LOGIC SAYS IT'S IMPOSSIBLE TO ERASE OUR SPRAWLING EXISTENCE. OUR LEGACIES OF CONCRETE AND PLASTIC SUPERHIGHWAYS AND SUBURBS. ...BUT THE EARTH MOVES ON

- A Novelty of Strata, Karuna Eberl

CHANGING SKIES

CREATIVE NONFICTION

2023

THE PROGRAM FOR WRITING AND RHETORIC

CREATIVE NONFICTION

UNIVERSITY OF COLORADO BOULDER



HINDSIGHT PRESENTS

WRITING THROUGH THE CLIMATE CRISIS

CHANGING SKIES

2023 - VOL. II

FOREWORD BY ERIN ESPELIE

HINDSIGHT PRESENTS

CHANGING SKIES

creative nonfiction

2023

VOLUME TWO

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FROM THE STAFF

EDITORIAL TEAM

This second edition of CHANGING SKIES recognizes that the best way to understand something is to engage with it, and the best way to understand another human being is to appreciate their story. In a world saturated with both climate alarmism and greenwashing, we strive to shine a light on individuals without deep pockets or cryptic underlying agendas. We look to all perspectives on the unprecedented challenges posed by climate change.

Some grieve for natural spaces now lost.

Some demand immediate policy changes to protect what remains.

A dejected few fear they may never be able to experience our natural world in the ways they'd always dreamed, while others patiently anticipate the extinction of our species at our hands; a lesson not learned, but suffered.

We go on, however, also looking for solutions. Our species creates problems but also solves them. Even in worst-case scenarios, we must adapt.

In future issues of CHANGING SKIES we challenge writers to explore every angle and to express their well-researched takes on the inevitable social, economic, political, and personal changes we face as a species. We challenge you to effect your change.

ONLINE TEAM

We in the Online department are dedicated to giving the work of our contributors a worldwide stage. The second volume of CHANGING SKIES represents our goals of looking outward to an international base of authors, artists, and readers.Through the publication of online exclusive pieces, pieces from past issues of both HINDSIGHT and CHANGING SKIES, and full PDFs of all volumes of our print titles, we hope to reach readers, writers, and artists from every mountain, desert, forest, and river of the world. Scan the code on the previous page to learn about submitting to our journals or to read and admire the writing and artwork we're passionate about publishing.

ART DIRECTION TEAM

HINDSIGHT's Art Direction team searches for visual complements to writing about both the urgency of addressing climate change and the beauty of what is at stake. We look to create a dialogue between image and text through juxtaposition and contrast, more than simplistic visual echoes.

MARKETING TEAM

HINDSIGHT's Marketing team would only exist with our dedicated staff. We all take on different roles to build awareness of our journals, challenge each other to produce great work, and keep the creative nonfiction genre alive at CU Boulder and beyond. We run campaigns on our website, social media accounts, and in print. Each semester brings new challenges, but the team continues to expand the audience, staff, and knowledge of HINDSIGHT.

We thank you for providing our team with valuable artwork and writing, making spreading our message more straightforward and meaningful. Please enjoy the second volume of CHANGING SKIES.

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TABLE OF CONTENTS

FOREWORD
THIRTEEN WAYS OF LOOKING AT THE SKY . . . 11
AN INTRODUCTION
Erin Espelie

BEFORE THE FLOODS 14
Rosalind Moran "It looms like a giant exoskeleton, a dinosaur for our times."

FENLAND IN HIGH SUMMER 18
Jessica Hansen "Anywhere else, it would be beautiful..."

OBSOLESENCE OF AN OASIS 20
Samuel Myers-Verhage "Desertification isn't a new problem..."

DIVINE WILL 25
Mary Silwance "We can celebrate while we pray for those suffering."

Changing Skies Climate Change Writing Contest First Place Winner
MARINE MURDERER 28
Nancy Whitecross "Many of the coral reefs are already barren."

LULLABY 32
Nicholas Barnes "Give me crickets, bullfrogs aplenty..."

SEA WALL 34
Denise Thornton "...then a crack like doom shook the valley."

NOTHING 41
Nicholas Barnes "It's not a crime, not yet."

SMOKE AND MIRRORS 43
Karen Davis-Brown "A real concern that these masks were, perhaps, here to stay..."

SIX MORE WEEKS OF WINTER 48
James Mead "Frozen hard and not a morsel to be taken..."

SNOWMAGEDDON 50
Macy Kay Naughton "Texas and 'too cold' are seldom found in the same sentence..."

NUCLEAR ENERGY IS GREENER 54
ON THE OTHER SIDE: AN APPEAL TO DEMOCRACY
Kevin Ember "...renewable energies alone cannot offset our carbon footprint."

DEBUGGED 61
Ralph La Rosa "...as if some god of fools roars out..."

PERITO MORENO 63
Whitney Brown "I picture myself, swimming and soaring, at the glacier."

SUNFLOWERS AND SELFIES 68
Mary Silwance "This was monoculture. Of course it was. What did I expect?"

Changing Skies Climate Change Writing Contest Second Place Winner
THE PROMISE OF GRANITE 73
Mara Buck "I often hear gunfire, even though my land is posted."

TILL THE RIVERS COME HOME 79
Udochukwu Chidera Amarachi "All were offerings to the gods, to bring back Okitankwo River."

A NOVELTY OF STRATA 87
Karuna Eberl "When the toilet paper runs out, books become a new sort of comfort item."

WHEN HUMANS SWARMED 90
Marcus Ten Low "Churned-out like blobs from factories."

CONTRIBUTORS 92

TABLE OF
CONTENTS

ART WORK

HARMONY 10
Deborah Ajilore

CHANGING SKIES 14-15
Sonali Roy

CLOSER INSPECTION 18-19
Clayon Montgomery

CHANGING SKY IN SEPIA 20-21
Sonali Roy

LOMO 6 24
Daniel Workman

UNTITLED 29
Maya Katz

FIREFLIES 32-33
Daniel Workman

ANATOMY OF A BURGER 35
Ethan Lahm

TIME AND TIDE WAIT FOR NO MAN 38-39
Sherry McCarver

BUTTERFLY PALACE 40
Edward Michael Supranowicz

SCENE FROM A SMOKY CITY 42
Kelsey Kennedy

UNTITLED 47
Jordan Eckes

CAR PASSING ON A SNOWY NIGHT 48-49
Colin Turner

SNOW ABYSS 50-51
Aidan Jones

UNTITLED 54-55
Aidan Jones

Changing Skies Art Contest Winner
AT DAWN 60-61
Winter Ross

EXPANSE 62-63
Elijah Pettet

OBLIQUE LONHORN ON SUNFLOWER 69
Justin Hein

PEACE IS OPEN 70
Adler Shannon

16 STILL 72, 77
Daniel Workman

FLUMP 78-78
Daniel Workman

OPERA HOUSE 82-83
Callie Keating

UNTITLED 86-87
Allison Murphy

THE SPACE BETWEEN 90
Gabriel Sanchez

PAINT 97
Daniel Workman



art by Deborah Ajilore

THIRTEEN WAYS OF LOOKING AT THE SKY: AN INTRODUCTION

by Erin Espelie

I
Above twenty snowy mountains,
the only moving thing
was the body of the cloud.

II
Our readings of the sky can be interpreted in Rorschach-fashion
to gauge our mood—steel gray, lace-like, sunny, inky black,
bathed in alpenglow, red at night a sailor's delight,
or tinged with enough blue to patch a Dutchman's trousers.

III
Looking down at Earth from the Moon
we can see straight through to the oceans, but looking up
in daylight the Sun obscures the cosmos. The atmosphere
acts as a one-way scrim, light scatters, and stars only appear as pinpricks
of light to the naked eye at night. We project ourselves up there
into a singularly shared space, to see a small part of the pantomime.

IV
In 2004 filmmaker James Benning pointed his camera up.
He made a 100-minute film, *Ten Skies*, in which he filmed ten
distinct skies for ten minutes each. Viewers can choose to see stasis
in the lack of camera movement or aberrations in the skyscapes,
from crossing aircraft to drifting wildfire smoke.

V
I do not know which to prefer,
the sublimity of sky that hides the destructive human hand
or the one that reveals the daylight scrim to be
stained by smog and smoke, scratched by satellites,
the nighttime skies bleached by artificial light.

VI
Stable ice in Patagonia, I prefer that, as Whitney Brown describes
in the pages that follow, in her dreamscape, Perito Moreno,
how to travel with the mind to the Andes Mountains.
"Sky-puncturing mountains, turquoise-hued lakes," and a notch
of earth called the Península de Magallanes, protect
one of the last stable glaciers on the planet, one that might even speak
to us, if we have faith enough to write, to listen, and interpret. Because,
we know that humans cannot, nor should not, provide all that we know.

VII
James Benning made another film in 2004 called *13 Lakes*,
in which he filmed thirteen lakes, each shot lasting, again, ten minutes without moving.
The film, therefore, is 130 minutes, each frame split, half-sky and half-water.
Benning explains that his formal choices relate to how the 2004 films are
"the antithesis of war" because atmospheric portraits are precisely about
"the kind of beauty we're destroying."

VIII
Destruction comes in so many forms. On these pages, Samuel Myers-Verhage writes
in "Obsolescence of an Oasis" of the impact of drought on families,
whole communities, in eastern Morocco. People must uproot,
become semi-nomadic, without knowing where they might land.
Myers-Verhage describes one such haunting, "The father's mile-long stare,
not directed anywhere, aimlessly wandering as a ghost."

IX
Flight and escape take another shape in the poem "Six More Weeks of Winter."
James Mead calls upon our myths to remind us how reliant
we and so many other species, like the "scrupulous" migrating birds,
are to the circular cycles of seasons—and what we lose when disruption comes,
when those in power get greedy and the powers that be get more powerful.

X
In the essay "Marine Murderer," Nancy Whitecross
remembers the most magical dive of her life,
underwater off the coast of South Africa, in the waters of Aliwal Shoal,
searching for beauty and biological symbiosis among scores of dolphins,
anemone tentacles, wrasse that "do a small dance," groupers, and more.
Ecosystems like this one may be relegated only to memories or memories of images.
What sharp cry can we utter?

XI
Wallace Stevens wrote, in "Thirteen Ways of Looking at a Blackbird,"
in section XI that "once, a fear pierced him" when "he mistook the shadow"
of his carriage for blackbirds.

XII
The climate is changing.
Creatures must be flying.

XIII
As you experience the words and images ahead, I ask you to consider,
What have we mistook as shadow? How much more beauty might we
discover if we make room for speculation, as Whitney Brown does.
What formal structures might we create to understand change, both subtle and extreme?
What kind of sky do we want to see—betwixt the cedar limbs or across flat desert?
Clock your minutes, mark your mood, and gauge how you want to see your future up there.



ERIN ESPELIE is a filmmaker, writer, and editor. She's an Associate Professor in Cinema Studies & the Moving Image Arts and co-director of NEST (Nature, Environment, Science, & Technology) Studio for the Arts at the University of Colorado Boulder. Her co-edited volume on "environmental futures" was recently published by Amherst College Press, *Deep Horizons: A Multisensory Archive of Ecological Affects & Prospects.*

BEFORE THE FLOODS

by Rosalind Moran

There is a sense of waiting in Cambridge. The small English city swells and shrinks with the migration of students and tourists, who lend pace to the foot traffic coursing through the wishbone of streets forming the city's centre. In summer, the students mostly depart and the colleges, keen to take advantage of their residents' absence, hastily erect scaffolding and begin repairing another year's worth of wear on their limestone fortresses. This is a seasonal city, one still functioning in response to the distinctly religious underpinnings of old British universities. Calendars here mark feasts for saints and the Holy Trinity, exactly as they did when monks and clergymen, as opposed to modern-day undergraduates, pored over readings in the halls. This is a city of tides.

When I moved to Cambridge in 2020, Cantabrigians and long-term residents delighted in telling me the eeriest of the local lore. Was I aware that the city sits a mere six feet above sea level, and that the surrounding region used to be largely underwater? How did I feel about flooding?

I went home and googled Cambridge's elevation. The internet proffered information about medieval and modern drainage, as well as articles inviting me to discover whether the street where I lived would be underwater in 2050.

Cambridge is a fenland settlement, built on former and current marshlands. Much of this part of England was originally wetlands, far better for sailing than for walking, glistening under a weak sun. I am told name of the nearby town of Ely derives from "isle," because the low hill on which the town is set was the only piece of land above water for miles around, for millennia. Fen-dwelling parishioners would row through marshes and swamps to reach the Ely Cathedral for prayer; it was not so long ago that the town and cathedral were inaccessible but by boat or causeway.



art by Sonali Roy

It was the Victorians who eventually drained the land, trading black-garbed boating parties for pheasant shooting in forests where the land squelched underfoot. The peat began to oxidise, drying into a more stable foundation for houses built of brick, as opposed to the huts on stilts that locals tell me were once common here. Did I know that the ancient people of the fens were rumored to have webbed hands and feet? They were supposedly master navigators, disappearing into the mist and then emerging again, purposeful, as they paddled through the British Isles, an ecosystem akin to a rainforest. This landscape, though seemingly nondescript, is a marvel and unique in its flat expanses; its mud and its drains; down its fabled boatpeople, skimming silently between their perched dwellings.

…if flood prevention strategies are not maintained, the land may simply slip away beneath rising sea levels.

It is strange to imagine the land surrounding central Cambridge submerged by saltwater. Human-delineated locales—Midsummer Common, Stourbridge Common, parts of Fen Ditton—all underwater. This eventuality is far from relegated to the past: the Cambridgeshire Fens are among Britain's lowest-lying regions. Local councils warn that if flood prevention strategies are not maintained, the land may simply slip away beneath rising sea levels.

Imagining this area obscured by floods—its topography of plains and hillocks gradually forgotten as maps update to show bodies of water and islands—is harder still given England is currently in drought. When it rains, drops fall noncommittally, sometimes barely wetting the houses' dark slate roofs. Heat expands within the thick walls of buildings, built to trap warmth—a home feature here that is usually welcome, but which has in recent months grown oppressive. In our offices overlooking dry London streets, my colleagues comment that rain does not fall as it used to, neither as frequently, nor in such torrential downpours. Strange, then, to think of floods being on their way in time, of their threat seeping a little further into public consciousness with every passing year. Yet such is the intricacy of climate, and the interdependency of human-made land modifications and ecological adjustments within the natural world. Now, as in so many places worldwide, England experiences the consequences of the changes it has helped sow.

Last year's drought in the UK turned grass brittle and straw-like, and the earth grew hard and packed to the point that when rain did come, the ground struggled to absorb it. Rivers and reservoirs around the country ran dry, revealing abandoned stone bridges and centuries-old roads that were forgotten as waters swallowed them entirely. In Cambridge parks, novice initiates to hot-weather living made questionable choices, setting up portable barbecues on tinder-dry lawns and stripping down in the sun instead of covering up or staying indoors. Being Australian, such sights caused me unease; where I come from, the sun safety slogan "Slip, Slop, Slap" forms, for a broad cross-section of society, a Trinity holier than the Father, Son, and Holy Ghost. Will sun safety become the dominant religion here as well, in time? Perhaps this notion is not altogether fanciful. Does spiritual belief not tremble, at least for some, when faced with the hot breath of a seemingly godless summer?

Will the drought come back? This past weekend, the marshes were already gasping, and cracks appeared in the soil of the fens. The fragmentation of the earth reflects the hairline fissures spidering along the walls of the country's weakening institutions. Strikes abound, and trains are cancelled as the metal rails supporting them warp in the heat. As for the rain and the tides, these grow ever harder to chart.

A former Australian Prime Minister described the UK rather facetiously as "an old theme park sliding into the sea." Whether he is correct regarding this decline remains uncertain. In a parched park in Cambridge's south, meanwhile, a Ferris wheel slumbers through the closing days of May. Its steel limbs grow hotter by the day, a static reminder of carefree days past, and possibly future. It looms like a giant exoskeleton, a dinosaur for our times.

FENLAND IN HIGH SUMMER

by Jessica Hansen

Anywhere else, it would be beautiful:
Whispering golden grass,
Soil baked dry and white
Like bones of some ancient beast
The wind—a gentle caress
Under the pulsing sun.

It stretches on forever:
Desiccated dead that trembles,
Flattened fields one mistake away,
A hundred miles of tinder boxes;
Kindling waiting for a match.

It has been betrayed,
This land that used to be sea,
Screaming for water it cannot drink,
For rain that never falls
While elsewhere sodden valleys drown,
And lightning does not burn acres to ash.

We do not need river stones to say,
“If you see me, weep.”
We need only see the cracked soil,
Plants dying months too early,
And hungry flames licking at our heels.

art by Clayton Montgomery

OBSOLESCENCE OF AN OASIS

by Samuel Myers-Verhage

I sat cramped between a mother and her violently-puking child in the backseat of a minivan. The vehicle propelled down twisting mountain roads, barely dodging the edge of bottomless cliffs. Confidence oozed from the driver, who burned incense on the dash and argued loudly on the phone over the radio's deafening Moroccan music. His boldness wasn't misplaced; he was driving a route he knew well: a single-lane highway, the lifeline for his hometown of Merzouga, Morocco. Arriving at the final destination of this vomit-initiating excursion, I was startled to find a desert town awaiting: more than half the houses in Merzouga were abandoned. I asked the driver, "*Qu'est-ce qui s'est-il passé ici?*" ("What happened here?") and he responded simply, "*Sécheresse*."

Drought.

This oasis sustained the locals for thousands of years through war, disaster, and famine. What forced these people to move away from the land of their ancestors?



art by Sonali Roy

In villages like Merzouga, a unifying pattern emerges: desertification. The most recent definitive UN assessment in 2005 states that 10 to 20 percent of the planet's drylands (6 to 12 million square kilometers) have already degraded, making desertification "among the greatest contemporary environmental problems."[1] The dire damage of desertification owes to its perpetuation as an environmental feedback loop—a dangerous process whereby previous grassland environments transform into more deserts due to a warming climate. On top of that, the increased surface area of these deserts encumbers the formation of new grasslands on the edges of the desert. This means that desertification will only grow exponentially if poor land use practices are kept, possibly leading to a Dust Bowl scenario when the next drought inevitably hits.

During the 1930s Dust Bowl, farmland in the Great Plains of the United States was reduced to dust because of the overproduction of crops. This led to a decline in population of every one and five people in the affected states. The concurrent Great Depression exacerbated the fragile nature of the situation; the two events made the era one of the worst in American history, due to environmental collapse on top of economic stagnation.

History repeats itself, and while not on the same scale, Merzouga faced a comparable situation. On my first day in the village, I went to the only local café, striking up a conversation with the owner in my subpar French. He had a simple response to my questions about why people left the area.

"Too many crops and tourists."

His words were unquestionably true, if brief.

1 Tal, Alon. "Degraded commitments: Reviving international efforts to combat desertification." The Brown Journal of World Affairs 13, no. 2 (2007): 187-197.

Desertification isn't a new problem; the Dust Bowl and Merzouga testify to that. So, why hasn't the issue received the proper attention? Desertification is fueled by inadequate focus on critical drivers, insufficient funding of initiatives to combat land degradation, and absence of effective domestic policies mandating continuous future use.

Owing to the lack of these factors, unpredictability is the norm in this scientific community—most scientists don't have a definitive time frame for when desertification will take center stage. These issues demand intense, preemptive action, because inhabitants of these affected areas only see desertification happening when it's too late to reverse.

Entire regions such as Drâa Tafilalet, which contains Merzouga, have been decimated by this negligence. Just north of this lies Oriental, or Oujda region, inhabited primarily by an ethno-social group known as the Aït Unzâr. They differed from the Drâa Tafilalet with a combination of sustainable mandates and well-organized institutions in rural areas—where water scarcity was most prevalent. The bilateral arrangement is known as the two qabîla system, where tribal assemblies make decisions about the basic concerns of collective socio-economic life.[2] The two qabîla system establishes an equitable framework for issues that need the most balanced interpretation that champion equitable arrangements.

This system also efficiently settles disputes with grazers, helping to keep the peace in an otherwise fractured society. Such fracture was also evident in Merzouga, where the only people with large social representation in the area were semi-nomadic goat herders. This decentralized system of the two qabîla can only be effective to an extent, as what has to be done in tandem is efficient environmental rejuvenation programs for the fragile desert ecosystem. These programs show success in healing desert ecosystems. There is a recent effort in eastern Morocco, where one program to combat grazing-related desertification increased rangeland productivity on 461,000 hectares, with plant biomass growing from 150 to 800 kg/hectares, with a $47.7 million price tag over ten years.[3] This project demonstrates the viability of present methods for combating desertification—and their accounting profits.

The full issue delves deeper than this basic economic model. Places like Merzouga can barely acquire the small amount of money necessary to make the changes that would save real people's lives.

Some locals don't have time to wait for this capital, as just 23 miles north from Merzouga outside the town of Rissani, Hassan Sadok took matters into his own hands.

"Date palms are a natural barrier against desertification," says the former hotel owner-turned-farmer, from lack of tourists. "In the beginning everyone laughed at me. The land was very dry and sterile, and growing anything in it was very difficult. Look over there. Those lands are dead. But on my farm, thanks to my date palms, the land is fertile. My farm turns a profit and is environmentally friendly."[4] Hassan Sadok was able to save his farm due to smart farming techniques, yet imagine how many more locals could be able to revitalize their farms if just given a little more money. If the locals possessed the capital for these initiatives, then they would almost always know how to use said capital meaningfully. Therefore, the responsibility of this issue falls less on the victims, and more on their donors.

The United States is a global outlier for this opportunity due to the sheer amount of money they invest abroad, compounded with their global contributions to desertification through greenhouse gas emissions. After World War Two, The US normalized overproduction of special synthetic crops, thriving on unregulated large-scale greenhouse gas emissions. A laissez-faire economic approach became the norm.

The nomadic Aït Unzâr rejected most of these principles since their lifestyle uses almost opposite resource management. "We follow the rains, deciding every time where to move with our herds; that is the reason why we are called 'Aït Unzâr'."[5] This semi-nomadic lifestyle is crucial for survival in a desert environment where rainfall is scarce, vegetation limited. The land can't support the excessive demands of capitalism, and yet must sustain its current inhabitants.

When desertification strips people of their land and they lack money to support solutions, its inhabitants will unwillingly become semi-nomadic, like in Merzouga. I remember riding by the hotel one last time the day I left Merzouga. My cab passed a family of seven crammed together in a minivan, their belongings tied together on the vehicle's roof. They glared at the hotel as the car trudged along, and their expressions will haunt me forever. The way the mother leered at the hotel which sucked out valuable water, while unsure if her family would eat that night; her face revealed the uncertainty of her future, and her children's future. The father's mile-long stare, not directed anywhere, aimlessly wandering as a ghost. Their lives have been blown away into dust, erased from the face of the earth with insulting insignificance. To the readers that haven't been swayed, who disagree with the consequences of desertification, or who don't empathize with thousands of families who have lost everything. I ask you,

What does drought mean to them?

2 Casciarri, Barbara. "Rare resources and environmental crises: Notes on water management among the Aït Unzâr Pastoralists in South-Eastern Morocco."" *Nomadic Peoples* 7, no. 1 (2003): 177-186.
3 Tal, Alon. "Degraded commitments: Reviving international efforts to combat desertification." The Brown Journal of World Affairs 13, no. 2 (2007): 187-197.
4 *Morocco's Oases Fight Back Creeping Desert Sands. 2016. Standalone Media Collections.*

5 Casciarri, Barbara. "Rare resources and environmental crises: Notes on water management among the Aït Unzâr Pastoralists in South-Eastern Morocco."" *Nomadic Peoples* 7, no. 1 (2003): 177-186.



art by Daniel Workman

DIVINE WILL

by Mary Silwance

My daughters want a real Christmas tree.

We have a perfectly serviceable fake tree in the basement already decorated with colored lights, jewel-toned ornaments, and shimmery silver tinsel. It was a gift from a friend moving, eager to travel light. I prefer used goods over new, anyways.

A real tree? I'd never even considered it.

But Christmas was barreling at me fast, so I caved and went to a nearby nursery. I found one that was just right. Well, just right in a Charlie Brown Christmas way: small and spindly. It shivered in a corner with another scrawny scrap of a fir, reminding me of the leftover kids who never got picked for kickball at recess.

I took home the discounted, desiccated tree to decorate. When my girls were small, we cut holiday cards into a long chain. This colorful homemade garland paired with tiny white lights adorned the gangly fir perfectly. After we finished, I sat in the darkened living room enjoying the Charlie Brown vibe, a soft glow gracing the room.

But I was uneasy.

Ecosystems were exterminated to plant acres of fir, spruce, and pine. What synthetic inputs forced them to grow in to marketable shapes and sizes? How far did they have to travel to get to a store near me? What kept them fresh? Were they shipped in refrigerated trucks like fruits and vegetables? That all seems ecologically excessive when we've been averaging 50-degree weather this December in Missouri.

Besides, what will I do with the tree after Christmas? If it's loaded with chemicals, I don't want to compost it or toss it in the backyard for

critters to nibble on. I don't want it decomposing near my garden beds nor do I want chuck organic matter into a landfill.

And then I remembered.

To secure the tree, I bored screws into four sides of it, shredding bark—tree skin—in the process. Trees feel. They form families, create diverse communities, take care of each other. I imagined rows upon rows of firs just like this one in monocrop plantations across the country. Indentured. Trees bred to be consumed. Then discarded.

Even my environmental concerns about a live tree, regarded the tree as an it, as an object. I feel a disconnect. The Christmas ritual in which I'd just participated doesn't match my growing awareness of the sentience of all beings; doesn't match my growing awareness of the sacredness of all beings.

To force a being to grow in unnatural conditions, kill it, then artificially keep it fresh to adorn and display her for one's enjoyment to eventually discard her, is a sacrilege. A tree is a being with a right to its own life.

I think of the common Christmas refrain, "Glory to God in the highest and on earth peace, goodwill toward men." While this excludes certain people, it certainly discounts nonhumans. Whatever falls outside of "men" can be othered: dominated, abused, used, enslaved, marginalized, even killed for the "glory of the most high."

Progeny of this God—Judaism, Christianity, and Islam—have littered history with those deemed underserving of good will. The legacy continues as goodwill is still not extended to all beings, let alone all humans. But because Sacredness pulses and shimmers in every speck of Earth, all beings are deserving of goodwill.

This startles me. If Divinity is the fabric of everything, why don't our Christmas traditions reflect that? Why participate in rituals that subjugate other beings? What's more, these traditions—the trees, lights, decorations, excess, grand religious services—rely on extractive practices that don't foster good will or peace on earth but jeopardize others to provide material accouterments for the holiday season.

How does that honor the Divine?

I've been told it's not that black and white. We can celebrate while we pray for those suffering. Maybe adopt a family, volunteer, donate. I'm weary of this equivocation. Inequity, marginalization, and suffering flourish; not peace on earth and good will. If the Christ child was supposed to be revolutionary, it's not working. That miracle has been pimped to uphold oppressive, marginalizing systems while a few get to feel virtuous for their charitable deeds.

Complicity in the desecration of Earth and Her Beings, denial of the Sacred in its wondrous omnipresence means we have become severed from understanding ourselves as Sacred. We have denied our own Holiness. Otherwise, how can we be callous to the Sacredness of the other? As I journey toward my inner Divine, I understand Divinity as the fabric we are each knit from. Which means we ourselves and all we encounter are Holy beings, deserving of reverence.

The anemic fir in my living room bolted to a tree stand is propped up on a yellow plastic milk crate hidden under a snowman tree skirt to give her height. It is time for new rituals. Let's develop traditions to honor the Sacred within and in every being so we can authentically manifest good will toward each being. Indeed, Divine will.

MARINE MURDERER

by Nancy Whitecross

The ocean was calm that day; there was no wind, only the sun beating down on my head as the dive boat sped on top of the water. The sky reflected an azure blue, with not a cloud in the sky. My fingertips gently touched the water. People asked me what I was doing when they heard me calling my friends to come and play with us. Within minutes, they had surrounded the boat, jumping gracefully in and out of the water. The bottlenose dolphins knew I was there; they waited for me to join them.

Just six kilometers off the coast of Umkomaas (South of Durban in the province of KwaZulu-Natal in South Africa) is Aliwal Shoal, one of the top ten dive sites in the world.

John, a fellow instructor and friend, brought a student on his first dive. The conversation was exciting as the student, his father, anticipated an incredible dive while we tried to play it down, as Aliwal Shoal could be daunting. More often than not, the visibility is less than five metres. When we dive in this glorious place we must remind ourselves that we are invaders of the fish species' habitat. It is not an aquarium.

I had my camera on the boat that day, hoping to glimpse my friends playing underwater. We kitted up. When I was ready, I did a back roll into the water with the dive buoy.

Immediately, the dolphins surrounded me as I dived to the bottom of North Sands, ten meters underwater. John and his father followed me. Once our student was safe, I handed the buoy line to John and immediately pointed my camera at the dolphins scratching their backs in the sand, one after the other, as though they were dancing to music. An albino dolphin joined in the fun. John and I tried to count how many of them were playing; it must have been close to one hundred. Our student was mesmerised as he knelt in the sand, watching them. As they ascended to breathe, two giant manta rays appeared out of nowhere, one covering

art by Maya Katz

my whole body as I lay horizontally above the sand. They disappeared into the depths of the deep blue ocean. Adrenaline rushed through my body. I had experienced pure love and joy from the living creatures below.

We had not moved from North Sands and needed to get to the reef to show our student more of nature's wonders. John, holding the buoy line, hovered just above us as we swam away to find the reef. The current was gently swaying us as we were propelled forward. In our vision was a magnificent sight: two clownfish playing in an anemone's tentacles. Even though their tentacles are poisonous, the clownfish are protected there. They live a symbiotic life without harm or fear. Their black and white stripes over their bright orange coats are beautiful against the bland pink anemone. As we swam over the many different types of coral, our student looked blissfully happy and content. The visibility was around eighteen metres and we were so lucky to witness a ragged toothed shark approaching us, gently flicking his tail. Aliwal Shoal is a breeding ground for the ragged toothed shark, also known as the grey nurse shark. Although he looked ferocious, he was a gentle giant as he swam past, enchanting us and our student.

As we swam further, an alien-looking moray eel peeked at us from his hideout. They are carnivorous predators and feed off small fish and crabs. Knowing he could deliver a nasty, painful bite, I avoided contact with him. He ventured out of his home and swiftly swam away on the hunt for his next meal. We swam around the beautiful colored coral, which had taken many thousands of years to evolve. I am particularly interested in montipora coral, which is preyed upon by butterfly fish. There are many types of montipora, some with branching arms, others with twisting spirals, and even more that grow on top of the rocks, blanketing them in color.

We came upon a cleaning station as we watched the many fish species swaying in the gentle current. We tried to explain to our student why several species of fish were waiting patiently to be cleaned by several cleaner wrasse. The cleaner carefully picked off dead skin, bacteria and parasites from each fish, taking particular care of the mouths and gills. Once clean, the fish happily swam away, leaving the wrasse with a full meal. Shrimps and cleaner wrasse then do a small dance, indicating to other species that they are ready for business. It reminds me of a car wash. Even predatory fish like groupers allow the cleaner fish to swim inside their mouths, removing hitchhikers and bacteria without harm.

Our time below had ended, and the magic of that one dive will live in our students' minds forever.

Our time below had ended, and the magic of that one dive will live in our students' minds forever. Seeing so many of my friends swimming beside us was a rare sight.

Almost twenty years have passed since that magnificent, magical dive, and although I have travelled to many dive sites worldwide, I have never experienced another dive that I could compare to that one.

Over recent years, I have witnessed what the temperature rise has done to my precious place. Oceans absorb ninety percent of the excess heat from global warming, endangering life in and around them, including humans.[1] The oceans cover seventy percent of our planet's surface, and forty-four percent is experiencing what has been called a "Marine Heatwave." The warmer the oceans get, the stronger the storms get. When a hurricane forms, the hot sea exacerbates it, creating more devastation. Warmer water contains less oxygen than cold water; therefore, fish's oxygen demand is much higher in warm water. During the ocean's heat waves, more fish will die.

Venomous sea creatures are increasing due to warmer waters and the acidity level of the oceans, especially the deadly Box Jellyfish and the coral-eating crown-of-thorns.[2]

Many corals in various parts of the world have been bleached by the sun and have died, devoid of color. The breeding grounds of several species of fish and mammals have been destroyed. I have observed how the increase in numbers of the crown-of-thorns has devastated some reefs by eating their way across the coral, a direct aftermath of climate change. If this continues and people do not take responsibility for their actions, in 2100 the oceans will be depleted.[3]

In the last eleven years, we have lost fourteen percent of the world's total coral reefs, equivalent to half of Australia's living coral.[4] A recent report claimed that the cause of the tragic loss is due to climate change, rising ocean temperatures, overfishing, and declining water quality. The report also mentioned that the coral reefs could recover. But we would have to reduce greenhouse gas emissions. However, coral takes many thousands of years to grow.

We will not see it recover in our lifetimes.

I realized that what I have seen and treasured during these last thirty years will soon be a memory as the oceans become depleted of their beauty. Many of the coral reefs are already barren. My grandchildren and great-grandchildren will only know this memory from the photographs and tales that I will pass down from generation to generation.

The changing climate is the enemy that has murdered my friends deep down in the once-magnificent waters of the oceans.

Note:

The excellent picture of that day, of the back-scratching dolphins, was later published in the DiveStyle Magazine.

I have been diving since 1994 and have had the good fortune to visit the Great Barrier Reef, the Red Sea and many Islands for over thirty years. As a diving instructor, I have had the pleasure of qualifying many students who have found a passion for scuba diving.

1 National Oceanic and Atmospheric Administration. "How Does Climate Change Affect Coral Reefs?" NOAA, January 20, 2023. https://oceanservice.noaa.gov/facts/coralreef-climate.html.
2 National Geographic. "Venomous Sea Creatures on the Rise Thanks to Climate Change." Environment, October 8, 2018. https://www.nationalgeographic.com/environment/article/climate-change-increasing-venomous-creatures-ocean-warming.
3 Lotterhos, Katie E., Áki J. Láruson, and Li-Qing Jiang. "Novel and Disappearing Climates in the Global Surface Ocean from 1800 to 2100." *Scientific Reports* 11, no. 1 (August 26, 2021): 15535. https://doi.org/10.1038/s41598-021-94872-4.
4 United Nations Enviornment Program. "Rising Sea Surface Temperatures Driving the Loss of 14 Percent of Corals since 2009." UN Environment, October 5, 2021. http://www.unep.org/news-and-stories/press-release/rising-sea-surface-temperatures-driving-loss-14-percent-corals-2009.

LULLABY

by Nicholas Barnes

I told her I like that color:
Sky with fire behind the hill.
It was gray, blue, and saddening,
But below, it was opal black.

It's spring, but not nearly summer,
More than winter, in fact.
These days feel like eighty
And the nights are all heart attacks.

Go away, go away to the movies,
I know I'll see you again.
I'll be sitting in my own theater,
The last showing starts at twelve.

Midnight comes with soldiers
And stars in their crowns.
We're all following the commander,
Though she seems a light year off.

Tonight I need my own party
Or an orchestra; symphony will do.
I want a country music singer
And a pedal steel: cry me to sleep.

Give me crickets, bullfrogs aplenty,
I know it's that time of year:
When her soothing anthem
Is whispered in the smoky air.

art by Daniel Workman

SEA WALL

by Denise Thornton

The team we gathered to build our timber frame house was a group of artists working construction day jobs, and when it came to setting our stone foundation, they all agreed Tom should take the lead. A lanky guy with a graying ponytail, Tom carried a dog-eared copy of *Living the Good Life* with him everywhere. Helen and Scott Nearing's self-published 1954 chronicle of their move to rural Maine has been the bedrock for many a back-to-the-land journey, and includes a how-to guide for building a strong, straight stone wall.

Doug and I were feeling our way toward building the greenest house we could—both a home and laboratory of sustainable shelter ideas with a carbon footprint the size of a baby's bootie. That meant passive solar design, and locally sourced, natural materials. We were inspired by the generations-old limestone foundations of faded red barns along our country road.

Thirty years earlier, during Doug's postdoc in the Netherlands, we lucked into renting a 300-year-old farmer's cottage along the edge of what was originally a Roman road. It stretched our sense of what a house could be to include axe-hewn timbers supporting wattle-and-daub walls and a thatched roof. We ate our meals, tucked our daughter into bed, and dreamed through the long winter nights in a structure that has sheltered families for centuries. So when it came to constructing our own house, no envelope-pushing idea seemed like a bridge too far. We were determined to lay the foundation for a home that might last as long as that Dutch cottage.

The land that the Nearings went back to was rich in a hard, igneous rock created some 400 million years ago when magma cooled and solidified deep underground. Our own rock is somewhat softer—soft being a relative term if you drop a chunk on your foot. Our bedrock was formed about 500 million years ago when Wisconsin lay near the equator



art by Ethan Lahm

beneath a warm, shallow sea teeming with creatures whose shells drifted to the ocean floor, bonding with quartz sand, and compressed over eons.

We paid a visit to Swiggum Quarry about ten miles away. Some of their limestone was broken into pieces of about the right size, and they glowed a pleasing, yellowish tan on that sunny morning. I was totally on board when I realized this kind of rock can be chock full of fossils—especially trilobites—that flourished into thousands of shapes and sizes, from three inches to three feet, in that ancient sea. Primeval precursors of insects and crustaceans with a pleasing pattern of triple ridges down their backs, trilobites grew by molting—each little fellow leaving a series of exquisite exoskeletons in its wake.

Wisconsin's state fossil, the Calymene celebra, was an adorable little trilobite scavenger who could have fit into the palm of your hand. If they were around today, you might keep a few scuttling across the bottom of your aquarium. Good luck catching him before he burrows under the sand!

Peter Brannen, in *The Ends of the World*, dubbed trilobites the standard bearer for the Paleozoic era. They survived the End Ordovician mass extinction 444 million years ago, and the Late Devonian 360 million years ago, but burrowing could not save them from the End-Permian Mass Extinction about 250 million years ago. Called the Great Dying, 96 percent of all species then alive were wiped out of existence. Intense volcanic activity in Siberia threw sulfur and CO_2 into the atmosphere, causing brutal global warming and acid rain.[1]

Trilobites that had scurried across the sea floor for 300 million years were suddenly slime, along with those who had crawled onto land and evolved into reptiles—some as big as the dump truck that delivered our stone. By the end of the Permian, nearly all of them had perished.[2]

The world in which trilobites thrived is long gone, but their fossils show up around here in places where roadbeds have been cut through the hills. Some of the richest roadside fossil viewing in our state is just minutes away from our land. We'd ordered a truck full of rocks and received a treasure trove of relics in the bargain.

Tom was not pleased with the quality of our rock when he saw the pile next to our house site. We belatedly learned that the rock from Swiggum Quarry is not generally considered attractive enough for building or landscaping and is usually crushed for roadbeds.

O.K. So our stone was not ideal, but when you're building a house with a sod roof, you are already (apologies to R. Frost) far down the path

1 Brannen, Peter. *The Ends of the World: Volcanic Apocalypses, Lethal Oceans, and Our Quest to Understand Earth's Past Mass Extinctions*. New York, NY: Ecco Press, 2017.
2 Ibid.

off-the-path of the path less traveled by. We forged ahead, helping Tom set up plywood forms and began to set stone knee walls that were basically straight and definitely strong.

Each stone was contemplated, then pivoted to fit its flattest side against the frame, more or less snugly next to its siblings. We shoveled concrete into the gaps, and let it set up before pulling away the forms and moving them on to the next section of wall. Because our stone was not as flat and smooth as Tom would have wished, concrete often oozed and hardened between the rock faces and the plywood. Every day of fitting stone was followed by two days of chipping concrete. The perfect tool for this dirty job turned out to be some of the smaller chunks from our rock pile.

Squatting in front of our growing wall, pounding away errant concrete globs, I felt as close as I've ever been to prehistoric humans who hollowed out canoes and shaped their own shelters with a rock in hand, though honestly, for someone with a cell phone in her hip pocket, it got a bit tedious. Bang upon endless bang. Each impact transferred through the bones in my hand and resonated up my arm. An hour of chipping felt like an epoch, but the wall slowly took shape, and the rock pile shrank.

...I felt as close as I've ever been to prehistoric humans who hollowed out canoes and shaped their own shelters with a rock in hand...

We had almost enough rocks for the job, but Tom and I eventually had to take his rusty pickup back to the quarry to find the best stones we could for the final push. Rick, the quarry man on duty, weighed our empty truck at the entrance and warned us to work fast because they were setting up to blast deeper into the rock face that day.

We wound our way through the lifeless, lunar landscape till we found a pile that looked promising and were picking through it for usable chunks when Rick roared up in a gigantic dump truck. Time to get out of the quarry. Now!

Dropping the rocks we were holding, we hopped into Tom's truck and raced after him to where Jerry, one of the explosives technicians, was waiting at the entrance. He phoned his partner. Three warning honks reverberated, then a crack like doom shook the valley.

Jerry told me he blows something up just about every day. Swiggum Quarry, he said, gets "shot" about twice a year. He grinned when I asked him if his partner had plunged a handle to detonate that mayhem. Explosions these days, I learned, were triggered by a hand-held device with two yellow buttons and a red light.

No sticks of TNT either. Acetic acid, the main ingredient in his explosives, was transported by tanker trucks. Jerry and his partner always mixed the explosives on site, so as not to be driving around with a volatile load that could come to a bad end on a train track or in a highway pileup.

Before the dust drifted away, Tom and I rushed straight for the new blast site. My nerves were still jingling from the explosion, but I was excited at the prospect of fresh rock. Local and fresh? How good can roadbed rock get?

As we approached the avalanche, Tom looked at me with a raised eyebrow. We were both struck by a distinctly pungent smell. I stopped and closed my eyes. I knew that smell, though I had never smelled it in Wisconsin. Could we be inhaling the long-trapped scent of an ancient ocean? I filled my lungs deeply and held it as long as I could.

That overpowering sense of sea breeze dissipated quickly as we searched, and soon we were sweating in the same hot, dusty air we had been breathing before the blast. We loaded the pickup with enough rock to finish our foundation, got weighed again, paid 12 dollars, and left.

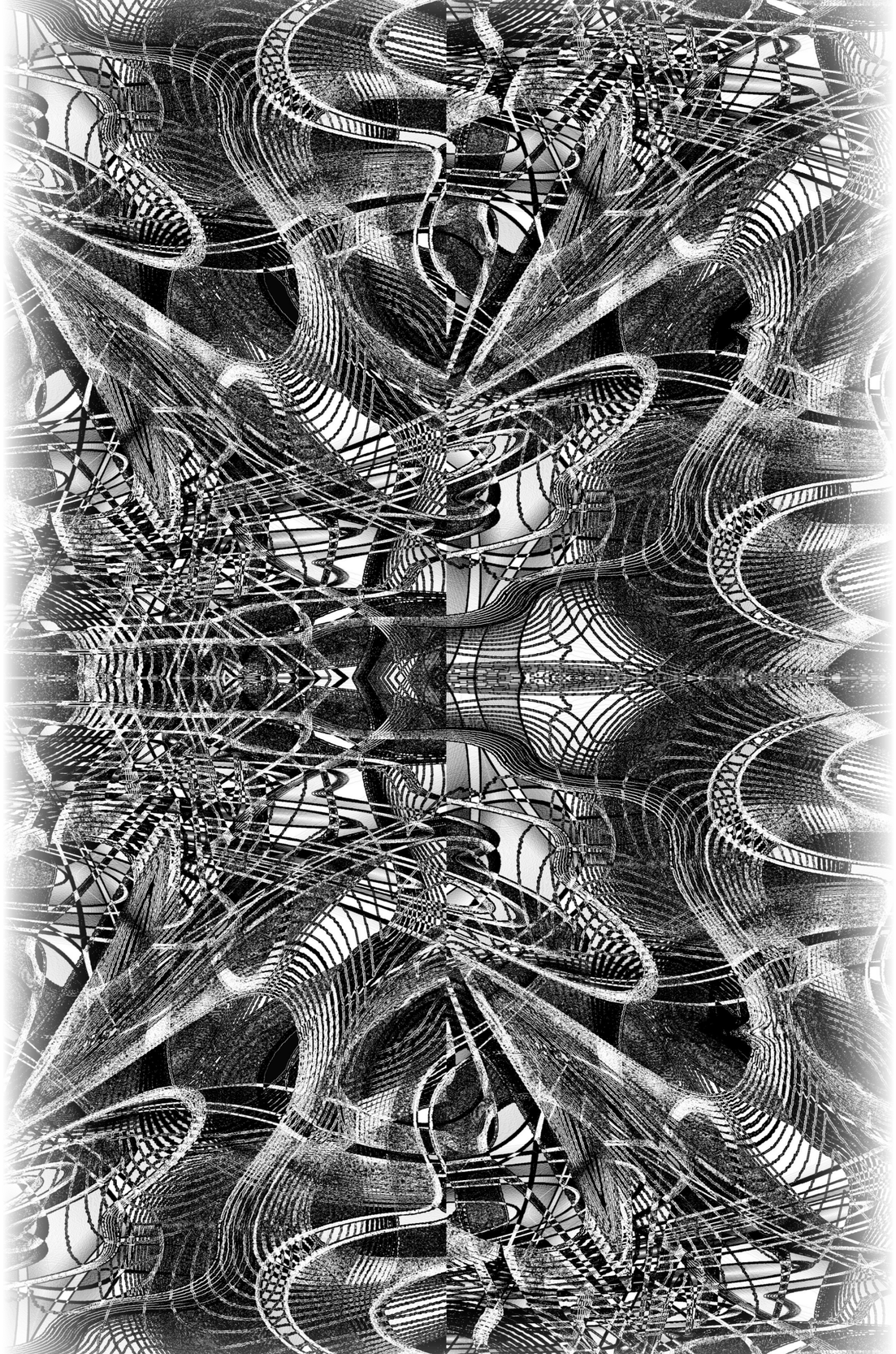
The next few days, as I mindfully fitted those rocks into the last of the wooden forms, I found myself inhaling hopefully as I hefted each stone, dreaming about that long-lost sea bottom under my feet.

Later that week I called up Richard Slaughter, the Director of the University of Wisconsin-Madison Geology Museum, who maintained that I could not have been inhaling odors of an ancient ocean. Though Paleozoic seas might well have smelled a bit like their modern counterparts, I was assured that any such smell in our limestone had been washed away by millions of years of fresh groundwater.

Still, ten years later, when I look at our sturdy, fossil-studded foundation, I believe that I did once inhale the last breeze of a lost world where trilobites scuttled freely across a warm and friendly ocean floor, as if they could go on forever.



art by Sherry McCarver



NOTHING

by Nicholas Barnes

I'm a dangerous gal. I never look at the walls that surround me. Everywhere, I'm caged in.
I wish I had that key, that's the one keeping me locked up, insane, and distorted.
Sometimes, I feel I'd be better off walking through the desert all alone, but I'm no Jesus Christ.
I can't turn water into wine anymore. Help me with this vintage.
I think of living things, and those that aren't, passing in and out of my skull.
He said: lift the curtains and let the sun shine on your precious little head today.
But there's no sun to see. It's not a crime, not yet. The skies, they're screaming Thursday.
I dream of arenas filled with fanatics facing their idols with guitars in hand.
And they preach to me from that lonely stage: you don't have to do all that you're doing!
I fret about my health, and my looks too. I wonder, what will thirty years do?
And I worry about my impact, my footprint. I fear that my shoes are far too large.
But I'm no clown. Just a bleeding heart, to a fault at times.
Come forth, you hedonist. You once put a spring in my step. A queen of 23 finds abstinence.
Come down from your hill, down to my level. Take me to that golden El Dorado.
Show me a picture of those ivory gates, and I'll shave off all my hair with that pendulum razor.
Let me find a way to live without worry or fear. Let my blood beat of my own accord.
I'm waiting for a boy who can stitch and sew. I'm an old quilt, patch me up with your miracles.

art by Edward Michael Supranowicz

SMOKE AND MIRRORS

by Karen Davis-Brown

Living in rural, northern Wisconsin, we are used to cooler temperatures, plentiful water in all seasons, and thousands of acres of forests and wetlands to explore and enjoy. Imagine our surprise when, for weeks on end, our pristine air was filled with a haze that blurred the horizon and turned sunrises a brilliant, ominous red.

It was the talk of the neighborhood, which in this case means the eight households—each on forty-plus acres of woods or hay fields—ranging a couple miles to the north and east of where I live. We shared our concerns with each other about itchy eyes, sore throats, headaches, and the imperative for our more medically fragile friends to stay indoors. We found ourselves checking the air quality rating daily, sometimes several times a day, something we never thought we would do in this verdant and socially isolated place. There was also the seldom-spoken anxiety of the potential return to face masks even after the COVID pandemic. A real concern that these masks were, perhaps, here to stay in this age when the air that we depend on for life may often carry danger as well.

This year was unusually warm and dry in our part of the world. Local rivers, usually welcoming to canoes and kayaks in late spring, ran so low we could only stand on the shore and marvel at huge stones which before were always hidden beneath a swift current. Our rainwater catchment barrels were empty—for the first time in recent memory we had to water our small flower and vegetable gardens from the pump. The Wisconsin Department of Natural Resources even prohibited campfires and issued air quality warnings for residents in all parts of the state.

art by Kelsey Kennedy

We learned that this uncomfortable, worrisome haze came from massive wildfires spanning the breadth of the Canadian provinces, resulting from the same shift toward a warmer, drier climate that we were experiencing farther south. They began in March and continue as I write. Winds from both the northeast and the northwest brought the haze, smell, and particulate matter from those fires not only to Wisconsin but as far west as Montana, as far east as New York, and as far south as Iowa and Washington D.C. Even European countries were affected.

These days, the evening news is full of reports on extreme weather and catastrophes all over the world, and we watch the footage with awe and compassion. We shrug and say the words "climate change" as we talk about our own weather, but we do not fully grasp the connections between the changing climate and human decision-making—our own or anyone else's.

The International Panel on Climate Change (IPCC), comprised of representatives from 195 countries, prepared a 2023 report titled *Climate Change 2023: Synthesis Report.* It explicitly states that "Human activities, principally through emissions of greenhouse gasses, have unequivocally caused global warming" and that "Human-caused climate change is already affecting many weather and climate extremes in every region across the globe," leading to "widespread adverse impacts on...human health..."[1] It goes on to assert that "Emissions reductions in CO2 from fossil fuels and industrial processes...due to improvements in energy intensity of GDP [Gross Domestic Product] and carbon intensity of energy, have been less than emissions increases from rising global activity levels in industry, energy supply, transport, agriculture and buildings."[2] The report continues to detail an explicit correlation between more frequent and intense "hot extremes," "heavy precipitation events," and "increases in agricultural and ecological droughts...due to increased land evapotranspiration" resulting from humanly caused climate change and predicts that these events will worsen in the future if alternatives are not put in place.[3]

Those of us who live in the rural United States are shackled, often unconsciously, to this fossil fuel economy that does so much damage. We often live miles away from shops and public services, and we depend on tractors and other machinery for our lifestyles and livelihoods. Not only is there a shortage of sustainable public transportation, even the chainsaws, log splitters, and generators we use to produce electric or

1 H. Lee and J. Romero, eds., *Climate Change 2023: Synthesis Report.* (Geneva, Switzerland: Intergovernmental Panel on Climate Change, in press, 6.
2 Ibid., 10, 12.
3 Ibid., 34.

wood heat often require petroleum products to operate. The need for fossil fuel products is so pervasive and ubiquitous that we don't even realize that there might be options when we pull up to the pump. We do not recognize this common habit for the cage that it is.

There are two fundamental reasons for this seemingly unsolvable dilemma. One is that the infrastructure of this country—rural and urban—presumes an unlimited supply of fossil fuel. There are few obvious options available for personal transportation, transport of goods, or even recreation, that do not require a petroleum product of some sort. The second is that the industrial and financial entities who generate wealth from this dependence spend a great deal of time and money to keep other possibilities from being openly researched, publicized, or developed on a broad and accessible basis. In its marketing, lobbying, and economic pressures to persuade local communities, the "corporate speak" is like a distorted mirror of deceptive language intended to trigger fear and a sense of false patriotism and thereby influence our perceptions and control our behavior.

Whether they use smooth and sophisticated words to convince us of how their products are somehow beneficial to us, or they deny the damage that they do, we need to develop the capacity to think more critically about our options and work together to develop more independence from corporate influence. We need to ask in response to their advertising ploys, "Where's the money?" Without a doubt, someone is profiting from our ignorance, fear, and perception of what it means to be happy and successful.

A striking example exists in is the network of pipelines that stretch from Canada across the north central region of the United States, reaching as far as the Gulf of Mexico. Line Three through northern Minnesota and the lands of the Anishinaabe people and Line Five across northern Wisconsin, home of the Bad River Band of Lake Superior Chippewa, highlight the corporate duplicity and constant collusion with local authorities, resulting in violence and exploitation in the name of cheap oil as well as the violation of rights of these sovereign nations and the division of local communities, sometimes beyond repair.[4] [5]

4 Hassanzadeh, Erin. "Line 3 oil pipeline: A look at what's happened since the pipeline started operating in northern Minnesota." CBS News Minnesota. May 3, 2023. https://www.cbsnews.com/minnesota/news/line-3-oil-pipeline/
5 Kaeding, Danielle. "Judge orders Enbridge to shut down part of Wisconsin oil pipeline in three years." Wisconsin Public Radio. June 19, 2023. https://www.wpr.org/judge-orders-enbridge-shut-down-part-wisconsin-oil-pipeline-3-years

People in across the Midwest and in rural communities across the country are overwhelmed and confused by the claims and counterclaims of environmental "experts." I sought out the aforementioned IPCC report on my own, but most of my neighbors are not so curious or persistent. They either believe the spin of the oil companies or they perceive themselves as powerless and the dilemma—too big to understand or change. Like so many others, my neighbors do not see the connection between the four-wheel drive pickups they drive, and the smoke that fills our once-clean air. We are all over sixty years old and have our own children and grandchildren. Not only our children, but children all over the globe have less and less access to clean air and water every year because of individual, corporate, and governmental decisions. The winds need to shift, and that change needs to start with us. It starts by asking, "Is this my only option?" and "Who's making money from my decisions?" Information is power. Becoming curious, persistent, and informed can make all the difference in the world.



art by Jordan Eckes

SIX MORE WEEKS OF WINTER

by James Mead

Demeter was deep downtrodden
when April winds were dry
Hades held her daughter still
unable yet to fly

waterfowl scrupulous
returned on tight time tables
to find the earth still
frozen hard and
not a morsel to be taken

weeping willow wept
still louder
to find her boughs still barren

and all the people
shook their heads
except the crude oil baron

surrounded by bright poppies now
that non-eternal winter
and being found
just wrong for now
my hands are hardly shaking

mother holds her daughter scared
new gleam in Hades' eye
in his mind a new deal making
six then six revised

art by Colin Turner

SNOWMAGEDDON

by Macy Kay Naughton

"Would you rather be too hot or too cold?" my mom reads from the box of cards at the dining room table. We unanimously decided "too cold." Maggie Mae, my sister, argues that it's easier for someone to warm up than to cool down. I agree while drawing another card.

If someone asked me now if I would rather be too hot or too cold, I would doubtlessly choose "too hot." Texas and "too cold" are seldom found in the same sentence, at least until February 4, 2021.

Maggie Mae clamors into the kitchen, announcing "School is canceled tomorrow!" We scramble to the couch to turn on the Weather Channel. Our eyes grow wide as we read the bold red headline: SNOWMAGEDDON. I can't remember the last time it snowed here, in Texas. We rush to the windows to see tiny pellets of snow spilling from the sky.

I roll my eyes at Maggie Mae, "Yeah, right. 'Snowmageddon.'"

I rush out the door with my sled, excited to have the day off. But when the cold slaps my face, I run back inside to grab a scarf. Finally, all bundled up, we embark on a day's worth of building snowmen and making snow angels. My sister and I are carefree even with snow in every inch of our clothes. I am freezing but content. Once the sun goes down, we conclude playing in the snow. We trek up and over the hill on our way to the house when we notice that the entire street is in total darkness. "It's only seven o'clock. Why is everyone asleep?" I wonder. I am too cold to understand what is really going on. Nearing our house, I have a rude awakening. My toes are freezing as I enter the front door—the temperature is the same inside as it is outside.

"Mom, what happened?" Maggie Mae asks, shivering.

Mom replies calmly, but I can see the worry in her eyes, "Everyone's power is out, but they said it would only last a few hours."

I sigh, annoyed that I must stay in my frosty clothing.

art by Aidan Jones

Except, we have no power for two weeks. In the following days, events escalate quickly. On the fourth day, I try to fill my water bottle, only to find that we are out of water. I start crying out of frustration. "I think this is my breaking point," I say. On the ninth day, I stare out the window, imagining warm weather. I had never been truly cold, but now I know it's the feeling of pins and needles sporadically piercing me. I broaden my gaze to see if I can spot the neighbors. I hope they are okay. Two blurry red lights grab my attention.

My mom notices the confusion on my face and hugs me, whispering, "They've been sleeping in their car to keep warm." I immediately feel my heart breaking. A ten-year-old child and her mother should not have to endure this.

On the tenth day, my best friend, Camryn, calls me. I can sense the tears in her eyes as she says, "I have to move in with my neighbors. Our pipes froze and burst." We open all our cabinets, hoping we do not face the same fate. On the fourteenth day of Snowmageddon, a single lamp begins to flicker. My mom sighs in relief, anticipating news of liberation. We entangle ourselves in a cliché family group hug, excited that we can finally stop the firing burning in the fireplace.

As I think of the grid failure causing Snowmageddon, I realize that the built and natural environment coincide more than I had ever thought. This correlation is both positive and negative. Sustainable design in homes can be used as a tool to mitigate climate change. I wondered how energy within my home could be different or if there were any solutions that could have prevented Snowmageddon altogether. The "Whole Building Design Guide" suggests that "Implementation of the sustainable design strategies across scales is an important step towards reducing GHG emissions, thereby mitigating climate change effects and promoting healthier living."[1] Building green reduces energy and promotes renewable energy.[2] This strategy could have helped the grid failure that occurred during Snowmageddon. The Leadership in Environmental and Energy Design (LEED) highlights the importance of retrofitting existing buildings.[3] The idea of modifying homes made me ponder, "How can my house use energy efficiently?"

Renewable energy is essential to tackle the climate crisis. In the article, "Drafting a New Architecture for Energy," Jatin Nathwani provides crucial statistics that "Current global primary energy demand is met by 85% fossil fuels (coal, oil, and gas) and 15% non-carbon sources (hydro, nuclear, bioenergy, wind and solar.)"[4] He stresses how there must be a shift in source use which starts in homes. Nathwani supports his claim by documenting the impact in home architecture of providing alternative energy, such as enhanced geothermal, hydro, nuclear, or solar energy.[5] I wonder if the grid would have failed if one of these alternative energies were present during Snowmageddon.

1 Sijakovic, Milan and Ana Peric. "Sustainable Architectural Design: Towards Climate Change Mitigation." ArchNet-IJAR : International Journal of Architectural Research 15, no. 2 (2021): 385-400. doi:https://doi.org/10.1108/ARCH-05-2020-0097.
2 Ibid.
3 Ibid.
4 Nathwani, Jatin. "Drafting a New Architecture for Energy: Keystone XL's Rejection Ought to Unshackle Us from Viewing Fossil Fuels as the Only Path to Prosperity-here are Three Alternatives." The Globe and Mail (1936-), Nov 28, 2015. https://colorado.idm.oclc.org/login?url=https://www.proquest.com/historical-newspapers/drafting-new-architecture-energy/docview/2121479722/se-2.
5 Ibid.

Geothermal energy is the most effective of these forms of alternative energy.[6] The Life-Cycle Assessment emphasizes that geothermal energy is a "key renewable source for sustainable heating and cooling applications."[7] Compared to common air-conditioning, geothermal heat pumps "present higher performance in output thermal energy over the consumed electricity."[8] Likewise, geothermal heat emits fewer greenhouse gasses.[9] Unlike other energy sources, geothermal energy is always available.[10] Additionally, because geothermal energy is naturally occurring, no fossil fuels are required to extract it.[11] If more homes in Texas utilize geothermal energy, another unexpected weather storm won't be so devastating.

On the last day of Snowmageddon, I hug my mom as we appreciate the feeling of warmth in our fingers slowly creeping in. I begin to get up but jump back into my chair. The floors are still frigid. A proposed energy alternative to forced-air heating is heated floors. Heated floors are eco-friendly, as well as more efficient than other heating systems.[12]

Another energy alternative that is beneficial to homes is energy-efficient lighting. At night, my house is shadowed by trees, so the flame of the fireplace had been our only source of light for those two weeks during Snowmageddon. Energy-efficient lighting minimizes energy consumption with daylight-linked controls.[13] My house already has more windows than necessary; therefore, we do not usually have lights on during the day. With these wireless network controls, the sensors would optimize the use of energy consumption daily by limiting its time.[14] Furthermore, daylight-linked controls reduce energy consumption in lighting by 60%.[15]

Snowmageddon has shifted the way I think about energy. Before, I did not think twice about how my house was supplied with light or heat, but now I understand all too well the consequences of poor design decisions. A power grid failure that causes power outages in 4.5 million homes is a devastating consequence. However, we can stop Snowmageddon from happening again by implementing sustainable energy sources. Whether it is heated floors, energy-efficient lighting, or geothermal energy, renewable energy in homes is essential for mitigating climate disasters like Snowmageddon.

6 Aquino, Andrea, Flavio Scrucca, and Emanuele Bonamente. "Sustainability of Shallow Geothermal Energy for Building Air-Conditioning." Energies 14, no. 21 (2021): 7058. doi:https://doi.org/10.3390/en14217058.
7 Ibid.
8 Ibid.
9 Ibid.
10 "Geothermal FAQs." Office of Energy Efficiency and Renewable Energy, 2019, https://www.energy.gov/eere/geothermal/geothermal-faqs
11 Ibid.
12 "Radiant Heating". Office of Energy Efficiency and Renewable Energy, 2022, https://www.energy.gov/energysaver/radiant-heating.
13 Tsangrassoulis, A. and DHW Li. "Energy Efficient Lighting Strategies in Buildings." Energy and Buildings 165, 2018. https://colorado.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/energy-efficient-lighting-strategies-buildings/docview/2066202170/se-2.
14 Ibid.
15 Ibid.

NUCLEAR ENERGY IS GREENER ON THE OTHER SIDE: AN APPEAL TO DEMOCRACY

by Kevin Ember

art by Aidan Jones

This paper was initially aimed for the mailbox of a senator who sits on the Energy and Natural Resource committee, but upon researching solutions for America's nuclear waste problem, I found that this would be a futile effort. Nuclear energy is an intensely bipartisan issue which has seen disagreement for multiple decades, partly driven by fear of the lethality of nuclear energy. In this paper I aim to address a reader who believes in taking necessary action to counteract climate change. Generally, the younger generation is more vocal about this call to action; however, its realization requires that we place our trust in the democratic process, the idea that every vote counts. This power must be realized by citizens of the United States to counteract the deathly grip that climate change has on our society. I hope to shed light on why citizens should err on the side of nuclear energy when politicians inevitably try to reason a way out of the hole humanity has dug for itself.

Nuclear energy has had a tarnished reputation during its short life in modern society. One main reason: average citizens' fear of radioactivity, a process so dangerous it can cause entire reactors to melt down, and, in the wrong hands, create nuclear weapons. Nuclear energy's significant dangers come with impressive advantages. Before nuclear energy can reliably take over non-renewable energies' role, we must address the issue of nuclear waste management.

Many proposals, such as the Yucca Mountain repository in Nevada, have attempted to create a permanent waste repository site. Since its inception, this plan has been plagued with countless legal issues and ground to a halt after President Obama asked the Nuclear Regulatory Commission (NRC) to pull its license.[1] Creating a long-term storage solution will take not only decades and lots of money, but also a shift in public opinion about nuclear energy. For nuclear energy to proliferate and propel society into a greener future, citizens have to understand the necessity of proper waste storage.

Undeniably, climate change creates unprecedented effects, and reducing humankinds carbon footprint requires action. This leads to the push for cleaner energies like solar, hydroelectric, and wind—with nuclear the forgotten child of the bunch. On paper, nuclear energy has everything that our nation seeks in clean energy: a small carbon footprint and remarkable efficiency. Nuclear doesn't depend on external variables to produce energy, and is equally efficient any time of day, any time of the year. The U.S. Department of Energy states that nuclear energy has the highest capacity factor at 92.5%, which means that over 90% of the time nuclear power plants in the U.S. operate at full capacity.[2] This eclipses the capacity factors of wind and solar energy at 35.4% and 24.9%, respectively.[3] Comparable energy outputs from solar or wind would require massive land areas to supply the less-efficient forms. Despite nuclear's potential for solving green energy problems, why hasn't its adoption been more widespread? Simply put, political opposition and cost.

Nuclear energy is vastly more nuanced than the fossil fuel industry. Opening a new nuclear power plant often costs hundreds of millions or billions of dollars. Some might criticize its high costs, but as technology develops, new reactors become "more fuel efficient and [...] inherently safer."[4] While reactor performance certainly is a salient concern, waste storage is extremely problematic since it reflects fossil fuels' comparable difficulties. Until recently, fossil fuel waste freely joined our amorphous blob of an atmosphere with little to no oversight, which we now know contributes to global warming. While nuclear infrastructures contribute very little to carbon emissions, its challenge of waste removal causes external problems to energy generation. If we adopt nuclear energy on a large scale, let's not make the same mistake we made with fossil fuels, where we didn't deal with external waste until after it had caused irreparable damage.

Since the first nuclear reactor started up in 1957, the US has generated 86,000 metric tons of nuclear waste, all of which is spread across the states.[5] 20,000 of these tons are under the responsibility of our own government as side products from nuclear weapon production.[6] Since 1982 when the Nuclear Waste Policy Act was passed, it stipulated that the Department of Energy (DOE) find a permanent site for all spent fuel which a majority of which is stored on site at nuclear reactors in dry casks.[7] To fund this search for a new site, a small amount of the tax that consumers pay for nuclear energy goes towards this fund, which currently stands at around $45 billion dollars.[8] Roughly $400-800 million are added to this fund yearly in effort to find a permanent repository site, which seems to be stuck in limbo since the 2010 decision to stop consideration of the Yucca Mountain site.[9]

The Yucca Mountain site was a glimmer of hope to deal with waste, but, as I earlier stated, is no longer a viable option. Immense controversy over the decision to end the work on Yucca Mountain resulted in a lawsuit between South Carolina, Washington State (both states holding some nuclear waste that is property of the US government), and the National Association of Regulatory Utility Commissioners (NARUC) versus the DOE, claiming that only Congress, rather than President Obama, held the authority to stop the project. Despite this lawsuit, the DOE began breaking up the Office of Civilian Waste Management, the agency responsible for facilitating the Yucca Mountain site. This caused further outrage with states that were storing spent fuel destined for Yucca

1 Weeks, Jennifer. "Managing Nuclear Waste". CQ Researcher, 28 Jan 2011. Thousand Oaks, California: CQ Press, 2011. 21 Sep 2023, doi: https://doi.org/10.4135/cqresrre20110128
2 "Nuclear Power Is the Most Reliable Energy Source and It's Not Even Close." Energy.Gov, www.energy.gov/ne/articles/nuclear-power-most-reliable-energy-source-and-its-not-even-close.
3 Ibid.
4 "Advanced Nuclear Power Reactors ." Advanced Nuclear Power Reactors | Generation III+ Nuclear Reactors - World Nuclear Association, World Nuclear Association , world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors.
5 "Commercial Spent Nuclear Fuel: Congressional Action Needed to Break Impasse and Develop a Permanent Disposal Solution." U.S. Government Accountability Office, www.gao.gov/products/gao-21-603.
6 Weeks, Jennifer. "Managing Nuclear Waste". CQ Researcher, 28 Jan 2011. Thousand Oaks, California: CQ Press, 2011. 21 Sep 2023, doi: https://doi.org/10.4135/cqresrre20110128
7 "Used Nuclear Fuel." Nuclear Energy Institute, 2023, www.nei.org/advocacy/make-regulations-smarter/used-nuclear-fuel.
8 Ibid.
9 Ibid.

Mountain. A non-partisan group called the Center for Public Integrity researched the Yucca Mountain long-term repository and concluded that this project was an example of a "broken government."[10]

This outrage isn't unfounded considering the lack of options for storing the sheer amount of waste that is being stockpiled. When a fuel rod is removed from a reactor, it sits in a cooling pool for a minimum of five years, as stipulated by the NRC. With limited space for cooling fuel rods, many of the nuclear power plants operating today can store them in casks, encased in metal and welded shut in five to fifteen-inch thick walls.[11] These casks often take up lots of limited space, preventing the redevelopment of power plants, costing taxpayers millions every year. In some cases, "the entire plant has been demolished and removed, leaving only fences and guards protecting fuel canisters."[12]

There were plans to build interim storage in Texas led by Interim Storage Partners (subsidiary of Orano USA) and Orano USA, a company specializing in managing spent nuclear fuel among other things. Interim storage is meant to be a temporary storage site for spent fuel with the site in Texas being able to hold up to 5,000 tons of spent fuel which was granted by NRC in September of 2021, with plans of expanding the facility of the next 20 years to store up to 40,000 tons subject to future approval by the NRC.[13] This was a step in the right direction, but this facility was only intended to store spent fuel for only 40 years until a more long-term storage solution was found. This plan was recently axed, though, as the half-life of nuclear waste demands a final resting place where the radiation won't interact with society for thousands of years.[14]

Plans to use the remaining energy in spent fuel rods face limitations as well. The DOE estimates that after one fuel cycle a fuel rod uses only 10% of its total energy. Engineers can harvest the remainder of the energy on a closed-loop cycle, but this increases energy waste.[15] Additionally, refining spent plutonium rods has received political pushback due to the potential use of highly-concentrated plutonium in nuclear weapons. Recycling spent fuel would require building "fast" reactors, which experts tout as more dangerous than conventional thermal reactors. The purification process involving breaking apart plutonium's actinides creates a more unstable system than that which drives nuclear power plants. Repurposing fuel would be costly compared to the more dangerous "fast" reactor process, and would create more radioactive and dangerous waste than spent fuel rods.

The DOE seems to have its hands tied with little-to-no wiggle room finding alternatives to store the spent fuel, eating away at taxpayer dollars. This ties back to the original dilemma: our government must handle this waste, but hasn't made advancements toward solutions due to political opposition and financial struggles. I don't have any solutions, either. I'm simply a college student who is worried about the future of our country, and, more importantly, the state of our world's climate. I am certain that nuclear energy has great potential for driving humanity into a green revolution, an era where we can power our homes without having to worry about adverse environmental impacts. To reach this era, we must first be able to adapt and change as a society, and remold ourselves to a less self-destructive form, and that begins with all the citizens who live in the United States.

I'd like to leave the reader with some food for thought. Climate change will continue to worsen without our intervention, and renewable energies alone cannot offset our carbon footprint. Nuclear energy is the strongest contender for solving our energy crisis and mitigating further warming. It's clear that the DOE needs to provide the public with a solution it once promised but has yet to fulfill. We are at war with our own existence, every day closer to the tipping point where anthropogenic climate change will irreparably change our world in ways that we can't even begin to comprehend. Inevitably, when there is some call to action to bring about a long-term storage facility, will you stand proudly on the side fighting to preserve our dying Earth?

10 Weeks, Jennifer. "Managing Nuclear Waste". CQ Researcher, 28 Jan 2011. Thousand Oaks, California: CQ Press, 2011. 21 Sep 2023, doi: https://doi.org/10.4135/cqresrre20110128
11 Ibid.
12 Ibid.
13 "Court Annuls Licence for Texas Used Fuel Store." *Court Annuls Licence for Texas Used Fuel Store : Waste & Recycling - World Nuclear News*, 30 Aug. 2023, world-nuclear-news.org/Articles/Court-annuls-licence-for-Texas-used-fuel-store
14 Ibid.
15 Weeks, Jennifer. "Managing Nuclear Waste". CQ Researcher, 28 Jan 2011. Thousand Oaks, California: CQ Press, 2011. 21 Sep 2023, doi: https://doi.org/10.4135/cqresrre20110128

DEBUGGED

by Ralph La Rosa

Global warming burns our bugs till dead,

as if some god of fools roars out, More heat!

It's sparking storms and wildfires, causing dread

by scorching earth throughout the human zoo.

Mosquitoes, spiders, gnats that found us sweet—

make them extinct, will we be bugged out too?

art by Winter Ross

PERITO MORENO

by Whitney Brown

art by Elijah Pettet

I like to daydream about magnificent places, and one of the planet's most incredible sights is in the Southern Patagonia Icefield, among sky-puncturing mountains, turquoise-hued lakes, and wind-shaped clouds. This sight, the Perito Moreno Glacier, is something to behold—98 square miles of snow and ice, ridges and crevasses, marvel and wonder.

So, as Perito Moreno transforms Andean snow into ice, we'll marvel. And as the glacier curves 19 blue miles toward a lake, as it towers hundreds of feet above the water, we'll wonder. Finally, when the ice cliffs calve under the weight of upslope snow, we'll behold: a cathedral's worth of glacier tumbling into the lake.[1]

I've never set foot in Patagonia. Even so, my daydream passport bears shimmering stamps from Argentina, slick-as-ice stickers of Perito Moreno.

In tangible Patagonia, most people look at Perito Moreno from viewing platforms. But in my wildest imaginings, I can go wherever I like, do whatever I want: scale the ice cliffs, cartwheel between the ridges, camp at the bottom of the crevasses. More than anything, I like to pretend that I'm swimming in the lake.

From the surface, Perito Moreno would look as jagged as a geode, and huge crystals would conceal the ice clifftops. I'd lounge on the lake, the water somehow bath-warm, but the glacier would calve, ice splintering from the cliffs, and in the second before the shards hit the water, I'd try to dash away. As the frozen mass struck the surface, I'd sink through the lake, where ice chunks would look like teal silhouettes. Then one silhouette would rise beneath me, and I'd look down to see a piece of ice surging to the surface. Lifted by that ice, supported by it, I'd burst back into the air. Flecks of mist would fall like rain, but once they had subsided, I'd see the ice cliffs' new facades: azure, angled, sharp. I'd wonder if the people on the viewing platform could see me, or if I melted into the jay-blue water.

Glaciers shrink when they melt and calve faster than they receive new snowfall, and in the era of climate change, most of Earth's glaciers are shrinking. But Perito Moreno is stable, Andean snowstorms making up for its calved ice. For a dreamer like me, one whose nightmares are often linked to climate change, Perito Moreno's stability is a delight. It's a source of awe, wonder, gratitude.

I ask myself: should I make a pilgrimage to Patagonia? What would it be like to see Perito Moreno? To wave hello to a glacier, to surround myself with ice?

I think I would cry. I know I would cry.

1 Bocchiola, Daniele, Francesco Chirico, Andrea Soncini, Roberto S. Azzoni, Guglielmina A. Diolaiuti, and Antonella Senese. "Assessment of Recent Flow, and Calving Rate of the Perito Moreno Glacier Using LANDSAT and SENTINEL2 Images." *Remote Sensing*, (2021).

But my pilgrimage would spew carbon into the atmosphere, an air-altering action that—on a planet hurt by many air-altering actions—threatens glacial stability. I'm not one to travel lightly, but I do travel often, and if Perito Moreno ever tipped toward catastrophe, I suspect I would fall apart. Crumble.

So I haven't planned a pilgrimage. Not yet. Instead, I picture myself, swimming and soaring, at the glacier. Shining.

Sometimes I dream that I'm an Andean condor, my wingspan nearly 10 feet long, blue sky coursing through the gaps in my flight feathers. I'd reel across the wind, coasting, gliding on thermals. But I'd rarely pump my wings. The air would keep me afloat.

No meal would await me at Perito Moreno, that loud-thundering field of ice, but the place would feel special—like a source of primordial wonder, or inarticulable power. I would return there often.

As the ice fell, I would hear familiar sounds: waves crashing, splashing, rocketing; onlookers exclaiming. Air is invisible to humans, though, so they couldn't consider its moods, its wobbles, the way that I could.

They wouldn't know that the icefalls make the air crackle.
Or that the crackling air makes me shake.
In the gusts, I would steady myself, airborne still.

The Canal de los Témpanos—the Iceberg Channel, an arm of Lago Argentino—abuts Perito Moreno and catches the calving ice. Human again, I dream that I'm swimming through the icebergs, through the many miles of channel. Backstroke to see the sky, freestyle to look into the lake. Breaststroke to move from one domain to the other, like an ambassador between air and water.

When I reached the lake's main body, more space would open around me: slopes backing away from the water, sunlight streaming into the valley. A perch would swim to me, and we'd exchange a few pleasantries. We'd agree that it was a soul-sustaining day, the whole world alive, the whole world fresh. To be fair, the perch would joke, this is freshwater. She'd flutter a fin, then take her leave.

I'd make it to the lake's far side, a few dozen miles away, and look for an outlet. Then I'd see it: the Santa Cruz River. Someday, in another daydream, I'll follow that river through miles and miles of cocoa-brown landscape. I'll swim to the place where the river flows into the ocean.

A notch of earth, the Península de Magallanes, protrudes into the Canal de los Témpanos, and scientists say that this has kept the glacier stable. As Perito Moreno flows downhill, it reposes against the peninsula, and in this way, the land has become a buttress; the lowest ice, a dam.[2]

Every few years, the dam collapses, a blue arch crumbling: ice shards and chunks and columns falling, breaking, bursting. On the lake, the waves roar, while the air fills with mist. Before long, the sky contains so many droplets that a gauze filters the spectacle, and through that gauze, onlookers glimpse calving ice, splashing water, heightening drama. Then, after the collapse ends, the dam spends seasons and seasons building itself back up.

When the dam has become substantial, you and I could stand on top of the ice. Imagine it with me: a splendid, sapphire-skies day at Perito Moreno. On Perito Moreno. The air would be cold, but we'd feel the sun on our cheeks, our hands, our foreheads.

Far below, we'd see the Canal de los Témpanos, the Península de Magallanes. Behind us would sprawl an expanse of ice, the glacier's beginning 19 miles away, among fleecy clouds and white slopes.

Smiling, we'd sashay across the dam.

In Patagonia, we could trek across Perito Moreno, and along the way, we'd see meltwater, the glacier dotted with blue pools. We'd kneel next to one, hit its surface with our palms, have a water fight. We'd send up a spray to plaster our hair, to push a shiver down our spines.

Later, we could kayak on the Canal de los Témpanos. As we paddled, we would spot ice chunks. When we saw one shaped like a bottle, we'd write to Perito Moreno. We'd slide our letter into the ice, trusting the lake to deliver the message, trusting the glacier to respond.

2 Lodolo, Emanuele, Federica Donda, Jorge Lozano, Luca Baradello, Roberto Romeo, Donaldo M. Bran, and Alejandro Tassone. "The Submerged Footprint of Perito Moreno Glacier." *Scientific Reports 10*, no. 1 (2020).

Dear Friends, the reply would begin.

It wouldn't come in the mail. Instead, blue-tinged words would rise from Perito Moreno, like particles of cool air, and an Andean condor would direct the words. They'd swirl over water, over land, sometimes getting lost. Then a gust would forward them, curling and spiraling.

The words would arrive on a breeze. We'd understand them easily.

Thank you for caring about me, the glacier would say. *I know that you have visited me, by watching videos and reading and daydreaming. I have sensed you here, so I have loosened ice columns near you. Sent a perch to greet you. Helped you keep your balance as you danced on the ice dam.*

Although you are strangers, I feel kinship between us.

Every day, as the perch swim, as the clouds scud, human visitors gasp at the sight of me. But I'm pleased to know that other people glow and smile and hope when they envision me.

Sometimes, for people like you, it is enough to know that a glacier is still in its prime. This knowledge can sustain humans; what humans do with this knowledge can, perhaps, sustain glaciers too.

I am tens of thousands of seasons old. About one thousand seasons ago, the air began changing: sooty specks in the atmosphere, hotter sunlight in the sky. But I remain blue, mighty, beautiful.

Yours, imaginatively,

Perito Moreno

So we'd tuck the letter into our minds. Keep it safe. Never lose it.

SUNFLOWERS AND SELFIES

by Mary Silwance

To catch the 7:04 sunrise, we left in the early dark. Along the forty-minute drive, we savored hot coffee and morning stillness while alert for deer. As the cityscape unraveled into countryside, we felt ourselves expand with the wide rolling fields. Dawn revealed sheer sheets of mist over fields of late soybean, speckled golden brown. At times skunk peppered the cold air.

For weeks, friends had posted pictures of themselves on social media in a sea of sunflowers. Their smiling faces peeked up at brown seedheads bigger than basketballs, their toddlers like little elves shaded under petals. Based on their pictures, we imagined acres of sunflowers, their splendor magnified through the rays of the rising sun. But when we turned down the final rural two-lane road to our destination, we felt underwhelmed. Then, disillusioned.

Indeed, there were acres of sunflowers. I glanced around and noticed smiley faces and hearts in some of the flowers' brown heads. Seeds deliberately pulled by humans. This felt like mutilation, or marking territory.

As we approached the fields we sought a path, not wanting to disturb or trample vegetation underfoot. But the ground was hard soil without mulch or weeds. Maybe a stray morning glory vine or bindweed, but it was mostly barren. This field of gorgeous sunflowers typified industrial farming. This was monoculture. Of course it was. What did I expect?

Monoculture is the agricultural practice of producing or growing a single crop—plant or livestock species in a field or farming system—at a time. Monoculture hinders beings from living where and how they're naturally inclined to, as members of multi-species ecosystems. Healthy ecosystems present a pluralistic population that cohabitate in mutually beneficial, self-sustaining ways. A mono-crop field, say of sunflowers, requires intensive chemical intervention to exterminate plants that



art by Justin Hein



would otherwise naturally occur as well as to artificially support the focus crop. Such interventions degrade air, soil, and water.

Our ecological upheaval and extinction crises are driven in large part by monoculture. How can I celebrate this, albeit stunning, instance of it knowing it is the brainchild of practices that ruin habitats for living beings?

I stood on the cracked bald ground, a haze obscuring the sunrise. I felt sad. What is monoculture, but the elevation or separation of a species, breed or genetic strain at the expense of others? At the expense of the collective good? Glorification of monoculture elicits themes of ethnic cleansing, racial profiling and race based subjugation that have devastated people the world over. Besides, there is little life for these sunflowers shivering in the morning cool when you think about what life could have been if they existed in a prairie or plains ecosystem with the other plants, critters and insects that make up their natural family. Are they lonely?

Remember that the science which once claimed certain races couldn't feel pain and were intellectually inferior created monoculture farming, is also the science now "discovering" plants communicate, and in their own plant way, form community. A truth long known by peoples who honor belonging to mutually beneficial pluralistic ecosystems. Who understand it's a form of mutilation and dominance to live otherwise.

But if you're just there for the selfies and hoped to catch the sun shimmer on the green, yellow, and brown bodies of sunflowers, none of what these beings need—matters.

That's how supremacy works.



art by Daniel Workman

THE PROMISE OF GRANITE

by Mara Buck

A rock lies in the path. A half-buried boulder. Common Maine granite never destined to become an upscale kitchen countertop, merely reclining where the glacier abandoned it, satisfied with its status as a dusty undignified mass. Something to trip you if you're careless. As long as I've walked this path, that damned rock has occupied that spot. Several times I've forgotten and stumbled, once even landing face first, getting personal with the woodsy world at eye level. Bruised my cheek and my ego. Damned rock.

I'm not a hiker. I'm a stroller, a painter wandering the trails of my hundred rural acres, plopping down whenever the mood strikes and the light is right to capture the moment. Such moments are increasingly rare, even here behind my gate. The world intrudes. The state highway department appropriates more and more of my property for their wider ditches, insisting that my innocent roadside trees are a menace they must eradicate. Despite my desperate protests, they continue drenching my milkweed and rugosa with toxic weed killer that trickles into the woodland brook flowing by my house. It seeps through the soil into the planet's core to infiltrate the groundwater, kills fish and frogs, and sickens whatever drinks or feeds or breathes. Sickens me as well. This chemical has been on trial as a carcinogen, banned in numerous countries, but recently our government has lifted the restrictions, considering the corporate bottom line more essential to the future of the planet than a few milkweed plants. Or a few cancer patients.

I've tried to preserve my woods as nature intended. This place where I live is not particularly pretty. It's a mishmash of ice-downed trees and new growth, ticks and deer tracks, stately blue heron and the occasional fox, the whole traversed by a perennially muddy driveway. Climate change and its accompanying ice storms have inflicted increased carnage on the forest. Centuries-old maples have tumbled like dominoes, their

frozen tonnage crushing their relatives until the former natural growth has morphed into a war zone. The emerald ash borer and the hemlock woolly adelgid have taken their toll, but woodpeckers eat the insects before any arboreal species are totally eradicated and the storm fatalities become apartment complexes for creatures whose rental fees replenish the woodlands. Throughout my twenty years in these woods, nature has continued to thrive, but currently nature has begun to gasp, her pleas pitiful, and I'm helpless to intervene. I can only rant. And watch.

They are truly wedded, the house and the land, in a perpetual embrace.

I live in a house without vinyl, freed from the trappings so adored by the real estate market of today. My hand-built house performs as a good neighbor to its site, quiet and thoughtful, and the one doesn't suffer for the other. Moss intrudes on my roof; I consider it charming. My house grows increasingly camouflaged, every day becoming more a part of the land that surrounds it. They are truly wedded, the house and the land, in a perpetual embrace. The trees maturing now outside my windows are the children of the trees whose lumber was sacrificed to become the bones of the house, and that seems just right to me. An occasional pileated woodpecker agrees as he pecks away at the posts of the porch. But this year he is alone. I'm terrified that next year I'll look for that cartoonish redhead and find nothing.

Every spring I would welcome the phoebes to their nests on my porches; one on the back, another on the front, sheltered from the weather under the roof's wide overhang, ancestral homes that are at this point as old as my own. I'd witness any number of newly-hatched youngsters fledge from those porches, their fragile tiny wings struggling until they reached the closest branch, and I would sigh in relief at their success. They made delightful tenants, but last year the nests were empty. Historic daubs of mud and dry grass, unpretty things littered with bits of shell and feather and feces, now sad relics. I've left them in place, intact, hoping, *hoping*, but in my heart I know there's been a decided change. The only birdsong I hear now is the hoarse cry of a lonesome crow, and I try to disregard the message.

This small forest, my home, a microcosm of a larger, wilder system, has been the perfect size for a single artist to share with a secret deer herd, rabbits, foxes, squirrels, but in recent years I cheer whenever I notice any hint of movement in the undergrowth, in the trees, along the brook. I saw one squirrel today. One, where there had been whole noisy families, chasing each other up the maples and down the oaks. Last week, I glimpsed a solitary doe browsing beside the brook. I wanted to rush up to her, to grab her and trundle her inside to cherish her. I often hear gunfire, even though my land is posted. I've never found deer remains, no evidence of slaughter, yet I fear something more deadly and insidious is the killer. The warmer climate has exploded the tick population and the animals have suffered. As have I. Each foray outside brings more ticks attached to the dog and to me. The new normal. How long can we adjust?

Rachael Carson wrote *Silent Spring* to warn of the demise of wildlife and the dangers of chemicals. Those words, *Silent Spring,* whisper in my ears, taunting the absence of birdsong, the stilled humming of bees and dragonflies. Wild blackberry and raspberry bushes produce stunted flowers that yield no fruit. When I see a bee, which is seldom, I smile and greet her, try to encourage her to find her relatives, to enjoy the brightness of the day. The goldenrod still rises triumphant, the asters bloom still colorful in the fall, but the lupine are scraggly. The Joe Pye weed has disappeared entirely. The Monarchs used to love the tall Joe Pye, gaudy orange flirting with the purple. Now they've disappeared as well. I've tried to replant milkweed, but it never blooms. There are no more apples on the twisted ancient trees. The land is diminished. What was lush years ago has become sad and threadbare, an elderly comb-over of its former self. The balance is tenuous. The future is questionable.

Now those nights are silent, with only the gulping of an occasional amorous bullfrog.

This is all so personal, so trivial, yet so unusual in the world of today that I feel I myself may be a vanishing species. My simple way of life is strangled by the cat's cradle of drooping wires that connects the vinyl houses perched along the highway to the power grid that struts across a field where deer used to graze at dawn. The residents of those vinyl-clad behemoths anxiously await the time when drones will deliver pizza directly to their fiberglass doors. I lack the money and the technology and the strength to live entirely off-the-grid, but my own wires are subtly buried and only the one pole at the highway announces the possibility of a twenty-first century human residence hidden beyond that road, beyond the driveway, beyond the trees. The rest of my property is referred to by the power company as

a “dead zone” along which I’ve forbidden poles and wires. I’m proud of my dead zone and it gives me great pleasure that my life is framed by nature, not the crudeness of transformers. The tree canopy remains so dense around my house that Google can’t find me and I doubt any nosy drone could penetrate. Yet changes have come and more will come, and I’m powerless to stop them.

My one hundred acres is wild but certainly not wilderness. Although I can hear a low rumble of traffic from the highway, I can see no other houses. No intruding light pollution disturbs the dense black sky; the Big Dipper hangs proud over an eighty-foot spruce. I used to hear night noises of foxes, owls, scurrying feet, and love songs in the dark. Now those nights are silent, with only the gulping of an occasional amorous bullfrog. The chorus of peepers has vanished. I remember last summer watching a single lightning bug pulse on the window frame. Only one. Pulsing for a missing mate. Can an insect be lonely? Not so long ago the evening twinkled with tiny green strobes, and I can see in memory Norman Rockwell children proudly showing off Mason jars overflowing with buglight, They are happy and carefree at summer’s dusk, rolling on chemical-free grass until they’re called inside to supper. Their grandchildren will never know such simple pleasures. Their lights will be digital, their grass Astroturf, and their suppers microwaved. Their mothers call, “Kids, don’t drink from the hose! Use your plastic bottles.” Such is progress. And the lightning bugs disappear into memory.

My knees won’t allow me to hike the mountains anymore, my back too cranky to carry a pack, but my mind looks down on untamed vistas, on the wildness of the wilderness, and I vow to do whatever I can to preserve it from the chemicals. From the intrusive chainsaws and the feller bunchers and the developmental horrors cloaked in greenbacks and lies. So many lies. Now that the clean water regulations have been eroded, perhaps to force us all to drink from the plastic spring, what can we expect in the future? What will be the future when the water is too tainted for the wildlife who are critical to the balance? I dream of things that were, but I have nightmares that extend beyond my humble personal home.

I think of that rock, that buried boulder in my path, and I try to consider it as metaphor, as a sign that beneath that which we can see lies the solidity of granite, bedrock that can neither be fracked away nor eroded, granite unchanged as a testament to the durability of the planet. The durability that will endure beyond this era of destruction.

art by Daniel Workman

TILL THE RIVERS COME HOME

by Udochukwu Chidera Amarachi



art by Daniel Workman

In the beginning, God created the heavens and earth,
He gave man dominion but he pushed the earth to its dearth,
All things were bright and beautiful,
All creatures, great and small, male and female were bountiful,
The lush pink of the rose flower,
The plush purple of the wild hibiscus,
Everything was bright and beautiful till a man came,
And earth never remained the same.

It was the year 2023 and the northwest winds carried the dust and brown sands from the Sahara and blew them into the Okitankwo River. It blew across the rainforests and the savannah like a goddess on vengeance, carrying sands and hot-blooded reptiles in its wake. We had never witnessed a dry season so vicious that it made all the wells dry and the sand very hot. This was the first year our river didn't come home.

The Okitankwo River had always been of cultural and spiritual significance to our people. Grandma told us that in the days of her youth, a mother and her newborn usually stepped outside for the first time after four weeks and would be cradled by the traditional priest who would scoop a handful of water from the enamel bowl and sprinkle the droplets on the forehead of the baby who would cry as the cold water drenched her. There would be a roar and laughter from the crowd at her naming ceremony. The child would be given to her father who would raise her with outstretched hands to the wet skies and call her name. The child would stop crying, watching her father as he whispers her names, Mmiriozuzo—the rain has come, Obianuju—born into wealth, Nnenna—our mother has returned. That way, the child would never forget where she came from; she would always follow the river home.

This was how it was done in the past. Now for those still in tune with the ways of our ancestors and as the water kept on becoming small and polluted, the mother and child would stand under an umbrella and the father would take some sand from the earth, mix it with the little spittle his tongue could produce, smear the wet earth on the head of the child making a sign of the cross. The father would pray that child's life would be filled with the memories of moist soils that still grew greens and of rivers overflowing their banks. He took the umbilical cord and buried it under the leaves of the udala tree whose roots reached deep into the ground. It had been a wonder in its youth when the waters ran through its veins but now, its snarling face etched on its bark was ridden with woody wrinkles, recalling the agony in its death, looking twisted and thirsty.

…the hot November sun reached into my eye glands and milked all the tears I had to cry, leaving them liquid-less.

The heat was relentless as I sat on the veranda and pondered on the loss of the place I had once called home. I tried to cry but my eyes were dry as if the hot November sun reached into my eye glands and milked all the tears I had to cry, leaving them liquid-less. When the child finally grew, he would never know about the Okitankwo River; the small plantations that bonded us together-sweet potatoes and sugarcanes that we grew along its edges, a few kilometers away from home. The famous Okitankwo River was the sparkling joy that ran through at least five villages including my own, Mbieri in Imo State, Nigeria. It didn't cower in the face of the fierce sun in the dry season. It came at the beginning of the rainy season and signalled the Ofa season. We would carry our cans and buckets to the river to get some water and use the smooth white pebbles that lay at its bank to scrub our dry feet till they become soft. The waters were so clear that we saw fresh fishes gliding with the tough currents—so clear that one could reach out and catch fish with both hands. Now the little water left was too warm and too toxic to support aquatic life. The fish displayed on the table by the fishermen had been dried so much that it could leave cuts in someone's mouth.

The children of today don't know what fresh fish from Okitankwo river tasted like, they were content with eating the dried crayfish and tilapia. They saw the toughness as normal, but I knew that was not what fresh fish tasted like. Fresh fish was a staple of our nsala soup; we would roll our eba into the thick spicy broth, laden with the traditional fresh catfish, and swallow it *gbim gbim* down our throats. The white sands on the Okitankwo riverbank would be used together with paw paw leaves to scrub the blackened backs of our pots and kettles till they shone like a mirror. Shouts of "Mmiri ayola, mmiri ayola" would rent the air but as the seasons came and changed and the sun grew closer to the earth, the river ran no more. We would rush to the riverbank when we heard the slightest noise but would end up staring at the hot baked earth and white stones where the water had once passed through. The edges of the river were where we dared nature, forcing the marshland to produce sweet sugarcane when we farmed with skill and patience. We would put seedlings into the ground, tend to them as the greens shot out from the earth, and wait patiently for the sweet yellow bananas that hung clearly on evergreen trees. The women in our household would carry the bananas in long baskets and ferry them to the next village where other women would hustle for the white sugarcanes in exchange for cubes of soap and seasoning. We would sit under the full moon sharing the fruits and telling folktales. But when this child would sit under the moon, he would hear stories of a gift of nature that had once been of cultural significance to his people, a source of a rare food crop and foreign exchange of some sort. With the waters went a part of us. He would be taken to the Okitankwo River and shown the pathway the waters followed—the swamp that held our crops was now ridden with remnants of water grass and the waters had retreated like a tortoise into his shell. No one uses the sands anymore; tiny green worms danced on the surface of what was left of the swamp with different generations of mosquitoes that invaded our houses at night, disrupting our sleep with the constant ringing sound and pumping malaria into our veins.

We would rush to the riverbank when we heard the slightest noise… the edges of the river were where we dared nature.

My mother said we had offended the gods, so they had cursed the land and taken back the gifts of water and the crops that grew therein. Anytime I went to what was left of the river, I saw eggs wrapped in red

clothes and bottles of Fanta. All were offerings to the gods to bring back our Okitankwo River. But it didn't come back. As I grew older and watched how nature changed all around me, I knew the gods were not to blame but we humans, and the way we didn't notice how nature was changing all around us. We kept on polluting the atmosphere with gases from our machines and cut down the trees that trapped the carbon. We told the younger ones our stories, remembering when the grass was greener and what we would have done to prevent the earth from overheating. Why had we ignored the red flags when we engaged in a toxic romance with our climate? The penguins, surrounded by their melting home, the sunflowers blossoming far earlier than they should because of temperature rises, forest fires swallowing up different species of plants and animals with their homes set in concrete.

It happened too fast: the rains not coming in April, the increasing heat, and the taint of dust. I remembered the Twitter banters, the Facebook posts, and the various threads of "Climate change is fake" and "Global warming is a conspiracy theory." I took a trip down memory lane and I concluded that it was not this bad when we were younger. Each generation met a degrading state of nature, but instead of preserving and improving on it, we perceived the decaying nature as normal, leading to a downward spiral in what we termed good nature. Present day children will find themselves left with what had once been called our home, a fading memory becoming a part of their history curriculum, and the once lush greens becoming the center of exhibition centers. Our children might never get to see nature in its true form. Our parents grew up watching palm squirrels chop from tree to tree with nuts and rats scurrying through the ceiling stealing fish from the basket but our children have forgotten that stars are part of the night sky. My little cousin hadn't put a paper boat on water before and watched it sail seamlessly with the water currents. In our carelessness about nature, we forgot that nature doesn't forget and any name you call your pet would be what it would answer. The earth was changing rapidly around us, and I was afraid. They called it eco-anxiety—fear of climate change. The idea that nature was shifting from one generation to the next, children didn't know that tigers were not just emojis in their phones but wild cats with orange stripes that ruled the forest. We are slowly forgetting what bird songs sound like and the satisfying feeling of crunching leaves under our feet on a forest floor.



No one has touched the few aquatic plants left where the Okitankwo water once was because we wanted to preserve whatever was left of our magical river. No one listens when the Federal Ministry of Water says that Nigeria's wetland loss increases by 6.5 percent per annum due to rapid urbanization. I didn't originally set out to be a writer to safeguard the environment. My first fascination was to be a doctor—like most Nigerian parents wanted their child to be, but I was perplexed when I saw that people were not noticing the darkness that enveloped the land because of the decline in the dance of fireflies. Memories of our gone river pushed me to be an environmental activist. But Mama knew I would always follow that path; I never outgrew chasing butterflies in the gardens and trapping fireflies in bottles. I moved from embracing nature to defending it. I chose my present residence because of the wild greens that grew behind it. I was hopelessly in love with nature, and I was happy to discover that a big patchwork of woods, fields, and umbrella trees behind my hostel remained untouched amid the expanding suburban grid of streets and lawns.

One morning, I woke up to the sound of a roaring chainsaw, the big ones with wicked edges used for felling giant trees. I watched the blade drive through the fleshy bark of the tree like a knife to the bones and my back twitched. I had heard about the rumors

of the government coming to build a secretariat on the land but I didn't know it would be true. I thought it was one of the stories that would fade away with time, but the chainsaws were real and the trembling sound it made was nerve-wracking. Then the bulldozers uprooted the giant trees, leaving gaping holes where they should have been.

Silence,
Melancholy,
The cooing of passenger pigeons stopped,
The whisper of sweet breeze on green leaves paused,
Loss, grief,

I felt like a part of me fell with the trees. It felt like I was never going to see a dear friend again. I felt the same type of pain that accompanied the loss of our sacred waters. It was happening over again, this violation of nature, this accelerated loss of species and life. Why didn't the government try to preserve nature in its true form, why were we robbed of the little greens we had left? What happened to having conservation centers to protect the trees that gave us oxygen and trapped carbon dioxide? Where would we run when the floods came? Whose roots would hold us firmly on the ground when the waters came? Every day I woke up to something new on the land—soon a foundation was dug and the house started taking shape. I took up my pen and wrote to the Ministry of Water and Land Resources but no one came. I went to the secretariat and sat all day waiting for the Commissioner, only for his secretary to tell me he had left by 5 pm. We lost hope and watched a building rise from a massive land that held Amazonian trees and different species of birds.

The people from the Ministry of Land came and we heaved a sigh of relief. They came, gathered in small circles, had small talks, and left. I was hopeful that they had ordered work to stop on the site, but I was wrong. The next day I came back from school and the building was wired with electric bulbs. I heard from whispers that handshakes and envelopes with a lump sum of money had been exchanged. They were giving out portions of our nature like pawns in a chessboard. This degradation is by our own hands, our creation. My friend shook her head as I took pictures and wrote columns for the school newspaper talking about the destruction of wetlands and forests due to urbanization, population explosion, and weak implementation of laws. The big men in Abuja already knew but there was nothing anyone could do; my heroic attempts could do little. I was applauded for my efforts, for drawing attention to the path of self-destruction we were heading to—but nothing more.

A year after I moved to Lagos for my internship program, I often refreshed my timeline to see news of angry waters carrying vehicles and people away. When we had cut down our trees, what did we expect? It is very important to train the future generation to have a higher appreciation for nature so that they do not make the same mistakes we are making. They should be taken outdoors to experience nature in its unadulterated form, the cooing of pigeons in backyard gardens, the beauty of corals, and hermit crabs on beaches. If not, our children will not only inherit the crimes of a generation that didn't get it right with its environment, but continue setting forests on fire and worsening the current situation. Instead of being in classes learning, they will be home, praying that the floods don't get to dangerous levels, watching as terrible winds uproot the zinc roof of houses and sail slowly away like paper boats. Till we understand that we have wronged nature, our rivers will never come home.



art by Allison Murphy

A NOVELTY OF STRATA

by Karuna Eberl

"How will we let them know? How do we leave them a message about what we did wrong, so they can get it right?" My love has posed this question several times. For him, our situation seems too bleak. He feels the weight of the future day when we lose the last emperor penguin, the day children are born onto a planet without blue whales. For him, the demise of human civilization is also inevitable, so he's seeking a solution on an expanded timeline. A way to leave seeds of wisdom for the future ones; the ones who will rebuild, so they may do so with more kindness and forethought.

It's an interesting challenge, leaving messages on a geologic timescale.

Logic says it's impossible to erase our sprawling existence. Our legacies of concrete and plastic, superhighways and suburbs. Knowledge and creativity. Physics, philosophy, biology, music, and art.

Actually, humanity is a fragile beast. But geology is not so dainty.

In a century or two, if we fail the carbon test, atmospheric CO_2 will reach 1,000 parts per million.[1] It was just 50 million years ago when the Earth was last there. The Eocene, as we dubbed it, was a humid jungle world, almost 30 degrees hotter than today,[2] where hoofed wolves[3] stalked fish from the beach and swamp-forests grew in the Arctic.[4] Humanity will not adapt well to the reincarnation of the Eocene, if we make it there at all. Earth will not just turn into a steamy jungle overnight. It will first become hostile and inhospitable.

1 Masso-Delmotte, V., et all. "Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways." IPCC, 2019.
2 News Staff. "How hot did Earth get in the past?" Syracuse University, 2022. news.syr.edu/blog/2011/07/05/geology-magazine/
3 Black, Riley. "How Did Whales Evolve?" Smithsonian Magazine, 2010. www.smithsonianmag.com/science-nature/how-did-whales-evolve-73276956/
4 Handwerk, Brian. "Primate-Like Critters Survived in the Arctic When It Was A Lush, Warm Swamp." Smithsonian Magazine, 2023. www.smithsonianmag.com/science-nature/primate-relatives-lived-in-the-arctic-circle-52-million-years-ago-180981503/

Just a handful of decades from now, at the pre-dawn of Eocene II, billions of people, displaced from submerged coastal cities and homelands turned to infertile desert, will roam the planet in search of… anything. Those with food, water, and soil will not have enough to share. Epidemics, famine, and war are now the backdrop to everyday life.

As time moves on, survival takes urgency over civilization.

Internet servers and the power plants that gave them life wither and go offline. Our ability to command satellites and communicate globally dissipates. Industrialization falls silent, along with paper mills and whatever factories in which ball-point pens were made. When the toilet paper runs out, books become a new sort of comfort item. The irony that we have just now finally quit carbon escapes most conversation.

In a few hundred years, humans will persist in scattered tribes.[5] Hunter-gatherers, mostly. Enough generations will have passed to lose accurate oral histories of the time before.

The elders tried to preserve some knowledge. They carved warnings into the rocks about greed, land ownership, and splitting atoms. They scratched equations of exponential population growth, the compounds of carbon dioxide and methane, and comforts long gone that they wanted to remember. A moose. A honeybee. A chocolate croissant.

By now, along the coasts—all oil-soaked from the billows of dislodged offshore rigs—only the skeletons of skyscrapers remain.[6] Supercharged storms and 16 feet more of ocean did away with the rest. Inland, abandoned nuclear power plants lazily contaminate the land, seep into the rivers.[7]

But the Earth moves on.

Plutonium half-lives tick down. In twenty-four millennia, only remnants of low-level radiation carry on, imprisoned below 40 feet of peat; dark soil made from the sequestered carbon of trillions of plants and other organisms that have since run their lifecycles in the tropical forests of the West.[8] On the ocean floor, only a faint layer of oil-carbon lingers, covered by a deep pillow of marine snow; the bodies of micro-animals that lived, died, and fell silently to the depths.[9] New coastal forests rise. Seabirds adapt.

5 Kiehl, Jeffrey. "Data from Earth's past holds a warning for our future under climate change." Yale Climate Connections, 2019. yaleclimateconnections.org/2019/06/data-from-earths-past-holds-a-warning-for-our-future-under-climate-change/
6 Golledge, N.R. et al. "The multi-millennial Antarctic commitment to future sea level rise." Nature, 2015. Sea level rise 5 meters by 2300. earthobservatory.nasa.gov/images/148494/anticipating-future-sea-levels
7 "How to Tear Down a Nuclear Power Plant." Scientific American, 2023. www.scientificamerican.com/slideshow/how-to-tear-down-a-nuclear-reactor/
8 "Background on Plutonium." U.S. Nuclear Regulatory Commission, 2021. www.nrc.gov/reading-rm/doc-collections/fact-sheets/plutonium.html
9 LaCapra, Véronique. "Chasing Ocean 'Snowflakes'." Oceanus, 2019. www.whoi.edu/oceanus/feature/chasing-ocean-snowflakes/

The last traces of Missoula, Salt Lake, and Denver become encased below 500 feet of rhyolitic ash. The Yellowstone caldera's fourth eruption.[10] It will still be 3 million or maybe 300 million years until the cooling returns.[11] The first snowflakes fall on the poles. Great ice sheets grow, migrating from the north. Thick beasts flowing over mountain and plain. The rusty dust of all of the cattlemen's barbed wire, the crumbled foundations of every dam and tailings pile stripped away, eroded and churned into the finest silt. An erosion period, an absence in the geologic record, is called an unconformity. An unconformity. All that is left when the glaciers retreat, ringed by moraines, those little jumbles of rocky rubble.

During the next warming, energetic, freed water carves canyons through the new layers of sediment and rock. This reveals a captivating puzzle for them—the future ones—to solve.

In Montana they find the Belt rocks again, that ten-mile-deep formation of stromatolites, the very algae which granted oxygen to Earth more than a billion years ago. Under the Yellowstone rhyolite tuff, they discover the fossils of long-extinct creatures and trees.[12]

Below that, they piece together a global layer of strange, plastic conglomerate; the sole sample of such material in the Earth's billions of years of strata.[13] They deduce it represents a cataclysmic event. A sixth mass extinction.[14] If do they find one of our messages, implausibly preserved on some slab of rock in some ancient cave, will they decipher our warnings in time?

CO_2, CH_4, $y = a(1 + r)^x$?

Or will they label the markings primitive art and debate whether we were intelligent enough to have loving relationships and complex language? Either way, what would it matter?

By then evolution might have made our warnings antiquated, our shortcomings obsolete. A road-worn sequence of genes ending in a fatally flawed branch of hominid.

Though they may ponder us, they will never unravel our full story.

Our warriors, priests, and chief executive officers. Our politicians and silicon masters. Our pipeline protestors, trash collectors, astronomers, nurses, newsreaders, basketballers, bartenders, backyard gardeners, shipwreck divers, nature writers—and, of course, my love, who so gently yearned to leave a warning—the lives of each and every one of us simplified into a narrow and bizarre novelty of strata.

10 "What caused Yellowstone's past eruptions and how do we know?" USGS.gov, 2019. www.usgs.gov/faqs/what-would-happen-if-a-supervolcano-eruption-occurred-again-yellowstone
11 Scott, Michon. "What's the coldest the Earth's ever been?" USGS.gov, 2021. https://www.climate.gov/news-features/climate-qa/whats-coldest-earths-ever-been
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13 Trinastic, Jonathan. "Plastic rock: the new anthropogenic marker in the geologic record." Scitable, 2015. www.nature.com/scitable/blog/eyes-on-environment/plastic_rock_the_new_anthropogenic/
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WHEN HUMANS SWARMED

by Marcus Ten Low



When humans swarmed the Earth,
Breathing down each other's necks,
Titillated, shaped as zooming crowds:

Our natures were bitter, some sweet,
Some replete with more and more children,
Churned-out like blobs from factories.

Setup with desks and chairs,
And a million brilliant material items,
Sat-up with a babyfied bewilderment of stares,

As we watched the greenwashed oceans,
Eyed by their blackish deadzones,
With poisoned fishes darting furtively.

Babies' needs and wants, "chimey" songs
Flowed us into happy illusions,
Celebrated further in creamy advertising.

Despite such smiles, and baby sighs
With sealife thrashing in nets, pulled from
The wasting oceans, the oceans slowly rise.

Widespread obesity resizing, we relearned it
As beautiful, just as frankenchickens
Assumed their own neat sacrifice.

It was our grace, to say something nice.
Dr. Dolittle came over—we had a ball
Trusting that plenty more animals,

Nonhuman, were left in tracts of forest or ice.
The glaciers, dripping in sunlight, had shear
And shred, leaving so many gazes dead.

We really should do something now, we
know—
But eight billion living on the globe cannot
Be unlearnt. The Earth has not long to go.

art by Gabriel Sanchez

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NICHOLAS BARNES earned a Bachelor of Arts in English at Southern Oregon University. He currently works as an editor in Portland, enjoys music, museums, movie theaters, and rain. His poems have been accepted by *Platform Review*, *Mortal Mag*, and *Barzakh*, among others.

WHITNEY BROWN primarily writes travel essays about climate change. She just graduated with an MFA in creative nonfiction from Brigham Young University. You can find some of her academic writing in *ASSAY* Journal.

MARA BUCK writes, paints, and rants in a self-constructed hideaway in the Maine woods. She won The Raven Prize for nonfiction, The Scottish Arts Club Short Story Prize, and three Moon Prizes for women's writing. Other recent first places include the F. Scott Fitzgerald Poetry Prize and The Binnacle International Prize. Her work was recognized by the Faulkner and Wisdom Society, Hackney Awards, Balticon, Confluence, and other numerous literary magazines and print anthologies.

KATE M. CHRISTENSEN, a bilingual speech language pathologist, climate activist and writer, uses writing to emerge from climate despair and imagine possibilities for the future that include a thriving planet. She lives with her family on the unceded ancestral lands Núu-agha-ttuvu-pu (Ute) and Hinono'eino (Arapaho)–in what we now call Colorado's Front Range.

KAREN DAVIS-BROWN recently retired from a career in human services and currently lives in northwest Wisconsin. For years she wrote newsletters, grants, research reports, and website content for her day job while simultaneously serving as an author and editor for the regenerative agriculture journal *Biodynamics* where she still works. Now she spends her time among trees and stones in the woods and by the water and writes to share her observations and the joy of this life with others in creative nonfiction and haiku.

KARUNA EBERL, a freelance nature writer, primarily focuses on place, history, and diversity. Her work was recently featured on the cover of *National Parks Magazine*. She calls Boulder and the San Luis Valley home.

JORDAN ECKES graduated from the University of Colorado Boulder with a degree in English Literature. Her passion is storytelling, and she has constantly pushed herself to discover the many ways one could tell a story–that's when she stumbled upon the camera. Her biggest challenge has been trying to capture the exact feeling of a certain moment in her photos, so when you look back on it you feel the same exact way. When she isn't diving into photography, you can find her skiing the back bowls of the Rocky Mountains on the weekends.

KEVIN EMBER, a student at the University of Colorado Boulder, doesn't have extensive knowledge about the field of environmental science or nuclear energy but remains passionate about preserving the earth and hopes to share this passion with others.

JESSICA HANSEN graduated from the University of Kent with a degree in English Literature with Creative Writing, currently finishing up an MA, before starting teacher training. Her work mostly concerns real world issues and human struggles. She has a complicated relationship with her home region, though it does have a certain beauty to it, and she hates to see it suffer as a result of climate change.

JUSTIN HEIN studies MCD Biology and Visual Art Practices at the University of Colorado Boulder. He grew up in Boulder and has always loved anything to do with cameras. Much of Justin's recent work relates to his love for beekeeping and bee research; although, he'll photograph just about anything (and have a fantastic time doing so).

AIDAN JONES is a graduate of the University of Colorado Boulder that is majoring in Strategic Communication with a focus on Media Design. Starting with logos and graphic design pieces for clients, he later fell in love with photography and began incorporating it into his art. More dedicated than ever before, he strives to create a portfolio that displays his photography, videography, graphic design, and personal art. Always experimenting with new forms of media, Aidan's main focus is to capture the world how he sees it.

MAYA KATZ graduated from the University of Colorado Boulder in 2021 with a Bachelor's Degree in Business Marketing. Her piece is a three-dimensional 48x24 acrylic on canvas utilizing mixed media like sand, shells, beads, rocks, foam, and glue.

CALLIE KEATING studies Business with a minor in Art Practices at the University of Colorado Boulder. She fell in love with photography because of the way it can capture a single moment and isolate it from time. She likes to use this ability, along with Photoshop, to create surreal images that make the viewer question the photograph.

KELSEY KENNEDY is a writer and photographer based in Brooklyn. She works on Broadway, only bombs at stand-up comedy half the time, and will collaborate on any creative project she can get her hands on—if it has to do with storytelling, she's interested. She graduated from Mizzou (M-I-Z) with degrees in journalism and theatre. You can find her on Twitter and Instagram (@kelseyskennedy (don't forget the middle initial)) or at her website kelseysue.com.

ETHAN LAHM currently attends the University of Colorado Boulder as a Senior earning his Arts Practices BFA. In his free time, he enjoys drawing, painting, petting dogs, and exploring the Boulder area. Ethan also hopes to make comic books one day!

RALPH LA ROSA has published a variety of prose, short fiction, poetry, and film scripts. These days, he mostly writes poetry, appearing widely on the Internet, in print journals and in anthologies. His books include the chapbook *Sonnet Stanzas* and the full-length collections *Ghost Trees* and *My Miscellaneous Muse: Poem Pastiches & Whimsical Words*.

MARCUS TEN LOW aspires to be "kind to all beings" as an ecological ethicist and artist. He has published many works in the field of animal rights and environmental protection along with being deeply observant of human character. He currently volunteers for the Animal Justic Party Qld in Australia and writes for *Stop Having Kids*. You can find him on social media (@ antibreeder1m).

SHERRY McCARVER, a wildlife photographer based in Gorgia, finds peace and solace in the wild places and enjoys capturing the beautiful sights with her camera–from the tiniest of insects to the most majestic of wildlife–the pursuit of the perfect photo brings her great happiness.

JAMES MEAD, an undergraduate student studying English Literature at The University of Colorado Boulder, works as an RA on central campus, and serves in the Colorado Air National Guard in Aurora.

CLAYTON MONTGOMERY graduated from the University of Colorado Boulder in the spring of 2021 after studying creative writing and advertising. He currently works on his writing and teaches English in the Spanish Basque Country. He hopes to soon publish a novel and a book of his photographs.

ROSALIND MORAN writes fiction, nonfiction, poetry, and plays. Her writing has appeared in *The Guardian*, *Electric Literature*, and *WIRED*, among others. In 2023, her creative nonfiction writing was shortlisted for the CRAFT Hybrid Writing Contest.

ALLISON MURPHY graduated from the University of Colorado Boulder with her BA in history and obtained her MA in English Studies from Arizona State University. Along with being a part-time lecturer, Allison also dives into the world of social studies, fine art, and creative writing.

SAMUEL MYERS-VERHAGE, a Geography major at the University of Colorado Boulder, also enjoys creative writing. He likes to implement personal experiences from traveling in his writing and hopes you enjoy reading his work.

MACY KAY NAUGHTON is a freshman at the University of Colorado Boulder interested in environmental design. She writes about her passions, including climate change.

ELIJAH PETTET graduated from the University of Colorado Boulder's Cinema Studies program and now works at Sunlight Ski Patrol. As a passionate photographer, Elijah feels honored to see his work paired with the beautiful and topical writing in CHANGING SKIES.

WINTER ROSS, an eco-feminist artist, writer, environmental activist, mental health advocate and shamanic practitioner, studied painting at Hartford Art School and received a BFA in Communications Design and Illustration from Rhode Island School of Design. She's had a long career as a graphic designer, including work for Rocky Mountain PBS. She has also held numerous artist-in-residence, teaching, and museum positions and received grants for independent curatorial projects which highlight environmental issues while exploring visionary and spiritual themes. Winter lives in Taos, New Mexico and Crestone, Colorado–same bioregion, both magical.

SONALI ROY takes interest in holistic approaches for maintaining good health both for humans and their nonhuman friends, as well as business management, latest science discoveries, technology, robotics, archaeology, architecture, food and nutrition, history, spirituality, art, and culture. She is a passionate traveler and photographer, music composer, singer, painter, 3-D art designer. She enjoys yoga and meditates regularly.

GABRIEL SANCHEZ, an artist, oil painter, entrepreneur, creative, and muralist whose strengths lie in his ability to bring ideas to life through visual expression. With a keen eye for detail, he has honed his skills, allowing him to bring unique perspectives to every project he undertakes.

ADLER SHANNON is a graduate of the University of Colorado Boulder. He has bachelor's degrees in History and Media Production, and also has a minor in Anthropology. After college Adler joined Boulder Media House, a production company in Denver, Colorado, where he worked as a commercial editor and videographer on a plethora of commercial projects. He currently works for the Zealand Youtube channel, based in New York City. He serves as the director and lead editor for the channel, catering to an ever-growing viewer base with over 300k subscribers and 3.5 million views in the last month.

Originally from Egypt, **MARY SILWANCE** now lives in Kansas City. Mary provides workshops on writing and serves on the editorial team of Kansas City Voices. While her poetry and essays appear in numerous publications, Mary explores ecology from an

intersection of justice and spirituality in workshops and at her website (www.marysilwance.com). Mary recently attended the Bread Loaf Environmental Writers Conference. When not outside, you can find Mary begging her three teenage daughters to play charades.

EDWARD MICHAEL SUPRANOWICZ is the grandson of Irish and Russian/Ukrainian immigrants. He grew up on a small farm in Appalachia. He has a grad background in painting and printmaking. Some of his artwork has recently or will soon appear in *Fish Food, Streetlight, Another Chicago Magazine, The Door Is a Jar, The Phoenix,* and other journals. Edward is also a published poet.

A science writer focusing for the past 15 years on environmental issues, **DENISE THORNTON** currently writes for The Aldo Leopold Foundation and has a blog (www.digginginthedriftless.com). Denise and her partner pour themselves into prairie and woodland restoration on their 44 acres in the Driftless Area of Wisconsin, where they live cozily and with clear consciences in the branching, unmilled timber frame, straw bale, passive solar, sod roofed house referred to in her essay.

Born and raised in Denver, Colorado, **COLIN J. TURNER** now lives in Boulder. An artist in his free time, Colin's favorite mediums include film photography, drawing, and mixed media. Colin is a certified CNC machinist, completing a degree in Computer-aided Design.

NANCY WHITECROSS, a poet and author from England, currently resides in South Africa. She previously qualified as an accountant in England. She last worked as a financial director of a company until she retired and began her autobiography. As a dive instructor who has traveled the world, she has witnessed firsthand how climate change has impacted the oceans.

DANIEL WORKMAN obtained his AAS from the Isaacson School for Professional Photography and graduated from the University of Colorado Boulder. Daniel focuses his artistic energy into mediums such as writing, photography, filmmaking, and songwriting. With an interest in culture, anthropology strongly influences the work he creates. Daniel's accomplishments include work with Pulitzer Prize winning photographers at the Eddie Adams Workshop in New York. Daniel is a frequent contributor to HINDSIGHT, having now appeared in five issues, including our earlier title, JOURNAL TWENTY TWENTY. You can find more of Daniel's work on his website (themodernnegative.com).



art by Daniel Workman

HINDSIGHT + CHANGING SKIES

BEYOND THE PAGE

Since the launch of Hindsight's second print title, CHANGING SKIES, our staff has been exploring ways to expand our committment to publishing incredible, diverse creative nonfiction. With two print titles, an ever-growing body of online publication, membership with CLMP, and more to come, HINDSIGHT is looking onward and upward as we try to answer that ever-present question: where do we go from here?

This year, HINDSIGHT joined the Community of Literary Magazines & Presses (CLMP), an organization committed to bringing small publishers together into a shared wealth of knowledge and support. Through the community at CLMP, HINDSIGHT can explore new heights of independent publishing and continue to promote incredible work.

HINDSIGHT has also joined Duotrope, a catalogue of publishers and agents from across the globe. Duotrope will help more writers and artists find their way to our pages, providing us with an even greater diversity of experience and artistry to highlight.

Updating our website, HINDSIGHTJOURNAL.ORG, has been a major project for us. Through our year-round submission portal, we recieve exeptional work that doesn't make the page. Developing a web space for HINDSIGHT to publish work outside of our print titles has allowed us to put more incredible creative non-fiction out into the world without the same production constraints.

Attending the annual Association for Writers and Writing Programs (AWP) conference has been another feather in the cap of our journal. AWP has served as an outlet for HINDSIGHT to spread its wings, enjoying a distribution of over 500 individual print issues at 2023's Seattle conference. As we approach the 2024 season and our third conference, we look forward to continuing to build relationships with both the literary community at large and with artists, wisened and fledgling, around the globe as they search for new ways for their work to be seen.

- Ian Hall & Marisa Lange

[clmp] who we are and what we believe

[clmp]

Community of Literary Magazines & Presses

who we are and what we believe

We—the Community of Literary Magazines and Presses—are hundreds of small publishers creating print and digital books, magazines, online publications, chapbooks, and zines, who have come together to do our work as publishers better and to organize around a shared set of beliefs:

[We believe that small literary publishers play a vital role in our culture by connecting the greatest diversity of distinctive writers to equally diverse communities of readers.]

[We believe that literary publishing is an artistic practice that helps writers realize their artistic vision and readers discover their work.]

[We believe that by increasing the organizational capacity of small literary publishers we contribute significantly to the vitality and vibrancy of our literary culture.]

[We believe that being a member of our community means participating in an environment of mutual support with both rights and responsibilities.]

[We believe in actively engaging those who share our passion for literature—readers, writers, booksellers, librarians, students, educators, funders, business leaders, and others—to ensure that small literary publishers, and the work they help shape and make public, will continue to thrive.]

[clmp] celebrates excellence in both the how and why of what our publishers do: bring readers and writers of literature together in the true spirit of community.

www.clmp.org

TEN YEARS ON

In 2013, JOURNAL TWENTY TWENTY began out of a single classroom. Inspired by the incredible writing from the students of WRTG 2020, that project went on to produce eight volumes of writing and art. Rebranding to HINDSIGHT in the year 2020, we asked—where do we go from here? The answer, of course: we go on. We have since produced three volumes of HINDSIGHT, and now our second volume of CHANGING SKIES.

We now publish writers from around the globe, while still preserving a space for University of Colorado Students. All submissions go through blind review first reads, with our top editors ensuring a majority of work from beyond the front range makes it way to our pages. As we continue on into a new decade of publishing creative nonfiction, our staff is committed to working with a vast array of international contributors while still remembering HINDSIGHT'S roots as a student-led publication.

Here's to another volume, another amazing staff, and another ten years.

