrat is ready to be rediscovered

by VANESSA VESELKA

photographs by CRISTIAN MOVILĂ

Sacel Castle was the primary home of the Nopcsa family, which traced its roots in the area to the 14th century.



ACEL CASTLE, IN A PART of Transylvania known locally as the Land of Hateg, is not open to the public, but Dacian Muntean, my guide, has arranged for us to get in. I've seen the entryway in old photographs—Persian rugs, a piano, a grand staircase lit by a round, cathedral-like window of leaded glass.

That is nothing like what I find before me. If it weren't for the window, I wouldn't recognize it at all. Swallows fly through where the panes once were and sunshine pours down on stairs now covered in rubble. Two huge ceiling beams have fallen and are lying askew on the landing. Others are detached on one side and hang down precariously.

"Is it safe to go up?" I ask Dacian. He considers. "Yes," he says. "I think so." A dog with matted fur follows us, along with her lame puppy. It's clear that this crumbling, abandoned castle is their home. They scamper over the rubble; one stops to pee on a pile of debris.



Upstairs, every window is gone. The floorboards are rotten. The walls are pockmarked with holes where treasure seekers, hearing a legend of hidden gold inside, have punched through. We come into what was once a stately library. Dacian points at a bay window. A breeze blows through the sockets. “I like to imagine him here reading,” he says. In the corner, an ornate wrought-iron spiral staircase leads up to nowhere, and I see light coming through a hole in the roof.

The castle was once the family home of Baron Franz Nopcsa von Felso-Szilvas, an Austro-Hungarian aristocrat born in 1877. Baron Nopcsa was a notorious figure in his day. A wild genius with a flair for the dandyish and the dramatic, he was an explorer, spy, polyglot and master of disguise. He crossed the Albanian Alps on foot and befriended local mountain men, sometimes involving himself in their tribal feuds. Once, he was nearly crowned King of Albania. It was said that he would disappear for months at a time only to arrive for polite tea at posh European hotels dressed as a peasant. Along with a younger man whom he called his secretary, he traversed swaths of the Balkans on motorcycle. He kept up years-long correspondences with famous and learned men all across Europe. Later in his life, he was known for chasing villagers from his estate with a pistol.

It is easy for the intrigue and romance of Nopcsa’s exploits, and the manner of his tragic death, to obscure the quieter fact that the baron was one of the great scholars and scientific minds of his time—and was largely self-taught. He was one of the first scientists to look at fossilized dinosaur bones and see a living, social creature. In fact, he was a staunch believer in the evolutionary relationship between birds and dinosaurs, decades before the idea became widely accepted among paleontologists. His overall contributions to the field have led some to call him the forgotten father of dinosaur paleobiology. “Nopcsa was asking questions nobody else was asking,” says David Weishampel, a paleontologist at the Center for Functional Anatomy and Evolution at John Hopkins University School of Medicine.

Nopcsa was equally brilliant as a structural geologist. While most of the scientific community still scoffed at the theory of continental drift, he provided some of the strongest evidence for such movement. He mapped the geology of Albania and became one of the country’s foremost ethnographers and his-



After an early foray into the Albanian Alps, Nopcsa posed for Austrian imperial and royal court photographer Carl Pietzner dressed as an Albanian warrior.

torians. "It would be no exaggeration to say that he knew the country and its people better than any foreigner of his day," says Robert Elsie, a scholar of Albania and the translator and editor of Nopcsa's memoirs, published in English in 2014.

Over his career, Nopcsa published several tomes and more than 150 scientific papers. Yet his name barely appears in textbooks. No historical plaque adorns any of the places he lived or taught. Even his grave is unmarked.

Nopcsa was born to a wealthy noble family, the eldest of three children raised at Sacel. He had a typical upbringing for an aristocrat in a provincial backwater of an aging empire. At home he spoke Hungarian and learned Romanian, English, German and French. His father, Alexius, had fought in Mexico against Benito Juárez, in 1867, as a hussar in the army of Maximilian, Archduke of Austria and Emperor of Mexico. Later Alexius became a vice-director at the Hungarian Royal Opera, in Budapest. Nopcsa's mother, Matilde, came from an aristocratic family from the nearby city of Arad.

In 1895, Nopcsa's sister Ilona was walking along a riverbank near the family home when she found an unusual-looking skull, and she brought it to her teenaged brother. It soon became his obsession.

The skull belonged to a previously undiscovered duck-billed herbivore from the dusk of the Mesozoic, around 70 million years ago, and was buried in sediment before a mass extinction that would wipe out three-quarters of all plant and animal species on earth. Crushed by geological forces, the skull was in terrible shape.

In the fall, Nopcsa entered the University of Vienna and took the skull with him. Like a cat with a gift rat, he presented it to his professor, a famous geologist, expecting him to take it from there. But the professor sent Nopcsa back to Transylvania and told him to figure it out for himself. Whether it was lack of interest or funding or the cunning strategy of a master teacher, it was the making of a great scientist.

In the library of Sacel Castle, Nopcsa taught himself geology, physiology, anatomy and neurology. He wrote to scientists all over Europe asking for more books. At the time, very few European dinosaurs had been found. Unable to compare his fossils with others, he relied on his imagination. Working

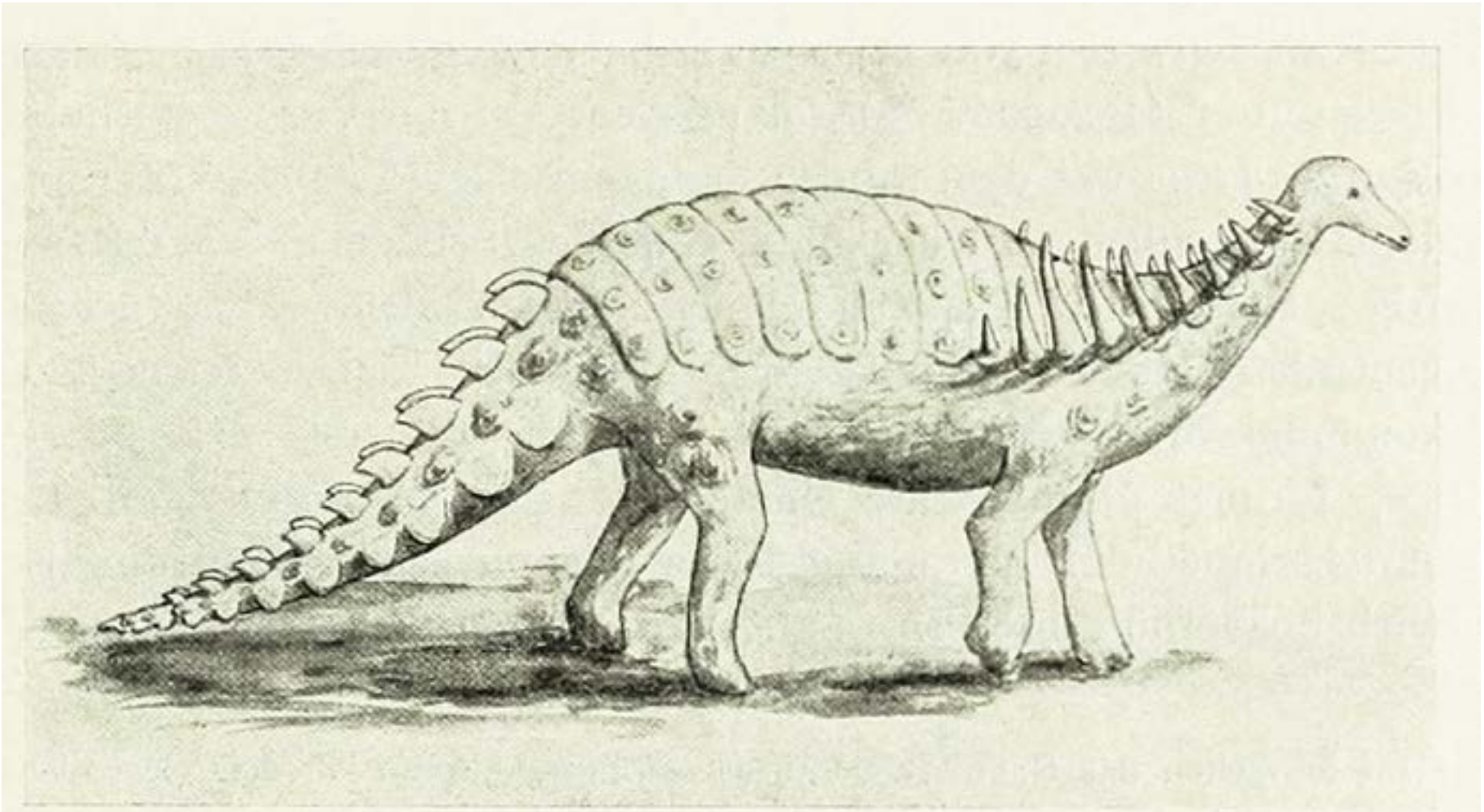
along the river strata, he began to excavate, preparing the fossils he found with homemade glue. From the tiniest scratch on the fossilized braincase, he speculated about the relationship between the pituitary gland, which regulates growth, and an organism's size, applying what he'd learned of soft tissue and blood circulation. Drawing on the jaw mechanics of lizards and alligators, he rearticulated his dinosaur's jaw and envisioned its musculature. In this, he was breaking new ground—comparing his dinosaur to living things.

Later, he would look at the pelvis and hind limbs of crocodiles to understand the mechanics of how running flight may have evolved in early birds. From watching birds themselves, he recognized brooding patterns in dinosaur nests, reasoning that since the hatchlings were too undeveloped at birth to defend themselves from predators, some dinosaurs must have parented their young. These ideas, too, were utterly new.

Nopcsa returned to Vienna and, at the age of 22, presented his work to the Austrian Academy of Sciences, one of the foremost scientific bodies in the world. His entry onto the international stage was anything but discreet. During his lecture, Nopcsa skewered the dinosaur classification system of a prominent scientist named Georg Baur with little concern for etiquette or empathy. His genius was clear, but so was his colossal talent for rudeness, which would shape his academic relationships throughout his life.

In time, Nopcsa would identify 25 genera of reptiles and five dinosaurs—the duck-billed *Telmatosaurus transylvanicus,* the beaked and bipedal *Zalmoxes robustus,* the armored *Struthiosaurus transylvanicus* and *Magyarosaurus dacus* and the meat-eating *Megalosaurus*. Four of these would become the "type specimens" of their species, the fossil blueprints against which all examples would be judged.

The Hateg dinosaurs turned out to be unique. They were unusually small—in some cases nearly miniatures. Nopcsa's titanosaur belonged to a family of massive sauropods reaching lengths of 100 feet and weights of 80 tons, yet *M. dacus* was the size of a horse. His *Telmatosaurus* was smaller than a crocodile. Others were roughly an eighth the size of their non-Romanian cousins. The question was, why?



Figur 2. Rekonstruktion von Struthiosaurus.

Nopcsa sketches in his own hand, like the *Struthiosaurus* above, appear throughout his papers.

The most obvious possibility was that Nopcsa had found juveniles. Yet he didn't believe this to be the case, and he was determined to prove otherwise. Certain bones grow together with age, and a good comparative anatomist, which Nopcsa was, can tell the developmental age of an organism by examining these sutures—so long as he has the right bones. But paleontologists don't get to choose their bones, and Nopcsa's Transylvanian miniatures presented either the wrong ones or were crushed beyond analysis. Looking for other ways to discern age, Nopcsa began to examine slices of bone under a microscope to study cell structure.

"Bones grow from the inside out, like trees," explains Weishampel. "It's possible to guess an age by counting the rings." Today this method is known as paleohistology, and Nopcsa's significant early contributions, particularly in determining which bones are most useful for analysis, remain largely uncredited, according to Weishampel.

Certain that his dinosaurs weren't juveniles, Nopcsa looked to explain *why* they seemed unable to grow beyond a certain size. And he began to formulate the argument that Hateg was



Nopcsa used a 70 million-year-old fossilized jaw (the lower portion is seen vertically here) to identify *T. transylvanicus.*

once an island—another claim supported by research after his death. Hateg Island's environmental pressures, he concluded, limited the dinosaurs' development.

"Islands are unique places, where biology gets a free hand," says Weishampel. "Large animals tend to get smaller—for example, the dwarf elephants of Malta, hippos in the Mediterranean." And, as it happens, the dwarf dinosaurs of Transylvania. The theory is that fewer food options lead to the success of animals with smaller anatomies. "And small animals," Weishampel continues, "tend to get larger, like Komodo dragons, boas and tortoises in the Galápagos." Nopcsa correctly identified the first set of conditions, and the second, scientists now speculate, can be explained by the idea that animals whose body sizes are held in check by predators on large landmasses tend to expand on an island with fewer of them. Nopcsa's theory of what he called "island insularity" developed into what scientists now know as the "island rule."

But though Nopcsa possessed many talents, he also possessed a private affliction, the symptoms of which can be discerned in letters he sent to Arthur Smith Woodward, the famous geological curator of the British Museum. The two men corresponded more or less monthly from 1901 until Nopcsa's death in 1933. Nopcsa's tone is touchingly deferential no matter how close the men became: The baron never failed to address his elder as "sir."

Leafing through the great cache of letters, each page preserved between sheets of plastic and bound in a dozen volumes now held in an archive at the Natural History Museum in London, you can see the places where Nopcsa's customary scrawl becomes spidery, as though his thoughts were turning in on themselves. Once, in 1910, after Nopcsa failed to arrive in London for a meeting, Smith Woodward received a note instead from Nopcsa's mother, the baroness. As if excusing a child from school, she explained that her son was unable to visit due to a recurring illness.

Nopcsa's life continued to be punctuated by periods of extreme productivity, extensive fieldwork and prolific writing, but over time his illness worsened. He later referred to what devastated him as "shattered nerves." Today we would likely call it manic depression.

Even as Nopcsa was establishing himself as a scientist, he became enthralled by tales of Albania's mountain tribesmen, whom he first heard about from a man thought to be his first lover, Louis Draskovic, a Transylvanian count two years his senior. Nopcsa soon determined to visit the mountains and study the land and the people there.

At the turn of the 20th century, fieldwork wasn't funded as it might be today, with university grants or stipends. And in this fundamental way Nopcsa's aristocratic status cannot be separated from his life as a scientist. He had social access and money for schooling. He met Smith Woodward through his parents, and his first geological foray into Albania, in 1903, was paid for by his uncle, a favorite courtier of Empress Elisabeth of Austria. In the years to come many of Nopcsa's Albanian adventures were paid for by the Austro-Hungarian Empire itself, the fruit of a different kind of relationship: At some point Nopcsa began to work for the vast and crumbling empire as a spy.

Albania was then the buffer zone between Austria-Hungary and the Ottoman Empire. As tensions rose in the run-up to World War I, the Austrian Imperial Council felt that it would be useful to have an accurate geographical and cultural map of the country. Nopcsa's resulting studies and photographs documenting the country's highland culture would become canonical for future ethnographers.

In 1906, while planning a trip, Nopcsa hired a young Albanian man to be his secretary. Bajazid Elmaz Doda was from a shepherd's village high in the mountains. Nopcsa wrote in his journal that Doda was "the only person who has truly loved me" since Louis Draskovic. The feeling was apparently mutual. Nopcsa would later name a species of ancient turtle after Doda—*Kallakobotion bajazidi*, or "beautiful and round Bajazid."

From the time they met until the outbreak of World War I in 1914, Doda and Nopcsa were often on the road. Nopcsa became fluent in local Albanian dialects and built friendships with the tribesmen. He was fascinated by their sense of honor. In a letter to Smith Woodward, he describes with great admiration witnessing a man take tea with the murderer of his son and saying nothing, because both were guests in another's house—a feat of self-restraint, Nopcsa wrote, that no European gentlemen could have matched.



The crumbling staircase at the castle, long known as Sacel, which was recently renamed for Nopcsa.

Meanwhile, Albania, held by the Ottomans for centuries, was becoming unstable. As the First World War approached, Nopcsa hoped to lead an insurgency of mountain tribesmen against the Turks. Europe's "great powers" wanted to claim the country, and in 1913 they held a congress in Trieste where delegates from the Albanian tribes were assembled to discuss who should be made king of a newly independent Albania. Nopcsa, displaying a bit of colonial dash, put forth his own name. It was not an outlandish suggestion. The great powers were determined to install a European aristocrat, and by this time Nopcsa had spent years in Albania and had built deep ties. But the foreign office ultimately did not support him, choosing instead a German, Prince William of Wied. It marked the end of Nopcsa's interest in politics.

"My Albania," Nopcsa declared with great paternalism in a letter to Smith Woodward, "is dead."

Arriving in Deva, the city in present-day Romania where Nopcsa was born, you first notice the medieval citadel, which looms over the city from atop the gargantuan cinder cone of an

ancient basaltic volcano. According to local lore, a woman was walled alive into the citadel's foundation when it was built in the 13th century, to make it "stronger." "People are superstitious here," says Dacian, who is a great collector of legends. "The last time someone was 'staked' here was 2004."

Dacian is in his late 30s, with long brown hair that makes him look more like a heavy-metal drummer than the head of a cultural restoration project. But his passion for Nopcsa is evident. Dacian is from Deva, too, and for him, the baron isn't just a great and underappreciated scientist—he's a hometown boy.

As a child growing up under the country's autocratic Communist leader Nicolae Ceausescu, Dacian tells me, he visited Sacel Castle, then an orphanage. "Who owns this?" he would ask. "The people," they said. "Yes, but who owned it before?" He got no more answer. As an adult, he began to do his own research, and for the past five years he and his partner, Laura Vesa, have worked ceaselessly to restore Nopcsa's name in the place of his birth.

"Before we started working, no one in Deva knew who he was," Dacian says. "Now, if you stopped someone on the street, they might say, 'Oh, that's the dinosaur man. He was a baron from here.'"

In the foothills beneath the citadel, houses with terracotta roofs line roads that meander like waterways. Goats and chickens wander around backyards, and shrines to Catholic saints decorate the street corners. As we thread through villages, Dacian tells whomever we meet—store owners, waitresses—about Nopcsa. It's his vision that Nopcsa's castle be restored and become a center for scientific research.

But Romania, though rich in natural resources, is poor in cash. Under communism the books in Nopcsa's library were burned for political reasons, but now they're burned for heat. So making the case for saving the castle is difficult.

In Hateg, we pull over at a roadside museum dedicated to the region's fauna. The door is locked, but the village bartender has the keys. The place is about the size of a one-bedroom apartment. The bartender valiantly recites what he knows about the dinosaurs that once roamed here. There are casts of fossilized eggs and a couple of displays showing *Balaur bondoc*, a small, feathered theropod recently discovered in the area. On a shelf



A museum in Hateg shows off a replica of a raptor-like dinosaur fossil near Nopcsa's home.

near the entrance sits a small collection of colorful clay dinosaurs made by village kids.

Later, we visit a building that locals hope will someday become a museum devoted to Transylvanian dinosaurs but is now filled, like the roadside attraction, with little more than some fist-sized rocks, a few casts of dinosaur eggs and posterboard displays. The mayor of the village arrives with a geologist from the University of Bucharest to give me a tour. The town has already installed, outside, a replica of *M. dacus*, Nopcsa's dwarf sauropod. The museum-quality replica, the mayor explains, is anatomically correct to the last detail—and made by a Canadian artist at great expense. But a Kickstarter campaign was needed just to cover the dwarf sauropod's shipping costs.

Dacian dreams that these small museums and posterboard exhibits will raise interest in the Land of Hateg, drawing visitors from other parts of Romania. He has put on exhibits about Nopcsa with borrowed photographs, made short documentaries for Romanian TV and translated hundreds of pages of the baron's memoirs from German into Romanian. Last year, he and Laura wrote a major proposal that won Sacel Castle a

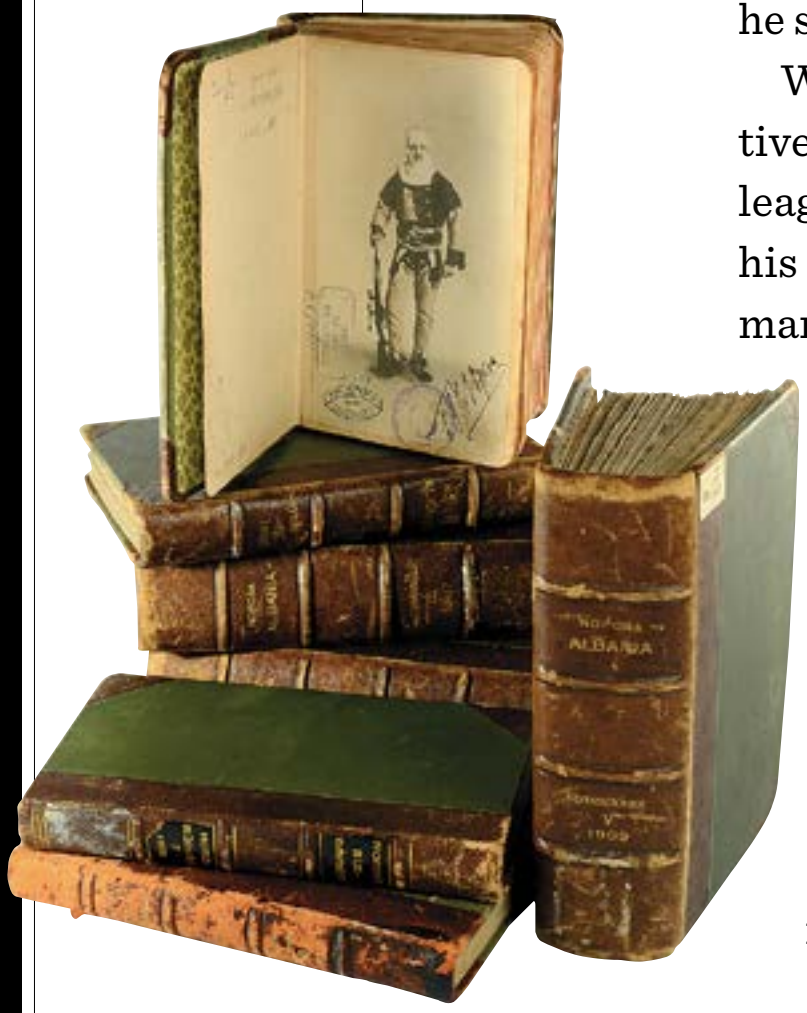
place on a list of cultural sites to be funded by the government. So far no money has come, and the castle is disintegrating. But Dacian has no doubts he will succeed; he speaks of the restoration as a *fait accompli*. He is irrepressibly optimistic, signing all his emails "Sunny Days!" He imagines a Transylvania where village women can sell their embroidery at a fair price to tourists, where kids know their history and where Nopcsa is not forgotten.

There is no easy explanation for why Nopcsa has been overlooked for so long. In recent years, a loose international brotherhood of paleobiologists, Albanologists and LGBT activists has emerged hoping to earn him a more prominent place in history. Some point to Nopcsa's sexuality as the reason for his persistent obscurity, and Dacian acknowledges that in a country as religious as Romania, the generally held belief that Nopcsa was gay (which the available evidence seems to corroborate) has been a hurdle in his campaign to restore the baron's legacy. But Dacian is circumspect, maintaining that Nopcsa's relationship with Doda could have been an intimate male friendship in keeping with the adventure books of the time, like those of Karl May, which Nopcsa loved. Dacian proposes something on the spectrum of Sherlock and Watson, Kipling and Gunga Din, a faithful manservant kind of thing. I introduce him to the term "bromance," which he loves. "Yes," he says. "A bromance."

Weishampel, at Johns Hopkins, offers a broader perspective, remarking that Nopcsa was known by many of his colleagues to be gay, and that it seemed to cause little stir. For his part, it's possible that the baron viewed himself less as a man on the margins of society than as a man above it. Paired with his eccentricities, however—like trying to be King of Albania, dressing like a shepherd, taking blood oaths to become brothers with Albanian tribesmen—he was, in a sense, fated to be an outsider scientist.

In the 1920s, the frontier of paleontology shifted to North America, as pristine fossil beds opened up to extensive research. "The great dinosaur rush out of Alberta changed everything," says Weishampel. "And Nopcsa never visited the U.S. or Canada. While respected in Europe, his work never reached a critical mass."

Nopcsa's travel journals, compiled in seven volumes, are considered essential reading for Albanologists.





By then, Nopcsa's revenues from his family estates had been lost in the aftermath of World War I, and with little money for research and his remaining family dispersed across Europe, Nopcsa began to sell his fossils. Meanwhile, scientific institutions, rather than gentlemen's societies, began to take up the responsibility of preserving professional legacies, and Nopcsa, who rarely darkened the door of a classroom, had few academic advocates. His work began to fall into shadow.

On my last night in Deva, I watch a DVD of *Lawrence of Arabia* in Romanian that I found for $.75 in a grocery store. I'm suddenly struck by the similarities between Lawrence and Nopcsa. Lawrence, an archaeologist, was also in love with the past. Both men had been spies during World War I, conducting espionage under the auspices of scientific research—although, in the case of Nopcsa, you might say he was conducting scientific research under the auspices of espionage. Both mastered multiple languages and were able to infiltrate fiercely independent cultures: Lawrence, the Bedouin, and Nopcsa, the Albanian mountain men. Both took on tribal customs and dress and sought to lead insurgent forces against the Turks. Both were



Doda, left, an ethnic Albanian from a highland village in the Accursed Mountains, and Nopcsa, circa 1931. The men spent nearly 30 years together.

men of empire, and both were presumed homosexual during their lifetimes. Even littler things were similar. They were each obsessive motorcyclists. Lawrence died in a motorcycle crash, and Nopcsa demanded to be cremated in his motorcycle gear. But T.E. Lawrence became "Lawrence of Arabia"—and Nopcsa died in penury.

In my hotel room, I wonder if the comparison had ever occurred to Nopcsa—and if it had, what might it have felt like for him to fall short?

One spring morning in 1933, at age 55, Nopcsa wrote a final letter to Smith Woodward, apologizing for failing yet again to show up in London. The letter is written with his usual formality, but near the end he included a bizarre, gleeful, completely uncharacteristic and nearly nonsensical rhyming poem. Two weeks later, on the morning of April 26, having sold all of his fossils and his remarkable library for a pittance, Nopcsa woke up, sent the housekeeper out on an errand and then shot a sleeping Doda before turning the gun on himself. In a suicide note, he gave the reason for his actions as nervous collapse.

Nopcsa and Doda were laid to rest in Vienna at exactly the same moment of the same hour, Nopcsa interred at the crematorium and Doda across the road in the cemetery's Muslim section. Nothing marks Nopcsa's grave. An ash tree has grown over Doda's.

I had heard that the apartment they spent years in, at Singerstrasse 12, had been converted into a bank. None of the tellers have ever heard of Nopcsa, but stepping outside, I spot an old number plate behind scaffolding on the building next door. The bank, it turns out, is number 10.

A man wearing a fine suit is buzzed in next door at Singerstrasse 12, and I sneak in behind him. Everything on the ground floor is original, including the old iron and glass elevator. From Nopcsa's obituary I know which floor the two men had lived on, and I go up.

The room where Nopcsa shot himself is today a real estate office. Through a row of large windows in what was once his Viennese library, morning light falls on the floor as it would have more than 80 years earlier. I wonder if I am the first person since before World War II to stand in that room knowing of Nopcsa's final act.



Sacel Castle, where Baron Nopcsa lived in the late 19th century, is closed to the public and needs major repair to return to its regal splendor.

It was said that Nopcsa conducted intellectual debates like Albanian tribal feuds. Even in his suicide note, he reserved a special place for Hungarian academics, whom he'd worked with unhappily years earlier during his only academic appointment, and demanded that the police prevent them from mourning him.

Regarding the disposal of his body, Nopcsa was emphatic. "I wish to be burned!" he wrote, using the harsher verb, *verbrannt*, rather than the softer language of being turned to ashes. The man who spent his life with bones from the past made sure to leave none of his own behind.

Anatomy of a Cure

BY **HAMPTON SIDES** __/__/__

PHOTOGRAPHS BY **TIMOTHY ARCHIBALD** __/__/__

A HALF CENTURY AGO, A YOUNG DOCTOR TOOK ON A **DEADLY FORM OF CANCER**—AND THE SCIENTIFIC ESTABLISHMENT. WHAT HAPPENED NEXT WAS ONE OF THE GREATEST MEDICAL MIRACLES IN U.S. HISTORY

IT BEGAN IN THE SUMMER OF 1968, THE SUMMER AFTER HER kindergarten year. Barbara Bowles was a 5-year-old girl growing up in the drowsy river town of Natchez, Mississippi. Happy and seemingly healthy, a fetching gap between her two front teeth, she was an introvert with brown hair, the youngest of three. She took piano lessons and, with few neighborhood girls her age, became a tomboy by default. But that summer, coming in from her romps, she began to collapse in exhaustion. Her dad, Robert Bowles, then a technician for



International Paper, noticed it first: How tired she was, the lost weight, the peculiar pallor that washed over her face. She complained that her joints ached and seemed to be having a lot of nosebleeds.

Robert took Barbara to the family pediatrician in Natchez, who examined her, ran some tests, drew some blood. And then, just like that, came the verdict: Acute Lymphoblastic Leukemia (ALL).

Under a microscope, the culprit was plainly visible in the blood smear. Deep in the marrow of Barbara's bones, white blood cells were proliferating out of control. They weren't normal white cells—they were immature structures called lymphoblasts, primitive-looking globules that seemed to have no purpose other than to crowd out her healthy blood cells. Coursing through her body, these cancerous blobs began to accumulate and take over, literally causing her blood to grow pale. (The word "leukemia" is derived from the Greek for "white blood.")

Leukemia. The mere sound of it plunged Robert and his wife, Eva, into despair. Acute childhood leukemia was considered a nearly 100 percent fatal malady. Being a blood disease, it did not offer the solace of locality. There was no one place where it resided; it was everywhere, and always on the move. "A death sentence," Robert said. "It left us in dread."

ALL was the most common form of childhood cancer. The Bowles' doctor referred to it as "the Wasting Disease." He told the couple that nothing could be done for their daughter in Natchez—that, really, nothing could be done for her anywhere. He knew of a few children's hospitals around the country that could likely prolong her life by a year or so. But after a brief remission, the lymphoblasts would surely return and continue multiplying inside her. She would become dangerously anemic. Infections would begin to attack her. She would suffer from internal bleeding. Eventually the disease would kill Barbara, just as it had in nearly every case of ALL the world had seen since 1827, when the French surgeon and anatomist Alfred Velpeau first described leukemia.

But the Bowles' family doctor had heard of one place that was experimenting with new drugs for ALL. St. Jude, it was called, named after St. Jude Thaddeus, the patron saint of hopeless causes. Decidedly outside the academic mainstream, this new-

fangled treatment center—St. Jude Children's Research Hospital—founded by the comic entertainer Danny Thomas on the largesse of America's Lebanese-Syrian Christian community, was located in Memphis, 300 miles upriver from Natchez. When it had opened in 1962, St. Jude had turned heads by announcing that its doctors hoped to "cure" childhood leukemia. Most experts scoffed then—and were still scoffing.

But understandably, Eva and Robert were desperate enough to try anything. And so one hot, anxious day in the midsummer of 1968, with Barbara wan and spent on the back seat, they drove through cotton and soybean fields up the Mississippi Delta toward Memphis.

I was born in Memphis the same year that St. Jude hospital opened its doors. As I grew up, I wondered about the improbable rise of this extraordinary institution that so quickly came to occupy a central place in the lore of my hometown. There was something mysterious about St. Jude; it seemed a semi-secret enterprise, bathed in a halo-glow. St. Jude has always appeared to be firmly in control of its publicity and zealously protective of its image. In back of those tug-at-your-heartstrings television ads and celebrity testimonials, significant pioneering triumphs had indeed taken place there. But how those successes had come about was not generally known and seldom talked about—even within the Memphis medical community.

Then, a few years ago, I was in Memphis visiting a friend whose son was being treated at St. Jude for an extremely rare and pernicious form of leukemia. Brennan Simkins, only 8 years old at the time, had undergone four bone marrow transplants. He would later enjoy complete remission with high prospects for a permanent cure (a success story chronicled in his father's recent book, *Possibilities*). But when I visited Brennan in his hospital room that afternoon, he wasn't out of the woods. With his resolute face, his thin smile, and his heartsick family gathered around, he looked much as Barbara must have on the day her parents had first brought her here.

In one of the brightly painted hallways, I met Bill Evans, who was then St. Jude's CEO and director. Evans gave me a brief tour of the billion-dollar campus, with its state-of-the-art labs, cheerful wards and vast research wings, where armies of be-

There was **NO ONE PLACE** where it resided; it was **EVERYWHERE**, and always on the move. "**A DEATH SENTENCE**."

smocked scientists—and at least one Nobel laureate—plumb the mysteries behind all manner of catastrophic childhood diseases. Nowadays, the hospital treats more than 6,000 patients a year.

I asked Evans: How did this all . . . happen? Long before it became a fundraising juggernaut and one of the world's most ubiquitous charities, St. Jude must have gone through a time of trial and worry and doubt, when its success was not inevitable. Who, or what, was responsible for turning the corner?

Evans didn't miss a beat. "The moment of breakthrough was 1968," he said, "and a clinical trial called the Total Therapy V Study." Then a note of awe crept into his voice. "It all came about because of one man: Don Pinkel."

This was news to me. In Memphis, everyone's heard of Danny Thomas—and deservedly so. He's buried in a mausoleum on the hospital grounds, with an important boulevard named after him that cuts through downtown.

But Don Pinkel? The Total Therapy V Study of 1968?

I heard the same reverential tone a few months later, when I spoke with Joseph Simone, a prizewinning oncologist in Atlanta who worked closely with Pinkel. "It wouldn't have happened without Don," Simone said. "He had the courage and the charisma and the idealism, and he provided the intellectual infrastructure to make St. Jude work." Pinkel recruited the staff. He devised the protocols. He forged the relationships. He coaxed the drugs from the pharmaceutical companies. He wheedled the grant monies from the federal agencies. In its first years, he kept St. Jude afloat, though it had few success stories and sometimes could barely make payroll. "Don had a clear and noble vision," said Simone, "and he created a culture of daring."

Perhaps most important, it was Pinkel who decided, from the outset, to put the conquest of ALL at the heart of the enterprise. Said Simone, "Don's the one who realized: It doesn't do any good to extend the lives of those kids by a few months. You have to go for broke. You have to go for the total cure."

And he did. In 1970, just eight years into his tenure at St. Jude, Pinkel was able to make an extraordinary pronouncement: Childhood leukemia, he said, "can no longer be considered an incurable disease." The hospital was seeing a 50 percent cure rate—and had the literature to prove it. Today, building on protocols he and his staff established at St. Jude, the survival rate for most forms of childhood ALL hovers around 85 percent.

Donald Pinkel, it seemed to me, was one of America's great medical pioneers. He had won some of medicine's highest accolades, including the Kettering Prize, the Lasker Award for Clinical Medical Research and the American Cancer Society's Award for Clinical Research. But outside of pediatric oncology and hematology, his accomplishments at St. Jude remained largely unknown—and unsung. So when I found out that he was alive and well and living in California, I had to meet the man.

Pinkel lives with his wife, Cathryn Howarth, a British-born pediatric hematologist, in a book-lined ranch-style house in San Luis Obispo, a college town surrounded by patchworks of orchards and vineyards. Now 89 years old and retired, Pinkel is an avuncular man with a gentle voice, kind eyes and silver-gray hair.

I could see in Pinkel the quality Simone was talking about: A clear and noble vision. Whatever it was, the magic was still there. Jesuit-educated, he still has a rigorous mind, a fierce work ethic and a zest for attacking problems. "I'm a very stubborn person," he says. "A coach once told me, 'Never run from a fight—the farther you run, the harder it is to fight back.'"

Yet at St. Jude, during those early years, hope went only so far. "There were times," he says, "when I would go into real despair." When a child died, the parents would often come to him and unload their anger and grief. Pinkel would listen for hours and try to put up a strong front, assuring them this was not a punishment from God. "Then, after they left," he says, "I would fasten the door and cry my eyes out."



Treating 5-year-old Barbara Bowles required doctors who were "on a mission, looking for something brand-new."

When Barbara Bowles arrived at St. Jude, they put her in a room with another girl about her age. Then they took her down the hall to draw her blood and aspirate her marrow—inserting a thin, hollow needle deep into her hip to draw a sample.

Her parents didn't tell her what she had. "I knew it was serious," Barbara said. "But that's all I knew."

Barbara remembers the medicine room, where they dispensed the drugs by IV. One of them made her feel flushed, as though some hot electric barb were snagging through her. Another left such an acrid taste on her tongue that the nurses gave her candy to suck on. The drugs were potent. She couldn't keep her food down. She was fuzzy and forgetful and irritable. She developed sores on her thumbs. Her muscles ached. She was so, so tired.

"Leukemia completely tears you apart—not just the child but the whole family," said Barbara's dad, Robert Bowles, who passed away not long after this interview, at age 87, earlier this year. "It preoccupies you. It takes over everything. You start to

have a fatalistic attitude. But the doctors and nurses were so compassionate. They gave you hope."

Barbara continued sharing a room with another girl. One day, though, the girl wasn't there anymore.

An irony: Donald Pinkel spent most of his career trying to van-quish one devastating children's disease, but as a young man he was nearly killed by another. In 1954, then a 28-year-old pediatrician serving in the Army Medical Corps in Massachusetts, Pinkel contracted polio. One night, as the virus ravaged through him, he nearly stopped breathing. Through his fever haze, he thought to himself, "This is it. I'm not going to wake up." For months, he was paralyzed. Having to rely on others to feed and care for him, he had good reason to believe his medical career was over. The Army retired him because he was unfit for duty and he spent the better part of a year in rehabilitation, learning how to walk again. Slowly, steadily, he graduated from a wheelchair to braces to crutches.

Even while he was recovering, Jonas Salk and Albert Sabin were becoming household names around the world for their historic efforts to produce a safe polio vaccine. It was a heady time for an ambitious young doctor like Pinkel, a time when the public was pinning ever greater hopes on miracles of medical science to eradicate the world's most terrible maladies. As he continued to improve, Pinkel took a position with Sidney Farber, a legendary pediatric pathologist in Boston, who then was experimenting with a promising new drug called aminopterin, which, he found, could induce temporary remissions in some children with leukemia. Though Farber was far from finding a cure, his groundbreaking work planted a seed in Pinkel and set him on his life's course.

In 1956, Pinkel accepted a job as the first chief of pediatrics at Roswell Park Cancer Institute, a prestigious research hospital in Buffalo, Pinkel's native city. He loved his work there but found that Buffalo's damp and freezing winter weather played havoc on his polio-compromised lungs, and he repeatedly contracted pneumonia. He knew he had to move to a milder climate; he didn't think he could survive another Buffalo winter.

And so, in 1961, when he met Danny Thomas and heard about the new hospital the entertainer was building down South, the

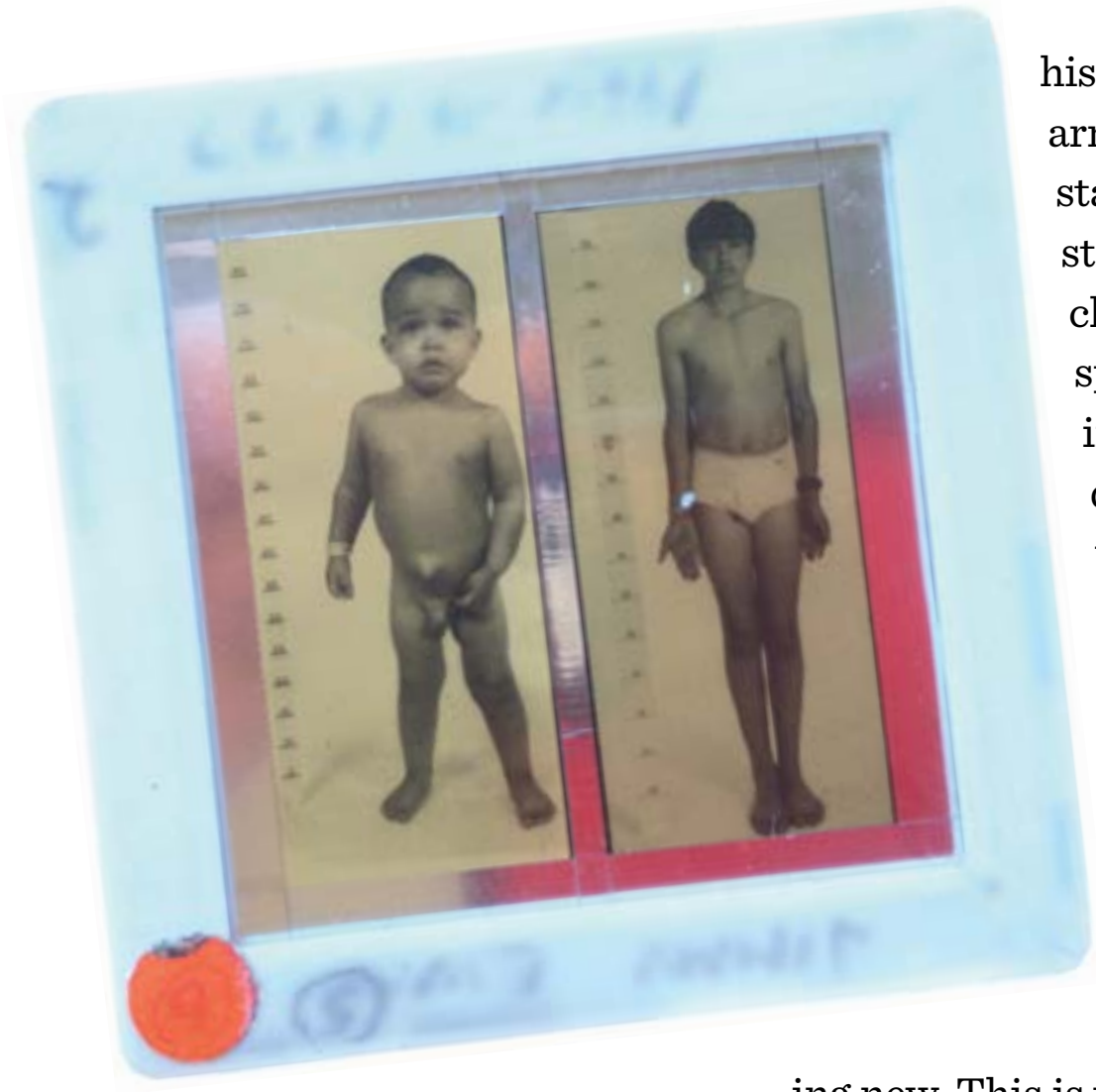
ST. JUDE opened in February of **1962** and the work **BEGAN IN EARNEST**. The hours were brutal, says Pinkel—"**TEN DAYS A WEEK**."

young doctor was intrigued. Pinkel had doubts about Memphis, however. At that time, it was a mid-sized provincial city surrounded by cotton fields—a fertile ground for musical invention, perhaps, but decidedly not on the map for cutting-edge medical research. "People thought I'd be crazy to go down there," Pinkel says. "It was a very chancy situation, led by this Hollywood character. One colleague told me I would be throwing away my career."

The state of race relations in Memphis also concerned Pinkel. "At first, I said I'd never move to the Deep South, because there was so much virulent prejudice down there." But when he met with some of the hospital board members, they agreed with his insistence that St. Jude would treat all comers, including African-American children, and that the hospital would be integrated top to bottom—doctors, nurses and staff. As if to underscore the point, Danny Thomas hired Paul Williams, a prominent black architect from Los Angeles, to design St. Jude. In addition, the hospital's board planned to devote significant resources to treating and researching sickle cell anemia—long a scourge in the African-American community.

Pinkel also expressed his concern that St. Jude should treat patients without regard to their family's ability to pay. "I was sometimes called a communist," Pinkel says, "because I didn't think children should be charged for anything. Money should not be involved at all. As a society, we should make sure they get first-class health care. This, in fact, is the philosophy of most pediatricians." A need-blind policy was Danny Thomas' notion as well—and the hospital's stated goal.

So Pinkel signed on: He would be St. Jude's first medical director. He was hired on a handshake at the callow age of 34, with an annual salary (paltry, even then) set at $25,000. He drove



his Volkswagen bug down to Memphis and arrived in the summer of 1961 to a curious, star-shaped edifice that was still under construction. Pinkel collaborated with the architects in revising the building's interior spaces to create a workplace conducive to interdisciplinary exchange—one in which doctors and nurses would daily mingle with pathologists and researchers. Pinkel wanted everyone eating together in a central cafeteria, sharing findings, infusing each other's work with a sense of urgency. He wanted a building that broke down boundaries between practice and theory, between the clinic and the lab. "The idea was to mishmash everyone up," Pinkel says. "It was actually nothing new. This is what people like Louis Pasteur and Paul Ehrlich did. The idea is to get everyone thinking together, debating—concentrating on the problem at hand."

"Pinkel wanted to create an environment of solidarity where everyone worked in the trenches together," says Joseph Simone. "He wanted people to take risks and move ahead rapidly with bold new ideas. And he wanted to keep things small. Pinkel would be leading a few platoons, not an army."

St. Jude opened in February of 1962 and the work began in earnest. The hours were brutal—"ten days a week," says Pinkel—but he was enthralled by the challenge of creating something entirely new.

What Barbara Bowles remembers most vividly is the spinal taps, how much it hurt when they inserted the needle that dripped the chemicals directly into the base of her spine. "You got the sense the doctors were experimenting," said her father, Robert. "They were very unsure about some of the side effects. They would change up the cocktail, trying to find something that would suppress the disease."

After her therapy sessions, Barbara would return to her room and open her coloring book, but often found that she was too exhausted to work the crayons. "The routine just wore her out," said Robert.

All the same, Barbara remembers St. Jude as a cheerful place. Toys. Puppet shows. Television. Ice cream. Parents stayed for less than $10 a night at the nearby Claridge Hotel. The kids were from all over the South, all over the country. Her parents reassured her that she was in the best possible place for treatment.

Still, Barbara did notice something odd: Her hair was falling out.

St. Jude didn't focus on just leukemia, of course. From the start, the hospital trained its resources on an array of devastating diseases—including cystic fibrosis, muscular dystrophy, sickle cell anemia and brain tumors. But it was Pinkel's ambition to "cure" ALL that caused consternation among his medical colleagues back East. Some thought it was irresponsible, the kind of quest that would give parents false hope. "At that time, with ALL, the idea was to try to prolong life in comfort—that was it," Pinkel says. "We called it 'palliation.' No one thought you were going to 'cure' anybody. That was almost a forbidden word."

Still, there had been tantalizing developments. By the early 1960s, a number of agents had been found that could temporarily induce remission in ALL patients. They were highly toxic substances with draconian tongue-twister names like mercaptopurine, methotrexate, vincristine and cyclophosphamide. Up to that point, doctors tended to give these chemotherapeutic drugs to their patients serially—that is, one at a time, a regimen known as "monotherapy." Each medication might work for a while, but invariably the doses proved insufficient and the patient would relapse. Within months or even weeks, the cancer would return. Doctors might move on to the next drug, achieving the same short-lived remission. But soon enough, another relapse would occur. The disease was so furtive, resilient and adept at hiding in the body (especially the meninges—the membranes enveloping the brain and spinal cord) that no single drug could knock it out.

Pinkel's idea—drawing on pioneering work then underway at the National Cancer Institute—was to use what he called the "full armamentarium." That is, combine all the drugs known to induce remission and administer them to the patient more or

less concurrently, at maximum tolerable dosages, over a sustained period. In addition, he would employ radiation of the cranium and the spine to reach the disease's final redoubts. Finally, he would continue to administer multi-drug chemotherapy for three years to "eradicate residual systemic leukemia." It would be a regimen so relentless, multifarious and prolonged that the disease would be permanently destroyed. He called it "Total Therapy."

"We said, 'Let's put it all together. Let's attack the disease from different directions, all at once.' My hypothesis was that there were some leukemia cells that were sensitive to one drug and other cells that were sensitive to another. But if we use all these drugs at once and hit them along different pathways, we would permanently inhibit the development of resistant cells." This intensive approach of simultaneously using multiple agents had been tried, with hugely successful results, in the treatment of tuberculosis. Why not try it with leukemia?

Pinkel realized, of course, that the Total Therapy protocol carried large risks. Each of these drugs, used alone, could have dangerous, even fatal side effects. In combination, who knew what they would do? "I really worried that we were going to push these youngsters to the very brink," he says. "On the other hand, you had to weigh the bitter fact that they were going to die anyway." Through the early pilot studies, he and his staff would constantly refine the dosages, improve the methods of delivery. Pinkel's staff would closely follow their patients, checking their blood weekly, and sometimes daily, to determine how they were tolerating this witch's brew of medicines. Pinkel recognized that he was quite literally experimenting on children—and this troubled him. But he saw little alternative. Says Pinkel, "We were tired of being undertakers."

For the first several years, with every new case admitted to the hospital, Pinkel sat down with the parents, explained to them his radical approach, and gave them a choice to participate. Not one parent declined. Many, in fact, looked at the situation altruistically. "They would tell me, 'We know our child is not going to live. But if there's something you can learn by treating our child that might one day lead to a cure of this terrible disease—please, please go ahead.'"

By the end of the summer of 1968, Barbara's leukemia had gone into remission. St. Jude released Barbara, and she went back home to Natchez just in time for first grade. "It raised our spirits," said her dad. "But we were still so apprehensive."

Barbara's mom gave her a wig to wear, and a variety of caps, but Barbara found it all so awkward. She didn't know what to tell her friends. By then she knew she had some form of cancer—but cancer was widely misunderstood then; many kids thought it was a contagious disease, that you could "catch" it on the playground.

Every Tuesday, Barbara would report to her pediatrician's office in Natchez to continue with her intravenous chemo treatments as prescribed by St. Jude. And several times a week, she and her family would go to the Lovely Lane United Methodist Church. Congregants held regular prayer meetings there, and would single out Barbara for special attention.

In the fall, when she went back to St. Jude for a checkup, the news was promising: Her remission was holding.

By 1968, Pinkel and his staff had completed the first four studies of the Total Therapy protocol. These trials offered a glimmer of hope: Between 1962 and 1967, a total of seven patients had enjoyed long-term remissions and seemed well on their way to full recoveries. Seven was by no means a definitive number, Pinkel conceded. "But it said to me, it's not necessarily so that they're all going to die." It also suggested that the underlying concept of Total Therapy was working; it just needed fine-tuning.

And so in early 1968, he and his staff started afresh with a new cohort of 35 patients—one of whom was Barbara Bowles. Who could have predicted that that year of national convulsions, the year when Martin Luther King Jr. was murdered on a motel balcony just a few miles from the hospital, would prove the watershed year in the history of this disease?

In the Total Therapy V Study, Pinkel placed greater emphasis on attacking the disease's last holdouts, those drug-resistant leukemia cells that secreted themselves within the membranes of the central nervous system. His new protocol would retain certain elements from the first four studies, but he would carefully revise the dosages while adding a few en-

Pinkel could **SCARCELY BELIEVE** his own numbers. A **50 PERCENT** cure rate? This was beyond astonishing—it was **HISTORIC**.

tirely new elements, including the use of methotrexate injected "intrathecally"—that is, directly into the spinal canal—to head off meningeal relapse. Pinkel and his staff began to administer the new protocols and waited for the results—which, given the time-lagged nature of both the disease and its treatment stages, took many months to trickle in.

But when the data finally arrived—bingo. Something in this new iteration of therapies worked. Thirty-two of the 35 patients attained remission. After five months, not one had relapsed. And after three years, half the patients were still in remission. By 1970, they were considered long-term survivors, all but declared cured. Pinkel could scarcely believe his own numbers. A 50 percent cure rate? This was beyond astonishing; it was historic.

In this eureka moment, one can only imagine the euphoria that surged through the corridors of St. Jude. "We were all excited," says Pinkel. "This was better than winning a football game, I'll tell you." He realized that the hospital was sitting on a giant secret that now needed to get out into the world; lives depended on it. "I sent my best people in different directions," Pinkel recalls, "and we gave papers all over the place saying it was now possible to cure this disease." They penned articles for the *Journal of the American Medical Association*, the *New England Journal of Medicine* and other important periodicals. Yet to Pinkel's dismay, he was met with sharp skepticism. Many experts simply refused to accept St. Jude's findings.

Some went further than that. Alvin Mauer, the highly reputed director of hematology/oncology at Cincinnati Children's Hospital, all but called Pinkel a fraud. "He wrote me a letter saying I have no business telling people leukemia was



"From the start, hope was always my theme," says Donald Pinkel (today in his study in San Luis Obispo).

curable, that I was foolhardy, and deceiving everyone. He really laid into me." So Pinkel invited Mauer to come to St. Jude and see for himself. "I said to him, 'You're like Doubting Thomas, in the New Testament. Why don't you come down here and feel the wounds?'" Mauer accepted. He met with the patients, examined the charts and histories, toured the wards and labs. And he was sold. "Mauer became one of our biggest advocates," Pinkel recalls with a chuckle.

By 1973, the Total Therapy V results had generally become accepted. "It was pretty gutsy what Pinkel had done," says Stephen Sallan, a leukemia expert at Boston's Dana-Farber Cancer Institute and a Harvard pediatrics professor. "He had found a way to treat ALL in the central nervous system, and he was sitting in the catbird seat. We were all paying attention." Suddenly, it seemed, everyone was knocking on the hospital's door. Joseph Simone remembers "a tsunami of doctors" coming to St. Jude to learn the protocol. Soon other U.S. hospitals were using the Total V methodology—and achieving the same extraordinary results. Pinkel traveled internationally to spread the news; he even made a trip to the Soviet Union to share his findings with Russian doctors. "What bothered me more than anything," says Pinkel, "was that Total Therapy required tremendous amounts of manpower and expensive technologies that weren't available outside the United States. I thought children all over the world should have the same opportunities as American children."

One of Pinkel's other great regrets was that the Total V protocol exposed children to radiation and noxious chemicals that he feared could cause lifelong complications, growth problems, even other forms of cancer. In subsequent studies, Pinkel sought to dial down the most toxic dosages. Pediatric cancer researchers eventually dispensed with the use of radiation altogether, but there was no avoiding the fact that the zealous treatments pursued at St. Jude—like cancer treatments everywhere—carried real hazards.

It was Pinkel's fervent hope that science would someday find a vaccine that would prevent ALL, so that none of the Total V treatments would even be necessary. For a time, he and his staff worked on a vaccine, to no avail. Pinkel has long had a hunch that ALL may be caused by a virus (as is true of some forms of leukemia found in cats and rodents). If science could isolate that virus, and develop a vaccine from it, then children could be immunized against ALL, just as they're immunized against diphtheria, mumps, polio and measles. "That's what I always hoped for," Pinkel says. "Prevention is always the better way."

So far, that dream is unrealized. But over the past half century, the 50 percent cure rate established by the Total Therapy Study has not only held—it's steadily, emphatically improved. The key components of ALL treatment remain just as Pinkel designed them. To combat the disease, physicians use many of the same drugs—vincristine, methotrexate and mercaptopurine, agents that were approved by the FDA in the 1950s and 1960s, then combined into treatment protocols by Pinkel's team. These subsequent leaps toward an overall cure rate approaching 90 percent were made possible, in part, by the development of better antibiotics and antifungals for fighting infections, by the advent of better diagnostic tests for detecting residual leukemia cells, and by the use of genomics to select the optimal drugs and doses for individual patients. Although these and other new techniques and medications have been added to the ALL arsenal, they have in no way replaced the basic protocol that Pinkel established all those years ago. Today, childhood ALL is frequently cited as one of the great triumphs in the war on cancer.

After publishing his findings and consolidating his breakthroughs at St. Jude, Pinkel soon considered a change. In 1974,

he resigned as the hospital's director and took a series of eminent hospital and faculty posts—in Milwaukee, Los Angeles, Houston, Corpus Christi. He was a builder, he realized, not a stayer. "I would set things up and get things rolling," he says. "Then I would move on."

While enjoying his retirement in San Luis Obispo, he has found that his polio symptoms have returned with a vengeance. He walks with a cane now, and often has to use braces. He stays busy swimming, reading medical journals and keeping track of his ten children and 16 grandchildren. From time to time he hears from his Total Therapy patients—they're scattered around the world now, with their own families and careers, and grateful to be alive after all these years. He has reportedly been considered for the Nobel Prize in Physiology or Medicine, and still occasionally lectures on medical subjects, at nearby California Polytechnic State University (Cal Poly). "Medicine isn't a job," he says. "It's a life. You're always on call."

For two years, then three, Barbara Bowles' remission held. Although she continued her chemotherapy sessions in Natchez and did regular follow-ups at St. Jude, she remained in school without interruption. "My parents would drive me up there every year," she says. "It was so scary—the whole time, I'd be saying to myself, 'Are they going to find something?' "

When she was 12, her hair grew back in an entirely new color: A brilliant silver-gray.

In 1980, twelve years after her ordeal began, doctors at St. Jude brought her in for yet another checkup. Only this time, they said, "You're cured. You don't have to come back."

Today she is Barbara Extine. She is a calm, stoic woman with rosy cheeks and a beautiful nimbus of silver-gray hair. She lives in Vicksburg, with her husband, Roy. She has a degree in geology, has finished her coursework for her master's and has done contract work for years as an environmental scientist for the Army Corps of Engineers. She's active in her church and is an avid gardener. Barbara hasn't been able to have children, and has had health problems that are likely related to her leukemia treatments—including a malignant tumor that led to the removal of her bladder.



Barbara Bowles Extine (photographed in Vicksburg, Mississippi) says that "Dr. Pinkel and his people gave me my life."

But she knows she's one of the lucky ones. Lucky enough to be connected with a piece of history, one of the kids who just happened to show up in exactly the right place at exactly the right time, under the watch of a kindly doctor on the cusp of a breakthrough.

"I'm so happy to be here," she says. "Cured. That was the word they used. You can't imagine the relief. You just can't imagine it." O



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Ask Smithsonian

YOUR QUESTIONS ANSWERED BY OUR EXPERTS

How long does a plant or animal species have to live in a region before it is considered native? And are all non-native species considered invasive?

Katherine Sabia, Monroe, Connecticut

The distinction between native and nonnative species does not disappear over time; if a plant or animal was introduced with human help, according to the Department of Agriculture, it is nonnative. There's also a crucial distinction between nonnative species and invasive ones, notes *Vicki Funk, senior research botanist and curator at the Museum of Natural History*. To be considered invasive, a nonnative animal or plant species has to displace one or more natives. Chicory, introduced from Europe as a flavoring agent in the 19th century, grows wild in the United States but does not displace native plants; but kudzu, introduced from Asia for erosion control in the mid-20th-century South, does, and is considered therefore invasive.

After researchers tag or collar an animal, does the device ever lead to the animal being ostracized from its group? **John Fleming, Rockport, Massachusetts**

Studies have found that African zebras wearing heavy collars may change their travel routes, and that collared water voles in the United Kingdom bear fewer female offspring, but the social implications of collaring have not been extensively researched. *Peter Leimgruber, head of the Conservation Ecology Center at the Smithsonian Conservation Biology Institute*, who studies Przewalski's horses, says he has observed no negative effects on the social ranking, behavior or fitness of those horses, or on that of other collared equines. In fact, one of the goals of collaring animals is to record their behavior in order to better understand their social structure.

How did the word "volume" become associated with sound?
Raymond Stubblefield, Harrisonburg, Virginia

The word has several threads in modern English, says *Mary S. Linn, curator of cultural and linguistic revitalization at the Center for Folklife and Cultural Heritage*. When it entered English, in the late 14th century, it referred to a roll of papyrus and to a bound book. As books grew larger, "volume" referred to bulk more generally. By the late 18th century, according to the Oxford English Dictionary, scientists extended the meaning to refer to bodies of matter occupying space, and musicians used it to refer to the power of voices to project in a space.

How long would it have taken the United States to build a third atomic bomb after it dropped the second (and last) one on Nagasaki on August 9, 1945?
Gary Miller, Davenport, Florida

Less than two weeks. *Michael Neufeld, senior curator at the National Air and Space Museum*, says that on August 10, 1945, Maj. Gen. Leslie Groves, director of the Manhattan Project, notified the War Department that another plutonium bomb could be "ready for delivery on the first suitable weather after 17 or 18 August." Documents from the era reveal that the United States was prepared to build at least 12 more bombs before Japan surrendered on August 15.

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