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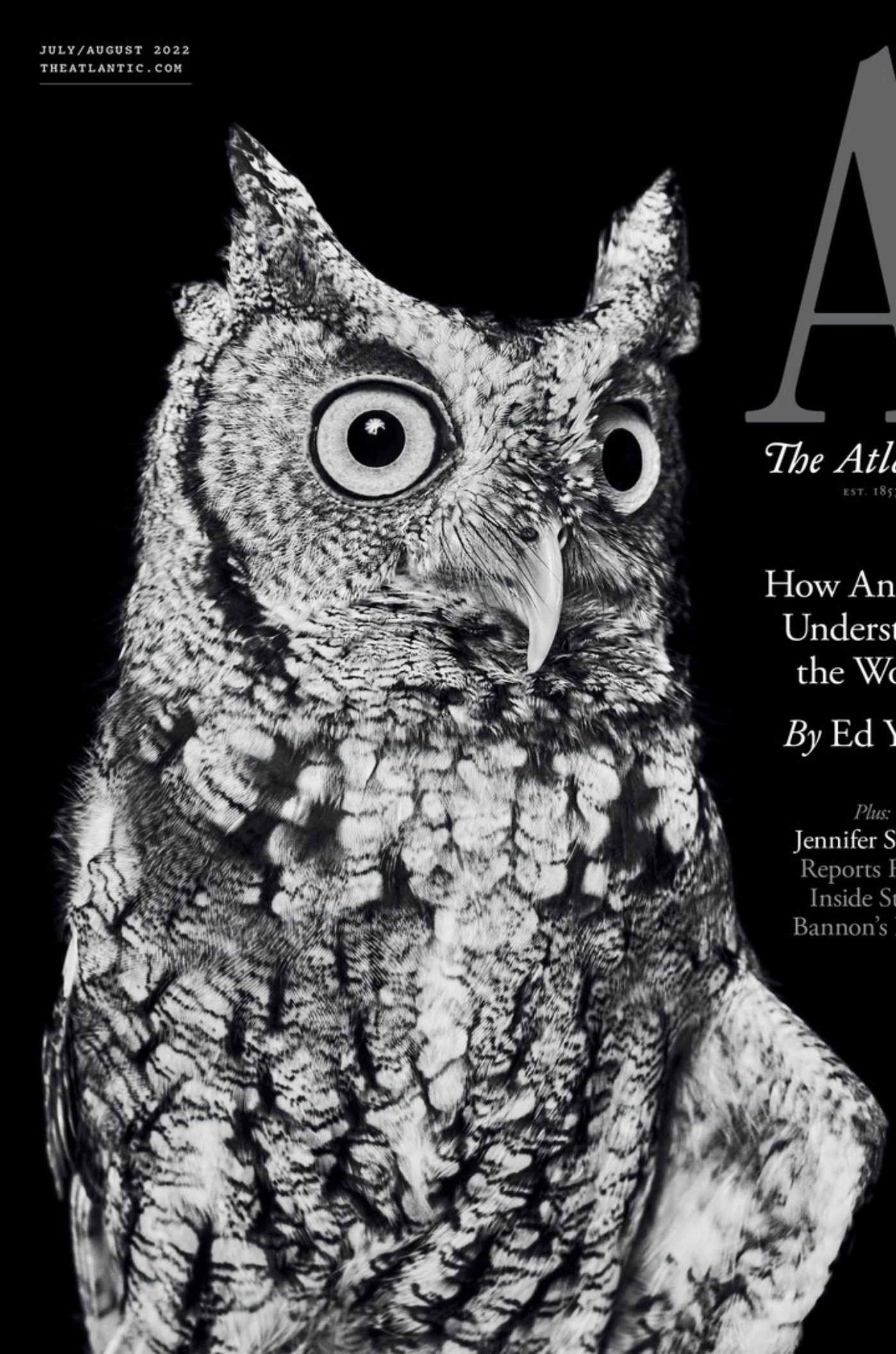

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How Animals Understand the World

By Ed Yong

Plus:
Jennifer Senior Reports From Inside Steve Bannon's Head

The Atlantic

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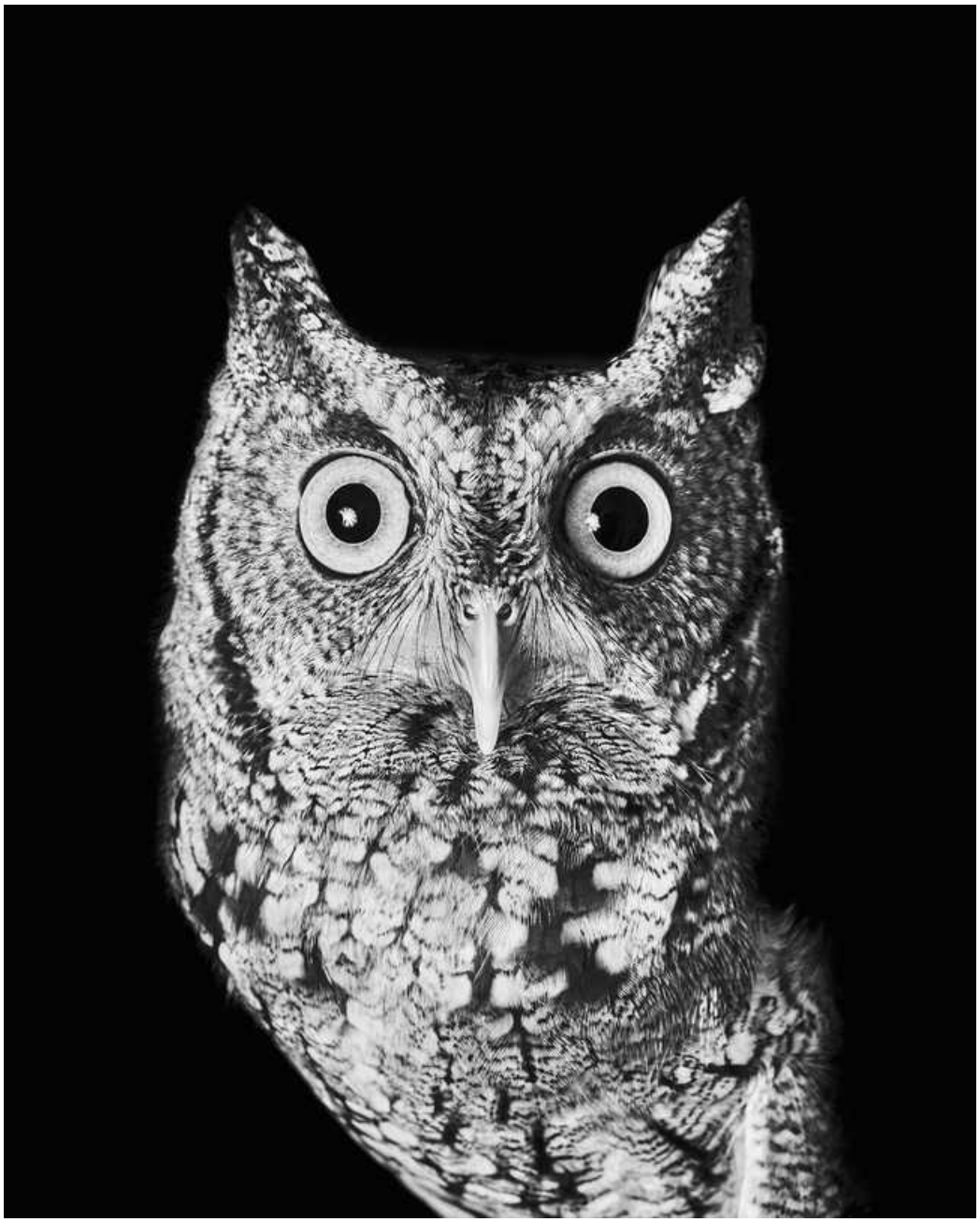
Cover Story

- **How Animals Perceive the World**
  Every creature lives within its own sensory bubble, but only humans have the capacity to appreciate the experiences of other species. What we've learned is astounding. -- Ed Yong



How Animals Perceive the World

How Light and Noise Pollution Confound Animals' Senses

By Ed Yong

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Within the 310,000 acres of Wyoming's Grand Teton National Park, one of the largest parking lots is in the village of Colter Bay. Beyond the lot's far edge, nestled among some trees, is a foul-smelling sewage-pumping station that Jesse Barber, a sensory ecologist at Boise State University, calls the Shiterator. On this particular night, sitting quietly within a crevice beneath the building's metal awning and illuminated by Barber's flashlight, is a little brown bat. A white device the size of a rice grain is attached to the bat's back. "That's the radio tag," Barber tells me. He'd previously affixed it to the bat so that he could track its movements, and tonight he has returned to tag a few more.

From inside the Shiterator, I can hear the chirps of other roosting bats. As the sun sets, they start to emerge. A few become entangled in the large net Barber has strung between two trees. He frees a bat, and Hunter Cole, one of his students, carefully examines it to check that it's healthy and heavy enough to carry a tag. Once satisfied, Cole daubs a spot of surgical cement between its shoulder blades and attaches the tiny device. "It's a little bit of an art project, the tagging of a bat," Barber tells me. After a few minutes, Cole places the bat on the trunk of the nearest tree. It crawls upward and takes off, carrying $175 worth of radio equipment into the woods.

I watch as the team examines another bat, which opens its mouth and exposes its surprisingly long teeth. This isn't an aggressive display; it only looks like one. The bat is unleashing a stream of short, ultrasonic pulses from its mouth, which are too high-pitched for me to hear. Bats, however, can hear ultrasound, and by listening for the returning echoes, they can detect and locate objects around them.

Echolocation is the primary means through which most bats navigate and hunt. Only two animal groups are known to have perfected the ability: toothed whales (such as dolphins, orcas, and sperm whales) and bats. Echolocation differs from human senses because it involves putting energy into the environment. Eyes scan, noses sniff, and fingers press, but these sense organs are always picking up stimuli that already exist in the wider world. By contrast, an echolocating bat creates the stimulus that it later detects. Echolocation is a way of tricking your surroundings into revealing

themselves. A bat says “Marco,” and its surroundings can’t help but say “Polo.”

The basic process seems straightforward, but its details are extraordinary. High-pitched sounds quickly lose energy in air, so bats must scream to make calls that are strong enough to return audible echoes. To avoid deafening themselves, bats contract the muscles in their ears in time with their calls, desensitizing their hearing with every shout and restoring it in time for the echo. Each echo provides a snapshot in time, so bats must update their calls quickly to track fast-moving insects; fortunately, their vocal muscles are the fastest known muscles in any mammal, releasing up to 200 pulses a second. A bat’s nervous system is so sensitive that it can detect differences in echo delay of just one- or two-millionths of a second, which translates to a physical distance of less than a millimeter. A bat thus gauges the distance to an insect with far more precision than humans can.

Echolocation’s main weakness is its short range: Some bats can detect small moths from about six to nine yards away. But they can do so in darkness so total that vision simply doesn’t work. Even in pitch-blackness, bats can skirt around branches and pluck minuscule insects from the sky. Of course, bats are not the only animals that hunt nocturnally. In the Tetons, as I watch Barber tagging bats, mosquitoes bite me through my shirt, attracted by the smell of the carbon dioxide on my breath. While I itch, an owl flies overhead, tracking its prey using a radar dish of stiff facial feathers that funnel sound toward its ears. These creatures have all evolved senses that allow them to thrive in the dark. But the dark is disappearing.

A big brown bat’s ability to echolocate allows it to thrive in the dark. (Shayan Asgharnia for The Atlantic)

Barber is one of a growing number of sensory biologists who fear that humans are polluting the world with too much light, to the detriment of other species. Even here, in the middle of a national park, light from human technology intrudes upon the darkness. It spews forth from the headlights of passing vehicles, from the fluorescent bulbs of the visitor center, and from the lampposts encircling the parked cars. “The parking lot is lit up like a Walmart because no one thought about the implications for wildlife,” Barber says.

Many flying insects are fatally attracted to streetlights, mistaking them for celestial lights and hovering below them until they succumb to exhaustion. Some bats exploit their confusion, feasting on the disoriented swarms. Other, slower-moving species, including the little brown bats that Barber tagged, stay clear of the light, perhaps because it makes them easier prey for owls. Lights reshape animal communities, drawing some in and pushing others away, with consequences that are hard to predict.

To determine the effect of light on the bats of Grand Teton, Barber persuaded the National Park Service to let him try an unusual experiment. In 2019, he refitted all 32 streetlights in the Colter Bay parking lot with special bulbs that can change color. They can produce either white light, which strongly affects the behavior of insects and bats, or red light, which doesn't seem to. Every few days during my visit, Barber's team flips their color. Funnel-shaped traps hanging below the lamps collect the gathering insects, while radio transponders pick up the signals from the tagged bats. These data should reveal how normal white lights affect the local animals, and whether red lights can help rewild the night sky.

Cole gives me a little demonstration by flipping the lights to red. At first, the parking lot looks disquietingly infernal, as if we have stepped into a horror movie. But as my eyes adjust, the red hues feel less dramatic and become almost pleasant. It is amazing how much we can still see. The cars and the surrounding foliage are all visible. I look up and notice that fewer insects seem to be gathered beneath the lamps. I look up even farther and see the stripe of the Milky Way cutting across the sky. It's an achingly beautiful sight, one I have never seen before in the Northern Hemisphere.

Every animal is enclosed within its own sensory bubble, perceiving but a tiny sliver of an immense world. There is a wonderful word for this sensory bubble—*Umwelt*. It was defined and popularized by the Baltic German zoologist Jakob von Uexküll in 1909. *Umwelt* comes from the German word for "environment," but Uexküll didn't use it to refer to an animal's surroundings. Instead, an Umwelt is specifically the part of those surroundings that an animal can sense and experience—its perceptual world. A tick, questing for mammalian blood, cares about body heat, the touch of hair, and the odor of butyric acid that emanates from skin. It

doesn't care about other stimuli, and probably doesn't know that they exist. Every Umwelt is limited; it just doesn't feel that way. Each one feels all-encompassing to those who experience it. Our Umwelt is all we know, and so we easily mistake it for all there is to know. This is an illusion that every creature shares.

Humans, however, possess the unique capacity to appreciate the Umwelten of other species, and through centuries of effort, we have learned much about those sensory worlds. But in the time it took us to accumulate that knowledge, we have radically remolded those worlds. Much of the devastation that we have wrought is by now familiar. We have changed the climate and acidified the oceans. We have shuffled wildlife across continents, replacing indigenous species with invasive ones. We have instigated what some scientists have called an era of "biological annihilation," comparable to the five great mass-extinction events of prehistory. But we have also filled the silence with noise and the night with light. This often ignored phenomenon is called sensory pollution—human-made stimuli that interfere with the senses of other species. By barraging different animals with stimuli of our own making, we have forced them to live in our Umwelt. We have distracted them from what they actually need to sense, drowned out the cues they depend upon, and lured them into sensory traps. All of this is capable of doing catastrophic damage.

In 2001, the astronomer Pierantonio Cinzano and his colleagues created the first global atlas of light pollution. They calculated that two-thirds of the world's population lived in light-polluted areas, where the nights were at least 10 percent brighter than natural darkness. About 40 percent of humankind is permanently bathed in the equivalent of perpetual moonlight, and about 25 percent constantly experiences an artificial twilight that exceeds the illumination of a full moon. "'Night' never really comes for them," the researchers wrote. In 2016, when the team updated the atlas, it found that the problem had become even worse. By then, about 83 percent of people—including more than 99 percent of Americans and Europeans—were under light-polluted skies. More than a third of humanity, and almost 80 percent of North Americans, can no longer see the Milky Way. "The thought of light traveling billions of years from distant galaxies only to be washed out in the last billionth of a second by the glow from the nearest

strip mall depresses me to no end," the visual ecologist Sönke Johnsen once wrote.

At Colter Bay, Cole flips the lights from red back to white and I wince. The extra illumination feels harsh and unpleasant. The stars seem fainter now. Sensory pollution is the pollution of disconnection. It detaches us from the cosmos. It drowns out the stimuli that link animals to their surroundings and to one another. In making the planet brighter and louder, we have endangered sensory environments for countless species in ways that are less viscerally galling than clear-cut rain forests and bleached coral reefs but no less tragic. That must now change. We can still save the quiet and preserve the dark.

Every year on September 11, the sky above New York City is pierced by two columns of intense blue light. This annual art installation, known as *Tribute in Light*, commemorates the terrorist attacks of 2001, with the ascending beams standing in for the fallen Twin Towers. Each is produced by 44 xenon bulbs with 7,000-watt intensities. Their light can be seen from 60 miles away. From closer up, onlookers often notice small flecks, dancing amid the beams like gentle flurries of snow. Those flecks are birds. Thousands of them.

This annual ritual unfortunately occurs during the autumn migratory season, when billions of small songbirds undertake long flights through North American skies. Navigating under cover of darkness, they fly in such large numbers that they show up on radar. By analyzing meteorological radar images, Benjamin Van Doren showed that *Tribute in Light*, across seven nights of operation, waylaid about 1.1 million birds. The beams reach so high that even at altitudes of several miles, passing birds are drawn into them. Warblers and other small species congregate within the light at up to 150 times their normal density levels. They circle slowly, as if trapped in an incorporeal cage. They call frequently and intensely. They occasionally crash into nearby buildings.

Migrations are grueling affairs that push small birds to their physiological limit. Even a night-long detour can sap their energy reserves to fatal effect. So whenever 1,000 or more birds are caught within *Tribute in Light*, the bulbs are turned off for 20 minutes to let the birds regain their bearing. But

that's just one source of light among many, and though intense and vertical, it shines only once a year. At other times, light pours out of sports stadiums and tourist attractions, oil rigs and office buildings. It pushes back the dark and pulls in migrating birds.

In 1886, shortly after Thomas Edison commercialized the electric light bulb, about 1,000 birds died after colliding with illuminated towers in Decatur, Illinois. More than a century later, the environmental scientist Travis Longcore and his colleagues calculated that almost 7 million birds die each year in the United States and Canada after flying into communication towers. The lights of those towers are meant to warn aircraft pilots, but they also disrupt the orientation of nocturnal avian fliers, which then veer into wires or each other. Many of these deaths could be avoided simply by replacing steady lights with blinking ones.

"We too quickly forget that we don't perceive the world in the same way as other species, and consequently, we ignore impacts that we shouldn't," Longcore tells me in his Los Angeles office. Our eyes are among the sharpest in the animal kingdom, but their high resolution comes with the cost of low sensitivity. Unlike most other mammals, our vision fails us at night, so we crave more nocturnal illumination, not less.

The idea of light as a pollutant is jarring to us, but it becomes one when it creeps into places where it doesn't belong. Widespread light at night is a uniquely anthropogenic force. The daily and seasonal rhythms of bright and dark remained largely inviolate throughout all of evolutionary time—a 4-billion-year streak that began to falter in the 19th century.

When sea-turtle hatchlings emerge from their nests, they crawl away from the dark shapes of dune vegetation toward the brighter oceanic horizon. But lit roads and beach resorts can steer them in the wrong direction, where they are easily picked off by predators or squashed by vehicles. In Florida alone, artificial lights kill baby turtles in the thousands every year. They've wandered into a baseball game and, more horrifying, abandoned beach fires. The caretaker of one property in Melbourne Beach found hundreds of dead hatchlings piled beneath a single mercury-vapor lamp.

Artificial lights can also fatally attract insects, contributing to their alarming global declines. A single streetlamp can lure moths from 25 yards away, and a well-lit road might as well be a prison. Many of the insects that gather around streetlamps will likely be eaten or dead from exhaustion by sunrise. Those that zoom toward vehicle headlights will probably be gone even sooner. The consequences of these losses can ripple across ecosystems. In 2014, as part of an experiment, the ecologist Eva Knop installed streetlamps in seven Swiss meadows. After sunset, she prowled these fields with night-vision goggles, peering into flowers to search for moths and other pollinators. By comparing these sites to others that had been kept dark, Knop showed that the illuminated flowers received 62 percent fewer visits from pollinating insects. One plant produced 13 percent less fruit even though it was visited by a day shift of bees and butterflies.

The presence of light isn't the only factor that matters; so does its nature. Insects with aquatic larvae, such as mayflies and dragonflies, will fruitlessly lay their eggs on wet roads, windows, and car roofs, because these reflect horizontally polarized light in the same way bodies of water do. Rapidly flickering light bulbs can cause headaches and other neurological problems in humans, even though our eyes are usually too slow to detect these changes; what, then, do they do to animals with faster vision, like insects and small birds?

Colors matter, too. Red is better for bats and insects but can waylay migrating birds. Yellow doesn't bother turtles or most insects but can disrupt salamanders. No wavelength is perfect, Longcore says, but blue and white are worst of all. Blue light interferes with body clocks and strongly attracts insects. It is also easily scattered, increasing the spread of light pollution. It is, however, cheap and efficient to produce. The new generation of energy-efficient white LEDs contain a lot of blue light, and the world might switch to them from traditional yellow-orange sodium lights. In energy terms, that would be an environmental win. But it would also increase the amount of global light pollution by two or three times.

After talking with Longcore, I head home to Washington, D.C., on a red-eye flight. As the plane takes off, I peer out the window at Los Angeles. The twinkling grid of lights stirs the same primordial awe that comes from

watching a starry sky or a moonlit sea. But as the illuminated city recedes beneath my window, that amazement is tinged with unease. Light pollution is no longer just an urban problem. Light travels, encroaching even into places that are otherwise untouched by human influence. The light from Los Angeles reaches Death Valley, one of the largest national parks in the United States, more than 150 miles away. True darkness is hard to find.

So is true silence.

It's a sunny April morning in Boulder, Colorado, and I've hiked up to a rocky hillside, about 6,000 feet above sea level. The world feels wider here, not just because of the panoramic view over conifer forests but also because it is blissfully quiet. Away from urban ruckus, quieter sounds become audible over greater distances. On the hillside, a chipmunk is rustling. Grasshoppers snap their wings together as they fly. A woodpecker pounds its beak against a nearby trunk. Wind rushes past. The longer I sit, the more I seem to hear.

Two men puncture the tranquility. I can't see them, but they're somewhere on the trail below, intent on broadcasting their opinions to all of Colorado. Then I realize I can also hear faraway vehicles zooming along a highway beyond the trees. Denver hums in the distance, an ambient backdrop that I had all but blocked out. I notice the roaring engines of a plane flying overhead. After my hike, I meet up with Kurt Fristrup, who says he's been backpacking since the mid-1960s. In that time, aircraft emissions have increased nearly sevenfold. "One of my favorite parlor tricks when friends visit is to ask, at the end of the hike, if they heard any aircraft," he tells me. "People will say they remember one or two. And I'll say there were 23 jets and two helicopters."

Before he retired, Fristrup was a scientist at the National Park Service's Natural Sounds and Night Skies Division, a group that works to safeguard (among other things) the United States' natural soundscapes. To protect them, the team first had to map them, and sound, unlike light, can't be detected by satellites. Fristrup and his colleagues spent years lugging recording equipment to almost 500 sites around the country, capturing nearly 1.5 million audio samples. They found that human activity doubles the background-noise levels in 63 percent of protected spaces like national

parks, and increases them tenfold in 21 percent. In the latter places, “if you could have heard something 100 feet away, now you can only hear it 10 feet away,” Rachel Buxton, a former National Park Service research fellow, told me. Aircraft and roads are the main culprits, but so are industries like oil and gas extraction, mining, and forestry, which fill the air with drilling, explosions, engine noises, and the thud of heavy tires. Even the most heavily protected areas are under acoustic siege.

Busy roads may drown out the alarm calls of songbirds like the tufted titmouse. (Shayan Asgharnia for The Atlantic)

In towns and cities, the problem is worse, and not just in the United States. In 2005, two-thirds of Europeans were immersed in ambient noise equivalent to perpetual rainfall. Such conditions are difficult for the many animals that communicate through calls and songs. Scientists have found that noisy neighborhoods in Leiden, in the Netherlands, compel great tits to sing at higher frequencies so that their notes don't get masked by the city's low-pitched hubbub. Nightingales in Berlin are forced to belt out their tunes more loudly to be heard over the surrounding din. Urban and industrial noise can also change the timing of birds' songs, suppress the complexity of their calls, and prevent them from finding mates. Noise pollution masks not only the sounds that animals deliberately make but also the "web of unintended sounds that ties communities together," Fristrup says. He means the gentle rustles that tell owls where their prey is, or the faint flaps that warn mice about impending doom.

In 2012, Jesse Barber and his colleagues Heidi Ware Carlisle and Christopher McClure built a phantom road. On a ridge in Idaho that acts as a stopover for migrating birds, the team set up a half-mile corridor of speakers that played looped recordings of passing cars. A third of the usual birds stayed away. Many of those that didn't paid a price for persisting. With tires and horns drowning out the sounds of predators, the birds spent more time looking for danger and less time looking for food. They put on less weight and were weaker during their arduous migrations. The phantom-road experiment was pivotal in showing that wildlife could be deterred by noise and noise alone, detached from the sight of vehicles or the stench of exhaust. Hundreds of studies have come to similar conclusions. In noisy conditions, prairie dogs spend more time underground. Owls flub their attacks. Parasitic *Ormia* flies struggle to find their cricket hosts.

Sounds can travel over long distances, at all times of day, and through solid obstacles. These qualities make them excellent stimuli for animals but also pollutants par excellence. Noise can degrade habitats that look idyllic and make otherwise livable places unlivable. And where will animals go? In 2003, 83 percent of the contiguous United States lay within about a kilometer of a road.

Even the seas can't offer silence. Although Jacques Cousteau once described the ocean as a silent world, it is anything but. It teems with the sounds of breaking waves and blowing winds, bubbling hydrothermal vents and calving icebergs, all of which carry farther and travel faster underwater than in air. Marine animals are noisy, too. Whales sing, toadfish hum, cod grunt, and bearded seals trill. Thousands of snapping shrimp, which stun passing fish with the shock waves produced by their large claws, fill coral reefs with sounds similar to sizzling bacon or Rice Krispies popping in milk. Some of this soundscape has been muted as humans have netted, hooked, and harpooned the oceans' residents. Other natural noises have been drowned out by the ones we added: the scrapes of nets that trawl the seafloor; the staccato beats of seismic charges used to scout for oil and gas; the pings of military sonar; and, as a ubiquitous backing track for all this commotion, the sounds of ships.

"Think about where your shoes come from," the marine-mammal expert John Hildebrand tells me. I look; unsurprisingly, the answer is China. Some tanker carried my shoes across the Pacific, leaving behind a wake of sound that radiated for miles. From 1945 to 2008, the global shipping fleet more than tripled, and began moving 10 times more cargo at higher speeds. And in the past 50 years, shipping vessels have multiplied the levels of low-frequency noise in the oceans 32-fold—a 15-decibel increase over levels that Hildebrand suspects were already 10 to 15 decibels louder than in pre-propeller seas. Because giant whales can live for a century or more, there are likely whales alive today that have personally experienced this growing underwater racket and now can hear only a small fraction of their former range. As ships pass in the night, humpback whales stop singing, orcas stop foraging, and right whales become stressed. Crabs stop feeding, cuttlefish change colors, damselfish are more easily caught. "If I said that I'm going to increase the noise level in your office by 30 decibels, OSHA would come in and say you'd need to wear earplugs," Hildebrand tells me. "We're conducting an experiment on marine animals by exposing them to these high levels of noise, and it's not an experiment we'd allow to be conducted on ourselves."

Because of the way we have upended the worlds of other animals, senses that have served their owners well for millions of years are now liabilities.

Smooth vertical surfaces, which don't exist in nature, return echoes that sound like open air; perhaps that's why bats so often crash into windows. Dimethyl sulfide, the seaweedy-smelling chemical that once reliably guided seabirds to food, now also guides them to the millions of tons of plastic waste that humans have dumped into the oceans; perhaps that's one reason an estimated 90 percent of seabirds eventually swallow plastic. Manatees can detect the currents produced by objects moving in the water with whiskerlike hairs found all over their body, but not with enough notice to avoid a loud, fast-moving speedboat; boat collisions are responsible for at least a fifth of deaths among Florida's manatees. Odorants in river water can guide salmon back to their stream of birth, but not if pesticides in that same water blunt their sense of smell. Weak electric fields at the bottom of the sea can guide sharks to buried prey, but also to high-voltage cables.

Manatee whiskers can detect currents in the water, but not quickly enough to dodge loud, fast boats. (Shayan Asgharnia for The Atlantic)

Some animals have come to tolerate the sights and sounds of modernity. Others even flourish among them. Some urban moths have evolved to become less attracted to light. Some urban spiders have gone in the opposite direction, spinning webs beneath streetlights and feasting on the attracted insects. In some Panama towns, nighttime lights drive frog-eating bats away, allowing male túngara frogs to load their songs with sexy flourishes

that would normally attract predators as well as mates. Animals can adapt, by changing their behavior over an individual lifetime and by evolving new behaviors over many generations.

But adaptation is not always possible. Species that mature and breed slowly can't evolve quickly enough to keep pace with levels of light and noise pollution that double every few decades. Creatures that have already been confined to narrow corners of shrinking habitats can't just up and leave. Those that rely on specialized senses can't just retune their entire Umwelt.

Our influence is not inherently destructive, but it is often homogenizing. In pushing out species that cannot abide our sensory onslaughts, we leave behind smaller and less diverse communities. And beyond polluting the world with unwanted sensory stimuli, we're also removing natural stimuli that animals have come to depend on, flattening the undulating sensescapes that have generated the wondrous variety of animal Umwelten.

Consider Lake Victoria, in East Africa. It is home to more than 500 species of cichlid fish that are found nowhere else. That extraordinary diversity arose partly because of light. In deeper parts of the lake, light tends to be yellow or orange, while blue is more plentiful in shallower waters. These differences affected the eyes of the local cichlids and, in turn, their mating choices. The evolutionary biologist Ole Seehausen found that female cichlids from deeper waters prefer redder males, while those in the shallows are drawn to bluer ones. These diverging penchants acted like physical barriers, splitting the cichlids into differently colored forms. Diversity in light helped create diversity in vision, in color, and in species. But over the past century, runoff from farms, mines, and sewage filled the lake with nutrients that spurred the growth of clouding, choking algae. The old light gradients flattened in some places, the cichlids' colors and visual proclivities no longer mattered, and the number of species collapsed. By turning off the light in the lake, humans also switched off the sensory engine of diversity, contributing to what Seehausen has called "the fastest large-scale extinction event ever observed."

As those species go extinct, so too do their Umwelten. With every creature that vanishes, we lose a way of interpreting the world. Our sensory bubbles shield us from the knowledge of those losses. But they don't protect us from

the consequences. In the woodlands of New Mexico, the ecologists Clinton Francis and Catherine Ortega found that the Woodhouse's scrub-jay avoids the noise of compressors used in extracting natural gas. The scrub-jay spreads the seeds of piñon pine trees, and a single bird can bury thousands of pine seeds a year. They are so important to the forests that, in quiet areas where they still thrive, pine seedlings are four times more common than in noisy areas they have abandoned, Francis and colleagues found in a later study.

Piñon pines are the foundation of the ecosystem around them—a single species that provides food and shelter for hundreds of others, including Indigenous Americans. To lose three-quarters of them would be disastrous. And because they grow slowly, "noise might have hundred-plus-year consequences for the entire ecosystem," Francis tells me.

A better understanding of other creatures' senses can show us how we're defiling the natural world—and can also point to ways of saving it. In 2016, the marine biologist Tim Lamont (formerly Tim Gordon) traveled to Australia's Great Barrier Reef to begin work for his doctorate. Lamont should have spent months swimming amid the corals' vivid splendor. Instead, a heat wave had forced the corals to expel the symbiotic algae that give them nutrients and colors. Without these partners, the corals starved and whitened in the worst bleaching event on record, and the first of several to come. Snorkeling through the rubble, Lamont found that the reefs had been not only bleached but also silenced. Snapping shrimp no longer snapped. Parrotfish no longer crunched. Those sounds normally help guide baby fish back to the reef after their first vulnerable months out at sea. Soundless reefs were much less attractive.

Lamont feared that if fish avoided the degraded reefs, the seaweed they normally eat would run amok, overgrowing the bleached corals and preventing them from rebounding. He and his colleagues set up loudspeakers that continuously played recordings of healthy reefs over patches of coral rubble. The team would dive every few days to survey the local animals. After 40 days, he ran the numbers and saw that the acoustically enriched reefs had twice as many young fish as silent ones and 50 percent more species. They had not only been attracted by the sounds

but stayed and formed a community. “It was a lovely experiment to do,” Lamont says. It showed what conservationists can accomplish by “seeing the world through the perceptions of the animals you’re trying to protect.”

Lamont’s experiment was possible only because the team managed to record the sounds of the healthy reefs before they were bleached. Natural sensescapes still exist. There is still time to preserve and restore them before the last echo of the last reef fades into memory. And in most cases, the work ahead of us is considerably simpler. Instead of adding stimuli that we have removed, we can simply remove those that we added. Radioactive waste can take millennia to degrade. Persistent chemicals like the pesticide DDT can thread through the bodies of animals long after they are banned. Plastics will continue to despoil the oceans even if all plastic production halts tomorrow. But light pollution ceases as soon as lights are turned off. Noise pollution abates once engines and propellers wind down. Sensory pollution is an ecological gimme—a rare example of a planetary problem that can be immediately and effectively addressed. And in the spring of 2020, the world did unknowingly address it.

The body clock of the barred tiger salamander is disrupted by artificial light at night. (Shayan Asgharnia for The Atlantic)

As the coronavirus spread, public spaces closed. Flights were grounded. Cars stayed parked. Cruise ships stayed docked. About 4.5 billion people—almost three-fifths of the world's population—were told or encouraged to stay home. As a result, many places became substantially darker and quieter. With fewer planes and cars on the move, the night skies around Berlin were half as bright as normal. Alaska's Glacier Bay, a sanctuary for

humpback whales, was half as loud as the previous year, as were cities and rural areas throughout California, New York, Florida, and Texas. Sounds that would normally be muffled became clearer. City dwellers around the world suddenly noticed singing birds.

In a multitude of ways, the pandemic showed that sensory pollution can be reduced if people are sufficiently motivated—and such reductions are possible without the debilitating consequences of a global lockdown. In the summer of 2007, Kurt Fristrup and his National Park Service colleagues did a simple experiment at Muir Woods National Monument, in California. On a random schedule, they stuck up signs that declared one of the most popular parts of the park a quiet zone and encouraged visitors to silence their phones and lower their voices. These simple steps, with no accompanying enforcement, reduced the noise levels in the park by three decibels, equivalent to 1,200 fewer visitors.

To truly make a dent in sensory pollution, bigger steps are needed. Lights can be dimmed or switched off when buildings and streets are not in use. They can be shielded so that they stop shining above the horizon. LEDs can be changed from blue or white to red. Quiet pavements with porous surfaces can absorb the noise from passing vehicles. Sound-absorbing barriers, including berms on land and air-bubble curtains in the water, can soften the din of traffic and industry. Vehicles can be diverted from important areas of wilderness, or they can be forced to slow down: In 2007, when commercial ships in the Mediterranean began slowing down by just 12 percent, which saves fuel and reduces emissions, they produced half as much noise. Such vessels can also be fitted with quieter hulls and propellers, which are already used to muffle military ships (and would make commercial ones more fuel-efficient).

We could regulate industries causing sensory pollution, but there's not enough societal will. "Plastic pollution in the sea looks hideous and everyone is worried, but noise pollution in the sea is something we don't experience so directly, so no one's up in arms about it," Lamont says. And as we desecrate sensory environments, we grow accustomed to the results. Our blinding, blaring world becomes normal, and pristine wilderness feels more distant.

But the majesty of nature is not restricted to canyons and mountains. It can be found in the wilds of perception—the sensory spaces that lie outside our Umwelt and within those of other animals. To perceive the world through others' senses is to find splendor in familiarity, and the sacred in the mundane. Wonders exist in a backyard garden, where bees take the measure of a flower's electric fields, leafhoppers send vibrational melodies through the stems of plants, and birds behold the hidden palettes of ultraviolet colors on their flock-mates' feathers. Wilderness is not distant. We are continually immersed in it. It is there for us to imagine, to savor, and to protect.

Barn owls track prey using stiff facial feathers that funnel sound toward their ears. (Shayan Asgharnia for The Atlantic)

In 1934, after considering the senses of ticks, dogs, jackdaws, and wasps, Jakob von Uexküll wrote about the Umwelt of the astronomer. “Through gigantic optical aids,” he wrote, this unique creature has eyes that “are capable of penetrating outer space as far as the most distant stars. In its Umwelt, suns and planets circle at a solemn pace.” The tools of astronomy can capture stimuli that no animal can naturally sense—X-rays, radio

waves, gravitational waves from colliding black holes. They extend the human Umwelt across the universe and back to its very beginning. The tools of biologists are more modest in scale, but they, too, offer a glimpse into the infinite. Scientists have used night-vision goggles to show that nocturnal bees can see in extreme darkness, clip-on microphones to eavesdrop on the vibrational songs of leafhoppers, and electrodes to listen in on the pulses of electric fish. With microscopes, cameras, speakers, satellites, and recorders, people have explored other sensory worlds. We have used technology to make the invisible visible and the inaudible audible.

No creature could possibly sense everything, and no creature needs to. Evolving according to their owner's needs, the senses sort through an infinity of stimuli, allowing through only what is relevant. To learn about the rest is a choice. The ability to dip into other Umwelten is our greatest sensory skill. A moth will never know what a zebra finch hears in its song, a zebra finch will never feel the electric buzz of a black ghost knifefish, a knifefish will never see through the eyes of a mantis shrimp, a mantis shrimp will never smell the way a dog can, and a dog will never understand what it is like to be a bat. We will never fully do any of these things either, but we are the only animal that can try. Through patient observation, through the technologies at our disposal, through the scientific method, and, above all else, through our curiosity and imagination, we can try to step into perspectives outside our own. This is a profound gift, which comes with a heavy responsibility. As the only species that can come close to understanding other Umwelten, but also the species most responsible for destroying those sensory realms, it falls on us to marshal all of our empathy and ingenuity to protect other creatures, and their unique ways of experiencing our shared world.

This article has been adapted from Ed Yong's latest book, An Immense World: How Animal Senses Reveal the Hidden Realms Around Us. *It appears in the July/August 2022 print edition with the headline "Our Blinding, Blaring World."*

Editor's Note

Features

- **The Vindication of Jack White**
  An obsessive protector of rock's past could hold the key to its future. -- Spencer Kornhaber

The Vindication of Jack White

The Vindication of Jack White

By Spencer Kornhaber

Something preposterous was happening the night I visited Third Man Records in Nashville. The label and cultural center founded by Jack White, of the White Stripes, generally strives for a freak-show vibe; you can pay 25 cents to watch animatronic monkeys play punk rock in the record store, and a taxidermied elephant adorns the nightclub. On the March night when I showed up, Bob Weir of the Grateful Dead was performing. Through a pane of blue-tinted glass at the back of the stage, another curiosity in White's menagerie could be glimpsed: a 74-year-old audio engineer in a lab coat who calls himself Dr. Groove.

In a narrow room behind the stage, Dr. Groove—his real name is George A. Ingram—stooped over a needle that was etching Weir's music into a black, lacquer-coated disc called an acetate. This is the first step in an obsolete process for producing a vinyl record. The lathe he used was the very same one that cut James Brown's early singles, in the 1950s.

Observing this process intently was White himself. Thanks to the endurance of early-2000s White Stripes hits such as "Seven Nation Army" and "Fell in Love With a Girl," the guitarist and singer is one of the few undisputed rock gods to emerge in the 21st century. On this evening, White, now 46, wore half-rim glasses and flannel, the only hint of rock coming from the Gatorade-blue tinge of his hair.

Listeners generally want a record to sound as loud as possible, White told me as Dr. Groove continued his work. But "you can have a mellow song like this"—the Dead's downbeat "New Speedway Boogie" drifted in the air—and then, all of a sudden, the drummer hits the effects pedal and pumps up his volume. If Dr. Groove isn't prepared, "the needle will literally pop out of the groove from the jolt," rendering the recording useless.

For so finicky an operation to take place in 2022 is, from one point of view, absurd. The music industry largely stopped cutting performances directly to disc 70 years ago, with the advent of magnetic tape. A few minutes before taking the stage at Third Man, Weir—a septuagenarian cowboy who spoke in a low mutter—had visited the back room and marveled that not even the Grateful Dead, those ancient gods of concert documentation, had captured a show in this fashion. "Cat Stevens said the same thing," White told me.

Ever since White installed a lathe at Third Man, a stream of acts has come to teleport to the time before Pro Tools. Unlike a recording made with contemporary equipment, a performance etched into an acetate can't be easily remixed or otherwise reengineered. Flubs, flaws, and interference instead become selling points—evidence of a recording's authenticity. "People who know, audiophiles—they see 'live to acetate,' they know the circumstances under which it was made, and it's exciting," White said. "There were no overdubs on that guitar. That solo really happened at that moment." A sticker on one acetate-derived record for sale in Third Man's store, by the dance-punk band Adult, promises "such detail in this live recording, you can even hear the fog machine!"

White is the sort of listener who appreciates such detail. This spring, a clip made the rounds online in which White demonstrated his uncanny ability to identify any song in the Beatles' catalog in one second or less. This keen sense of the past helped the White Stripes—the Detroit band he formed in 1997 with his then-wife, Meg White—revive classic-rock rawness in an era of plastic pop and space-age hip-hop. After the band's breakup, in 2011, his solo records earned consistent if narrower acclaim. Lately, though, his obsession with the antique has made him an unlikely power broker in what was supposed to be the digital age.

Streaming, the cheap and convenient format that came to rule the industry in the past decade, has begun to grate on a diverse range of artists and listeners. Musicians' foremost gripe is about money: Spotify, the dominant platform, reportedly pays a fraction of a cent whenever a song is played. When, more or less overnight, the pandemic made touring impossible, the difficulty for most acts to make a living from such an arrangement became painfully clear.

The virus also spurred a public reckoning with Spotify earlier this year. A number of artists, including Neil Young and Joni Mitchell, pulled their catalogs from the platform to protest its exclusive deal with the podcaster Joe Rogan, who had aired misleading information about COVID-19 vaccines on his show. In the eyes of those dissenters, Spotify's unwillingness to remove Rogan reinforced the idea that it views music as just another offering in a buffet of content.

The devaluing of music as an art form, many artists worry, is hardwired into the streaming format. The old ways of building relationships between act and audience (liner notes, audio quality) are subordinated by the new: algorithmic curation, which invites endless listening but not active engagement. This may seem like the way of the future, our tastes intuited and satisfied by strings of code. But while the medium continues to attract new users, some listeners are showing signs of streaming burnout.

One way to measure this sentiment is by looking at the popularity of the physical media that White has long championed—and that ought, in a streaming-enabled world, to have gone extinct. After languishing for years, vinyl sales began a steady climb around 2007 and then exploded during the pandemic. Last year's 41.7-million-unit, $1 billion gross for the medium represented 61 percent year-over-year growth, and this after a 28 percent spike in 2020. Limited-edition records—sold for upwards of $30 a pop at retailers such as Target and Amazon—have become integral to release strategies for the likes of Taylor Swift and Adele, who last year sold 318,000 vinyl copies of her most recent album within two months of its release. The same direct-to-acetate ritual Weir and Dr. Groove performed at Third Man's shrine to music past also produced the first live album by Billie Eilish, the 20-year-old Gen Z phenomenon known to eat spiders on YouTube. Maybe White had been onto something.

White's Third Man label got serious about reviving vinyl in 2009. Even his friends wrote it off as a vanity project in keeping with his other willfully retro larks, such as his upholstery hobby (don't throw away the old; make it new) and his co-ownership of a company that manufactures baseball bats ("Built to spec … for the athlete that competes with a warrior's mentality"). He was full of grand pronouncements in defense of the old, hard ways of doing things. "Technology is a big destroyer of emotion and truth," he declared in the 2008 documentary *It Might Get Loud*.

Today, in conversation, White has an innocent, almost surfer-dude affect, though his appetite for discussing outmoded forms of technology has hardly waned. While we were hanging out with audio engineers, he proposed a guessing game about when 8-track cartridges were last on the market. (White doesn't own a smartphone, so a member of Weir's entourage looked

it up. The answer, per Wikipedia, was late 1988, vindicating White's memories of seeing such tapes as a teen at Harmony House Records in Detroit.) Later, in Third Man's lounge, he described waiting months to see Paul Thomas Anderson's *The Master* on 70 mm, only to have the experience ruined by a screaming baby in the row in front of him. The point of the story wasn't that someone had brought an infant to a psychosexual thriller about a cult leader—it was that White had really wanted to enjoy the movie on celluloid.

I'll admit that I arrived in Nashville skeptical of White's nostalgist views. Some of my most crucial music memories include pirating Green Day on Napster and spacing out to Sufjan Stevens through Bluetooth speakers. Analog obsessives, I've found, can be dismissive of the powerful relationships that streamers form all the time with new artists. And some vinyl heads treat music mainly as an acquisitive hobby, like sneaker collecting. The records remain safely in their sleeves, lest their value as commodities be diminished by taking them out to play.

But White is less doctrinaire about these matters than I feared. With Third Man now a cultural fixture, he seems less like a strident iconoclast than a peacemaker between the streaming economy and the stuff economy. He insists that he never wanted to stop the march of progress; he only wanted to make sure the past didn't get torched along the way. As he put it, "It's hard to inspire only with one set of ways—only with the digital part, only with the vinyl part."

White told me he listens to 90 percent of his music digitally. He appreciates the way that streaming helps new acts find wide audiences. (Olivia Rodrigo, whose debut single made a swift transit to No. 1 thanks to Spotify, is one of the young pop artists he admires—which is cute because she herself is a White Stripes obsessive.) "I know it's not amazing money on streaming, but if vinyl hadn't blown up over the last few years, it would be a lot more dire," he said.

I gave White the chance to take a victory lap for saving vinyl from what seemed like certain doom, but he was quick to credit the figures who sustained the format in the '90s and 2000s: house DJs, punk bands, Pearl Jam. Still, he acknowledged that Third Man had played an outsize role. At

first, the company focused on kooky innovations, including records that projected 3-D images when spun. (Disney borrowed the same hologram artist for a 2016 *Star Wars* soundtrack, which shot up an image of a TIE fighter or the Millennium Falcon.) “I never minded the gimmicks,” White said. “If it turns a kid on to music that they would have never gotten into, then whatever.”

Today, Third Man has the makings of an old-media empire. Divisions in Nashville and Detroit master music, publish books and rock-focused magazines, and develop photography. Last year, the company opened its third record store/rock club/wonder emporium, in London. But Third Man’s greatest source of influence may be the record-processing plant White opened in Detroit in 2017, which has tripled its manufacturing capacity since then. Day and night, the facility whirs along, not only pressing Third Man’s work—such as the record that will result from Weir’s gig—but also filling contract orders from behemoths such as Paul McCartney, BTS, and Beyoncé.

White’s forays into the future haven’t always been as successful as his treks to the past. In 2015, he joined a group of superstars—including Jay-Z, Beyoncé, and Madonna—with an ownership stake in the Spotify competitor Tidal. A press conference about the virtues of an artist-driven platform was met with skepticism. Tidal was, specifically and flagrantly, a *celebrity*-driven platform. The service did tout higher audio quality and better payouts to artists than competitors, but user sign-ups were slow, and the service never found its footing. White, who was not involved with running the company, said the backlash was eye-opening. “I don’t think [Tidal] was promoted properly from the get-go,” he said. “It quickly became a lesson: Maybe people don’t like it when the artists own the art gallery … It sort of gets to ‘Eat the rich’ kind of stuff.”

White winced when I asked about an even more contentious attempt at revolution in the music world: non-fungible tokens, or NFTs. As the pandemic wore on, some record-industry figures argued that giving fans the ability to purchase digital assets—interactive album art, or even ownership rights to a song—would fulfill the same yearning for collectibility that has helped drive the vinyl boom. Others—White now among them—see NFTs

as a way to get listeners to pay for things they can generally get for free. “It gives off a vibe of ‘Well, if people are stupid enough to give me money for this, I’ll take it.’”

But in 2021, the White Stripes—a legacy brand more than a band at this point—hawked some NFTs, animations tied to a 10-year-old EDM remix of “Seven Nation Army.” White said that those had been pushed by the defunct band’s management. “I don’t want to come out and say ‘I had nothing to do with this,’” he told me. “It is my band. We allowed it to happen. But it didn’t really interest me. It’s not something we’ll be doing very much of.”

What does interest White is the internet’s broader music landscape—despite the fact that he isn’t the most fluent participant in it. He appreciates how underground scenes and subcultures, which might seem like logical casualties of streaming, haven’t quite died out: “You almost get a neighborhood feel in the TikToks and—what is it?—the Bandcamps and SoundClouds,” he said. (Witness the recent wave of chatty, droll post-punk bands such as Wet Leg, a favorite new find of White’s.) He even had a kind word for social-media platforms such as Twitter and Snapchat, not that he uses them. In their character counts and time limits, he sees proof of one of his favorite theories: Constraint is the mother of creativity. “There’s inspiration to be taken from all of that stuff,” he said.

White has always thrived within constraints, many of them self-imposed. The White Stripes famously had no bassist, and White originally composed his 2018 solo album, *Boarding House Reach*, with the same reel-to-reel recorder he used when he was 14 years old. For the two records he’s released this year, April’s *Fear of the Dawn* and July’s *Entering Heaven Alive*, White didn’t need to dream up new limitations. The pandemic did that for him.

When the coronavirus made studio sessions with other instrumentalists a risk, White, a consummate collaborator (besides the White Stripes, he has formed two other successful bands over his career, the Dead Weather and the Raconteurs), did something he’d rarely done: He played all the parts on his songs. This in turn required another previously unthinkable step: using software to arrange drums, guitars, keyboards, and even samples into a

coherent whole. Once, the *enfant terrible* of the White Stripes had routinely denounced computers for their deadening effects on rock. But the technology has improved since Nickelback's heyday, and White now believes that, in the right hands, it can stoke the life of a song rather than sap it. "It's like, CGI in movies is so much better than it was in the early 2000s," he said.

As social distancing loosened up and White brought in other musicians to record the songs he'd been writing, the resulting work fell into two categories: thrashing, Deep Purple–inspired rock and roll, and sweet, "Maybe I'm Amazed"–style love songs. His past solo albums had been mishmashes of styles, and he had assumed that this time he'd end up with another eclectic collection. But, he explained, instead of fitting together naturally (he knitted his fingers), the loud songs and the soft ones now seemed to repel each other (his fingers then made a crosshatch). The muse was pushing him toward two separate albums—though not a double album, which he knows screams *filler*. ("People even say that about *The White Album*, which seems shocking.")

Both the mosh-worthy *Fear of the Dawn* and the brunch-friendly *Entering Heaven Alive* are among the best albums of White's solo career. The lead single on *Fear of the Dawn*, "Taking Me Back" (which spent a few weeks at No. 1 on rock radio), has guitar jolts so menacing that they almost trigger a fight-or-flight reflex. White likes that the title phrase can be heard a few different ways. "Maybe the pandemic has made everybody ask the world, 'Will you take me back as we emerge from our caves?'" he told me. The lyric is also a way for White, the father of two teenagers, to link his generation to the next. "When you kids do that," went White's alternative reading, "it takes me back to when I was a kid."

A renewed appreciation for the tangible should be a boon for musicians who have struggled in the streaming era, a period in which rising profits for the industry as a whole have only incrementally benefited most individual artists. But demand for vinyl now exceeds manufacturing capacity by astonishing margins. A record that would have once taken three months to go from recording to the shelves today requires eight months or a year. Even White has been a victim of the lags; he'd originally considered

releasing his new albums on the same day, but with his plant at capacity, he decided to stagger them. He has dubbed his present concert series the Supply Chain Issues Tour. As he tries to expand production at his Detroit factory, White finds himself more and more preoccupied by "regular manufacturing-plant kind of problems," he said. "How many shifts do we have? Once you start the machines, how many hours do you keep them going?"

But Third Man can only do so much: In 2021, an unnamed industry executive speculated to *Billboard* that global pressing capacity would need to at least double to meet present demand for vinyl. Some indie figures blame the bottleneck on the pop stars who have bought up time at small pressing facilities. The real problem, White argues, is a lack of manufacturers. He recently filmed a plea for the three major record labels—Universal, Sony, and Warner—to build their own factories. Vinyl is "no longer a fad," he said, standing amid the hazmat-yellow equipment of his pressing plant. "As the MC5 once said, you're either part of the problem or part of the solution."

Third Man's record-pressing plant, in Detroit. White recently filmed a plea for the three major record labels to build their own factories. Vinyl is "no longer a fad," he said. (Jim West / Alamy)

In the meantime, artists are stymied by scarcity. Some commentators in the music industry see this as a sign that musicians need to focus on reforming streaming services or advocating a return to paid downloads. Others say that less unwieldy formats, such as the humble cassette tape, would be a more sustainable medium for collectors (sales of tapes have indeed begun rebounding recently). White has always wanted all of the above. When he launched Third Man's first store, he had dreams of iPads packed with MP3s next to 1940s recording booths, and of customers accessing both a record-of-the-month club and an online streaming library of live music. While not all such plans have come to fruition, when I visited the Nashville location, I was amused to find a rotating rack displaying CDs for sale, as if at a Tower Records in 2005.

Yet there is no doubt that the very things that make vinyl a chore to replicate—the bulkiness, the frameable album art, the fingerprint-like grooves that differentiate one record from the next—are part of why vinyl is surging right now. It's the sort of paradox that has animated White's entire career as a songwriter and businessman: romance leading to frustration, frustration leading to romance.

In the Blue Room, Third Man's concert venue, Weir and his band Wolf Bros preached between songs. The bassist, Don Was, who is also the head of the legendary jazz label Blue Note Records, gave a spiel about the glory of "authentic," Auto-Tune-free music. Weir recalled his teenage vinyl experiences. "You'd go to a friend's house, and you'd put records on and you'd listen to music all night," he said. "People don't do that anymore, because you can't. You can't listen to digital music for very long, because it makes your brain tired."

The crowd whooped, but I felt a defensive pang. We all fetishize our formative listening experiences—whether they were dancing to jug bands on vinyl 'til sunup or vibing to Frank Ocean on an iPhone while riding the subway. Still, maybe Weir was right: Whose brain doesn't feel tired these days? What if I've been addicted to musical fast food since first downloading MP3s at age 11? What if entire generations have been?

Looking around at the audience offered a less declinist narrative. Many of Weir's followers were 20-somethings in flannel; they twirled alongside a

few grizzled, Merlin-looking guys who no doubt had been attending shows like this one for decades. The legendary, highly physical subculture of the Dead—an ecosystem of bootleg recordings, concert tailgates, and tie-dye merch—appears to still be going strong. Indeed, it has provided a model that many of today's acts are embracing. Live ticket sales have surged in recent months. Rappers and indie singers alike are moving branded hoodies and hats faster than they can manufacture them. Even in the slick, futuristic world of K-pop, fans express their devotion by snapping up CD bundles laden with such delights as key chains and postcards. Fans download and stream, but they still thirst for a connection with artists that isn't mediated through a screen.

I circled backstage to find White hanging out with staff. As we watched Dr. Groove gingerly turn over an acetate, White described the layers of quality control in the process of making Weir's record. "You know that show *How It's Made*?" he asked. "I get so jealous: *Oh, they make razor blades, how hard!* They just build the machine and it pumps it out. But we have to make something that sounds good when you put it on your turntable. There's magic dust in there."

Weir finished up "Saint of Circumstance," the last of the songs that Dr. Groove had planned to capture. His assistant marked the record with a pen, and then placed it into a cardboard container. "Vinyl is final‼" White shouted.

Weir wasn't finished playing, though. As his encore of "China Cat Sunflower" and "I Know You Rider" stretched past the 10-minute mark, Third Man's reel-to-reel recorder—striped red and white in the White Stripes' classic aesthetic—ran out of material with which to record backup. Loose tape flapped and jangled. "This machine was not built for this type of jamming," Bill Skibbe, White's longtime audio engineer, said. Someone suggested ripping the rest of the show from YouTube, but audiences at Third Man are typically asked not to film concerts. White prefers that the only glow come from the electric candles that flicker from wall sconces, not iPhones held aloft. The encore would not be lost, however. White's team had yet another device capturing the show for posterity: a digital recorder.

This article appears in the July/August 2022 print edition with the headline "The Vindication of Jack White."

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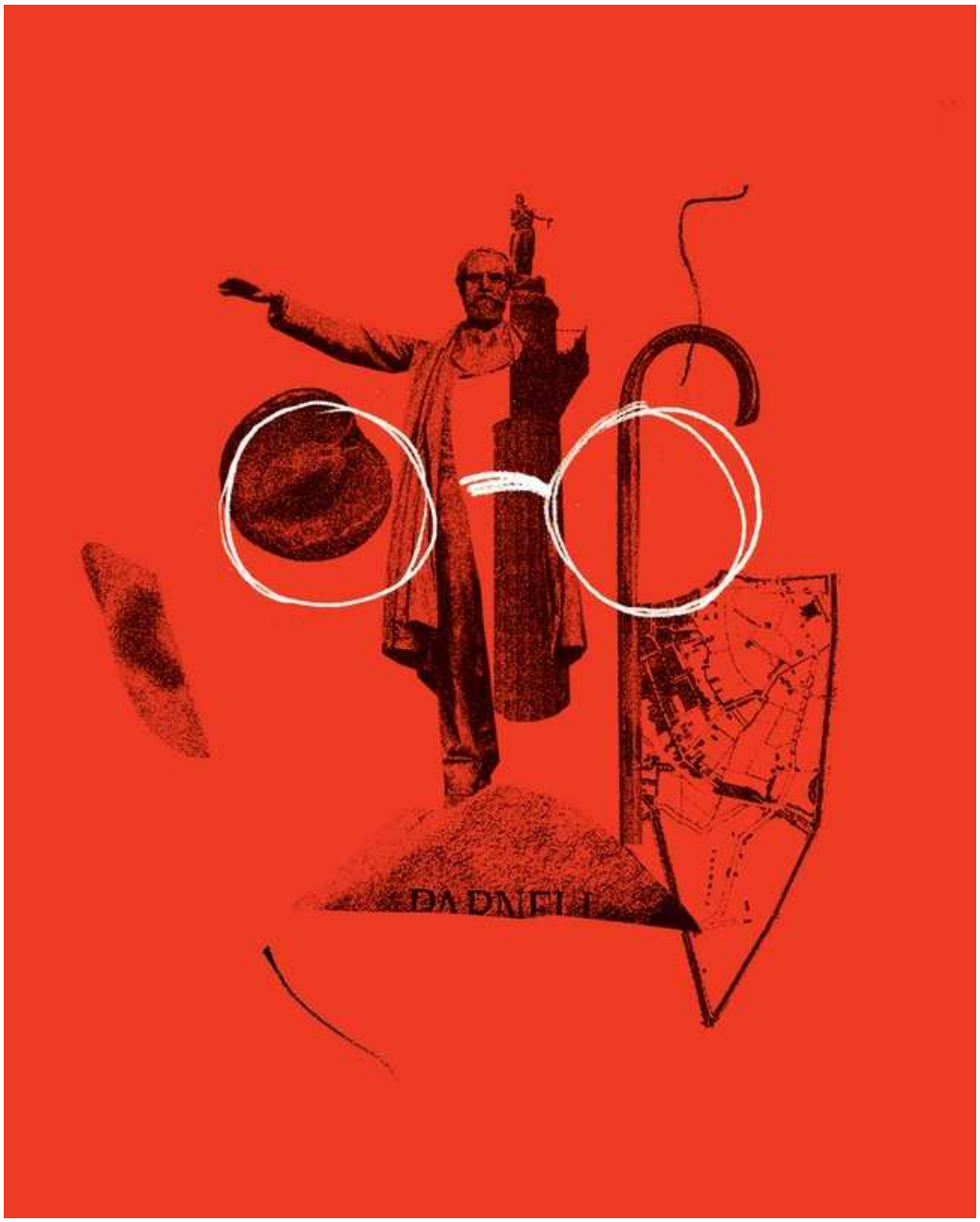

The Book That Never Stops Changing

‘Ulysses’: The Book That Never Stops Changing

By Fintan O’Toole

When I was a kid, the axis around which Dublin revolved was a huge Doric column that had stood at the center of the city since 1809. On the top was a statue of the English naval hero Vice Admiral Horatio Lord Nelson. Even to a child, his presence seemed anomalous. It was as if Washington, D.C., were dominated by a giant memorial to King George III.

One day, when I was 8 years old, my father and his cousin Vincent led me and my brother up the 168 steps that wound through the hollow interior of the monument we Dubliners called Nelson’s Pillar. I had never before seen the city from a vantage point so high that you could take in the whole place, the bay to the outlying mountains.

But there was, for me, an edge of unease. Vincent had bought half a dozen plums in a fruit shop. When we got to the top of the pillar, he opened the brown paper bag and gave us each one. He and my father started laughing about how they could spit the stones down on the people below. I found this deeply unsettling because I did not know my father could be like that, that he could joke about something I was sure would get us into big trouble. It was also darkly mysterious. The adults clearly thought there was some meaning in all of this—but what did plums have to do with Nelson?

More than a decade later, I found out. I was reading, for the first time, James Joyce’s *Ulysses*. The centenary of the novel’s publication is being marked in Dublin with official enthusiasm climaxing on Bloomsday, June 16. But back then it was still—as it should be—a thrillingly strange and dirty book, full of provocations and subversions. I came to an episode in which the author’s alter ego, Stephen Dedalus, is passing Nelson’s Pillar

with some other men. He tries to impress them with a story about two middle-aged Dublin women who save their money for a day out. They buy a lot of plums and climb the pillar. Then "they put the bag of plums between them and eat the plums out of it, one after another, wiping off with their handkerchiefs the plumjuice that dribbles out of their mouths and spitting the plumstones slowly out between the railings."

Reading this took me back to my childhood and explained an incident that was both vivid in my memory and oddly obscure. Now I knew what my father and Vincent were joking about and why we were eating plums way up there above the streets of Dublin. The book was in their heads, and they were inhabiting simultaneously Joyce's comic parable and the present-day city. But if the passage in *Ulysses* illuminated a moment in my own past, I still could not understand Stephen Dedalus's story. Why were those apparently respectable women spitting the hard pits of a fruit down onto the heads of their fellow citizens?

What I wanted to do then was go back and climb the pillar again. Surely the best way to grasp what the women were doing was to retrace their steadily mounting steps. This was the great privilege of reading *Ulysses* as a native of the city it has immortalized: The fictional world of the book mapped onto the physical reality of the streets and buildings, so that each could radiate into the other.

Except that, by the time I was reading Joyce, the pillar had vanished. In 1966, not long after our family adventure with the plums, some members of an Irish Republican Army splinter group had planted a bomb under Nelson's statue that blew it off its plinth and shattered the top part of the column. The sad stump was then demolished by the authorities.

The bombers very deliberately erased one kind of memory—the idea of Dublin as a British city, visually dominated by a very English hero. But they also obliterated an important part of Joyce's city.

In *Ulysses*, the pillar is described as the "heart of the Hibernian metropolis." That heart was ripped out. From that moment, a very specific experience became impossible—a visual and spatial sensation of hauling your bones up through the dark interior of a huge stone tube, emerging into the light and

then seeing the city and its hinterland in every direction. Joyce undoubtedly did that, and the topography imprinted itself on his imagination. I had been lucky enough to do it once, but I was painfully aware that no one could ever do it again.

Only much later, reading *Ulysses* for a second time, did I realize that in the book itself there is also an absent monument. If you know Dublin, you will be familiar with the obelisk just a few hundred yards up O'Connell Street from where Nelson's Pillar had stood. It commemorates a much more appropriately Irish hero: Charles Stewart Parnell, who drove the cause of Irish Home Rule to the very center of British politics in the 1880s. The statue of Parnell is the only monument by the great sculptor Augustus Saint-Gaudens in the artist's native city. For Joyce, it would have had a special significance—at the age of 9, he wrote a poem in praise of Parnell, his first published work; his proud father had it printed up as a broadside. The fall of the leader of Irish nationalism in the late 19th century, brought down by a scandal over his adulterous liaison with a married woman, was for him the most embittering event in recent Irish history. "'Twas Irish humour, wet and dry," Joyce wrote later, "Flung quicklime into Parnell's eye."The foundation stone for Parnell's monument was laid in 1899, but by 1904, when *Ulysses* is set, it had still not been built. Joyce saw this failure as emblematic of what he called the paralysis of Irish life. In a lecture in 1907, he noted sardonically that "in logical and serious countries, it is customary to finish the monument in a decent manner … but in Ireland, a country destined by God to be the eternal caricature of the serious world … they rarely get beyond the laying of the foundation stone."

In *Ulysses*, on the morning of June 16, 1904, as the protagonist Leopold Bloom is riding in a carriage to Glasnevin Cemetery for the burial of the hard-drinking Paddy Dignam, he passes an empty plinth at the top of O'Connell Street. His silent thought is: "Foundation stone for Parnell. Breakdown. Heart." This is the other heart of the Hibernian metropolis, the broken one. It marks a place so sunk in lassitude that it cannot even honor its lost leader.

The sour irony is that Nelson, too, had an affair with a married woman. Stephen Dedalus calls him the "onehandled adulterer." (Nelson had lost his

right arm in battle.) Nelson's sexual transgression does not prevent him from being immortalized in Dublin—while Parnell's similar sin still clouds his memory. Because Parnell has not been properly memorialized, it is, in *Ulysses*, as if he has not been laid to rest at all. He is the unquiet ghost that haunts the book.

When Bloom is in the cemetery, one of his companions points to Parnell's tomb: "With awe Mr Power's blank voice spoke:—Some say he is not in that grave at all. That the coffin was filled with stones. That one day he will come again." This notion is made all the more real because at various points during the day, we encounter Parnell's living doppelgänger, his brother John Howard Parnell. ("There he is: the brother. Image of him. Haunting face.")

Joyce embeds in *Ulysses* a complex set of thoughts and feelings about these two monuments—what's there and not there, what is imposed on Ireland as official British memory and what has yet to be properly remembered at all. And all of this had become mixed up for me with my own memories of my family and my hometown. Nelson's now nonexistent pillar, that paradoxical monument to oblivion, was, for me, an image of both the evanescence of the past and the way that odd parts of it linger and persist—an image, too, that had a beautiful color and a sharp taste: plum.

I still didn't know, however, what Stephen Dedalus's parable was about. In the bizarre but very Joycean logic of association that makes *Ulysses* such a constantly changing book, the meaning came to me from an apparently unrelated source. The chapter in which the parable is told is largely about rhetoric, and the conversation that precedes it recalls a speech by a 19th-century Dublin lawyer that alludes to Moses leading the Jews out of Egypt. While I was rereading the section, I also read Martin Luther King Jr.'s staggering final oration, on the eve of his assassination, in Memphis: "I've been to the mountaintop … And I've looked over. And I've seen the promised land. I may not get there with you." King transforms himself into Moses, who gets to see Israel from the top of a mountain but at the same time is told by God that he himself will not live to enter it.

If I had read my Bible, which I had not, I would have known that the name of the mountain is Pisgah. In *Ulysses*, Stephen calls his odd story "A Pisgah Sight of Palestine or the Parable of the Plums." If I'd had one of the many

annotated editions of the novel that have since appeared, or if the internet had been invented, I would have understood the allusion. But I thought that *Pisgah* was just a Joycean invention—it does, in my defense, sound like a plausible vulgar expression of disgust that might have been current in 1904.

Stephen's acrid joke is that the Moses who was supposed to lead Ireland to its promised land—Parnell—is unremembered; meanwhile, despite the expansive view, no Irish future can be seen from the top of the very British monument to Nelson. The women who take such trouble to climb it will not even be granted a sight of a new Ireland, let alone get to live in it. And why plums? Maybe just because they have the bittersweet tang of memory.

This article appears in the July/August 2022 print edition with the headline "The Book That Never Stops Changing."

Beware the Luxury Beach Resort

Beware the Luxury Beach Resort

By Lauren Groff

I hate the beach. My skin burns and blisters as soon as the sun touches it, I dislike sweating without exercising, and sand makes no sense at all to me—it's just hot and gritty dirt that other people apparently enjoy rolling around in. I was raised by parents whose idea of leisure is cutting miles of trails in the woods and painting an entire house by hand, so the prospect of enforced idleness makes me panicky. Plus, the ocean itself, while aesthetically pleasing, is terrifyingly untrustworthy, with its riptides and hurricanes and tsunamis and sharks and microplastics and slithering monsters of the deep. It has just too many sneaky ways to kill you.

When I have gone on beach vacations, it's been under duress. I married into a family of generous people who are also horrifying extroverts, and whose notion of a good time is a nice, boozy, mostly reclined stay on some tropical island together. But for catastrophists like me, the luxury beach resort raises a whole new set of psychological torments on top of those provided by more ordinary beaches. The entire time that we're in our ostensible paradise, I'm busy obsessing over the unintended consequences of our stay, such as the environmental degradation caused by bringing wasteful tourists to delicate ecosystems and the racist and classist issues of displacement. The Situationists, as usual, said it best in Paris in the spring of 1968, when, in protest of capitalism, they scrawled graffiti reading CLUB MED: A CHEAP HOLIDAY IN OTHER PEOPLE'S MISERY.

I've gleefully stored away this factoid about the Situationists, along with many others that come from Sarah Stodola's new book, *The Last Resort: A Chronicle of Paradise, Profit, and Peril at the Beach*, a sharp and exhaustive examination of the history and pitfalls of luxury beach resorts all over the world. Stodola tells us that "the world's first known seaside resort" was Baiae, near Naples, where Romans from the first to fourth centuries created an opulent and wild party town that the philosopher Seneca called "a hostelry of vices." There, Stodola goes scuba diving to explore the submerged half of the ancient city, with its intricately decorated geothermal baths and saunas and a nymphaeum, which she describes as "a sanctuary room dedicated to water." During its heyday, Baiae was a debauched playground for emperors; it was, in fact, where the emperor Nero tried to murder his own mother, Agrippina, by putting her on a boat designed to

self-destruct beneath her as it floated off. When she survived by swimming away, he had one of his henchmen finish the botched job later that night.

For a long time after the Romans, the concept of the luxury beach resort disappeared, resurfacing in altered form when the English upper classes, grown weary of their inland spas, began to be seduced by the curative properties of cold ocean water. In 1753 a doctor named Richard Russell moved to the old Saxon town of Brighton, on the south coast of England, and built a guesthouse for himself and his patients, setting off a little craze that spread across the channel to places like Trouville and Cabourg (which Marcel Proust reinvented in his fiction as Balbec). But these attempts at the beach resort were somewhat unpleasant and chilly. They offered very little luxury and relaxation, and encouraged drinking a great deal of seawater to purge bodily ills and leaping frequently into the frigid waves from horse-drawn bathing machines.

A more decadent understanding of seaside entertainment caught on in the mid-19th century, when the tiny principality of Monaco was nearly bankrupt, and Princess Caroline, the enterprising wife of the hapless Prince Florestan, of the ruling Grimaldi clan, had an idea. Amid rumors that gambling might soon be outlawed in the landlocked spa towns of Germany (as it had been for years elsewhere in Europe), she persuaded her husband to legalize it, and they hurriedly built a casino in Monte Carlo. Meanwhile, they took a different cue from the French Riviera, which for a time had been attracting the rich with the promise that the warm and salubrious Mediterranean airs would cure such ailments as “consumption, weak nerves, obstructed perspiration, languid circulation, scurvy, chest pain, general weakness, faintness, low spirits, fever, and loss of appetite.” Though the cover was health, vice was the true draw, no longer just a sport of the idle rich, but an aspirational avocation for ambitious men of the middle class. Monaco was soon thriving, and a new age of hedonism at the seashore had begun.

In the United States, summer resorts had been thickly established along the coasts of the Northeast since the early 19th century; Long Branch, New Jersey, was even touted as the “American Monte Carlo.” But the beach resort in its most romantic form—seared into the public consciousness as a

tropical wonderland of sea and surf and fruit and floral shirts—truly began in Hawaii, not long after a bunch of greedy American businessmen effected a coup d'état that removed the Hawaiian monarchy and claimed the archipelago for the United States in 1898. The deposed Queen Lili'uokalani lived by a breeze-swept bay called Waikiki, on the island of Oahu, where one of the first major resorts was built, the Moana.

Later, in 1927, a fever dream of a resort hotel opened, the Royal Hawaiian, a great pink hulk that ushered in the beach glamour and exoticism that we associate with luxury resorts today (where Joan Didion once fled, as she wrote in an essay, "in lieu of filing for divorce"). What was good for the economy of the gorgeous locale, however, was bad for its ecology—a trade-off that, though glaring, not surprisingly went ignored. The new buildings of Waikiki were constructed so close to the shore that they impeded the natural flow of sand, and the once-abundant beaches washed away. A tourist now sees sand that is replenished by machines and held in place by man-made barriers that stop its natural movement, which serves only to erode beaches farther down the current.

Stodola is, like me, skeptical about the beach idyll, constantly seeing the darker forces of environmental and cultural degradation amid all the luxury she describes. She is at her most incisive when she calmly, clearly lists what is lost when beach resorts take over a place. For instance, she describes the Fijian village of Vatuolalai, where two clans used to live as equals, one owning the beach where they fished, the other the acres inland where they grew crops such as taro, coexisting according to *solesolevaki*, which means that "everyone in a community is obliged to work together toward common ends." Then, in the 1970s, the resort developers crept in, renting the land from the beach owners, who now had the funds to buy nontraditional foods and goods. The Polynesian chestnut trees were ripped out and non-native coconut palms put in. Fiddler crabs and the golden plovers that ate them disappeared; turtle-nesting on the beach became rare. Silt built up in the local river and blocked the trevally fish from swimming and spawning there, and the coral reefs were damaged first by river silt flowing into the bay and then by the fertilizer runoff from the golf course, as well as by the sunblock that washes off tourist bodies.

Diminished coral reefs meant far fewer fish. Faced with scarcity, Vatuolalai's inhabitants started working for themselves, not for the collective good. Ninety-two percent of them became involved in tourism. The knowledge of how to make oil and traps and mats was lost, as were traditional dances, supplanted by those from other nations in the Pacific, which young people performed for tourists. The provisions that since time immemorial had been saved up in case of emergency were no longer there for the villagers. When Cyclone Kina hit in 1993, the residents had to rely on the government to survive, instead of on their own stores. Diabetes became endemic, the result of a new diet of processed foods. Stodola watches happy families from Australia in the resort's pools, the adults bellied up to the bars set into the water, and feels certain that none of them sees any of the trade-offs that went into making the resort they're enjoying.

Stodola's careful critique of the invasive species that is the luxury resort helped clarify my beach-hater's reflexive outrage. And yet, as she piled on her profiles of resorts all over the world—and Tulum blended into Sumba, which blended into Barbados, which blended into Bali, which blended into Acapulco, their high-priced cocktails and corrosive effects becoming a repetitive blur—I felt dizzy and exhausted. Luxury can swiftly glut. I also felt morally queasy about her pursuit. Her travels officially counted as research, I understood. But I began to wonder how someone so perceptive, intelligent, and ethical could so studiously anatomize the pervasive harm wreaked by these places, and yet take long-haul flights around the globe to spend time at many (many!) more of them than nailing her argument required. She recognizes the ways in which she is complicit—she makes that clear in *The Last Resort*—and still she kept choosing to be complicit.

Is it enough of an excuse that Stodola overindulged in luxury with the aim of writing this book? I'm not sure. I recognize that part of her point is to convey the mad hedonism of the resort world. Still, I felt better on arriving at her penultimate chapter, in which she brings the purpose of the book back into focus by suggesting ways to rethink the luxury resort. Stodola gathers a slate of proposals from environmentally minded people she meets during her travels, and does her best to stick to the practical, mostly avoiding the sweepingly wishful.

Among the items on her list are regrowing mangroves to protect coastlines from erosion and high winds; getting resorts to discourage long-haul flights by offering discounts to visitors who avoid them, thus nudging people toward more regional travel; serving local cuisine and drink instead of wastefully importing goods from afar; making resorts responsible for maintaining their beaches (which, in one case that especially inspires her, involves a machine that turns discarded beer bottles into sand); building more wisely and limiting tourist numbers; and saving the coral reefs that ensure the health of the resorts' waters. High-end ecotouristic enterprises already make sustainability part of their enlightened allure—at a price, of course—but Stodola optimistically imagines the spreading appeal of basking not just in the sun but in conscientious stewardship, even as sea levels inexorably rise.

I am glad that *The Last Resort* exists, because it gives me ammunition to shoot down the next island-vacation proposal. (Let's do a family hike! Better yet, a staycation where we all read books in separate rooms!) At the same time, I am afraid that I am the book's custom-built audience, given my wariness of beaches. The people who might most benefit from this book—those who have bought into the myth of paradise with an ocean view, deleterious impact be damned, and have the means to regularly experience a version of it—don't want their illusions destroyed. If they were to receive *The Last Resort* as, say, a (passive-aggressive) birthday gift, they might well immediately fling it into the giveaway bin.

I don't say this to condemn those who hesitate to listen to the climate Cassandras among us, or who at any rate fail to act on warnings to desist from this or that treasured activity. I also choose to ignore many inconvenient truths, and the sacrifices that they should inspire but that would dampen my own pleasure in living: Forswearing fancy beach resorts just happens to be no skin off my sun-blistered back. If I can't help feeling that Stodola tries to have it both ways, which I read as a kind of hypocrisy, the reason I find it hard to swallow is that I so often do the same.

Or, rather, we all share in the hypocrisy, save for those few Earth angels who live off the grid and use no plastics. If we all paid attention to what is happening to the planet in the Anthropocene, we'd be running around with

our heads on fire. Instead, we churn on in our lives, ordering stuff for next-day delivery when we could shop locally, driving to the grocery store only half a mile away instead of biking, and flipping the radio dial when another instance of extreme weather strikes, because we just can't bear what another fire or hurricane portends. All the while, we're nagged by conscience, which slowly drags our spirits down. Perhaps we need a nice beach vacation to recover! And so we go on, with our tidal cycles of unbearable guilt and panicked complicity, in and out, just like the ocean, where we sit and watch the sunset in our near-nakedness, drinking mai tais, in order to forget all the ways we are failing the Earth, in our vicious circularity, in our infinite regress.

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White Author, Black Paragons

Geraldine Brooks's Sympathy for Her Black Protagonists Isn't Enough

By Jordan Kisner

It’s 2019 in Washington, D.C., and Theo is changing his art-history dissertation after finding a painting of a horse in his neighbor’s giveaway pile. He is 26 years old, a Black Londoner (his mother is Yoruba, his father Californian) and a former star polo player. He left the sport for academia because of relentless racist harassment, and now studies stereotypes of Africans in British painting. The working title for his dissertation is *Sambo, Othello, and Uncle Tom: Caricature, Exoticization, Subalternization, 1700–1900*. He jogs with his dog for exercise, careful to wear his Georgetown shirt because “his favorite run took him through lily-white Northwest Washington and Daniel, his best friend at Yale, had instructed him that a Black man, running, should dress defensively.” Because he’s from the U.K., he may not understand all the nuances of American racism, but he understands enough. When the lady across the street, from whom he got the horse painting, flinches as he approaches to help her, he feels “the usual

gust of anger" and takes a deep breath, saying to himself: "Just a White woman, White-womaning."

Theo might be chagrined to find himself a protagonist in *Horse*, Geraldine Brooks's latest work of historical fiction, which braids his story with the narrative of Jarret, an enslaved groom of the horse in the 19th-century painting Theo finds. For one, Theo is skeptical of white artists taking on Black subjects. The original hypothesis of his dissertation is that the Africans in British portraits were rendered less as people than as objects: "His argument mirrored Frederick Douglass's caustic essay, arguing that no true portraits of Africans by White artists existed; that White artists couldn't see past their own ingrained stereotypes of Blackness."

This is a self-conscious—and bold—inclusion for a novel with not one but two young Black male protagonists written by a 66-year-old white Australian woman. Brooks is a skilled journalist and an acclaimed novelist, and *Horse* is not her first foray into historical fiction set in part during the American Civil War. Her novel *March* is narrated primarily by the father in *Little Women*, and tells the story of Mr. March's years as a chaplain for the Union Army. That novel won the Pulitzer Prize in 2006. Neither is this her first time writing across cultural divides. Her first nonfiction book, *Nine Parts of Desire (1994)*, was about the "hidden world of Islamic women." Her 2011 novel, *Caleb's Crossing*, is about a young white Puritan girl's friendship with Caleb Cheeshahteaumauk, a character inspired by a Wampanoag man of the same name who was the first Native American to graduate from Harvard, in 1665.

This kind of venture has become trickier in the past 10 years. The publishing world has been racked by overdue debate about cultural appropriation and whether and how white authors should write characters from other racial or ethnic backgrounds. Five years after Brooks published *Caleb's Crossing*, the white American writer Lionel Shriver gave a notorious keynote speech—briefly donning a sombrero—at a Brisbane literary festival, ranting about the "clamorous world of identity politics" and the threat she felt it posed to literature: "The kind of fiction we are 'allowed' to write is in danger of becoming so hedged, so circumscribed, so tippy-toe, that we'd indeed be better off not writing the anodyne drivel to

begin with." Retorts and replies followed. "It is possible to write about others not like oneself, if one understands that this is not simply an act of culture and free speech, but one that is enmeshed in a complicated, painful history of ownership and division," the novelist Viet Thanh Nguyen observed. More recently, the blockbuster turned critical conflagration *American Dirt* (a novel about migrant trauma, for which its white author was paid a seven-figure advance) set off months of heated articles. Some pointed out that immigrants remain under-published and underpaid for their own stories in the American media market; others objected to the implication that any identity-based limits should be placed on a fiction writer's license.

In putting Douglass's argument so early in the book—on page 57—Brooks signals to us that she enters her latest project knowingly. She's read up on the Discourse. A gauntlet has been thrown—white artists can't do justice to Black subjects—and she will take it up. Despite her evident efforts, the book does not turn out to be the counterexample she might have hoped.

H*orse* started with a real horse: Lexington, who was one of the great racehorses of the 19th century and a prolific sire. When Lexington died, his skeleton became an exhibit but was later forgotten in the attic of the Smithsonian's National Museum of Natural History. Brooks, a horsewoman herself, grew fascinated with the painter Thomas J. Scott, who did several portraits of Lexington, and she was especially curious about one of Scott's portraits that remains missing. A description of that painting in a July 1870 issue of *Harper's* magazine describes Lexington being led by "black Jarret, his groom." Nothing else is known about the real Jarret, and *Horse* grew out of Brooks's imaginings of the life he might have lived. She had wanted to write about horses, she admits in her afterword. But as she researched horse racing in the antebellum South, "it became clear to me that this novel could not merely be about a racehorse; it would also need to be about race."

The structure of the novel is poly-vocal, occupying a loose, floating third person as its short chapters jump among its cast of characters. The story is bounded historically by 2020 in Washington, D.C., where Theo's find is identified as a lost 19th-century portrait of Lexington, and the 1850s at several southern horse-breeding farms, where Jarret, a gifted and reserved

young horse trainer, develops a spiritual, even psychic connection with a newborn foal named Darley, who will later become famous as Lexington. The boy and the horse become best friends and deeply bonded partners. “That horse about the only one thing I care for,” Jarret declares. Though his father, also a horse trainer, has bought his own freedom, Jarret remains enslaved, and his story line is fraught with vulnerability: Jarret and Lexington are sold together from one wealthy landowner to another, to another.

Occasionally, the book swerves to the 1950s in New York, where Jackson Pollock and Lee Krasner make an appearance: Their friend, an art dealer named Martha Jackson, acquires one of the lost Lexington paintings from her maid, who seems to have inherited it from an ancestor connected to Jarret. (This third era’s plot, which is also based in historical fact, is notably less developed than the other two.) Sometimes Jarret’s perspective dominates in the novel; other times Scott’s or Theo’s vantage prevails—or that of Jess, a young white Australian woman who’s pursuing her fascination with zoological research at the Smithsonian in 2019; or that of Mary, the young daughter of the white emancipationist Cassius Clay and a frequent presence at the Meadows, the farm where Jarret and his father work. Intermittently, Brooks serves up a mix of multiple viewpoints over the course of a single chapter.

But in spirit, the book belongs to Jarret and Theo, with complementary foils in the form of the two young white women. (While there are several Black female characters in the book, none is granted complex interiority.) In 2019, Theo begins to date Jess, despite some ambivalence. In 1850, Mary likes to hang around the barns and talk to Jarret (who is two years older) while he works. Brooks has taken pains to make both women flawed: Whereas Jarret and Theo are carefully dressed, meticulous, and possessed of “impeccable manners,” these women are often careless, unkempt, emotionally fragile—and racist without quite knowing it. Jess and Theo meet because she assumes he’s stealing her bike. She’s then so embarrassed by her behavior that she tells him she found the incident traumatic. (“Typical, Theo thought. He’d been accused, yet she was traumatized.”) When Mary is angry, she reminds Jarret that he’s enslaved, and then feels hurt later when she tells

him that she considers them friends and he is too incredulous at the idea to reciprocate.

Brooks clearly attempts to demonstrate self-awareness, to preemptively deflect any criticism that she has favored the characters whose life experience most resembles her own—but the dynamic she creates between Theo and Jess and between Jarret and Mary flattens all the characters. Theo and Jarret are described, at every turn, as exemplary, socially and spiritually. They are handsome, tall, gifted, and educated (Jarret takes an opportunity to learn how to read). Animals instinctively trust them (Theo and his dog are exquisitely attuned). They are constantly swallowing their rage. They are always patiently explaining something. Where others stumble, they are steady. Theo tells Jess at one point that he wants to help his old-lady neighbor even if she's racist, because "'whatever *she* might be, it doesn't mean that *I* won't do what I know to be right.' Jess sighed, defeated, and smiled at him. 'You're just a better person than me, I guess.'"

Theo is a better person than Jess, no doubt, but Brooks grants Jess something that she denies Theo—and to a degree Jarret. Jess gets to fail; Jess gets to change. By contrast, Theo is static. Sometimes he reads like a caricature: "He was his own man long before any of his peers even realized that was an option. He'd embraced life as a rootless loner, at home in the world but belonging nowhere in particular. Comfortable with a wide range of people, close to very few." He remains angry but patient, smart, gentlemanly, and gentle to the end.

Jarret, the most rounded of the many characters who take turns narrating *Horse*, changes less than you would expect given that the story tracks him from adolescence into his late 30s. His spiritual evolution is condensed into two formative episodes. In the first, he is saved by Mary and her father from an ill-conceived escape attempt, and he learns thereafter to control his anger and work within the constraints of his enslavement. The second leap forward—which is presented as his real moral maturation—comes when he is briefly forbidden to care for Lexington and is sent to labor in the fields, where he is whipped.

Startlingly, this is framed as a blessing:

When Jarret finally reunites with Lexington and leaves that plantation, he reflects that "he wasn't sorry to have seen what he'd seen, and learned what he learned. Not just the book learning. He felt larger in spirit. There was a space in his soul for the suffering of people. He resolved to take account of their lives, the heavy burdens they carried."

These passages call to mind the history of white people insisting that whippings under chattel slavery were an experience of moral training upon which the enslaved might reflect with sanguine gratitude—a history that Brooks is aware of but nevertheless echoes here. Jarret, an emotional teenager who doesn't seem to lack empathy in the first place, is turned into a saint, floating somewhat above the action.

I keep thinking about Parul Sehgal's elegant panning of *American Dirt*, in which she joins the novelist Hari Kunzru in arguing that "imagining ourselves into other lives and other subjectives is an act of ethical urgency." Transracial authorial imagining, she writes, is a profound undertaking. "The caveat is to do this work of representation responsibly, and well." Brooks's attempt is made earnestly, but not well. In keeping with the character construction, the plot itself veers toward formula. *Horse* relies on ungainly cliff-hangers to pull the reader from chapter to chapter. (In one, Jess inspects Lexington's skeleton in 2019 and concludes, "Something had happened to this horse when it was alive. Something dreadful.") The romance is bland. ("Was it the wine, or was she becoming infatuated with this man?") The details occasionally inspire a flinch (describing an enslaved young man as a "dusky youth"), and the moments when Brooks addresses racism more directly can read as self-conscious and pedantic. ("Look. It's not your fault you get to move easy in the world," Theo's friend Daniel tells Jess after an act of violence. "We just can't afford to.")

Brooks is an accomplished writer, and many of her gifts are evident amid the clumsiness of the overall effort. The relationship between Jarret and Lexington is intimate and compelling. When they are briefly separated, the uncertainty of their reunion feels like an existential crisis. Brooks has a talent and passion for research that is fully expressed here—she writes beautifully about the anatomy of horses and the delicate work of "articulating" their skeletons, arranging every bone in its proper place. The

descriptions of 19th-century horse racing, when the animals were bred differently and raced much longer tracks, are thrilling. Brooks has attended with equal care to the quotidian details of each era (corn pone in the antebellum South, bebop for Jackson Pollock, mid-century-modern furniture for Theo).

I read to the end wanting *Horse* to right itself, to be one of those books that achieve the creative and ethical intersubjectivity that signals great fiction. Brooks gives Jarret and Theo just enough spark to make us wish she'd also given them a more deeply imagined, nuanced, and substantial portrayal. Each ends as a trope: one a man who triumphs against all odds, the other a martyr. Brooks's sympathies are evidently with them, and so are ours. But sympathy seems like an inadequate achievement in a project like this, which takes as its subject the worst consequences of white Americans' failure to recognize the full humanity of Black people. Sympathy has a way of falling short, aesthetically as well as politically—it is a frail substitute for the knotty, vital insight that can emerge from sustained immersion in another psyche, another soul. If readers feel sorry for Theo and Jarret without really needing to believe in them as whole beings, what exactly do their portraits accomplish?

This article appears in the July/August 2022 print edition with the headline "A White Author Fails Her Black Characters."

Departments

- **An Ode to My Thesaurus**
  Truly an essential, indispensable, necessitous volume -- James Parker

An Ode to My Thesaurus

The Thesaurus: An Essential, Indispensable, Necessitous Volume

By James Parker

They've got you all wrong. They think you're a trick, a cheat sheet for fancy words, a way of counterfeiting cleverness. (And Americans are fatally awed by cleverness. This acclaimed young author/tweeter/whatever is always "whip smart." That drunk guy is always shouting "Think you're smarter than me? HUH?")

Or they'll treat you as a mere lexical resource. A vocabulary expander. A ThighMaster for out-of-condition prose. I mean, we've all done it. Reached for you, that is, when the words arriving in our forebrain, from the charred and private little glossary that we keep in our backbrain, seem … insufficient. Don't say "in a shitty mood." Say "captious."

But that's not how, or when, to use you. That's not who you are. You, my friend, are a vision. You're a shamanic trip into the essence of words: a shimmering, unfolding, occasionally scarifying million-petaled experience,

a miraculous nest of emergent relationships, and the writer who abuses your nature, who exploits your abundance, will pay. He will pick the wrong word, and he won't sound clever at all. He'll sound like an ass. He'll sound like a *silly Billy*, a *twerp*, a *stooge*.

A thesaurus—here it comes—is for increasing one's aliveness to words. Nothing more and nothing less. By going into the buzzing and jostling hive of words *around* a word, we get a purer sense of the word itself: its coloration, its interior, its traces of meaning. I looked up the verb *excite* just now and found the word in its affective (*touch*, *move*) and mechanical (*electrify*, *galvanize*) aspects. Which gets at who we are, as humans, doesn't it? Feelings and circuitry.

Lewis Carroll made up *chortle*, and you absorbed it, placing it snugly between *chuckle* (benign and big-bellied) and *cackle* (witchy and weird). Ken Dodd, the great English comedian, made up *tattifilarious*. ("Now," he told an interviewer as an old man, "now is reality. And it's wonderful. By Jove, it's tattifilarious!") You have not, as yet, absorbed that. I'd float it in there somewhere between *bittersweet* and *custard-pie*.

As for you, blessed Mr. Roget, they say you had OCD. Of course you did. You were hooked, hung up, haunted by the hidden life of words: their selves, their stories, as told by the words they are closest to. You gave us a great gift. May you rest eternally among your synonyms.

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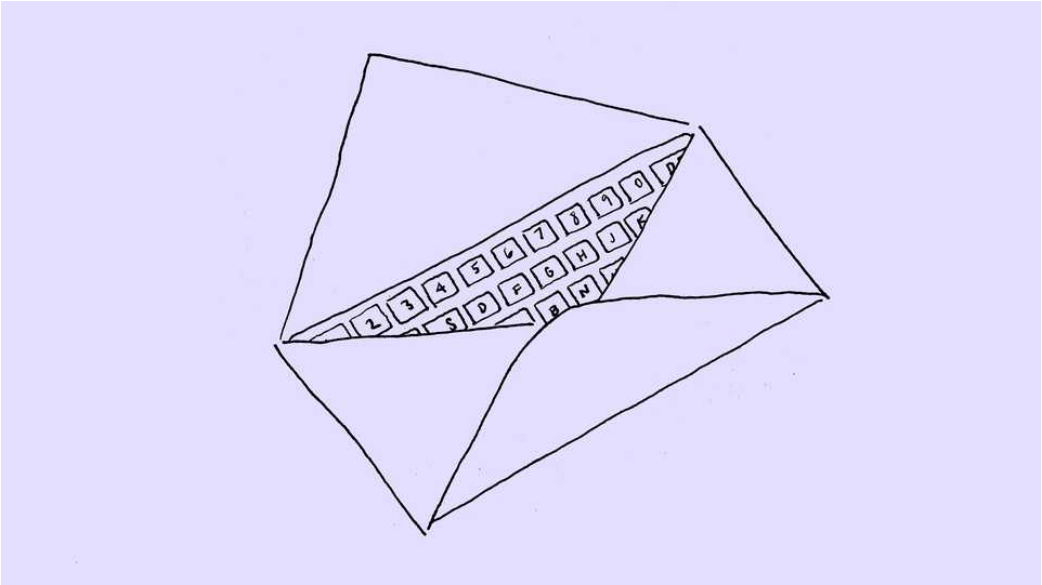
Poetry

- **Invitation**
  -- Jane Hirshfield



Invitation

Jane Hirshfield: ‘Invitation’

By Jane Hirshfield

It was not given me to write in the primary colors.

I did not recognize the 350,000 species of beetle.

I loved what was spare but could not draw it.

My luck and errors equally mostly escaped me.

My eyes faltered, but found their way to different windows.

The fate-souk bartered my shapes and sounds between stalls.

When the keyboard offered an incomprehensible symbol,

I reached my hand out, as if to a Ouija board’s invitation

or a stair’s polished handrail—because it was incomprehensible,

because my hand could add its own oils to that railing.

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