
SPRINGS

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Note from the Editors

How many generations does it take to make a meal? How do we show we care—for humans and for nonhumans alike? When we look up, is it a starry night or a sea of fog? The latest edition of [Springs: The Rachel Carson Center Review](#) is a meditation on the minutiae and a potential answer to these questions.

At home in Utah, author Christopher Cokinos reflects upon a life of lunar research, as it led him to Tucson, Arizona, and back again, contemplating the expectations we put on places. Cokinos encourages us to stop what we are doing and look up, to sit with the alien terrain, and to ponder [“The Place of the Moon”](#) in our lives, histories, and futures.

Although often dubbed the “poor man’s soup,” from the Middle East to the Balkans, the culinary heritage and human traditions of tarhana prove that it is so much more. In [“Cultures of Tarhana,”](#) biologist and human geographer Sevgi Mutlu Sirakova explores the fermented staple’s diverse history, from its microbial cultures to its distinct culinary flavors and skills, foregrounding tarhana’s importance to a sustainable future of food.

[“Everybody Talks About the Weather”](#) is a historical advertising slogan that encapsulates multiple stories about German environmental politics. As historian Stephen Milder demonstrates how the meaning of the slogan has moved away from a parody of “idle chitchat” and taken on a “radically different, urgent undertone,” the essay reveals how today’s perception of environmental problems differs from that of the 1960s.

If reading about tarhana worked up your appetite, get ready for your second course with writer and cultural historian L. Sasha Gora’s [“Stew of the Earth.”](#) Travelling to the town of Furnas, on the Azorean island of São Miguel, Gora guides us through a place where hot springs boil tea and fumaroles simmer stew, and asks us to consider the relationship between environments, ingredients, energy, and being ecological.

Wrestling with the ethics of keeping birds in captivity for human pleasure, [“Avian Escapees and Budgie Snugglers”](#) is where historian Kieko Matteson pens her discord. As Matteson looks at ways to harness our attachment to individual companion species, she attests that it is “so much harder to feel comparable passion towards bird’s survival on a larger scale.” Initiatives like the “Feathered Lives Also Count” Act, she proposes, could take the place of cages.

Daniel Dumas’ discussion with critical geographer Elspeth Oppermann begins north of Sydney, in Darwin, Australia’s Top End and Oppermann’s childhood home. Oppermann has developed a novel approach—combining ethnography with thermal physiology—to better understand socio-material and energetic relations between bodies and their environments. From the military to the construction site, [“Handling Heat”](#) discusses what it means to work in and on heat in the age of climate change.

Beyond these exciting additions, *Springs* continues its efforts to assemble writing from other open-access RCC publications. Our *Springs* [archive](#) curates articles from the online and print journal [RCC Perspectives](#) (2010-2020), the peer-reviewed online journal [Arcadia: Explorations in Environmental History](#), and publications from RCC’s multigenre ecopedia, [Seeing the Woods](#).

Munich,
31 October 2024

THE PLACE OF THE MOON

Christopher Cokinos

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Christopher Cokinos

The same Moon rises everywhere, but, for me, the Moon is part of the US West. It rose over my first house near Logan, Utah; three houses in Tucson, Arizona; a canyon cabin in Utah; a brief home in Salt Lake City, Utah; and now, a retirement house in Logan, a place that, years ago, I thought I'd never leave. Moonlight—and the satellite's wild surface as revealed by my telescope—reshaped my relationships to the Sonoran Desert and to the Wasatch Mountains of northern Utah, to which one science writer compared a lunar crater.



Still from the film *Frau im Mond*, written by Thea von Harbou, directed by Fritz Lang, 1928/29. Photo by Horst von Harbou / Deutsche Kinemathek. [Public domain](#).

In the West, the Moon changed me. It made me a better person. Learning its human and scientific history, spending hours observing through my telescope, and thinking hard about the expectations that we put on places—often unrealistically—reminded me of the need for humility before expanse.



The author's study with Moon map and telescope in the nineteenth-century adobe house he and his wife restored in Tucson. © William Lesch. All rights reserved.

When I first left Logan more than a decade ago, I wept. I didn't think my wife and I would ever move from the riverside acres we'd lived on for years, home to willows and beavers, dogwood and wintering eagles. But a new job and perhaps more opportunities for me and Kathe awaited in Tucson. I hadn't counted on imposter syndrome, one of several chasms I felt could be filled by adulation, nor could I embrace the pointed heat of the desert. I faltered, stumbling in what Arthur Miller once called "the usual darkness," where my 10-inch-aperture telescope also gathered dust.¹

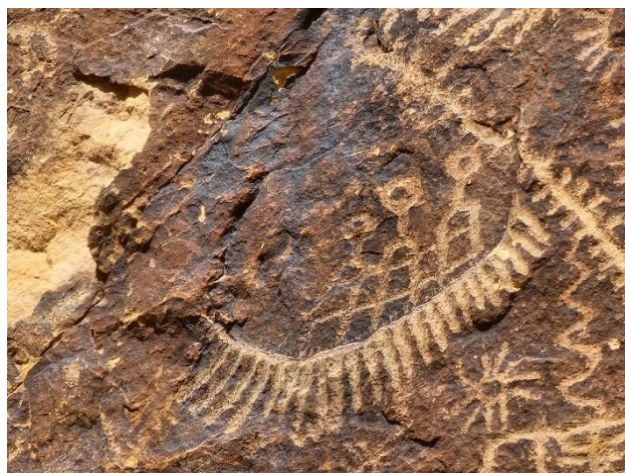
Then I saw the Moon anew. For years, I had avoided it because I preferred looking at galaxies and nebulae, "faint fuzzies," as amateur astronomers call them. But in my Tucson backyards, seeking calm from meditation, conversation, and therapy, but also from the sky, I looked at the Moon with a sudden appreciation for its sublime landscapes, its hulking mountain ranges, its terraced craters the size of states, and its valleys gouged out by meteorites. As well, I looked at the Moon from the cabin we got in Logan Canyon in order to escape Tucson's belligerent summers. It peeked above the ridge in early evenings like a trickster with something obvious to tell me.

I would go on to learn that in the US West, especially for native cultures, the Moon was, as elsewhere, terribly important. Archaeoastronomy sites, like New Mexico's Chaco Canyon, and Utah's Parowan Gap, demonstrate the sophistication and importance of Indigenous lunar astronomy—such ancient lunar astronomy was some of the first empirical study of the heavens, helping cultures bridge the temporal gap between days and seasons. More recently, places like the Flagstaff area would become "analogs" for lunar terrain; Apollo astronauts and, now, NASA's Artemis explorers put on space suits and work as though they are on the Moon.

In Tucson and Logan Canyon, I learned my way around the Moon, learned its science and folklore, listened to either traffic or hermit thrushes, and, with the help of loved ones and the occasional book of philosophy—I lugged Schopenhauer in backpacks—I cultivated what that thinker calls, in my loose translation, "the will that has calmed itself."² It's strange: how the right kinds of connections foster the right kinds of unattachment. Those connections were observational and empirical: I looked at the Moon carefully, gaining knowledge of its topography, and I read about the Moon deeply, gaining an appreciation of its many stories, literal and fanciful. So, the linkages I felt toward the Moon allowed me to loosen unhelpful linkages on the Earth, like those of career pressure or the desire for approval.

In the words of one nineteenth-century selenographer, I "became in thought a lunar being."³ Who needs ambition when you can fly over the rounded peak of Mons Hadley Delta? Or craving when the terminator—the line dividing light from darkness—falls over the inky ashes of Sinus Aestuum?

Writing about our companion world, which moonwalker James Irwin compared to an Idaho winterscape, became a form of homecoming to the place I loved most—Utah—and a form of reconciliation with a place I'd struggled with—Arizona.⁴

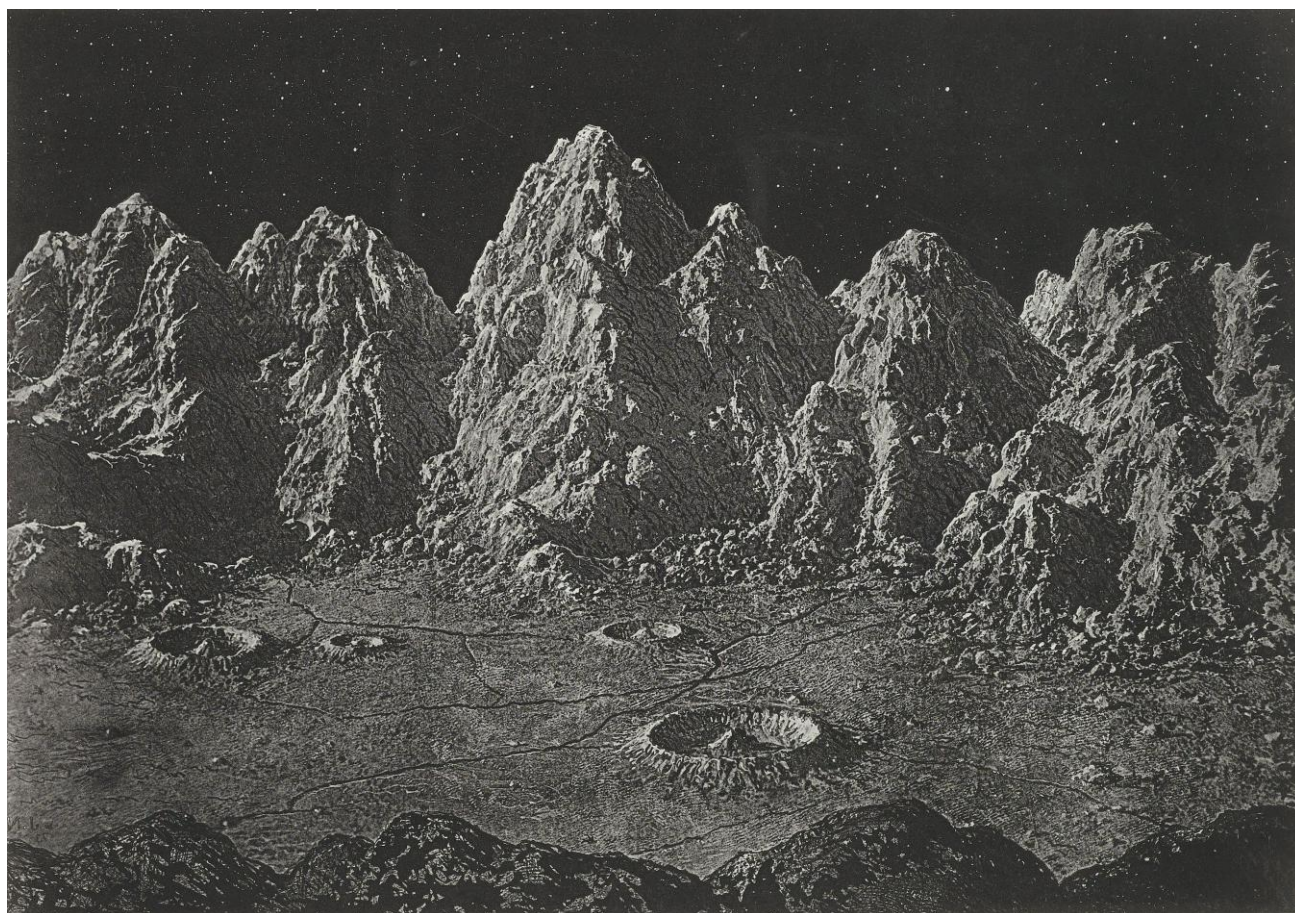


Rock imagery from Parowan Gap, Utah, depicting what some scholars say are the "three Moons of winter." Native cultures say it depicts a famine story. Both explanations may be correct. © Christopher Cokinos. All rights reserved.

Though he didn't walk on the Moon, another Apollo astronaut, Frank Borman, first described its sight from orbit as "a vast, lonely, forbidding-type existence, or expanse of nothing."⁵ Yet the lunar landscape is full of drama and lessons! Borman wasn't ready to take the Moon on its own terms. Ironically, I'd done to Tucson what Borman (a Tucson native) had done to the Moon.

The Moon's terrain was visualized as sharp-peaked, creased, almost ridiculous in pointy-mountain splendor.

Behind Borman's remark is a fascinating off-world environmental history. Though nineteenth-century selenographers were perfectly aware that rounded objects cast sharp shadows and despite the visual evidence of rounded mountains that kept accumulating into the early twentieth century, the Moon's terrain was visualized as sharp-peaked, creased, almost ridiculous in pointy-mountain splendor. By the middle of the twentieth century, astronomers—both professional and amateur—knew, and in the later cases, were drawing, lunar features correctly: Mountains and crater rims of the Moon had been worn down by eons of meteorite strikes, giving the lunar landscape a swelling, muscular grandeur, not the alpine fictions of such artists as Chesley Bonestell. In short, the Moon's hulking peaks were rounded not sharp. This fact deeply annoyed those who had created a Romantically sublime fictional Moon that looked like lunar Alps. For them, a Moon with rounded mountains was boring.



A nineteenth-century depiction of a kind of alpine Moon, a Romantic view that even some astronomers then knew was incorrect. The Moon's mountains are rounded and muscular. The tension between accurate depiction of place and what it "ought" to be has been central to the author's quest for coming to terms with the Moon and locales in the US West. James Nasmyth, *Group of Lunar Mountains. Ideal Lunar Landscape*, c. 1830, collotype, 145 x 207 mm, Rijksmuseum Amsterdam, Plate XXIII. [Public domain](#).

Bonestell famously illustrated views of our solar system—especially in the 1940s and 1950s—that were accurate within bounds of science. But he knew his paintings of the Moon were not. Like the artists of the US West and the Hudson River School who exaggerated landscape features, Bonestell painted the Moon, as one of his defenders puts it, “as it ought to be.”⁶ Without such a fictional landscape, they ask, would we have wanted to go there at all?

Such a misunderstanding of the geopolitical context for the lunar Space Race is remarkable. President John F. Kennedy was not looking at Bonestell’s popular illustrations in *Life* magazine or the book *Conquest of Space*.⁷ Kennedy did not care for space exploration. But he was convinced by arguments that a moonshot would be the best way to beat the Soviets in the eyes of the world.

Apollo was born, and, in 1968, Apollo 8 sent the first humans, including Borman, to another world. Focused mostly on the mission and with very little lunar-science preparation, the crew “othered” the Moon, calling it “dirty beach sand” and saying it “certainly would not appear to be a very inviting place to live or work.”⁸

Although the Moon has no Indigenous life, attitudes that we bring to it will help determine our state of mind there. If it’s boring, ugly, and dirty, then we bring that negativity with us onto the surface of a world that has been manifestly crucial to our species. Alternatively, really appreciating the lunar surface through the telescope and lunar history through books has given me quite the opposite reaction of the Apollo 8 crew. My time in Tucson, ironically, was a version of what Apollo 8 did to the Moon.

Attitudes that we bring to the Moon will help determine our state of mind there. If it’s boring, ugly, and dirty, we bring that negativity onto the surface of a world that has been crucial to our species.

While I had spent the first years in Tucson trying to learn its natural history—even coediting *The Sonoran Desert: A Literary Field Guide*—I could never overcome my own sense that, strictly for me, it was not “an inviting place to live or work.” The heat staggered me. Thorns grew everywhere. I missed northern Utah, where I had experienced what Germans call *Heimat* (“home,” with emotional connotations). It was my home ground.

Later Apollo missions, starting with Apollo 15, emphasized science. The Apollo 15 crew in particular grew fond of the Moon and spoke of it in familiar, loving terms. It became a home. They had prepared for a place by learning of it ahead of arrival, working in what philosopher Sandra Shapshay calls “the thick sublime.”⁹ I had tried, belatedly, to overcome my objections to Tucson’s climate and flora, only to find it wouldn’t work. Notably, I also became less of an activist there. By being less connected to place, I was less motivated to steward it.

As COVID-19 hit and my teaching moved online, and as Kathe and I eyed an early retirement, we moved back to Utah, for a time settling in Salt Lake City. I learned there that our house was close to where Apollo 15 moonwalker James Irwin had lived during his high school years. He and I shared trails in the Wasatch foothills. I loved that coincidence, but it wasn’t enough to keep us from returning to Logan, where, apart from Tucson, our closest friends live, where I know best the trails, birds, seasons, and plants.



The Moon seen through the author’s telescope from his cabin at Logan Canyon, Utah. © Christopher Cokinos. All rights reserved.

One of the first things I did when we bought this bungalow was put up the telescope on a spring evening. We hadn't moved in yet. In fact, the renovation was just underway, but I showed our friends Paul and Phebe the Moon. The sky over this house is capacious.

The Moon's West, however, is not only a personal story. As I worked on my book about the natural and human history of the rocky satellite, I followed in the footsteps of the Apollo astronauts who trained here. The US West has been a kind of lunar proving ground. It still is, for a new generation of explorers under NASA's Artemis program, which will land the first woman and first person of color on the Moon in a couple of years.



Artemis I Rollout (NHQ202211040012). [CC BY-NC-ND 2.0](#). Courtesy of NASA.

At the Rio Grande Gorge outside of Taos, I stood by the cliff's edge where Irwin and fellow Apollo 15 moonwalker Dave Scott practiced their 1971 explorations of the wide and deep Hadley Rille, which once flowed with lunar lava. Near Flagstaff, I drove the same cinder roads that Apollo crews and geologists drove as they simulated excursions in the Lunar Roving Vehicle—the makeshift terrestrial version was built in sheds and garages in Flag and was affectionately called “Grover” (short for “geologic rover”).

On my way to use the 60-inch telescope at Mount Wilson, perched between Los Angeles and the Antelope Valley where Neil Armstrong once lived, I stopped along a creek beside a roadcut. It exposed a bright white rock: anorthosite. This light mineral occurs on the Moon too, and astronauts came to this very spot to sample it and recognize its importance. On the primordial Moon, anorthosite floated to the top of a massive ocean of magma. I picked up chunks from beside the pavement, and they glittered in the sun. Finding anorthosite on the Moon helped confirm this magma ocean, an ocean that was the consequence of—and evidence for—the unfathomable chance violence in the form of impacts.

And it was in Tucson, of all places, at the Lunar and Planetary Laboratory (LPL) in the early 1960s that our modern lunar exploration truly began, with LPL's renowned scientist Gerard Kuiper directing telescopic mapping and the first primitive probes, the Ranger series, which took photos as they neared—then crashed into—the Moon. It was in an LPL Quonset hut that William K. Hartmann, then a grad student, discovered a massive impact feature mostly on the Moon's farside. And it was Hartmann, along with Donald R. Davis, who correctly hypothesized that the Moon was formed when a giant protoplanet slammed into the Earth about four billion years ago.



Backyard of the nineteenth-century adobe house, where the author had put up his telescope. © William Lesch. All rights reserved.

My alienation in the desert altered somewhat during my lunar voyages, for it was in the city I had struggled against that twentieth-century scientific studies of the Moon began in earnest. I have now fonder memories of that place, though I don't regret leaving: Once, after showing the Moon to our friends' young son, I saw his face lit from the eyepiece, palm trees rattled—strange sound!—and I felt my eyes tear up. It was magical.

What do we want from the places where we live? And, if visions are to be believed, places where we'll live next, like on the Moon, where water ice lurks in the shadows of polar craters? By being less connected to a place, we'll be less motivated to steward it. Already, policymakers, astronauts,

lawyers, artists, and scientists are urging that our lunar return take into account the place the Moon holds for cultures around the world. That we listen to diverse voices. And that we leave some parts of the Moon free from mining water ice, so that scientific sites, historical sites (like the Apollo landing zones), and vast swathes of lunar wilderness can be free of industrial infrastructure. Groups like [For All Moonkind](#) and the Europe-based [Moon Village Association](#) are trying to inflect policy in this way.

Part of that effort must be, I think, to really know the Moon's wider cultural, scientific, and artistic history—the very history I encountered in writing *Still as Bright: An Illuminating History of the Moon, from Antiquity to Tomorrow*. Part of that effort also involves seeing the Moon—deliberately. Putting eye to eyepiece to get to know the lunar landscape, its features, and its names. I can tell you, honestly, it is a remarkable vision, the magnified Moon in an eyepiece. If we don't, we risk doing to the Moon what Frank Borman did to it. And, in my way, what I did to Tucson.

Part of the effort must be to really know the Moon's cultural, scientific, and artistic history. It involves seeing the Moon—deliberately. Putting eye to eyepiece to get to know the lunar landscape.

Returning to the Moon to stay is full of promise and peril. It could be an opportunity to responsibly settle another world, balancing all kinds of social and scientific considerations. Or it could repeat terrestrial mistakes of unregulated exploitation. What it won't be is a replacement for Earth.

No one can claim legal ownership of the Moon. Yet we all possess it.

"I own [my house]," wrote British novelist Brian Aldiss, "in the way that the Moon and the tree shadows own me: by falling across me and influencing me intensely . . . The intense love one has of one's house is really a love of life itself."¹⁰

Back home in Logan, I've come full circle, like a Moon in its motions, drawn most to what holds it close.

It's no small thing to me that the first long look I took at the Moon was from beside mesquites in our gravelly backyard of the Tucson adobe. Kathe was tending a fire and singing. I was shocked by the telescopic sharpness of Copernicus, a crater that looks a bit like a flower, but is a real place. That view reminded me of a childhood smitten with spaceflight and, more importantly, the present in which nothing should be taken for granted: love, luck, homes, the familiar and ever-new, whether it's the wide side of this continent or the person with whom you orbit and to whom you call, "You have to come see this view."

From such intimacies, we can make ourselves better citizens of place

Notes

¹ Arthur Miller, *The Penguin Arthur Miller: Collected Plays* (Penguin, 2015), 143.

² Arthur Schopenhauer, *The World as Will and Representation*, trans. and ed. Judith Norman, Alistair Welchman, and Christopher Janaway (Cambridge University Press, 2010), 439.

³ James Nasmyth and James Carpenter, *The Moon Considered as a Planet, a World, and a Satellite* (John Murray, 1903), 257.

⁴ James Irwin and William A. Emerson, Jr., *To Rule the Night* (Ballentine, 1973), 46.

⁵ David Woods and Frank O'Brien, "Apollo 8 Lunar Flight Journal," *Apollo Flight Journal*, National Aeronautics and Space Administration NASA History Division, 4 May 2024, <https://www.nasa.gov/history/afj/ap08fj/index.html>.

⁶ Ron Miller and Frederick C. Durant III, *The Art of Chesley Bonestell* (Paper Tiger, 2001), 26.

⁷ "Solar System: It Is Modeled in Miniature by Saturn, Its Rings and Nine Moons," *Life* magazine, 29 May 1944, 78-80, 83-84, 86; Willy Lee, *The Conquest of Space* (Viking, 1949).

⁸ Woods and O'Brien, "Apollo 8 Lunar Flight Journal."

⁹ Emily Brady, *The Sublime in Modern Philosophy: Aesthetics, Ethics, and Nature* (Cambridge University Press, 2017), 189.

¹⁰ Brian Aldiss, *The Shape of Further Things: Speculations on Change* (Doubleday, 1971), 1, 84.

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CULTURES OF TARHANA: A TALE OF HUMANS AND MICROBES

Sevgi Mutlu Sirakova

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This article is peer reviewed

Sevgi Mutlu Sirakova

The entire house was permeated with a smell reminiscent of fresh sourdough. It was the first thing that greeted you—the herald of a warm wintertime soup in the making: tarhana. In autumn, the scent of tarhana preparation, a process lasting three weeks, envelops many village homes in Turkey, Cyprus, and Bosnia. When you open the door to the room where tarhana base is spread out to dry, the sharp smell hits you and serves as a vivid reminder of its special place in culture.



Tarhana base and soup. © Grandbrothers on Adobe Stock. All rights reserved.

The cultures of tarhana—a fermented instant soup base—come with a long-practiced culinary tradition in the Middle East and the Balkans.¹ Although often dubbed the “poor man’s soup,” tarhana is much more than just a soup; it is a fermented staple that has preserved and transmitted distinct flavours, culinary skills, and cultural heritages across generations. While conducting ethnographic research on fermentation practices in Bulgaria and Turkey, I’ve learnt to appreciate the prevalence and diversity of tarhana traditions.² I began to see that “cultures” of tarhana encompass not only live fermentation starters, where microbes play a specific role, but also the rich traditions and practices surrounding this staple.

As fermentation practices weave invisible microbial, traditional, and imaginative threads together, they provide fertile ground for exploring these intertwined cultures of tarhana across three layers. The first layer hosts microbial cultures that have been passed down through generations and spread across locations. Here, fermentation emerges as a “coevolutionary force,”³ selecting the microbes that both shape and are shaped by tarhana practices. The second layer holds traditional skills and

knowledge as diverse as the variety of fermented products they yield. And the third layer harbours culinary heritages that have the potential to inspire sustainable paths amidst the fading of traditional foodways.

Coevolving with Microbes

The cultural prominence of tarhana is engrained in a deep history.⁴ As its tart scent suggests, its fermentation process is akin to that of sourdough bread. Both involve cereal fermentation facilitated by yeast and lactic-acid bacteria.⁵ Despite numerous varieties of tarhana,⁶ almost all of them share three common ingredients: finely milled grains (predominantly wheat), yogurt, and the collective labour of both nonhumans and humans.



Preparing tarhana dough. © tolgaldun on iStock. All rights reserved.

Within the *long-durée* history of human-microbe partnerships, two ingredients of tarhana are particularly noteworthy: yogurt—recognised as the oldest fermented dairy product,⁷ and wheat—integral to other ancient, fermented products like beer and bread.⁸

The microbial side of tarhana's story begins with two starter cultures: yogurt and previous tarhana batches. Flour, cooked vegetables, and spices are then mixed with these cultures, which are teeming with the yeast and bacteria that enable tarhana's metamorphosis.⁹ The lactic-acid fermentation of cereals that characterises this stage imparts a distinctive sour taste to tarhana, just as it does to sourdough bread, intertwining their flavours and fermentation tales. During its week-long fermentation, tarhana is mixed daily by hand, its transformation carefully observed.

What distinguishes tarhana from sourdough bread is its two-week drying stage. The dough is divided into small pieces and spread out on cotton sheets. This phase slows down tarhana's transformation and enhances its flavour and longevity. As a result, dry tarhana can be stored for

many years, much longer than bread, making it an ideal provision for winter. By adding water, the dry mixture can be quickly cooked into a nutritious soup. These qualities are plausibly what have made tarhana an indispensable food for nomadic societies in the western Eurasia, who travel seasonally to find grazing land for their herds and therefore benefit from nonperishable food.

Fermented foods evolved alongside the domestication of plants and animals in preagricultural times.¹⁰ Throughout the long history of human-microbe collaborations, each culture has developed its own unique methods of fermentation.¹¹ These traditions have become the cornerstones of culinary practices globally.¹² Until recently, fermentation was the primary method of preserving food, and it still contributes to a significant portion of our diet.¹³ Bread, wine, and cheese are just a few gifts from those collaborations, with the ecological diversity of each region reflected in the different flavours of fermented products.¹⁴ Tarhana likely emerged from such ancient foodscapes, blending yogurt—itsself a fermented product—and wheat—two foundational components of early fermentation practices in the Fertile Crescent.

The recurring fermentation practices in the long term set the stage for a coevolutionary process that leads to “successive changes in two or more ecologically interdependent species.”¹⁵ From a biological perspective, such changes are genetically traceable in both humans and the microbial species involved in the fermentation practices.¹⁶



Tarhana dough after resting for about a week. © Sevgi Mutlu Sirakova. All rights reserved.



(Left) Divided tarhana dough waiting to dry. (Right) Breaking the drying tarhana into smaller pieces. © Sevgi Mutlu Sirakova. All rights reserved.

It is even more fascinating to consider how fermentation practices, such as making tarhana, not only influence the microbes involved but also inform the microbes’ evolutionary selection. These practices serve as a form of “niche construction” for the microbes;¹⁷ humans actively control fermentation ecologies by altering environmental conditions, such as temperature, nutritional content, and oxygen level. Our species guides microbial successions to favour beneficial microbes and suppress harmful ones.¹⁸

Every act of fermentation requires skills and traditions to create ecological niches suitable for microbial selections. The repetitive and adaptive nature of these practices creates persistent selective ecologies, which potentially pave the way for the domestication of microbes. Sensing and interacting with microbial ecologies is crucial for guiding microbial successions.¹⁹ And this requires mastery; without the skills to navigate microbial possibilities, the endeavour may easily fail.

When we consider how humans benefit from relationships with microbes in fermentation, it is conceivable that certain microbes have been domesticated via these practices.²⁰ However, this relationship is not one-sided; the selected microbes, in turn, produce the flavours we desire, making the interaction inherently interdependent. In terms of evolutionary strategy, we should also acknowledge that microbes have effectively been using us to ensure their genes are transmitted across generations.

As evolutionary ecologist Rob Dunn posits, yeast—a key fermentation agent in bread and beer (and we may add tarhana)—has essentially domesticated humans.²¹ It is through yeast that cereals became a staple in our diet. This perspective is based on the evolutionary concept of domestication, which requires significant genetic adaptation over time.²² When we compare the evolution of human and yeast traits, it appears that human genes have undergone a certain level of change in this coevolutionary tale,²³ while the yeast genome has remained relatively unchanged.



Dried and granulated tarhana ready for storage. (Left) © Busranur Cebi on iStock. All rights reserved. (Right) © Sevgi Mutlu Sirakova. All rights reserved.

Enduring Traditions of Tarhana

Fermentation traditions embed rituals into tarhana's ecologies that allow microbes, stories, and imaginations of tarhana to travel and transform with each preparation. This coevolution is reflected in the various regional names for what in Turkish is called *tarhana*, including *tarkhana* in Armenian, *tarkhineh* in Persian, *tarxane* in Kurdish, *trahanas* in Greek, *tarhonya* in Hungarian, and *tarana* in Serbo-Croatian.²⁴

Research examining the linguistic origins of *tarhana* explores its potential evolution in the Hittite and Byzantine periods and underscores the complexity of its heritage.²⁵ These studies suggest that the various names for tarhana share a common ancestor, perhaps as ancient as the common ancestor of their microbial cultures.

It is commonly accepted that “tarhana” originates from the Persian *tarḫwāne* (ترخوانه), meaning “soup made from dried yogurt.”²⁶ This term combines the Persian words *tar* (تر), meaning “wet or soaked,” and *ḫwān* (خوان), meaning “table, dining place” or “large wooden bowl.”²⁷ The name itself therefore reflects the soup’s preparation method, which involves soaking dry tarhana in water before cooking.

The widespread consumption of tarhana across various geographies further reveals the growth of its coevolutionary tree, while its biocultural coevolution is truly manifested in its diverse additional ingredients. As tarhana traversed regions, each community imbued it with local flavours, incorporating ingredients such as wild plums, cherries, resin, or meat.²⁸ Thus, tarhana is geographically specific, enriched by each locality’s offerings. Turkey alone is said to have over 50 different varieties of tarhana.



Three types of tarhana from Turkey: sour tarhana on the left, tarhana chips (Çerez Tarhana) at the top and bottom, and chunky (Topak) tarhana on the right. © Sevgi Mutlu Sirakova. All rights reserved.

The richness of tarhana then stems not only from what it is made of but also from how it is made. For example, Topak tarhana is traditionally sun-dried, particularly in the southern regions, while some types of powdered tarhana are commonly dried indoors, away from the sun—a method typically adopted in cooler and rainier climates. Documenting endangered culinary heritage, the Slow Food movement’s “Ark of Taste” highlights tarhana for its diversity. Seven tarhanas are listed—made from goat, sheep, and cow yogurt as well as different local spices and vegetables, with considerable variation in their physical form, ranging from powdered to chip-like shapes. Although the practice of tarhana-making is in decline, it remains prevalent as a means of winter-food provisioning, particularly in rural areas of the Middle East and the Balkans.

The Futures of Tarhana

Fermented foods are not merely culinary products; they are vibrant archives that transmit recipes, tastes, and microbes across generations.²⁹ Each type of tarhana holds the story of its microbial and traditional cultures. These stories impart the knowledge and skills needed to cultivate and nurture the microbial diversity that enriches our lives.³⁰ Fermentation practices are inherently about the preservation and continuity of these cultures. Throughout human history, these have been the bedrock of food security, helping communities survive countless crises. When we consider some varieties of tarhana as endangered, it signifies more than just the disappearance of a food—it diminishes the prospects of collaborative ways of surviving.

This concern unfolds in three distinct ways. Firstly, we risk losing a significant portion of food diversity, which is essential for preserving biodiversity on a global and microbial scale.³¹ Ironically, the decline of these practices comes at a time when we need their guidance more than ever, in an age marked by extinctions. Secondly, tarhana's diversity transcends mere numbers: it embodies practices, recipes, and rituals that engage with its sensorial aspects, enabling multispecies collaborations amidst the tide of homogenisation. And, thirdly, losing this diversity means losing the capacities for resistance—including the microbial diversity and flavours they foster, which have been crucial for our health and coexistence.³²

Envisioning the future of our food, then, demands that we grasp the tales tarhana holds. To offer you a warm bowl of tarhana soup would be a satisfying conclusion to this exploration. As that is not possible, I will instead share my family's recipe from the Balkans with you. To truly experience the cultural richness of tarhana, I encourage you to seek out a friend from the Balkans or the Middle East and listen to their stories.

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The Author's Tarhana Recipe



Tarhana soup ready to eat. © alpaksoy on iStock. All rights reserved.

Ingredients for 5 kg tarhana:

- 0.5 kg yogurt (cow, sheep, or goat)
- 250 g of last year's tarhana (to initiate fermentation)
- 0.5 kg tomatoes
- 2 kg peppers
- 1-2 onions
- ca. 3 kg white flour (or as much as the dough can absorb)
- dry thyme, chili pepper, mint (according to taste)

Stage 1: Setting the Conditions

To initiate fermentation, mix last year's tarhana into yogurt the night before you plan to process it. Leave it out at room temperature to sour. You will need half a kilo of yogurt to yield five kilograms of tarhana, which will be sufficient to serve a family of five for a year.

Finely chop the vegetables the following day. The types of vegetables added vary by region. In the Balkans, we use tomatoes, peppers, and onions. Boil the chopped vegetables in water (ca. 500

millilitres). Once softened, blend them thoroughly. Add as much flour as the purée can absorb and knead in the soured tarhana-yogurt mixture. Season with dry thyme, chili pepper, and mint.

Stage 2: Resting the Relations

Cover the dough with a moist cotton cloth to prevent it from drying out and leave it to ferment for about a week. The rising dough needs to be stirred daily by hand to ensure even fermentation. If necessary, add more flour. Once smell and texture are satisfactory (similar to that of sourdough bread), divide the dough into small pieces and spread them on a clean cotton sheet.

Stage 3: Aging the Taste

Leave the dough pieces to dry for five to seven days in a well-ventilated room that is not exposed to direct sunlight. Turn the pieces over daily and break them into smaller ones by hand. Once thoroughly dried, crush and granulate these smaller pieces manually. Store the powdered tarhana in cotton bags or in glass containers for later use.

Consumption Stage: Enjoying Tarhana

To prepare the soup, leave the dry tarhana to soak in warm water overnight (50 gramstarhana with 150 grams of water). One tablespoon of the dry mixture will suffice for each serving.

This is optional, but you may lightly fry *kavurma* (meat sautéed in its own fat and preserved), or onions and tomato paste in butter or vegetable oil. Add water to the ingredients (one bowl per person) and then gradually mix in and cook the dissolved tarhana. Add as much water as needed and leave to simmer. Sprinkle the soup with dried chili, thyme, and mint before serving. The finished soup is thick and has a sour flavour. It is delicious with grated *kaşar* (a medium-hard cheese) or crumbled white cheese (similar to feta).



Tarhana vegetables cooked in a cauldron. © Sevgi Mutlu Sirakova. All rights reserved.

Afiyet olsun!

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Notes

¹ I first experienced tarhana practices in a small Turkish village nestled in Bulgaria's Rhodope Mountains, where I grew up. The invaluable knowledge of traditional fermentation practices, passed down by my family and relatives, inspired this article and continues to shape my academic research.

² Details about my multi-sited ethnographic fieldwork can be found in "Connected Food: Preserving Traditional Food Practices via Portable Foods," in *Portable Food: Proceedings of the Oxford Symposium on Food and Cookery 2022*, ed. Mark McWilliam (Prospect Books, 2023).

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"EVERYBODY TALKS ABOUT THE WEATHER"

Stephen Milder

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Stephen Milder



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One summer day in 1966, the 23-year-old secretary Margot Müller was serving coffee at the McCann advertising agency's Frankfurt office. In the conference room, admen had gathered to discuss their ideas for a new Deutsche Bahn (German Railways) poster. Glancing at the wintry motifs they had designed, Müller said to no one in particular, "*Alle reden vom Wetter. Wir nicht.*" (Everybody talks about the weather. Not us.).¹

Müller's utterance excited her colleagues at McCann and catalyzed the creation of a celebrated advertising poster: On a black background, the ad paired Müller's slogan with the image of a locomotive plowing unencumbered through heavy snow. "Better take the train" was written in small letters at the bottom. This slogan became famous, turning the erstwhile young secretary into one of McCann's leading ad writers.

In fact, over the six decades since the Deutsche Bahn first deployed it, Müller's motto has hardly left the public discussion. According to one scholar, it is "perhaps the most frequently quoted [slogan] in the history of German advertising."² Müller's pithy comment was itself a quotation of sorts. It paraphrased an old witticism, attributed to the American journalist Charles Dudley Warner: "Everybody talks about the weather, but



The McCann Agency's 1966 Deutsche Bahn advertisement: "Everybody talks about the weather. Not us." © DB Museum Nuremberg. All rights reserved.

nobody does anything about it!”³ Both the nineteenth-century one-liner and the 1966 Deutsche Bahn advertisement trade on the idea that for middle-class suburbanites, at least, talking about the weather epitomizes idle chitchat. Hence, “doing something” is the exact opposite of talking about the weather, and Müller’s motto reminded Germans that while they were chatting about the snow, the railways’ well-trained personnel and powerful locomotives were getting travelers where they needed to go.⁴

The story of Müller’s slogan and its afterlives is not just a tale about old jokes and advertising breakthroughs. It is also an account of the changing political position of environmental problems in the era of anthropogenic climate change. In fact, following the career of Müller’s slogan reveals how increased awareness of climate change has brought environmental issues into the mainstream and redrawn the boundaries between meaningful political conversation and mindless chatter.

The story of Müller’s slogan and its afterlives is an account of the changing political position of environmental problems in the era of anthropogenic climate change.

When the Deutsche Bahn ad debuted, there was no doubt that talking about the weather was a shorthand for pointless small talk. In 1967, in fact, two young graphic artists used the likenesses of three “left-wing saints” to design a new poster that turned “talking about the weather” into a political epithet targeting opponents’ failure to take meaningful action. That episode in the slogan’s life began in Jürgen Holftreter’s Stuttgart studio. Seated at his desk, Holftreter was working on a collage that combined Müller’s slogan with profiles of Marx, Engels, and Lenin, when his friend Ulrich Bernhardt walked into the room. Looking over Holftreter’s shoulder, Bernhardt was stunned by what he saw. He quickly convinced Holftreter to let him have a go at the half-finished design, changed the background from black to red, and turned the collage into an ad used in the student government elections at the Stuttgart State Academy of Art and Design.⁵ Holftreter’s design was first produced in a run of just 50 silkscreen prints, but it was soon adopted by the Socialist German Students’ League (SDS) for its International Vietnam Conference in 1968, reprinted numerous times during the 1970s, and pinned to the walls of student apartments across the country. Holftreter and Bernhardt had created “the classic political poster in Germany.”⁶



Together with another student, Ulrich Bernhardt (left) presents a poster bearing a reprint of his design in January 1968. The poster features the three “left-wing saints”: (from left to right) Karl Marx, Friedrich Engels, and Vladimir Lenin, and reads: “Everybody talks about the weather. Not us. SDS Socialist German Students’ League.” © picture alliance / dpa / Fritz Reiss. All rights reserved.

From the perspective of the radical left, Holftreter and Bernhardt’s iconic red poster was a reminder that mainstream politicians never got to the bottom of social problems by addressing the capitalist system itself. Instead, leftists argued, politicians just wasted their breath talking about “vacuities like the weather or the neighbor’s garden landscaping.”⁷ The journalist and Red Army Faction cofounder Ulrike Meinhof took this argument to its extreme in a fierce 1969 critique of recent discussions about the oppression of women. She argued that “appealing to fate and equal rights” but failing to “attack the class structures of capitalist society” that underpinned women’s exploitation amounted to no more than “talking about the weather.”⁸

In 1960s West Germany, many politicians derided environmental concerns as precisely the sort of vacuous topic that ought to be the subject of small talk, not serious politics. The response to Social Democrat Willy Brandt’s 1961 campaign pledge that “the sky over the Ruhr,” Germany’s most important—and most heavily polluted—industrial center, “must be blue again,” was telling.

Many politically engaged West Germans separated environmental problems, which they conceived of as meaningless talk about the weather, from economic concerns, the real stuff of politics.

Brandt used the image of clear, blue skies in a place whose name was synonymous with heavy industry to express how measures to mitigate air pollution would improve the “health of millions of people.”⁹ His political opponents, however, took him to task for emphasizing an irrelevant matter like the color of the sky rather than an important subject of politics, like industrial production. Minister of Economics Ludwig Erhard suggested that Brandt’s pledge to clean the air over the Ruhr was peripheral to serious politics by referring to it as a “throat lozenge.”¹⁰ The spokesman of Erhard’s Christian Democratic party went much further. By denouncing Brandt’s pledge as “a free ticket for a dangerous trip into the unknown, a sure recipe for state bankruptcy, and a document of total lack of responsibility,” he suggested that focusing on blue skies was tantamount to intentionally neglecting fundamental political matters.¹¹ On the radical fringe and in the halls of government, in other words, many politically engaged West Germans separated environmental problems, which they conceived of as meaningless talk about the weather, from economic concerns, the real stuff of politics.

Late in the 1980s, however, the emergence in popular political debates of the ozone hole and climate change offered an impetus to rethink not only the importance of environmental problems, but also what it meant to talk about the weather. Thinking along with another nineteenth-century one-liner, “climate is what we expect, weather is what we get”—a quote that is attributed to Charles Dudley Warner’s friend Mark Twain—helps to explain the changing meaning of talking about the weather and its significance. Indeed, as growing awareness of anthropogenic climate change made concerns about flooding and droughts, heat waves, and superstorms more widespread, experiences of unpredictable, extreme weather made the expectation of a stable climate appear naive. Changing weather patterns raised a question that got straight to the heart of the assumption behind Müller’s slogan—was talking about the weather really synonymous with small talk anymore, or had it become a means of getting at a seminal political issue?

Over time, environmentalists transformed the slogan’s connotation, making neglecting the weather a far more egregious offense than chatting about it.

Remarkably, environmentalists used Müller’s slogan itself in order to chip away at the idea that talking about the weather was just idle chitchat. Over time, they transformed the slogan’s connotation, making neglecting the weather a far more egregious offense than chatting about it. After all, in an era where the weather eluded expectations in ways that made it a matter of life and death, what subject could be more important?

The graphic designer Klaus Staeck jumpstarted environmentalists’ efforts to rethink what it meant to talk about the weather. Having grown up in Bitterfeld, the center of the East German chemical industry, Staeck had perceived pollution as a fundamental political problem since the age of 10, when he first got pneumonia from breathing his hometown’s toxic air. In 1956, at the age of 18, Staeck emigrated to West Germany, and, by 1990, he was already an experienced environmental campaigner and artistic provocateur. As part of a Greenpeace campaign advocating for a total ban on hydrofluorocarbons (HFCs), Staeck designed a poster that paired images of German chemicals executives with the phrase “Everybody talks about the climate. We’re ruining it.” By replacing “weather” with “climate,” Staeck forced Germans to reflect on how serious talking about environmental problems could be. With the glib phrase “we’re ruining it,” he emphasized industrialists’ active role in environmental devastation.¹²



Klaus Staeck's poster for Greenpeace's 1990 anti-HFCs campaign. "Everybody talks about the climate. We're ruining it." Unknown photographer. © Edition Staeck / VG Bild-Kunst, Bonn 2024. All rights reserved.

At the same time as Greenpeace was pushing for a ban on HFCs, the West German Green Party latched onto climate change as an issue that could be used to show that environmental concerns were fundamental to all sorts of political problems, from transportation to energy to industrial production. The Greens made climate change the centerpiece of their campaign for the December 1990 parliamentary election—the first to take place in newly reunified Germany. Green candidates traversed the country in a chartered train, which they dubbed the "Ultimate Climate Express," and emblazoned their campaign posters with the phrase "Everybody talks about Germany. We're talking about the weather." Instead of German reunification, the poster continued, the Greens were focused on issues like "the ozone hole, smog, the greenhouse effect, storms, [and] acid rain."

Needless to say, amid the "rush to German reunification," the Greens' "climate campaign" fell flat. The West German Greens failed even to clear the "five percent hurdle" that was a prerequisite for representation in parliament and lost all 44 of their seats in one fell swoop.¹³ Though their campaign went down in history as an infamous failure, the Greens had nonetheless broached the idea that addressing environmental problems was a vital national interest. In recent years, that conception has become widespread, suggesting that in the longer run, the Greens' climate campaign contributed to a new understanding of environmental politics.

In fact, as discussions of climate change have garnered urgency, environmentalists have turned to Müller's slogan



The West German Greens' 1990 parliamentary election campaign poster. "Everybody talks about Germany. We're talking about the weather." © Archiv Grünes Gedächtnis der Heinrich-Böll Stiftung. All rights reserved.

time and again. It has proven so useful because it helps to articulate the growing consensus that climate change mitigation is a seminal political challenge, not a pet project of the well-to-do; in essence, then, the changing meaning of talking about the weather reveals the extent to which our political priorities themselves have changed in the era of anthropogenic climate change.

Today, it is failure to talk about the weather that marks a sign of neglect or serves as evidence that politicians are about to depart on a dangerous trip into the unknown. Thus, critical parodies following in the tradition of Staeck's 1990 attack on the chemical industry emphasize how despite the fact that "everybody talks about the climate," powerful politicians are "ruining it." A satirical poster created by the activist group Extinction Rebellion, for example, alleges that the conservative Christian Democrats have subsidized the coal and car industries and "actively blocked" the transition to green transit. An advertisement by the renewable-energy firm KACO contends that the liberal Free Democrats have done too little to support the solar energy industry, despite their probusiness orientation. Another satirical poster, this one created by an adbusting group and photographed by the Frankfurt activist group KoalaKollektiv, used the phrasing "Everybody talks about the future. We're making a climate crisis," as a reminder that Germany's leading energy company, RWE, "is one of the world's largest operators of fossil fuel-fired power plants."



Satirical poster by an adbusting group. "Everybody talks about the future. We're making the climate crisis." Discovered and photographed by the KoalaKollektiv who used it in their anti-greenwashing campaign. The poster is a parody of [this RWE ad](#). © KoalaKollektiv. All rights reserved.

Growing concern with climate change has also motivated advertisers to restore the powerful, problem-solving subtext of Margot Müller's old slogan by emphasizing what is to be done. Once again, the Deutsche Bahn led the way. A 2007 advertisement touted the environmental benefits of train travel with the slogan, "Everybody talks about CO₂ emissions. We're taking action."

Growing political attention to environmental problems has also changed our perceptions of who does meaningful politics.

In 2019, when Fridays for Future protests regularly mobilized tens of thousands of young Germans, the Tübingen artist Anne-Christine Klarmann created a poster that pushed even further, equating talking about the weather with meaningful political action. On a bright blue background, Klarmann's poster featured screen-printed portraits of Judith Ellens, Greta Thunberg, and Carola

Rakete. Above the three women's faces was the old slogan, "Everybody talks about the weather." But underneath the images was the phrase, "Us too." Rather than contrasting taking action with talking about the weather, Klarmann's poster made them one and the same. "Historically," she said with a nod to Holftreter and Bernhardt, "talking about the weather was just what neighbors always did—nothing more than small talk." And yet today, talking about the weather is itself a reference to taking action, a project of hard-working young activists, her poster shows. Not only Thunberg's school strike but also Ellens' food advocacy and Rakete's life-saving missions on the Mediterranean are closely linked with climate change. And what is more, the three women with whom Klarmann replaced Holftreter and Bernhardt's old, male "left-wing saints" reveal how growing political attention to environmental problems has also changed our perceptions of who does meaningful politics. These are three women, Klarmann says, who "are independent, they just do what they want; they need no party, they have no fear. They do not need to sit in the first row."¹⁴



(Left) Anna-Christian Klarmann's 2019 poster, featuring (from left to right) Judith Ellens, Greta Thunberg, and Carola Rakete. *Everybody talks about the weather. Us too*, 2019, screen print, 100 x 70 cm. © Anne-Christine Klarmann/ VG Bild-Kunst, Bonn 2024. All rights reserved. (Right) Die Partei's poster from the 2024 elections to the European Parliament. "Everybody talks about the climate. We're making it!" © Die PARTEI / Roland Kronbauer / Die PARTEI Landesverband Bayern. All rights reserved.

The changed meaning of "talking about the weather" reveals how environmental problems have moved from the margins to the center of political debates, bringing new people into politics in the process. It also offers evidence that the borders between politics and small talk have changed. In the climate age, where extreme weather has come to epitomize environmental destruction, the slogan has become so deeply associated with pressing environmental problems that posters bearing the phrase are to be found every election season. Most recently in the 2024 European Parliament election, "The Party" (a project of the satirist Martin Sonneborn known for deploying farcical slogans like "Sexy! Traffic jam!") put up posters with an image of a jumbo jet leaving a vapor trail across a

clear blue sky and the phrase “Everybody talks about the climate. We make it.” For a phrase that has its roots in a nineteenth-century witticism and is funny precisely because it states the obvious, this latest political poster suggests not only a story that has come full circle, but also a problem that is so essential to political debate that referencing it is restating the obvious. In fact, in this context, Charles Dudley Warner’s old one-liner, “Everybody talks about the weather, but nobody ever does anything about it,” has a radically different, urgent undertone.

Notes

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⁴ On the functionality of the ad, see Janja Polajnar, “Alle reden vom Wetter. Wir Nicht. Fahr lieber mit der Bundesbahn. Von Slogan-Karrieren in und außerhalb der Werbung,” in *Werbegeschichte(n). Markenkommunikation zwischen Tradition und Innovation*, ed. Sabine Heinemann (Springer VS, 2019), 253–80, p. 262.

⁵ Ulrich Weitz, “Plakativ,” *Kontext: Wochenzeitung*, 24 October 2012, <https://www.kontextwochenzeitung.de/kultur/82/plakativ-934.html>.

⁶ Ulrich Bernhardt, telephone interview with author, 9 March 2022.

⁷ Weitz, “Plakativ.”

⁸ Ulrike Meinhof, “Alle reden vom Wetter,” *konkret* 4 (1969): 5.

⁹ Willy Brandt, “Vertrauen in die Zukunft unseres Volkes,” *Vorwärts*, 3 May 1961, 19–23, p. 20.

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¹¹ CDU spokesman quoted in Franz-Josef Brüggemeier, *Tschernobyl, 26. April 1986: Die ökologische Herausforderung* (Deutscher Taschenbuch Verlag, 1998), 199.

¹² Heinz Schutz, “Klaus Staeck: Es brennt—Plakate zur Umwelt-Zerstörung und Klimakatastrophe,” *Kunstforum* 278 (2021): 218–26. See also Klaus Staeck, “Ich musste mich früh für eine Haltung entscheiden.” *Der Plakatkünstler und Verleger Klaus Staeck lebt und arbeitet bis heute in Heidelberg: Interview with Klaus Staeck*, interview by Mirjam Mohr, Universität Heidelberg: Heidelberger Profile, May 2013, <https://www.uni-heidelberg.de/de/universitaet/heidelberger-profile/alumni-interviews/ich-musste-mich-frueh-fuer-eine-haltung-entscheiden>.

¹³ Notably, the East German Greens, who did not use this slogan in their campaign, did win five percent of the vote in the territory of former East Germany, and thus won eight seats in parliament.

¹⁴ Anne-Christine Klarmann, Zoom interview with author, 10 March 2022.

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STEW OF THE EARTH

L. Sasha Gora

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6 • 2024

L. Sasha Gora

Besides the leaves that a bag gathers, all you need for a cup of tea is hot water, and in the town of Furnas the earth boils it directly. I bend in front of a spigot and perform the same trick I learned as a child at family dinner parties: to run my finger through a candle's flame as fast as I can—too slow and the heat will catch it.



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Although not quite in the middle of the Atlantic, the Portuguese Azores Islands are so far, so distant, that the easiest coordinate feels like somewhere out there. Somewhere between Europe and North America. Somewhere in the thick of the ocean.

This somewhere is a green so bright it edges on psychedelic. But the weather is fickle. It teases you, making you believe you don't need a sweater or that it's safe to leave your umbrella at home. One moment the wind grates your skin, and the next the sun strokes it. Rain is always a possibility. You experience the weather by the hour, even by the minute. A single day performs multiple seasons. Ferns behave like trees, pineapples—against all odds—grow in green houses, and menus describe local wines as “persistent.”

*The ground hums and hiccups and hisses with heat. Springs bubble and boil.
Sulfur exhales from the earth, and vapor clouds rise and blanket the air.*

Not only a geography lesson, the Azorean archipelago can teach you a story or two about energy, about warmth, about the boiling heat under the crust of the earth. The Azores are the souvenir from when volcanoes contoured a splatter of islands on the ridge where the Eurasian, African, and North American tectonic plates crash, clash, and collide. On São Miguel, the largest of the nine islands and the one that hosts Furnas, volcanoes roll like hills and stretch like valleys. The town is hemmed in by fumaroles, geysers, and hot springs (*caldeiras*) rich in minerals and iron, sodium bicarbonate and boron, fluorine and carbon dioxide. The ground hums and hiccups and hisses with heat. Springs bubble and boil. Sulfur exhales from the earth, and vapor clouds rise and blanket the air. The performance is dramatic, contrasting how much geological action takes place beneath the surface—what Bruno Latour calls “the thin skin of the Earth”¹—and how much pushes above. Its name makes it no secret that Furnas is a steam bath of a town.

The springs are too hot for bathing but just right for brewing tea or boiling stew. Some invite mugs and pots, and others hide behind signs warning that their gases are too noxious, their waters too warm. Usually these warnings are tomato red, but one is green: “Caution Hotsprings Very Hot,” it instructs. It hangs above a less colourful one—white flecked with skinny red letters. “Don’t Step On The Boil Zone,” the capital letters insist. A wooden boardwalk escorts me around what feels like an outdoor oven. The fumaroles sneeze and spurt and wheeze. Smoky with the threat of a run-in with scolding water the same temperature as hell, I can’t help but think about stories about climate change and what it means to say that the world is on fire.

On 3 September 1630, a volcano erupted and shook the site that would later stage Furnas. Dormant ever since, its former crater is now a lagoon, and on its banks, the heat of the earth is put to work simmering stew.

The earth shares its warmth, and local cooks are clever enough to cruise for it, to coax it to prepare their dinner for free. They extract heat and its energy from what lies beneath the surface. Known as both *Cozido das Caldeiras* and *Cozida das Furnas*, this dish typically begins by assembling a museum of meat—from chicken, blood sausages (*morcela*), and ribs, to bacon, pork belly, and pigs’ ears—folded between cabbage and carrots, potatoes and garlic. The meat coats the bottom of a stock pot, then the vegetables stretch themselves out, creating a bed for the sausages and, finally, more cabbage leaves.

What happens if you think of a recipe not as a set of instructions to follow but as a script to interpret or rehearse?

Professionally, I study recipes for a living, and, personally, I like to be bossed around by them when I’m too tired to figure out my appetite on my own. But, lately, I keep imagining other ways to approach them. What happens if you think of a recipe not as a set of instructions to follow but as a script to interpret or rehearse? Perhaps even an equation—about how to feed and be fed on a warming planet—to solve? As a formula that pens a credit line that includes the labour of those who turn flora and fauna into food, and not just the authors who translate these acts into words? By asking these questions, I follow the advice of the philosopher Timothy Morton, attuning to how I am “already being ecological.”² “Ecological awareness,” asserts Morton, “is awareness of unintended consequences.”³ Eating, in other words, is always ecological, and cooking is an environmental act. A score scripts multiple outcomes, choreographing the possibility of a plurality of performances. Energy tethers one step to the next.

Cozida das Furnas edges toward what I've started calling "culinary formulas"—or maybe even "culinary scores."⁴ But beyond the ingredients and sequence in which they are cast—it is not the what but the where of the *Cozida das Furnas* that things become interesting, steamy even.

Fifty-something geothermal cooking pits mark the lagoon's shore. At one meter deep, the craters are the size of manholes and lined with concrete. Wooden signs—the kind that identify garden herbs and vegetables—claim the fumaroles, calling dibs for restaurants, local families, or visitors. Managed by the Municipality of Povoação, its park attendants bury the pots, tucking them in under mounds of warm dirt so perky, so ambitious, they would impress the most industrious of ants.



Hot springs, Caldeiras das Furnas, São Miguel Island, Azores, Portugal. Photo by Jules Verne Times Two / julesvernex2.com, 2021. [Wikimedia Commons](#). CC BY-SA 4.0.

The title of anthropologist and primatologist Richard Wrangham's book *Catching Fire: How Cooking Made Us Human* gives away his argument. "What made us human?" he asks, only to propose that "one of the greatest transitions in the history of life, stemmed from the control of fire and the advent of cooked meals."⁵ Yes, fire can be made, but heat can also be found. And in Furnas, the simmering earth was waiting for humans to show up with a pot of stew. No tinder necessary.

In a sealed underground steam chamber of a cooking pit, a volcano stew is a slow affair. This is cooking that requires patience. Any good cook is an apprentice of temperature and how it behaves in relation to time. The earth begins its lunch shift at five a.m. The pot contains no water, no stock. Instead, the steam makes the ingredients sweat, producing their own liquid, extracting their own sauce. At a temperature between 64 and 96 degrees Celsius, volcanic heat simmers the stew for six to eight hours.

In Furnas, the simmering earth was waiting for humans to show up with a pot of stew. No tinder necessary.

After the stew has served its time, the park attendants—layered in puffy vests and flannels—call on hooked poles to hoist the pots, releasing them from the ground. I watch two men use one hand each to fish out a pot coddled in cotton and deliver it safely to the back of a van. I wonder whose lunch it is.



One of the pits used for cooking by Terra Nostra. © Richard Ellis on Alamy. All rights reserved.

That evening, I eat at Terra Nostra Garden Hotel—the kind of accommodation where the unofficial dress code is a bathing suit and a bathrobe, and the only activity that requires clothing is dinner. I study the menu, authored by chef Nuno Gonçalves. One page is a catalogue of *Das Nossas Caldeiras* (From Furnas hot springs). Translating the island’s specialty stew into gastronomy’s *lingua franca*, the menu calls it a “Portuguese pot-au-feu.” As I wait for mine to arrive, I think about how the underground heats and shifts all that is above, cracking any sense of stability.

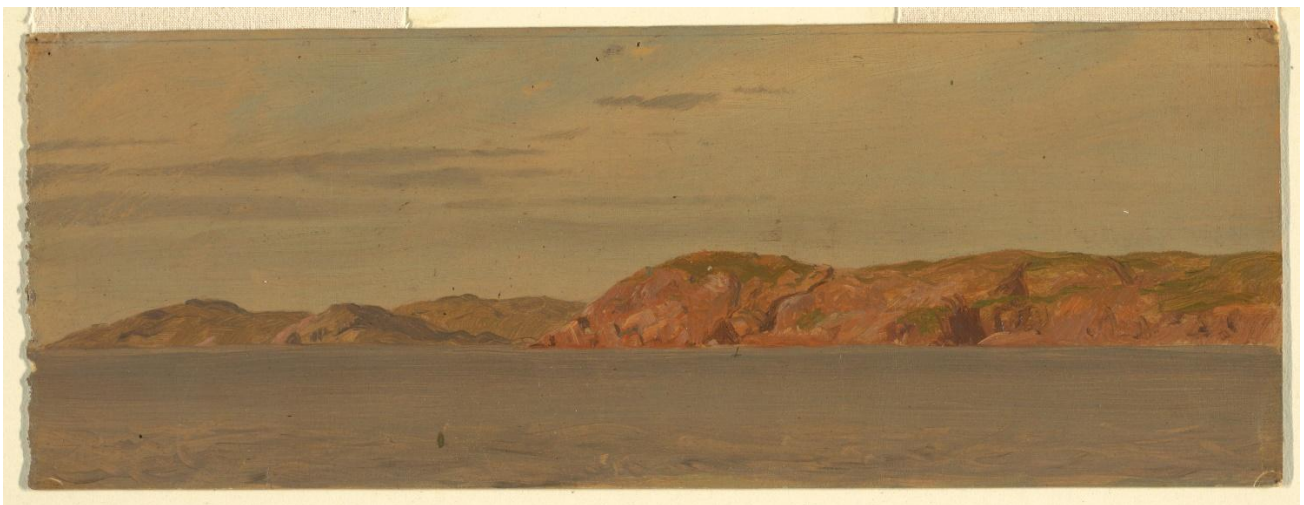
I’m writing this elsewhere, on “an island off of an island” in the northwest Atlantic. Fogo is the largest offshore island in the Canadian province of Newfoundland and Labrador. Its Portuguese name—

fogo—means fire and draws a line between one side of the Atlantic and the other. Between the two, the ocean is a patchwork of blues, and the water quilts together the waves.

The studio I am working in is off-grid—a bring your own water, bring your own heat kind of place. Solar panels borrow energy from the sun, energy I use to power a space heater that sits at my feet, but a faster, hotter, option is the studio's woodstove. So, here on Fogo, I'm learning to make fire, recalling lessons from long-ago camping trips. The formula of bark, first, then kindling, and, finally, logs. The hope that the flames will catch, that the wood is dry enough. As I pile branches and light a match, I remember how on São Miguel the word fogo branded walls and decorated signs.

I'm learning to make fire, recalling lessons from long-ago camping trips. The formula of bark, first, then kindling, and, finally, logs. The hope that the flames will catch, that the wood is dry enough.

A scene in *Land of Milk and Honey*—a novel as beguiling as it is disquieting—also brings me back to the tastes, textures, and temperatures in Furnas. Author C. Pam Zhang details brioche slathered with cultured butter and daube dolloped with crème fraîche before describing pudding with an interior “so creamy it recalled the molten center of the earth.”⁶ The book details sculpting gourmet meals—dishes so over-the-top that they have more in common with fine art than they do with alleviating hunger—at a time when crops fail, smog thickens like cream, and the world is dying.



Frederic Edwin Church, *Brimstone Head, Fogo Island, Newfoundland, 1859*, drawing. Courtesy of [Cooper Hewitt, Smithsonian Design Museum](#). Public domain.

Perched on Fogo Island's northwest tip is Brimstone Head, which, according to the Flat Earth Society, is one of the earth's four corners. “Did you notice the sign?” Jane the Geologist asks the brace of hikers she leads to the end of the trail up this stack of volcanic rock. Some grab their phones, camera apps on guard. Others turn around to sneak a second peek of the sign. “We’re still waiting to see what happens when someone wanders off the edge,” laughs one of the islanders. Before trekking to the top, Jane casts a rainbow of sponges—blue and pink, yellow and red—to mimic this island's geological history. She's teaching us what the rocks know, how the earth tells stories. A couple of weeks earlier someone told me that geologists lick rocks to identify their minerals. “Is it true?” I ask. “Oh yeah,” Jane smiles. To taste is to find. To taste is to know.

Volcanoes exaggerate how the earth is alive. How it isn't a passive surface on which to pin nations, cuisines, and dreams, but how it rumbles and shakes and spatters. Exhaling heat, the earth simmers stew and brews tea, all while shattering the expression "solid ground."

Notes

¹ Bruno Latour and Peter Weibel, *Critical Zones: The Science and Politics of Landing on Earth* (MIT Press, 2020), 3.

² Timothy Morton, *All Art is Ecological* (Penguin Books, 2018), 41.

³ *Ibid.*, 16.

⁴ This question guided my 2022 residency at Delfina Foundation as part of the fifth season of its [Politics of Food](#) programme.

⁵ Richard Wrangham, *Catching Fire: How Cooking Made Us Human* (Basic Books, 2009), 4.

⁶ C. Pam Zhang, *Land of Milk and Honey* (Penguin, 2023), 130.

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AVIAN ESCAPEES AND BUDGIE SNUGGLERS

Kieko Matteson

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This article is peer reviewed

Kieko Matteson



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A Budgie



Earthbound budgie in Jubilee Park, Sydney (close-up). © Kieko Matteson. All rights reserved.

Late one evening soon after I had arrived in Australia for a sabbatical, I was out strolling with my daughter through a Sydney park, seeking relief from the summer humidity, when something yellow on the ground caught my eye. We stopped to take a look. It was a bird. Small, disheveled, its feathers neon bright in the glare of a nearby lamppost, the creature appeared out of place. It was vaguely pecking at the grass, but when it pitched forward clumsily, it was clear it needed help. My daughter and I debated what to do. Should we capture it? How? Even if we could, what would we do with it? Other people walked past, deep in conversation, unaware of the drama unfolding inches from their feet. Lacking my glasses, I tapped “lostt brid rexsue?” into my phone’s search app and snapped a location photo just as the bird abruptly rose and flapped unsteadily into a tree, high out of reach.

My first reaction was relief. Though it looked ill, the bird—a budgie, I ascertained from Google—had shown it could fly. Was that not also proof it could fend for itself? I would not have known how to care for it in any case, nor where to find a vet at that hour. Nonetheless, my relief quickly morphed into guilt. “Poor Howard,”

my daughter murmured, having already given it a name. "He's not going to make it." Realising I should try harder, we headed home, where I searched the web for further guidance. A quick scan yielded a half-dozen Facebook groups devoted to pet birds in New South Wales. Selecting one of them, I hastily composed a "found" message, added my photo of the pitiful Howard beneath the lamppost, clicked through image grids of buses and bikes to prove that I was human, pressed enter, and waited.

Responses soon rolled in. A wave of sad-face and hug emojis, coupled with comments like "Did U catch it?," "poor baby," and "It's sik [sic]," while not especially useful in the way of advice, helped drive my post to the top of the group's page, where it had a better chance of being seen. I had started the "rescue" process, and now I had to persist. I herded my daughter to bed, sent my partner on a seed run to the all-night grocery, and stayed up monitoring the lost-and-found thread while my less-than-thrilled partner tramped through the park proffering bird kibble to invisible budgies. To no avail: Though he encountered fruit bats and rats aplenty, not one nocturnal parrot appeared.

The next morning, Howard's unfortunate fate became evident: A woman named Catherine posted on the thread that she had gone to the park in the morning, millet in hand, "hoping to find him alive" but instead "found [the] little one deceased." "I covered with leaves and left some flowers on top. So sorry for the loss," she wrote, adding a flower emoji in condolence.

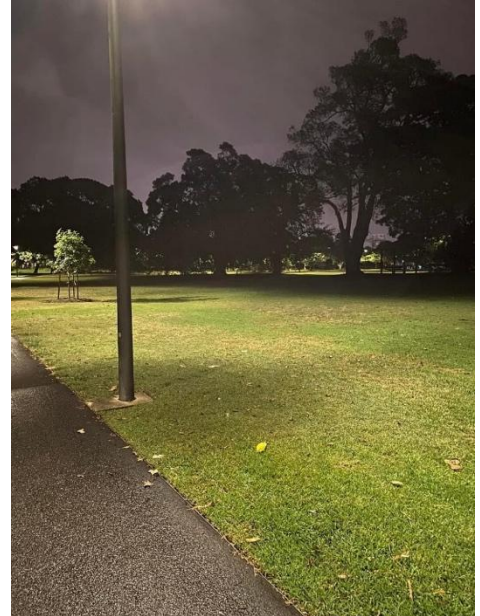
Having tried and failed to save the yellow budgie from oblivion, that might have been it for my association with the "lost and found birds sydney And Surrounding Areas" Facebook group. By this point, however, my curiosity had been piqued by the seemingly endless stream of messages—as many as 20 or 30 per day in inner Sydney alone. Posts like mine, announcing the sighting of an apparent pet, were in the minority, far outnumbered by communiqués from owners in desperate search of their "Cupcake," "Bobo," or "baby boy GUCCI."

Who were all these birds on the lam, I wondered, and what of the "budgie snugglers," as I came to call them—humans who cherish birds' companionship but express their devotion in welded mesh and galvanised wire?¹

As a longtime admirer of winged creatures in the wild, I could not help but feel an unkind sense of reproach. There was no doubting the authenticity of snugglers' affections, but if their beloved "Peaches" and "Pearface" had never been captive to begin with—much less bred for a life of confinement—they would not have ended up expiring disoriented and alone on their first and only experience of life on the wing.

Bird keeping by its very nature is fraught with contradiction, as myriad studies from veterinary medicine to environmental history have shown,² but the most commonly cited contemporary justifications for avian ownership—to enjoy the birds' bright plumage and sociable natures—feel especially incongruous in Australia, where an astonishing array of large, colourful, and exceedingly voluble birds abound.

To be sure, domesticated budgerigars of the sort one finds at the pet store are far removed from their native cousins. Nearly two centuries of selective breeding have turned them into heavy-chested specimens with eye-popping hues and human-tolerant dispositions—as distant from their lean yellow-and-green wild kin as wolfhounds from wolves. Unlike some species of escaped or released pet birds, moreover—the ring-necked parakeet most notorious among them—budgies bred in captivity do poorly on their own and rarely establish themselves outside of cages for long without human assistance.³



Under the streetlight. © Kieko Matteson. All rights reserved.

The hapless “Howard” never stood a chance.

Freedom is the Thing with Feathers

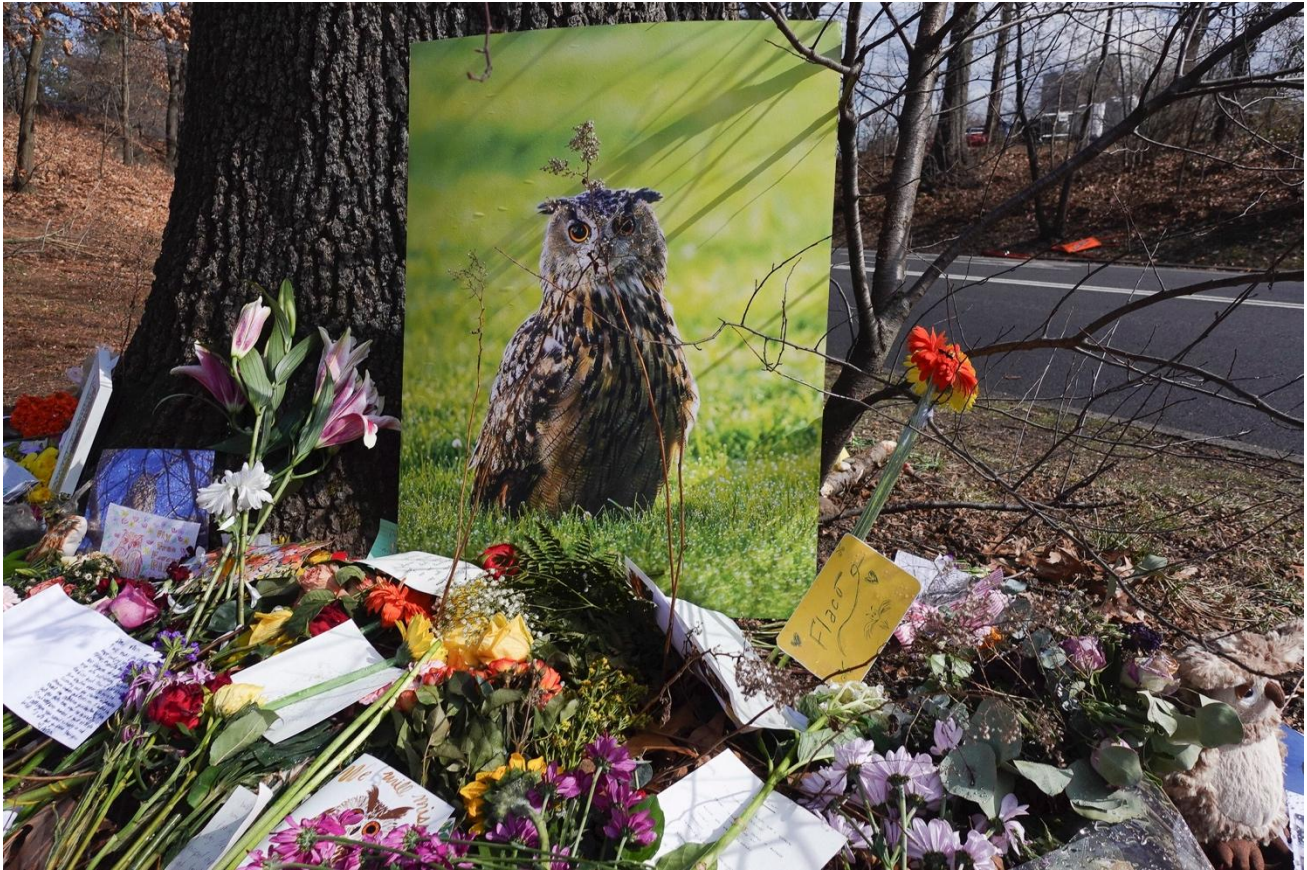
It was around the time that my daughter and I encountered the ill-starred yellow budgie in the Sydney park that another, much larger member of the Aves class was making international headlines: Flaco, the Eurasian eagle owl (*Bubo bubo*), had reached the one-year anniversary of his escape from New York’s Central Park Zoo. His clandestine release by an unknown individual in February 2023 had not been without controversy; zoo officials and many others feared for Flaco’s safety and characterised his liberation as a criminal act.⁴ Still, even those who felt he would be better off in captivity found it hard to resist the spectacle of an apex predator with a two-meter wingspan soaring through Central Park, flexing his freedom for the first time.

Aside from possible surprise at a blink of his huge yellow eyes, those who visited Flaco while he was still in the zoo may have found the experience little different from looking at well-rendered taxidermy. Hearing him hoot for hours from city rooftops or watching him preening in the park, however, inspired familiarity and awe, even for those who only saw him secondhand through video clips. “[Yay our friend Flaco](#),” commented a typical YouTube viewer.

Even those who felt Flaco would be better off in captivity found it hard to resist the spectacle of an apex predator with a two-meter wingspan soaring through Central Park, flexing his freedom for the first time.

A mere three weeks after his freedom anniversary, Flaco’s growing adulation turned to anguish when he abruptly slammed into a West Eighty-Ninth Street building and died. A necropsy indicated he had been suffering from a raging case of pigeon herpesvirus and acute rodenticide exposure, both of which likely contributed to his demise.⁵

Comparatively unknown during his 13 years of confinement, Flaco had catapulted to the all-time Who’s Hoo of *Bubo bubos* only as a result of his scrappy, year-long urban survival odyssey outside of the zoo. Although the Central Park Zoo press release announcing his death suggested embitterment, blaming “the vandal who damaged Flaco’s exhibit” for his abbreviated existence, few could deny that Flaco’s final year of life had been glorious compared with the isolation and anonymity of his time behind bars.⁶



New York City, 26 February 2024: New Yorkers made a makeshift vigil in Central Park for Flaco, a Eurasian eagle owl who escaped his long-time enclosure at Central Park Zoo in 2023 and passed away after nearly a year of freedom. © picture alliance / Capital Pictures / Katie Godowski/MPI. All rights reserved.

Observing the outpouring of public responses to his death, from national news reports and editorials on its meaning to heartfelt online odes and handmade portraits left at the base of Flaco's favorite oak,⁷ I was struck by the intensity of people's sense of loss. "You moved us all, we loved you so much. We are so glad you had a year of freedom," wrote one of the many mourners who left messages by the tree.⁸

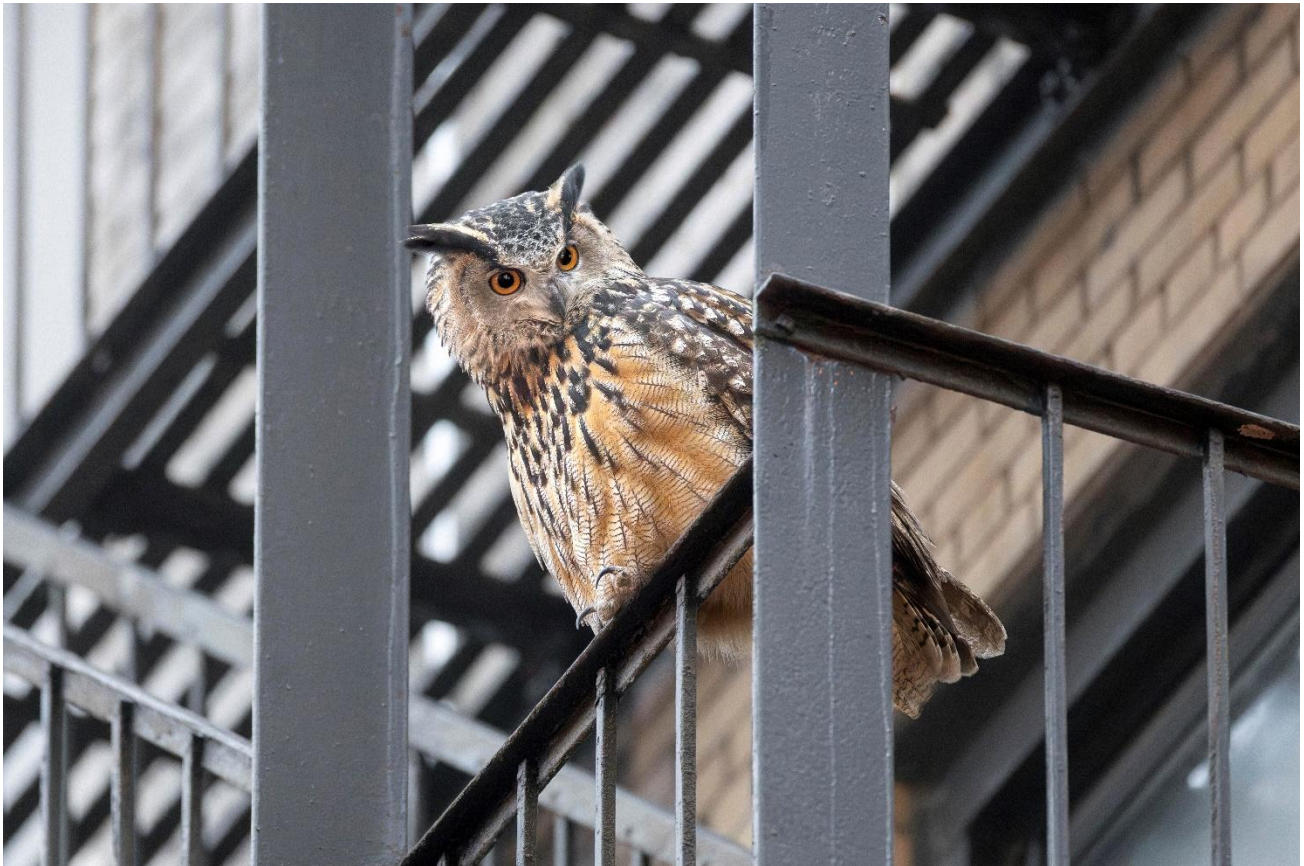
The comparison with the discourse on the "lost and found birds sydney" Facebook group, which I was reading at the same time, was jarring. Flaco had been on display for over a decade but was only truly seen and appreciated when he was free. By contrast, the distraught back-and-forth about avian escapees like "Mango," "Rex," and "Bluey" suggested that captivity was intrinsic to their value, and without it their existence was futile and finite.

As is the case with most other-than-human species, the perception of a bird's worth and right to autonomy is directly proportionate to the function it fulfills for people.⁹

The outlooks of budgie snugglers and freedom-loving Flaco fans can be understood as expressions of the universal human desire for closeness and connection with other beings.

For many, Flaco's year of ecological autarky made him an icon of liberty and self-determination and reinforced commonly held anthropomorphic ideas about the special entitlement of predators to live unfettered. The discussion on the lost-and-found Facebook group, on the other hand, emphasises birds' bonds with their owners and penchant for kisses and cuddles. Juxtaposed thus, the outlooks of budgie snugglers and freedom-loving Flaco fans would seem at utter variance. Yet

they can also be understood as expressions of humans' innate interest in "the big wide world . . . of bumptious life," to use Donna Haraway's phrase, and of the universal human desire for closeness and connection with other beings, feathered or otherwise.¹⁰



Flaco lounging on a Manhattan fire escape, New York, 3 January 2024. © picture alliance / Associated Press | David Lei.

Flaco's decision to stay in Central Park and roost next to a well-trafficked road, despite being theoretically able to go anywhere, made it easy to observe him in action.¹¹ Having been on exhibit his entire life, he was apparently untroubled by the parade of onlookers below his branch, snapping pics and aahing as he fluffed his feathers and swiveled his head. Proximity and predictability alone do not a relationship make, but this more than anything is what made people love Flaco: His nearness fostered knowingness and felt like intimacy.

Pet birds' interactions with their owners likewise serve as evidence of amity, though they have less say in the matter. Uncertainty over the true nature of their attachment—sincere or merely transactional?—may explain the anxious subtext beneath bird owners' lost-and-found Facebook posts: Does the fact of their birds' escape suggest they were never really close after all?

As different exemplars of Haraway's concept of companion species, both sets of escapees underscore the challenge of interspecies incomprehension and the limits of freedom as a framework for understanding.¹² Judging by the reports on the lost-and-found Facebook page, factors like poor flying skills and harassment by other species are the main reasons birds fail to return once they have flown the coop. Few owners dwell on what caused them to depart in the first place. It is unspoken but obvious. Hope sings. Freedom flies.

Time to Scale Up the Snuggling

At this point in the essay, it is likely apparent where my sympathies lie regarding birds in confinement. A lifelong birder ever since being handed a pair of binoculars by a science teacher on

a seventh-grade field trip, I had never thought very hard about pet birds, beyond fleeting pity. If it were up to me, caging birds for human pleasure would become a bygone relic of past cultural outlooks along with fox-hunting and bear-baiting. Still, even though I oppose bird keeping as a pastime, I found the discussion on the lost-and-found group fascinating as evidence of everyday acts of altruism and concern towards other species.

There are effectively two categories of participants in the “lost and found birds sydney” Facebook page: seekers, whose pets have gone missing, and finders—usually random people like me who came across a bird in distress. Without necessarily being conscious of it or articulating it as such, finders are engaged in what theorists describe as the “ethical practice of care,” defined as having an emotional response, being compelled to assist, and taking action in a meaningful way.¹³ Posts on the page show this practice playing out multiple times a day. Indeed, it is the unspoken principle upon which the whole enterprise rests. Passersby notice a bird where it would not normally be and take it upon themselves to report it or even transport it to a vet, making it possible for the bird to be reunited with its owner.



The author birding on the French-Spanish border, July 2017. © 2017 Frank Zelko. All rights reserved.

Why is it so easy to care about exceptional birds like Flaco or parrots that elude their owners, but so much harder to feel comparable passion towards birds' survival on a larger scale?

This impulse extends to wild birds as well. Although the Facebook group's raison d'être is linking pets and their keepers, people consult the page when they do not know where else to turn. One recent discussion thread, for example, involved an ailing lorikeet that turned out not to be a pet, as the person who spotted it assumed, but a wild bird suffering from Lorikeet Paralysis Syndrome (LPS). Guided by members of the group, the individual was eventually able to capture and deliver it to a wildlife rehabilitator.

Though my own bumbling attempt at budgie rescue came to naught, it is comforting to know that in a city the size of Sydney, birds can gain attention and assistance. At the same time, however, I find myself unsettled and a bit dubious about the disproportionate interest lavished on these singular cases. Why is it easy to care about exceptional birds like Flaco or parrots that elude their owners, but so much harder to feel comparable passion towards birds' survival on a larger scale?

It is an age-old conundrum, of course; one that has long confounded thinkers from behavioral psychologists to bioethicists. Various described as the “spotlight” or “identifiable-victim” effect, the phenomenon reflects humans' natural tendency to feel empathy for individuals while disregarding or being oblivious to the needs of anonymous others, even when they hail from the same groups. It poses particular challenges in the context of environmental conservation.¹⁴

Flaco's display was intended to educate zoo visitors about Eurasian eagle owls' lifeways and the threats they face in the wild. Its success in this regard is hard to measure. What is clear, however, is that once Flaco became free, conservationists had a very difficult time leveraging his fame to raise awareness about eagle owls in general, much less explain why he should live out his days in a tiny enclosure.¹⁵



Eurasian eagle owl in the Netherlands. © AGD Beukhof on iStock. All rights reserved.

Eurasian eagle owls are listed by the International Union for Conservation of Nature as a species of least concern; which is not to say no concern. There are no current coordinated monitoring programs across their vast range, which extends from Scandinavia and southern Europe to East Asia, nor are reintroduction efforts in progress. Nonetheless, Eurasian eagle owls' numbers have been in decline for decades due to an assortment of intentional and inadvertent human actions: poisoning, egg theft, high-voltage power-line strikes, habitat encroachment by Alpine tourism, and more.¹⁶ Flaco's charismatic presence in Central Park could have been an opportunity to educate the public about the magnitude of species declines worldwide and the manifold challenges birds encounter on a warming planet of eight billion people. Instead, he was mostly championed as a tough and tenacious New York personality, the type urban denizens claim as their own and miss when they are gone.

Similarly, bird owners project affection and personality traits onto their pets, like "Jiaojiao" (meaning "graceful" or "gallant," depending on the characters) and "Precious," but they seem little aware or interested in their parrots' status or impact as a consumer good.¹⁷ Alexandrine parrots, for example, are listed by the IUCN as "near threatened" in their native range of South and Southeast Asia, in large part due to nest-robbing and adult capture to supply the global pet trade.¹⁸ In Australia, imports of live parrots have been banned for more than 25 years, meaning that in theory, nonnatives like Alexandrines are born and bred in captivity. In practice, however, exotic animal trafficking into Australia has continued, facilitated by online commerce and insufficient monitoring and enforcement.



Caged birds for sale on a street market in Italy. © [Cerib](#) on Adobe Stock. All rights reserved.

Worldwide, the statistics on parrots are extraordinarily grim. According to a recent estimate by the World Parrot Trust, as many as half the parrots on the planet live in captivity.¹⁹ Even as a rough tally, based on an approximation of fifty million in private ownership, zoos, and breeding centers and a roughly equal number in the wild, the implications are shocking.²⁰ The proportion varies widely by species, depending on their popularity as pets and ability to reproduce in confinement. The African grey parrot (*Psittacus erithacus*), for example, has been highly prized as a caged bird for more than five centuries and can be bred in captivity. Nevertheless, one hundred thousand are captured and exported from West Africa for the pet trade every year, to the point that the African grey is now listed as endangered in the wild by the IUCN.²¹



(Left) An African grey parrot sitting on top of its cage. © Lothar Brademann on iStock. All rights reserved. (Right) An orange-bellied parrot. © susan flashman on Adobe Stock. All rights reserved. This image has been cropped.

For the critically endangered orange-bellied parrot (*Neophema chrysogaster*), by contrast, captivity is its only ticket to survival. Found only in Tasmania and a tiny area of South Australia and Victoria, the orange-bellied parrot has suffered habitat loss and migratory mortality so severe that it is now doomed without human intervention.²²

Beyond the special challenges parrots face because of habitat pressures and their allure as pets, the world bird population as a whole has seen a precipitous drop over the past 50 years. Grassland birds in North America and Europe, as well as birds of tropical and subtropical forests in Central and South America and Asia, have been especially affected, with losses on the order of 40 to 80 percent depending on species and region.²³ While not all the news is bad—notably, the recovery of raptors from their DDT-driven declines in the 1970s, and increases in water and shorebirds along some US coastlines—the overall picture is alarming.²⁴ In North America alone, the population loss is estimated at three billion birds since 1970—a drop of roughly one in four birds present a half-century ago.²⁵

How might the hype surrounding standouts like Flaco be harnessed to protect wild birds and the ecosystems upon which we all depend?

As Thom van Dooren argued in *Flightways: Life and Loss at the Edge of Extinction*, under such circumstances, the meaning of existence itself is ambiguous. While conservation measures like captive breeding and release can stave off annihilation, they cannot address attendant losses like ecosystem engagement and intergenerational knowledge that constitute a species' significance in context.²⁶

How might the hype surrounding standouts like Flaco be harnessed to protect wild birds and the ecosystems upon which we all depend? How, too, might bird owners be urged to expand their avian attachments beyond their personal parrots and *scale up the snuggling* to encompass species-level support?

The threats are too great to leave to conservation groups alone. Rather, as more people become aware of the scale of species declines, they are launching initiatives to combat the problem. In New York, for example, a group of state lawmakers renamed their proposed bird-safe building legislation the "Feathered Lives Also Count" (FLACO) Act, seeking to turn the owl's demise into a win for the hundreds of thousands of migratory birds who navigate urban hazards every year. Mandating the use of safer window glass and other techniques to mitigate bird strikes, the bill has gained far greater attention than when it was introduced a year earlier, thanks to its homage to the owl-turned-New York-icon.²⁷



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Building public support for flora and fauna that most people will never see is no easy task. Conservation advocates increasingly seek to counter the problem through whimsical branding campaigns that spotlight particular birds, beasts, or causes, and foster a sense of stakeholdership, even if only fleeting. Bird of the Year polls in Australia and New Zealand similarly capitalise on people's love of online contests, using stunning nature photos to highlight the diversity of antipodean birdlife and call attention to the threats it faces. Perhaps inevitably in this era of electoral distrust, some participants have cried "fowl" as the polls' popularity has grown, launching bitter accusations of ballot stuffing and vote rigging run amok. For the birds at the center of the feud, however, the more attention the better.²⁸

The newly launched Americas Flyways Initiative (AFI), a multilateral partnership between the US-based National Audubon Society, BirdLife International, and the Development Bank of Latin America and the Caribbean, could take a page from the FLACO Act and avian pin-ups playbook to similarly advertise their efforts. Ambitious and potentially transformative, the initiative aims to monitor and protect migratory birds on a hemispheric scale through extragovernmental coordination of national policymaking, sustainable development, and private-sector investment.²⁹ At present, however, the birds that are the project's target beneficiaries get lost in the language of global finance. To succeed in gaining attention and to mobilise pressure on flyway nations to embrace and underwrite the AFI's policy prescriptions, the initiatives' organizers could use a dose of identifiable-victim viral star power of the sort that made Flaco a global phenomenon. An unabashed tie-in with the animated 2011 Twentieth Century-Fox film "Rio," for example, featuring a real-life migratory hero instead of a cartoon character, might be just the ticket to tug heartstrings and open wallets.

More successful in this regard are community-oriented wetland restoration projects like the [Pacific Flyway Center](#) in the greater San Francisco Bay and the [Bellarine Catchment Network](#) in Victoria, Australia, that cultivate human visitors' sense of place and solicit their participation in their ongoing stories. Through marsh boardwalks, interpretive panels, and educational outreach, these initiatives foster understanding of migratory corridors, while also offering opportunities for recreation, wildlife

viewing, and sensory engagement. Though tiny in the grand scheme of things, these sites nonetheless provide a critical lifeline for birds. To keep them going, organizers are keenly aware that capturing and sustaining human interest must be part of the equation. However, without a Bird of the Year or Flaco, such projects, too, can struggle over time.



(Left) A brushturkey at Manly Beach in Sydney. (Center) A bakery-loving cockatoo in Katoomba, New South Wales. (Right) A white ibis strolling past a warning sign in the Royal Botanic Garden Sydney. © Kieko Matteson. All rights reserved.

Perhaps the best example of an initiative that combines people's curiosity about birds with the opportunity to establish personal connection is the long-running [Cockatoo Wingtag / Big City Birds](#) project, first launched in Sydney in 2011 with a focus on sulphur-crested cockatoos (*Cacatua galerita*). Using Facebook and, more recently, a citizen-science app known as [Spotteron](#), participants can report sightings and provide activity reports on urban birds marked with large yellow tags. Over time, the observations of individual birds and their doings have generated a narrative understanding of their personalities and preferences as they go about their lives and interact with people, places, and other avifauna. The project has now been expanded to other parts of Australia and encompasses four other common urban bird species as well: the brushturkey, white ibis, little corella, and long-billed corella.³⁰ Though not specifically developed with conservation goals in mind, Cockatoo Wingtag / Big City Birds has been remarkably enduring in developing awareness of cities as spaces of avian coexistence and in fostering an alternative understanding of community.

In an ideal world, such projects, which acknowledge birds' agency but also provide the sense of connection people crave, could take the place of cages. For budgie snugglers committed to keeping birds close, however, it does not have to be an either/or proposition. They can continue looking after their pet parrots to the end of their (very long) lives while also advocating for psittacines in the wild. As a voting bloc, parrot owners are arguably the best positioned to push for policies that support avian conservation, as they know better than most how full and rich every individual bird's life can be.

Bird owner or not, it is incumbent on all of us to embrace a multifaceted approach to environmental altruism: Beyond the celebrity escapees or "identifiable victims" that grab our attention, we must snuggle the species and spaces around us, acknowledge our interconnectedness, and take meaningful action.

Notes

¹ As opposed to "budgie smugglers"—Aussie slang for men's Speedo-style swim trunks popularised by former Prime Minister Tony Abbott (and derided by association).

- ² E.g., A.-K. Burmeister, K. Drasch, M. Rinder, et al., "The Owner-Bird Relationship: Relevance for Pet Bird Welfare," *Animal Welfare* 31, no. 1 (2022): 137–54, <https://doi.org/10.7120/09627286.31.1.012>; Shawn Peng and Donald M. Broom, "The Sustainability of Keeping Birds as Pets: Should Any Be Kept?," *Animals* 11, no. 2 (2021): 582, <https://doi.org/10.3390/ani1020582>; Anne Tygesen and Björn Forkman, "The Parrot-Owner Relationship and Problem Behaviors in Parrots," *Anthrozoös* 36, no. 6 (2023): 985–97, <https://doi.org/10.1080/08927936.2023.2238434>; Ingrid Tague, *Animal Companions: Pets and Social Change in Eighteenth-Century Britain* (Pennsylvania State University Press, 2015), 14–57, <https://doi.org/10.1515/9780271067445>; Nancy J. Jacobs, "Conviviality and Companionship: Parrots and People in the African Forests," *Environmental History* 26, no. 4 (2021): 647–70, esp. 660–64, <https://doi.org/10.1093/envhis/emab052>.
- ³ Mattia Menchetti, Emiliano Mori, and Francesco Maria Angelici, "Effects of the Recent World Invasion by Ring-Necked Parakeets *Psittacula krameri*," in *Problematic Wildlife: A Cross-Disciplinary Approach*, ed. Francesco Maria Angelici (Springer, 2016), https://doi.org/10.1007/978-3-319-22246-2_12; Penny Olsen, *Flight of the Budgerigar: An Illustrated History* (National Library of Australia, 2021), 113, 198–200.
- ⁴ Statement from Central Park Zoo, "An Update on Eurasian Eagle Owl," Wildlife Conservation Society Newsroom, 12 February 2023, <https://newsroom.wcs.org/News-Releases/articleType/ArticleView/articleId/18689/An-Update-on-Eurasian-Eagle-Owl.aspx>.
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- ⁶ Statement from Central Park Zoo, "Flaco, the Eurasian Eagle Owl, Has Died," Wildlife Conservation Society Newsroom, 23 February 2024, <https://newsroom.wcs.org/News-Releases/articleType/ArticleView/articleId/22056/Flaco-the-Eurasian-Eagle-Owl-Has-Died.aspx>.
- ⁷ E.g., Janet Winkler, "Ode to Flaco," in Gus Saltonstall, "Flaco's Cause of Death Confirmed; a Central Park Memorial; and an Ode to the Eurasian-Eagle Owl," *West Side Rag*, 26 February 2024, <https://www.westsiderag.com/2024/02/26/flacos-cause-of-death-confirmed-a-central-park-memorial-and-an-ode-to-the-eurasian-eagle-owl>.
- ⁸ Saltonstall, "Flaco's Cause of Death."
- ⁹ On relative valuation, see Andrea Gaynor, "Animal Agendas: Conflict over Productive Animals in Twentieth-Century Australian Cities," *Society and Animals* 15, no. 1 (2007): 29–42, <https://doi.org/10.1163/156853007X169324>; also Amir Zelinger, "History of Pets," in *Handbook of Historical Animal Studies*, ed. Mieke Roscher, André Krebber, and Brett Mizelle (De Gruyter Oldenbourg, 2021), 425–38.
- ¹⁰ Donna J. Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Prickly Paradigm Press, 2003), 32.
- ¹¹ Charline Charles and Eileen Lehpamer, "Fugitive Flaco Returns to Beloved Oak Tree in Central Park," *PIX11: New York's Very Own*, 17 November 2023, <https://pix11.com/news/local-news/manhattan/fugitive-flaco-returns-to-beloved-oak-tree-in-central-park/>.
- ¹² Haraway, *The Companion Species*. For expansive application of the companion-species concept, see also Eben Kirksey, *Emergent Ecologies* (Duke University Press, 2015), <https://doi.org/10.1515/9780822374800>.
- ¹³ Thom van Dooren, "Care: Living Lexicon for the Environmental Humanities," *Environmental Humanities* 5, no. 1 (2014): 291–94, <https://doi.org/10.1215/22011919-3615541>. The essay discusses María Puig de la Bellacasa, "Nothing Comes Without Its World: Thinking with Care," *The Sociological Review* 60, no. 2 (2012): 197–216, <https://doi.org/10.1111/j.1467-954X.2012.02070.x>; and Puig de la Bellacasa, "Ethical Doings in Naturecultures," *Ethics, Place and Environment* 13, no. 2 (2010): 151–69, <https://doi.org/10.1080/13668791003778834>.
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- ¹⁷ Jiaojiao, a Quaker parrot, was listed as “Missing from Hurstville”; likewise, Precious, an Alexandrine parrot, was “Missing from Fairfield,” in “lost and found birds sydney And Surrounding Areas,” Facebook, 23 May 2024, <https://www.facebook.com/groups/982210595283052/>.
- ¹⁸ BirdLife International, “Alexandrine Parakeet: *Psittacula eupatria*,” IUCN Red List of Threatened Species 2017: e.T22685434A110985466, <https://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T22685434A110985466.en>.
- ¹⁹ Emma L. Mellor, Heather K. McDonald Kinkaid, Michael T. Mendl, Innes C. Cuthill, Yvonne R. A. van Zeeland, and Georgia J. Mason, “Nature Calls: Intelligence and Natural Foraging Style Predict Poor Welfare in Captive Parrots,” *Proceedings of the Royal Society B: Biological Sciences* 288, no. 1960 (2021): 20211952, <http://doi.org/10.1098/rspb.2021.1952>. “For this highly threatened order, in which > 40% of species are threatened or near threatened [7], captive populations equal wild ones in size (each around 50 million; J. Gilardi, World Parrot Trust, 2020, pers. comm.), spanning zoos (for a few thousand individuals [8]), breeding centres (for tens of thousands [9]) and private homes (for tens of millions [10]).”
- ²⁰ Determining the actual number of parrots worldwide—captive, feral, naturalised, and resident in their native habitats—is extremely difficult. See Stephen Pruett-Jones, ed., *Naturalized Parrots of the World: Distribution, Ecology, and Impacts of the World’s Most Colorful Colonizers* (Princeton University Press, 2021), 24–28, <https://doi.org/10.1515/9780691220710>; also George Olah, Stuart H. M. Butchart, Andy Symes, et al., “Ecological and Socio-Economic Factors Affecting Extinction Risk in Parrots,” *Biodiversity and Conservation* 25 (2016): 205–23, <https://doi.org/10.1007/s10531-015-1036-z>.
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- ²⁵ Kenneth V. Rosenberg, Adriaan M. Doktor, Peter J. Blancher, et al., “Decline of the North American Avifauna,” *Science* 366, no. 6461 (2019): 120–24, <https://doi.org/doi:10.1126/science.aaw1313>.
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- ³⁰ Australian brushturkey (*Alectura lathami*), Australian white ibis (i.e., black-headed ibis) (*Threskiornis molucca*), little corella (*Cacatua sanguinea*), and long-billed corella (*Cacatua tenuirostris*). On public reception of the project, see Eben Kirksey, Paul Munro, Thom van Dooren, et al., “Feeding the Flock: Wild

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HANDLING HEAT: A CONVERSATION WITH ELSPETH OPPERMAN

Elspeth Oppermann and Daniel Dumas

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Elspeth Oppermann and Daniel Dumas

Critical geographer Elspeth Oppermann worked on the UK-ESRC-funded [Cool Infrastructures](#) project, which brought her to the Rachel Carson Center (RCC) as a senior research fellow in 2020. Elspeth currently works on a transdisciplinary pilot project on heat and undernutrition, based at the International Institute for Environment and Development (IIED), and funded by the Wellcome Trust, the Volkswagen Foundation, and NovoNordisk. Daniel Dumas (RCC) recently completed his doctoral dissertation, which critically assesses representations of Indigenous peoples and geographies in Canada. While Elspeth's work relates primarily to adapting to heat exposure, she has a cocker spaniel who can't stand the heat and would rather run in the snow in Germany than the sand in Singapore. Though Daniel does not currently have a dog, you can find him channelling his inner Golden Retriever when jumping into the Isar River on any hot day in Munich. Here, Elspeth and Daniel discuss what it means to work in and on heat in the age of global heating.



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Daniel Dumas: Elspeth, it seems like you have got a real passion for heat-related research. You've worked on the Cool Infrastructures project and considered how people in their everyday lives experience and respond to chronic heat exposure, and now, you are working on a transdisciplinary pilot project on how undernutrition and heat stress relate to one another. What kindled your interest in heat-related topics?

Elspeth Oppermann: Most of my work has been at the intersection of heat stress as a hazard and the impacts that has on working people. My interest in both stems very much from my childhood, growing up in Darwin, Australia. The Top End of Australia is known for being hot and humid and

therefore basically a horrible place to work—at least if your work is outdoors. My interest in occupational health—and my passion to investigate the everyday lives of workers—stems from my father. As someone who finished school at 15, he didn't have a choice but to work in so-called low-skill labor-intensive roles—in railways, forestry, and mining. Specifically, he had worked in a copper and uranium mine known as Rum Jungle during its final years of operation. We lived on the same street as a man he had worked with, and both he and my father died of lung cancer within six months of each other, when I was twelve. In my mind, there was no doubt this was related to their shared work at the mine. I will never know for certain if it was the cause of their deaths, but copper mines are notorious for high rates of lung cancer amongst their workforce. As such, occupational health is a very personal matter for me.



(Left) Men working with machinery, Rum Jungle uranium mine near Darwin. (Right) An overhead view of the Rum Jungle open-pit mine. © Northern Territory Government, Australia. All rights reserved.

Because of the environmental destruction that mining activities cause, it is often overlooked that those working at mine sites are themselves often the most exposed to these same risks. They also do the work they do for a host of mundane reasons—the necessity of employment or of providing for a family—and not out of some evil desire to violate the earth. I wanted to explore how, in their everyday lives, workers navigate the risks of such dangerous employment, and heat is one of those risks.

DD: I'm sorry to hear about the loss of your Dad, and I thank you for sharing that. It is clear that this is a deeply personal topic. How did you then start working on adaptation and heat stress, from a research perspective?

EO: I'd conducted my PhD on adaptation to climate change in the UK but moved back to Darwin for my postdoc in a political climate—at both the state and federal level—that was very hostile to discussions of climate change under then-prime minister Tony Abbott. As such, work on climate change had to be conducted “under the radar,” as it were—so I focused instead on current climatic conditions. This turned out to be very generative as outdoor workers were already dealing with climate-change impacts in the form of intensification of chronic heat exposure (which is experienced seasonally or year-round, in places like northern Australia and Singapore, respectively).

DD: Why do you think work on adaptation to heat stress is such an important topic, especially in regard to climate change?

EO: Heat is already one of the biggest killers. In Australia, heat is known to kill more people than all other environmental hazards combined. Globally, however, deaths connected to heat have been poorly reported, for various technical reasons, and, as such, its impact has often been assumed to

be less than what it is. That's changing—there were reported to be [50,000 deaths from heat in Europe last year](#), and with the frequency and intensity of heat waves increasing globally (and faster in Europe than anywhere else), this issue is forcing its way onto political agendas, [with the UN Secretary General recently calling for urgent and substantial global action](#). Globally, the number of people affected by [chronic heat exposure could be as much as 5 billion by 2050](#).

DD: On a more individual level, how does heat impact people in everyday life? And how does this differ across the world?

EO: So, we see very different impacts depending on whether you're somewhere that experiences moderate conditions with only occasional heat waves (such as temperate regions, like Europe), or whether you're somewhere that experiences hot conditions chronically. In places where occasional heat waves are the concern, the risk is that people are not physiologically or behaviorally adapted to the problem. I've experienced this living and working in Munich—both my apartment and my office (before I started at the RCC) had no air-conditioning, no fans, and no shade over the windows; both were in the city center and baked in the urban heat-island effect. Although prevailing weather conditions only reached 30 degrees Celsius, I felt much more vulnerable than I had on a mine site in Australia at 42 degrees Celsius, where air-conditioning for recovery overnight was available and iced water was ubiquitous.

What heat-health practitioners hope to see, are quite radical shifts in daily practices so that people avoid the heat, avoid exertion, and the resulting health risks.

In addition to the absence of material sources of resilience, when people encounter heat waves as a novel condition, they are not physiologically acclimatized or behaviorally adapted. As such, they might expose themselves for too long, or work too hard, with the result that their body has too high a "thermal load," such that they risk developing heat-related illness, perhaps heat exhaustion or even heat stroke, or otherwise suffer a cardiovascular or respiratory failure. In these situations, what heat-health practitioners actually hope to see, are quite radical shifts in daily practices so that people avoid the heat, avoid exertion, and these resulting health risks. In places where heat is chronic, people are better acclimatized but still put up with low-level chronic impacts such as frequent headaches or irritability, and always with the risk that even a small change in heat-adapted work processes will increase exposure or exertion and be enough to push them into more severe heat-related illness.

DD: Nearly all of your work is focused on chronic heat exposure, tropical heat, and humid heat. Can you tell us about what this is and why it's important?

EO: When I began writing on this topic about a decade ago, most of the focus in the academic and policy literature in the climate adaptation and disaster risk management space was on heat waves in temperate zones. As such, the literature and policy responses were missing a huge swathe of how, where, and when heat is dangerous—the tropics were largely overlooked, even though they have some of the world's biggest exposed populations (think of India, Southeast Asia, and Nigeria, for example). I was collaborating with Dr. Matt Brearley, a thermal physiologist, who had been working in northern Australia for a long time and who—as far as I'm aware—coined the term "chronic heat exposure"—that is, seasonal or year-round exposure to heat stress.



This image from Costa Rica demonstrates how the common construction process of building upward floor by floor means workers responsible for the preparation for concreting (rebar and form work) are always exposed to the sun. Photo by Josue Isai Ramos Figueroa, 2018. [Unsplash](#). [Public domain](#).

DD: Speaking of collaboration, you've done quite a lot of work with physiologists and occupational health professionals. What has this been like?

EO: It's been fun! It's opened doors to field sites and provided access I would never have had on my own, such as mine or construction sites or factories, and working with partners I never would have anticipated, such as medical doctors from the Vietnamese military. The disciplinary difference has been very generative... It's given me an insight into how physics and physiology frame the problem and, in doing so, opened up new ways of thinking about everyday practices of heat management that take on a more-than-human, elemental, and phenomenological flavor. For example, using thermal imaging cameras, and core body temperature monitoring pills (tiny thermometers encased in capsules that participants swallow), [I was able to trace how heat flows from machinery to bodies](#) and the intimate way microenvironments and people's behavior in them shapes heat exposure. Being involved in government-funded projects and part of networks like [GHHIN](#) (the Global Heat Health Information Network), has also given me a front-row seat to observe how differently heat-health is problematized by varying disciplines and sectors. Public-health officials, largely informed by epidemiology, for example, identify "hot" conditions based on numbers of hospital visits or deaths, which is very different from meteorologists, who operate based on historical (environmentally monitored) norms.

My worry is that as global heating ramps up, we'll see the militarization of the borders of survivable zones and the further weaponization of heat exposure to protect them.

DD: You mentioned working with the Vietnamese military, and there have been some elements of thinking about the military that have popped up from time to time in your work. Can you tell us about these?

EO: Firstly, thermal physiology has its origins as a military discipline, so engaging with the former implicitly brings with it histories of militarization, occupation, and the use of soldiers' bodies. At Charles Darwin University in Australia, I led a scoping study for the Australian Department of Defence on how heat stress under climate change might affect preparedness and operations. This was an interesting experience as we were reporting on implications without by any means having access to the necessary information about what defense capabilities there were and what was planned for the region—so this was an exercise in deduction and informed speculation that really reinforced for me the importance of being “on the inside” to do really effective work.

Nevertheless, the report was effective—I did hear the feedback that it was considered the best value for money project that unit had funded that year, and [climate change is increasingly discussed within the military](#), in Australia and globally. For us as researchers, in the hostile political climate at the time, we wanted to make the most of the opportunity to have anyone with a direct line to the federal government taking the threat of climate change seriously. Finally, militarization has always been a facet of territorial expansion and the securitization of borders—heat has been historically a very powerful factor in this—we can take European settler colonial struggles to cope with heat in the tropics as one example. My worry is that as climate change, or global heating, ramps up, we'll see the militarization of the borders of survivable zones and the further weaponization of heat exposure to protect them or manage behavior elsewhere. [Nicole Starosielsky and others](#) have done brilliant work demonstrating this, drawing on examples from the US-Mexico border to Afghanistan.

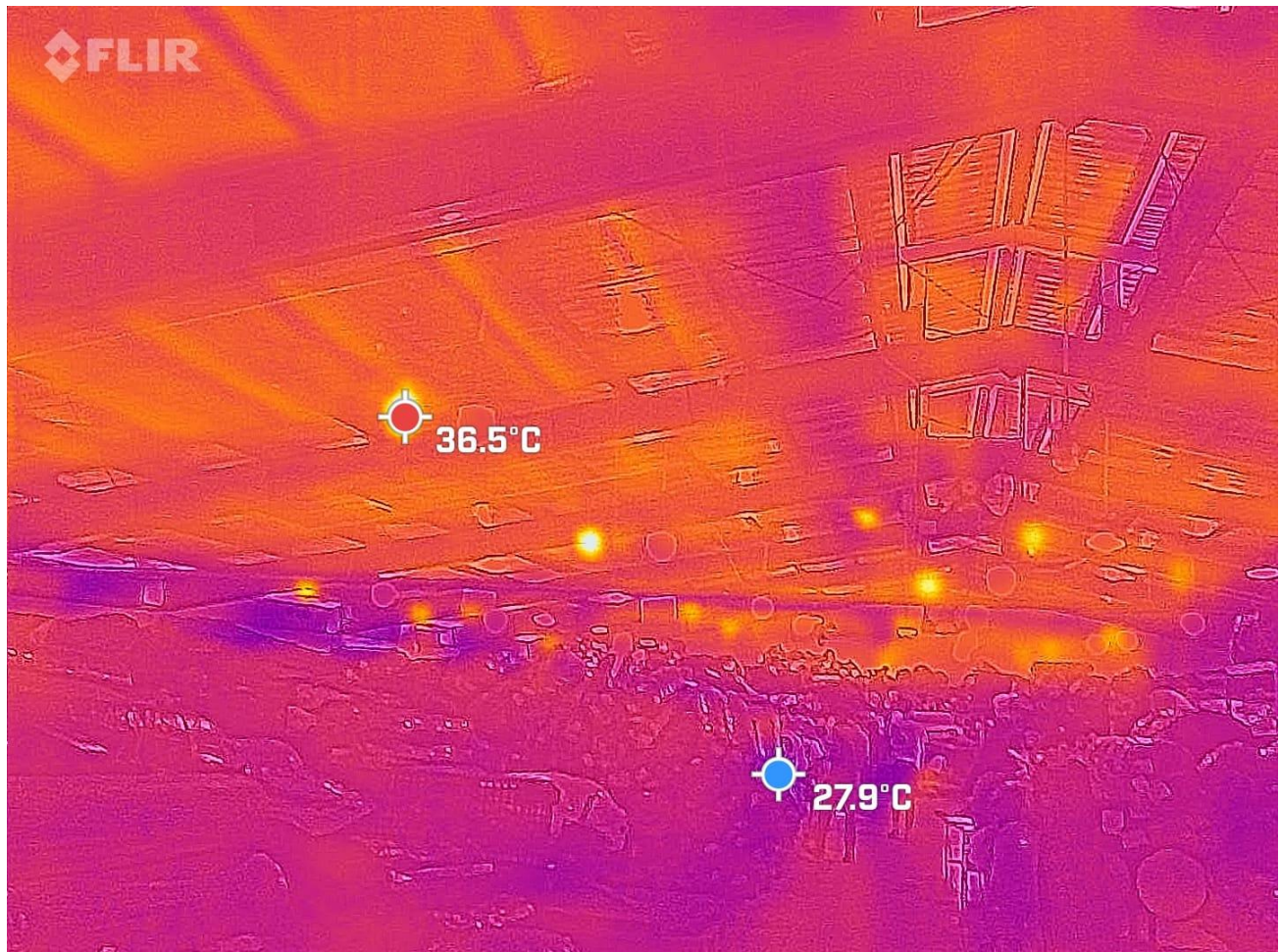
DD: You've now touched upon various collaborations across multiple different projects, so I must ask which research methods you employ across these projects and if they differ—for instance, is it primarily conducting interviews and doing government-related research?

EO: Although I've done desk-based research, the majority of my work has been using sensory ethnography combined with a social-practices approach that in turn draws on the shift to new materialisms to pull in interdisciplinary insights from thermal physiology and environmental monitoring. I do this to pay attention to the way thermal energy flows between bodies and environments and how its doing so is modulated by practices. You can see this in the way workers learn to time their performance of certain tasks on a worksite, making use of the movement of the sun and where shade is available, for example. It is these everyday “mundane” and “lay” knowledges that play a huge role in keeping workers safe.

Workers actively show us the places that are hot, the tools that are heavy, the surfaces that radiate heat, the vats from which steam spews forth.

As such, the methods themselves have involved combining ethnographic interviews with physiological monitoring to get workers to explain their experience of a workday and examining that recursively in relation to their monitored data (heart rate, core temperature, step count, for example). This helps us to understand what really drives heat stress. The simple answer might be, “It's a hot day,” but the combined physiological and ethnographic answer might instead be, “The team is one man down due to illness and receiving a lot of verbal pressure from the foreman to complete the repair, so they're working longer and harder than they should in the heat.” The sensory ethnography part (drawing on Sarah Pink) is my favorite aspect of this—heat is something that you have to *feel*. Finding ways to get people to show or describe sensation is complicated, so we make sure we do interviews *in situ* and compliment these with video tours of workplaces and living quarters—workers actively “show” us around these spaces, show us the places that are hot, the tools

that are heavy, the surfaces that radiate heat, the vats from which steam spews forth. In doing so, as researchers we are not just seeing but also touching surfaces and feeling spaces so we can also sense what our respondents do—and start to catalogue all the energetic exchanges they are describing.



Thermal image of factory roof from a field site in Vietnam, radiating heat at 36.5 degrees Celsius. The coolest surface in the factory is 27.9 degrees Celsius. Many factories across Southeast Asia use uninsulated roofing material, so heat from the sun is reradiated into the interior. © Teledyne FLIR / Elspeth Oppermann. All rights reserved.

DD: Any new and exciting methodologies you're itching to try?

EO: Through my time as a researcher at Charles Darwin University, I worked in proximity to researchers on Indigenous Knowledges in Australia ([Ground Up](#)), who really drummed into me the need to pay attention to moments of disconcertment when engaging with people operating out of ontological, epistemic commitments different from my own. In the recent [HeatSafe](#) project in Singapore, it became very apparent that the Bangladeshi and Tamil workers we were speaking to understood what caused heat-related illness and how to treat it somewhat differently from the Western account of heat health adopted by our research team. Some of these principles could be explained with reference to other systems of medical knowledge such as Ayurveda. However, in the course of the project, the workers' understandings were somewhat sidelined as "interesting but slightly irrelevant."

It became apparent that the Bangladeshi and Tamil workers understood what caused heat-related illness and how to treat it differently from the Western account of heat health.

Yet the truth is they are far from irrelevant if these are the principles workers are using to treat heat illness day to day. Furthermore, by ignoring them, we are enacting a kind of ontological violence. This became very apparent when I found myself in the position of recommending ingestion of cold water when, for many of the workers, this was seen as potentially unhealthy. If workers were to follow our advice, this runs the risk of being perceived as thermal violence (à la Nicole Starosielsky), even though it was clearly intended as an act of thermal care. This situation was, of course, ethically fraught but also intellectually fascinating. It got me thinking about just how widespread such disjunctures might be and how we might do a better job of working in good faith with different knowledges in devising occupational health policy.



Person making sandalwood paste. Ayurveda offers multiple strategies to manage heat, one of which is applying sandalwood paste to the body to cool the skin. Photo by Harsha K R. Flickr. [CC BY-SA 2.0](#).

DD: This is fascinating, given that it moves away from a solely Western account of heat health. How are traditional forms of medicine being integrated into your current work?

EO: These “alternative” knowledges about heat perhaps shape the behavior of most of the global population outside of Western countries. If we think about the enormous populations of South Asia and China that follow, to some degree at least, what might broadly be grouped as Ayurvedic and Traditional Chinese medicine (TCM), there is huge potential not only for misinterpretation of Western-derived public-health messaging but for such messaging to be perceived as disingenuous, false, or even potentially dangerous. As such, together with a group of researchers from South Asia, we’re working on a project proposal at the moment that will bring together different kinds of knowledge authorities (Ayurvedic and other traditional medicines, TCM, and Islamic knowledge authorities, together with thermal physiologists and public-health officials) to examine how various ontologies of heat health differ and align, to build a better understanding of the issues at stake, and to see what potential there might be for codeveloping—in particular places—shared public-health messaging that is commonly acceptable to the knowledge communities there.

DD: On a broader note, what do you think a warming planet will entail? Are goals such as that of the Paris Agreement to keep the rise of global surface temperatures to well below 2 degrees Celsius even attainable?

EO: I have to hope that they are attainable. We absolutely must strive to keep warming well below that limit if we can, and even if we miss our goal, every fraction of a degree of warming we avoid saves us countless losses of life and unnecessary suffering. We are already locked into an amount of warming that is pushing the limits of what our health-care systems can cope with. We had 50,000 deaths from heat in Europe alone, just last year, with about 1.5 degrees Celsius of warming. This is not acceptable, but it’s conceivable that as long as further warming is prevented, we might be able

to improve our systems enough to cope. However, warming beyond 2 degrees Celsius would be catastrophic. We could be looking at a [tripling of deaths](#) by the end of the century. Not only would health-care systems be impacted but so would productivity and GDP overall—and that's just from heat, let alone all the other impacts of climate change.

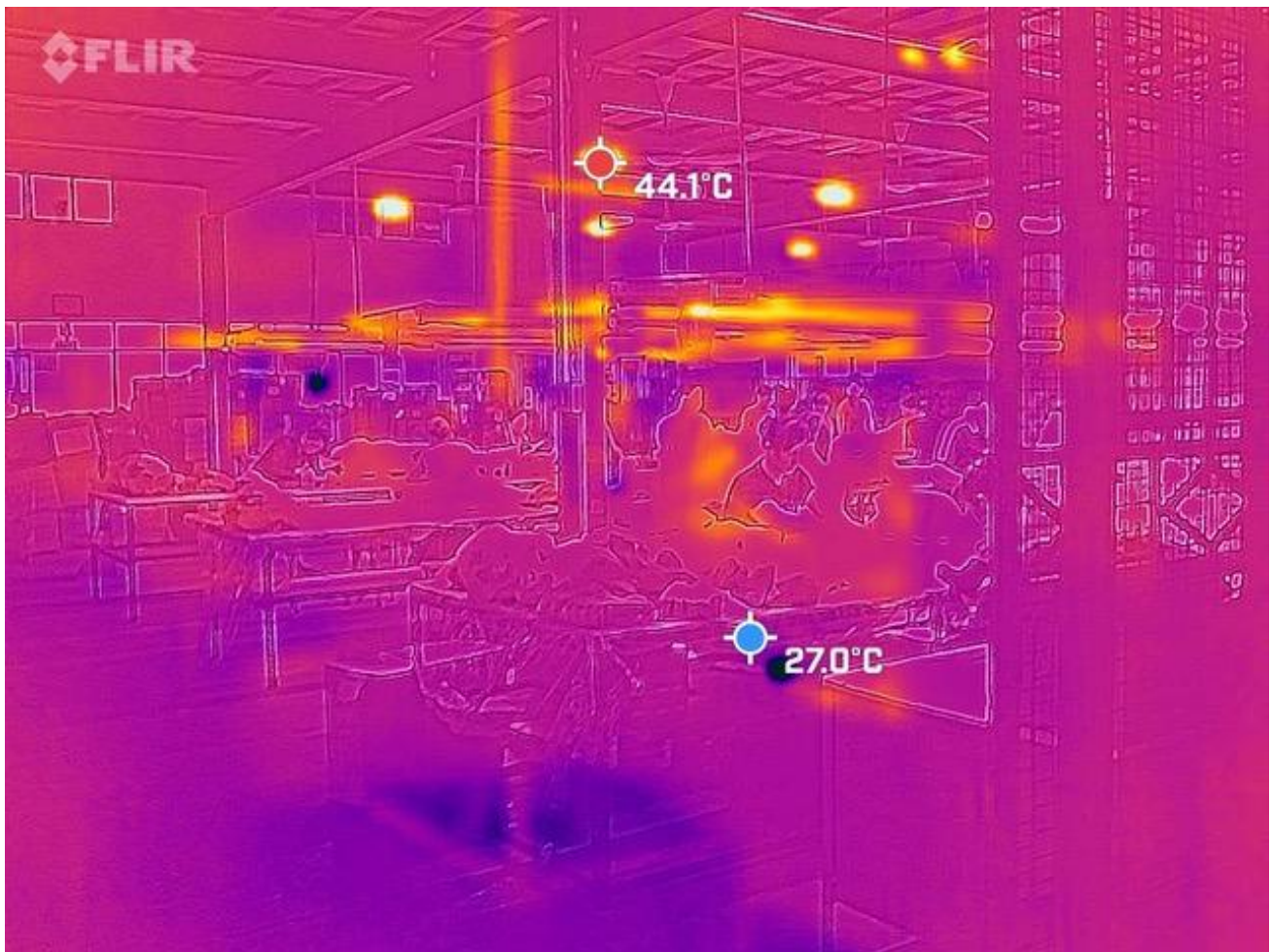
We are already locked into an amount of warming that is pushing the limits of what our health-care systems can cope with.

DD: Is there room for hope then?

EO: Yes, there absolutely is. I was privileged to act as an expert for the European Commission (EC) for their occupational-health summit last year. Heat has now been placed as a key aspect of the framework approach on climate-change impacts across the EU. It was very encouraging to see the beginnings of a deep level of intellectual engagement and careful political negotiation taking place between, for example, the European Trade Union Confederation (ETUC), informed by the European Trade Union Institute (ETUI), BusinessEurope, and the EC regarding how heat should be addressed.

DD: Are there any practical policy initiatives that you've seen come out of these engagements?

EO: The projects I've been involved in have been largely aimed at effecting policy change at least at the company level, if not beyond. In Australia, we worked with McArthur River Mine to implement changes at the site level—including ensuring crushed ice was permanently available across the site. In Singapore, for Project HeatSafe, a series of interventions (cold water ingestion, regular breaks, and climate-appropriate clothing) were trialed at the company level, and an [educational video on managing heat was developed in multiple languages](#) (Bengali, Tamil, Chinese, and English), which is now being rolled out across the city-state for new employees working in construction. As an expert for the European Commission on climate change and occupational health for their 2023 political summit on occupational safety and health, I was able to provide evidence to support discussions regarding the importance of climate-change impacts and particularly extreme heat for workers across the EU. I know this evidence was drawn on during the discussions, which led to a political statement reinforcing climate change and heat as key action areas for the next few years. Some of that work also informed conversations that have been taking place between the EC, ETUC/ETUI, and BusinessEurope as they've negotiated whether, and if so how, to develop a legally enforceable threshold temperature for work cessation across the EU.



Thermal image of factory floor, with temperatures ranging from 44.1 to 27 degrees Celsius. The patches of yellow and red demonstrate heat generated by lighting and machinery—and highlighting the variety of experiences; workers at some stations are more exposed to heat than others. © Teledyne FLIR / Elspeth Oppermann. All rights reserved.

DD: Are there big areas that you think are missing in heat research?

EO: There have been some major shifts in heat research over the last few years. Some of the “hot” topics recently have been how heat stress combines with air pollution to produce deadly conditions, and the other is the mission to identify whether chronic exposure to heat, or chronic dehydration, contribute to CKD—chronic kidney disease of unknown origin, which is responsible for tens of thousands of deaths every year.



This worker rolling up his sleeves and with his helmet sitting too high on his head demonstrates what may be a trade-off between risks—immediate thermal comfort being privileged over longer-term risks of UV-protection and physical impacts/trauma. © 2023 JSB Co. on Unsplash+. All rights reserved.

There are two areas that I think are missing and may be just as important. The first of these is examining how malnutrition and heat stress interact. It's a fact that in many parts of the world facing chronic exposure to extreme heat, populations are also widely malnourished—this includes being undernourished where food sources are limited (think of displaced populations from conflict and environmental stress in parts of Africa, Asia, and the Middle East). Crucially, as climate change progresses, extreme heat is likely to trigger heat waves as well as droughts, resulting in people encountering extreme heat with reduced access to food. The Wellcome Trust-funded pilot project I'm part of first examines the state of the evidence on the relationship between undernutrition and heat stress, and second looks at how this problem plays out in the specific context of internally displaced people's (IDP) mobility. We will be working with experts and NGOs in Pakistan and Nigeria to develop a conceptual framework for how mobility, heat stress, and undernutrition relate.

The second issue that I think has gone widely unrecognized is the assumption that there is "one way" to understand heat health. This is deeply problematic. First of all, meteorologists, physiologists, and epidemiologists don't always agree on what conditions are "hot" and why they matter. This is in part because their objects of concern are different. They might be the environmental system, the human body, or the health system—all have different but related vulnerabilities to heat. The difference between these disciplines, however, can be somewhat bridged by their common foundation

in Western scientific thought, and particularly thermodynamics. However, there are everyday knowledges as well as alternative medical knowledges of heat beyond those of Western science that we must take seriously, as I've touched on already.

DD: So then, I'm curious to ask, thinking about everyday knowledges, what does your work show in terms of best strategies to survive on a warming planet?

There are everyday knowledges as well as alternative medical knowledges of heat beyond those of Western science that we must take seriously.

EO: We need to aim for decent quality of life (including safety at work). In the labor-intensive workplace (from factories to construction sites), there is so much that can be done to improve the lives of workers, a lot of it relatively simple and mostly accessible measures: Allowing new workers time to acclimatize, self-pacing the rate of work, scheduling heavy work for cooler times of day (or night, in some cases), allowing frequent rest-breaks, ensuring sufficient hydration, allowing access to ice slurries for ingestion and/or active cooling in airconditioned refuges. A lot of workers know many of these things already but do not feel able to ask for or implement them, so creating organizational cultures backed by workers' rights, where they are free to speak out helps greatly. Ensuring people have the chance to cool down and recover when they get home—and indeed on their way to and from work—are also major issues. Tackling how heat plays out across different domains (home and work, public and private) requires collaboration across multiple sectors and

branches of government. However, on the global scale, none of these measures will be enough if we don't get emissions under control and aim for less than 2 degrees of warming, so we have to keep that goal in focus too.

DD: Thank you very much for sharing, Elspeth, and for tackling this important topic in your research and practices!

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