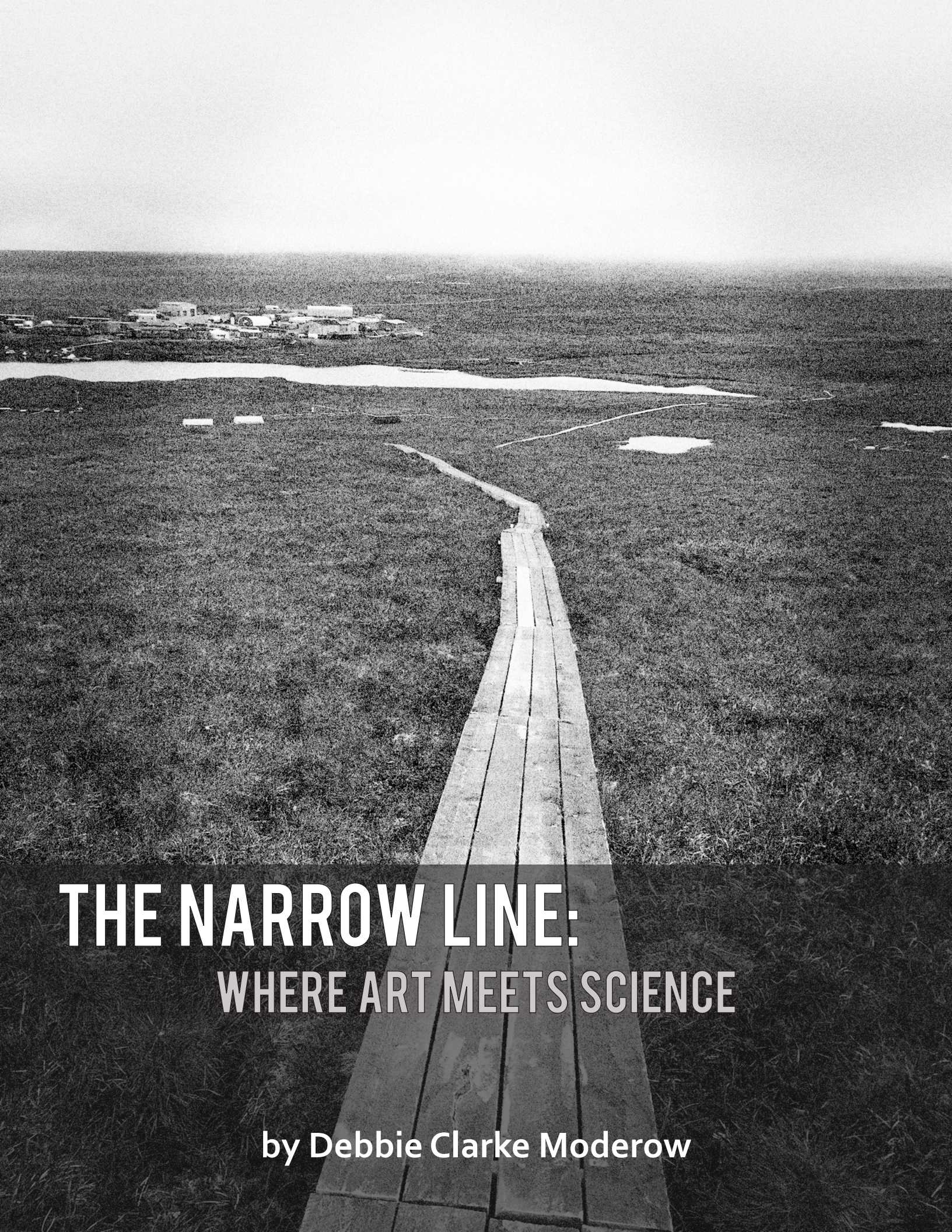

THE NARROW LINE:

WHERE ART MEETS SCIENCE

by Debbie Clarke Moderow

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cover and layout by Jennifer Moss

1

I'd never spent time at a research station before. After four days in the Arctic tagging along with scientists at the Toolik Field Station, visiting labs, and listening to a wide range of presentations, you'd think my mind would have been in a state of overload—that my ability to take in more information might have been limited. But when the artist asked the scientist about the loons, I was eager for his response.

"Our first morning here, we saw three yellow-billed loons fly over the lake," the artist said. "Were we looking at a mating pair and this summer's young?"

The scientist shook his head. "It's tough. Yellow-billed loons mate for life. You're partially right—you likely saw a mating pair. But this summer our loons had no chicks. When they're unsuccessful breeding, they tend to join up with others. We've seen groups of three this summer. And even a few of five."

I fidgeted with my pen. I'd watched those loons fly over. I'd gone back to our weatherport tent and jotted notes about the magnificent winged creatures that had migrated to the Arctic as two and now prepared to fly south as three. I'd assumed a story of resilience and survival and new life. But I was wrong.

The scientist had more to say. "You know, the loons weren't the only ones affected by the warm winter and the series of rogue storms that followed in springtime. The white-crowned sparrows had trouble too. They tried again and again to nest, but failed. For the second year in a row, they have no young."

After a pause, he added, "We're afraid it will be pretty quiet here next summer."

2

I've always been a bird person. Before I knew how to ride a tricycle, I obsessed over the birdfeeder on the other side of the windowsill, where our tabby cat sat and twitched her tail at chickadees feasting on suet and sunflower seeds. The backyard of my New England home, along with my imagination, was populated with crows and fireflies and busy grey squirrels that tossed acorns onto my head from branches of the oak tree that towered over my sandbox. By the time I entered first grade, I knew that the nuthatch, with its hooded head, carried secrets from the woods behind our house, and if I listened carefully at night, I might hear the call of an owl.

At age twelve, I understood that the scarlet tanager's return in winter had everything to do with flyways, food sources, and distant wild places. When my parents talked about something called DDT and acid rain, my father frowned and my mother usually tried to change the subject.

My childhood curiosity about the world beyond my window should have primed me for a high school schedule filled with science classes. A career in ecology or ornithology would have made sense. Logic would have predicted that as a sixty-year-old who had lived in Alaska for nearly forty years, I might have been the one delivering a presentation about migratory birds instead of sitting in the audience listening, but my life took a different course.

When I walked into the tenth-grade science lab and faced the Bunsen burners, rubber gloves, the tweezers, and the vials, everything felt sterile, analytical, and forced. As much as I tried, I could not make the connection between the nuthatch at the feeder and the periodic table of elements that hung on the wall. After one obligatory semester, I fled from the frog on

the metal plate, the microscopes, and the slides, and found refuge instead in the pages of Ernest Hemingway, Robert Frost, and Henry David Thoreau. Science was simply not "my thing."

Now, after so many years, I'd found my chance to circle back to the lab. Alarmed by the threat of climate change, and hoping to write about its progression in my northern backyard, I participated in an art-science collaboration called, "In a Time of Change: Microbial Worlds." I figured if I could force myself to understand the microbial underpinnings of change, perhaps I'd be able to write about our warming climate. As an Alaskan author, maybe my voice could make a difference.

For almost a year before traveling to Toolik, our group of fourteen artists had met monthly with scientists to learn about microorganisms. Our first meeting introduced us to the world of microbes, including bacteria, algae, viruses, lichen, and protozoa. In the University of Alaska Fairbanks microbiology teaching lab, technicians helped us focus a microscope lens so we could watch bacteria scurry across a slide. On a hot afternoon, we followed ecologists into the field, where they measured gasses emitted from microbial activity within the melting permafrost.

Information shared at these gatherings illuminated diverse and multifaceted organisms. While some microbes cause disease and contribute to climate change, others promote human health, remove toxins from the environment, and maintain balanced ecosystems.

To look through the lens at microbial worlds was enlightening, but the optics of this new view did not always come easily. It was one thing to discover that mushrooms sprouting along my backyard trail emerged from a vast web of tiny threadlike hyphae that worked with bacteria underground to break up plant litter and aid in soil formation. It was something altogether different to put that knowledge to use. Still, with each exposure to microbial science, I wanted more. Mostly I grew impatient for our group's upcoming five-day visit to the Toolik Field Station. It would be the ultimate arts-science field trip.

3

Our journey to Toolik began in Fairbanks at 8:00 a.m. on an August morning, when our group boarded a small tour bus for the eleven-hour drive north. Determined to make the best of my foray into Arctic research, I settled into my seat with a field guide in hand. I planned to read it cover to cover. As it turned out, I didn't get past the first chapter.

The windows on our bus were tall and wide—perfect for framing an ever-changing landscape. Just north of Fairbanks, the familiar sight of forested hills returned me to the runners of my dogsled, where, on an unseasonably warm day the previous December, my huskies and I slipped through birch trees in the dusky midday light. To run dogs on the shortest day of the year in such comfort was a treat, but my high spirits were offset by the knowledge that 36 degrees on winter solstice was far from normal.

As our bus continued north, we drove through country ravaged by recent wildfires. I'd come to appreciate the monochrome beauty of blackened timber tilting over a forest floor sprouting hints of new green. Aware that the health of the boreal forest depended on rejuvenation from fire, I wasn't surprised to spot a hawk owl perched on the crooked tip of a charred spruce tree. The visibility in this burnt out timber offered the small raptor a hunting advantage. For this moment, anyway, our warming climate might grant this creature a decent chance for survival.

Our warming climate. For years the effects of climate change have stared Alaskans down. From neighborhoods decimated by fire to snowless winters necessitating cancellation of international mushing and ski events, from eroding coastlines forcing village relocations to the recent die-offs of migratory bird populations—single events could rarely be blamed solely on climate change, but the accumulation of data was clear. Some Alaskans insisted on arguing about the causes of our planet's warming, but few could dispute the facts of milder winters and receding glaciers. Or that a 1979 satellite photo showed a vast portion of the Arctic Ocean locked in summer sea ice where, in a corresponding 2012 image, there was

open water.

Despite a shared and urgent concern, our group of artists and scientists rarely named the issue of climate change. Instead, we gathered in the context of science—where questions are identified and data collected day by day, and year after painstaking year. In the spirit of collaboration, we exchanged perspectives about science and art. An ecologist talked about his calling to identify clear questions, and the ongoing draw of discovery. Biologists, painters, and writers spoke of their desire to chase down a particular truth—and their passionate follow-through in the lab, at the easel, or on the page.

In addition to spending time in the university lab and following scientists into the field, we listened to presentations about the practical application of microbial science. From remediation of oil spills to innovations in sewage treatment techniques, we learned about benefits resulting from ongoing research. Our conversations were always open, enlightening, and anchored in mutual respect. So it came as a jolt when our bus reached the Dalton Highway, eighty-four miles north of Fairbanks, and I confronted the politics of the road we traveled. In the context of climate change, the implications were impossible to ignore.

4

The Dalton Highway, a 414-mile industrial haul road constructed to support the Trans-Alaska Pipeline, was built in the 1970s. Those were the days of the energy crisis, when my parents talked of the dire national need to conserve fuel. The 800-mile pipeline from Alaska's Prudhoe Bay oil fields to the port of Valdez was touted as America's solution to the problem. The construction of the Dalton Highway was completed in five short months. In a flurry of dollars, the Trans-Alaska Pipeline was up and running by 1977.

Now, almost forty years later, I sat in the comfort of a tour bus and traveled that same road. There was no denying the irony of it all: that our group of artists and scientists, gathered in a program called "In a Time of Change," drove through Alaska's iconic wilderness in a luxury vehicle fueled by gasoline, following a trajectory constructed by and for "Big Oil." Not only were we burning fossil fuel to reach our destination, we traveled a road that facilitated the increase of greenhouse gas emissions worldwide.

The political persona of the Dalton Highway was anything but subtle. When we drove across the bridge spanning the Yukon River, my gaze was drawn to her powerful current. Then our driver announced, "We'll take a break up ahead. But I need to tell you, no one is allowed to walk on this bridge." He pointed to tall light poles suspending loudspeakers and cameras, the ever-present voice and eyes of the U.S. Department of Homeland Security.

The further we drove, the more I recognized the fickle nature of the Dalton Highway. Some of her miles boasted a smooth and paved surface, while others were dirt and mud, riddled with ruts. In a matter of a few hours, we drove alongside national wildlife refuges, pump stations, and work camps. Overlooks celebrated everything from the gold rush to the glaciers of the Brooks Range to the history of pipeline construction. We motored past wild rivers with Alaska Native names such as Kanuti and Koyukuk, while voices of truckers crackled over the CB radio, announcing locations on "Oil Spill Hill," "Oh Shit Corner," or "Beaver Slide."

Each mile revealed a smorgasbord of images that were topographical, historical, and cultural. But to hear our driver radio to the truckers, "Little green tour bus, heading over the Roller Coaster," was to recognize our vulnerability. Against the massive industrial rumble of oncoming eighteen-wheelers, our little green bus motored along. We might have been small in stature, but our vehicle carried the timeless dimensions of scientific inquiry and artistic expression. I hoped our group could live up to our collaborative calling.

5

We rode north on the Dalton for hours. By the time we reached the Arctic Circle, at milepost 115, the trees had thinned. By milepost 235, just south of the Chandalar Shelf, there were none. To our west and north rose the jagged peaks of the Brooks Range. Her massive southern flanks lifted from an extended reach of green earth and water—marked by the snaking presence of the Trans-Alaska Pipeline.

"There are places to the south of us where the pipeline is buried underground," our driver explained. "But because the Arctic is a land of continuous permafrost and temperature fluctuations bring shifts in terrain, Alyeska Pipeline engineers created a system where the pipeline could float above ground and withstand topographical changes."

With the pipeline always in sight, we ascended the switchbacks of Atigun Pass. Wet summer snowflakes swirled in the air. Gushing waterfalls and crumbling scree gulleys fell from high rock walls as we passed. After rounding a particularly tight corner, we confronted the unlikely sight of a man, bundled in winter clothing, waving a warning flag. At a 4,739-foot high mountain pass in the Arctic, our bus stopped at a portable traffic light. Off to the side of the muddy road, two pieces of heavy equipment bludgeoned the tundra. Evidently two communications companies were vying to lay fiber-optic cable. One could argue that progress in telecommunication was critical to this northern frontier, but all I could see was one more scar. Deep and messy and wide.

Caught between two views—the unfettered wildness on one side of the bus and a messy industrial work site on the other—we crested the pass and descended the other side. With fresh momentum, we cruised beneath mountains shrouded in clouds and alongside swollen threads of rivers that braided through green valleys mottled with snow and a few hints of autumn gold.

The gradual pitch north from Atigun ushered us onto the sweep of land that extends to the Arctic Ocean, where glacial valleys stretch beneath an expansive northern sky. The land mass rich in hardy vegetation welcomes hundreds of bird species that annually wing across boundaries national, political, and topographical to nest. This was the northern slope of the Brooks Range, where Alaska Native people have long lived off the land and her creatures.

The North Slope. To most Alaskans these words have had far more to do with the economy than with anything else. "He's working on the Slope," our neighbors have long told us. "Things have slowed on the Slope," or "Let's hope for new leases on the Slope." The phrase has meant dollars and oil, school funding, annual permanent fund checks, police protection, theater, museum expansion, and more. To Alaskans, the Slope has signified more about lifestyle than about a pristine and rare sweep of wilderness at the northern edge of our continent.

The spectacular view out the bus window during those last miles north of the Brooks Range should have delighted me. We spotted a northern harrier diving to the tundra. A lone caribou posed on a low-lying ridge. Despite the wild dimensions of the landscape, my morale wavered. I was lost in discordant thoughts about the collision between preservation and exploitation of this remarkable land when, mercifully, our mud-splattered bus rolled to a stop.

"Welcome to Toolik Field Station," our driver said.

And so, 368 miles north of Fairbanks and 128 south of the Arctic Ocean—and the oil fields of Prudhoe Bay—our eleven-hour road trip came to an end. Relieved to have reached our destination, we listened to our leader describe weatherport assignments, dining room protocol, and a welcome orientation that would follow dinner. Then I stuffed my unread guidebook into my backpack and stepped out of the bus, into the cold Arctic air.

6

On the first morning at Toolik, I woke up confused. The chill on my face and the rub of my sleeping bag cinched against my chin reminded me of camping in Denali National Park. But this was different. I hadn't hiked past the bluff where the golden eagles nest or chosen the perfect patch of soft tundra for pitching my tiny tent. Instead of the buzz of mosquitoes and the rush of a nearby creek, the rumble of a generator mixed with the steady rhythm of footsteps.

A voice said, "Morning." One of my tent mates was stirring.

"Damn it was cold in here last night," another said. "How could we have not turned up the heater? What were we thinking?"

Ree, the practical one, ended the discussion. "No point in worrying about it now," she said. "It's time to get moving."

And so we did.

I scrambled to my feet and pulled on my warmest hiking clothes and tough rubber boots. Then I picked up my backpack, already loaded with gloves, dry socks, binoculars, a hand lens, a notebook, and a pen, and stepped out of our tent into the hustle of scientists embarking on a new day of fieldwork—while telling myself to pay attention.

The dining hall smelled like bacon. Several scientists donning wool hats and backpacks stood in line for coffee. Others circled a buffet table, piling their plates with French toast, buttermilk pancakes, scrambled eggs, and vegetarian burritos. Clusters of people sat at long tables, quietly talking. Others hustled around a lunch bar, bagging sandwiches, trail mix, and cookies for a day in the field. These men and women looked familiar to me—like they were heading out on a hike or a day fishing.

Not feeling particularly social, and intimidated by the prospect of explaining to a group of scientists why I had come to Toolik as a writer, I sat at an empty table. With a warm mug of coffee in hand, I looked out the window at a narrow boardwalk leading up and over the hillside above Toolik Lake. Figures trudged along its silver line. They moved slowly and deliberately. A few stopped and leaned over, apparently tending to their studies. The lake beneath them shimmered in the soft morning light.

As I sat, sipping my coffee and watching them, I wanted to go there: to walk the path where the scientists worked. At that moment, I was not scheming about hiking to a distant peak. For once, I had no ambition to reach a particular ridge where there might be a longspur nest or a dramatic view into a hidden alpine valley. Instead, I wanted to slow down. To shadow the researchers and share their patient deliberate focus on the land beneath their feet. I wanted to try to understand.

7

Every day during our visit to Toolik, we listened to presentations about ongoing research. It didn't take long for me to see the Arctic landscape in the context of water.

The freeze-thaw cycle in the far north had everything to do with the ebb and flow of life, from the microbial communities beneath the tundra to the birds that flew overhead. In a warming climate, this landscape was thawing. Lakes were rising, new ponds and streams forming. Everything was affected by fluctuations of water.

Permafrost, the layer of permanently frozen soil that lies beneath tundra, has been the subject of many studies. One month before we traveled to Toolik, our group watched an ecologist drill a deep hole into the earth and pull out a three-foot-long permafrost core. I already knew something about permafrost—how my husband and I had to build our cabin near Denali on pilings because of the shifting ice-laden ground. But to watch a permafrost fudgesicle melt in my hand, while listening to an ecologist explain that I might be holding organic matter 40,000 years old, made a lasting impression.

By the time I listened to presentations at Toolik, I could envision the subsurface layer of frozen prehistoric plant matter. I could imagine microbes, similar to those we'd seen under the microscope, acting as decomposers—feeding on plant matter and releasing carbon dioxide. "We believe the earth presently contains far more organic carbon in soil and permafrost than there is in the atmosphere. We're uncertain what might happen if our warming climate releases all that stored carbon," one scientist said.

As if this information was not alarming enough, there was more. "It's not only about carbon dioxide," a microbial ecologist told me. "The heating up of Arctic lakes means the ground beneath them is also thawing." In those anaerobic places, where there was no oxygen, a different microbial process was underway, in which microbes called archaea release methane. "Methane is twenty-five times more powerful than carbon in trapping warmth in our atmosphere," she told me. "We're paying a lot of attention to methane these days."

It was mid-morning when our group walked single file, following Toolik's lead scientist along the narrow boardwalk. We stopped halfway up the hill and listened as she described several small structures off to our side.

She explained that one was a greenhouse, designed to capture heat and create a warmer climate. Another structure, covered with a tarp, served as a shade house. The third was simply a frame, outlining the status quo. These isolated ecosystems simulated different climates, where data could be collected and documented over long periods of time.

We were asking questions about ongoing studies, when all at once we heard them. The scientist paused mid-sentence. We all looked overhead. Three large birds winged toward us.

"Yellow-billed loons," one artist whispered.

They swooped low.

The loons drew our rapt attention. In unison, as if we were marionettes connected by strings to a master puppeteer, we turned to watch the feathered beauties pass. We looked to the sky long enough to be dizzy from the view. Then, sensing a different movement, I noticed Ree wobbling behind me. She lost her balance and staggered off the boardwalk onto the hummocked hillside.

I held my breath and watched her take one, two, three, four, and maybe five valiant slow-motion steps, attempting to prevent her inevitable fall. Then, in one fluid motion, she rolled onto the soft tundra and back onto her seventy-year-old feet. Laughing—still looking skyward—she told everyone, "Don't worry about me. I am just fine."

And she was.

8

I've always been the one who welcomes change. In late August, when the tundra in Denali turns red and gold, and I hear the unmistakable gargle of sandhill cranes migrating south, something deep inside me stirs. The brilliant light of summer might be waning, but the crisp fresh start of winter will soon arrive. During the darkest winter months, I've found hope—in the snow-laden trees or in the face of an ermine poking his head out of the woodpile. I've felt warmth from the song of our sleddogs during the sub-zero night.

Even when bad things happen, I've tried to focus on something positive. When an old cabin burnt to the ground, I cringed at first, but with time I came to accept the emergence of a new structure. When ravens abandoned their nest near our home, I watched for a sign of new inhabitants. Long ago I understood that life is nothing but the progression of change.

Yet even to me, our warming climate lurks as a monster—one of unwieldy and threatening proportions. I've smelled the odor of our planet's warming and covered my face with a bandana when thick smoke settled in our valley. I've walked on a dirt path south of Anchorage, where I had once skied on the surface of a glacier. I've advised a young couple against starting a sleddog kennel like ours for their children, because the junior dog mushing club in Anchorage had not had enough snow for races in years.

When I ran my dog team through villages along the Bering Sea coast, I looked into the eyes of people confronting inevitable relocation. Recent photos of dead murres washing up on the beaches of Homer, Alaska, have haunted me. To recognize the role our culture has played since the Industrial Revolution in altering the global climate has driven me to an anxiety-ridden place darkened by shadows of guilt and despair.

But take me by the hand, like the scientists did in Toolik. Hold the boat steady as I step in and take my seat alongside the ecologists. Show me what it looks like to collect air from lake water, and explain what it is you are measuring. Dip a vial deep under the lake's surface, and hold it toward the sky so I can see zooplankton that the fish eat.

Tell me, please, how you know that the frozen plant matter beneath this lake is thawing. And exactly why you collect so many samples. What might those measurements show? Is it possible that the frontier of microbial understanding holds mysteries that we seek to unlock? Could there be a resilience hidden in this thawing land—one that might save us?

9

I traveled to Toolik intent on gathering knowledge and maybe a few answers. I returned home with a new respect for questions.

Hope for our changing climate lies in the questions scientists ask—and in the reality that they do not know everything. The same way artists do not. Like poets and painters, the ecologists and the physicists push to the edge of understanding. With patience and focus and dedication that I find hard to manage, they pursue answers, one incremental step at a time.

Humans may have built an 800-mile pipeline through Alaska's iconic wilderness—and transported more than 16 billion barrels of oil from beneath Prudhoe Bay—but the cost of that manmade "triumph" has yet to be fully measured. The ramifications of fossil fuel extraction on the health of global air, earth, and water are the subjects of ongoing debate. Questions driven by scientists fuel hope for knowledge and the possibility of answers containing healing solutions.

After explaining her work on antifreeze proteins in DNA, and how they pertain to microbial adaptation to winter, a

geneticist admitted that sometimes she works on a study for years without coming to a conclusion. "Sometimes the answer to a question is chaos," she said, before adding: "That's just the way is. And really, it's okay."

Today, when I recall those three loons winging above the hillside near Toolik Lake, I remember a scene loaded with meaning—and one unanswered question. I see a diverse group of artists and scientists trudging along a tilting walkway suspended over unstable thawing ground. When a trio of mythical creatures flies past, everyone quiets. The visitors on the boardwalk share an unspoken celebration that there are three; they don't yet know that this summer, the number three does not signify breeding success. Instead, those six wings beating overhead deliver a promise of fertility and reproduction—optimism and joy. Ree's pure delight in the birds sends her tumbling off the boardwalk onto the soft Arctic tundra, where momentum grants her a grace-filled recovery.

The flyover delivers a message of hope at the time, but in hindsight one riddle remains: Will those yellow-billed loons recover?

10

Two months after returning from Toolik, Ree and I walk carefully across a recently frozen lake. We follow a scientist named Katey. She wears a life jacket over bulky winter mountaineering gear and drags an orange plastic sled behind her.

Katey Walter Anthony is an aquatic ecosystem ecologist, but many refer to her as "the methane scientist." Committed to studying the natural release of methane, she documents bubbles that percolate through northern lakes and ponds. While the climate has warmed and Alaskans have argued about how to regulate extraction industries that contribute to our planet's warming, Katey has classified bubbles. She's named the bubbles according to various dimensions and mapped them. Lit them with a match, and watched bubbles in ice erupt into flame. One of her projects considers whether methane seeps near Arctic villages could be harnessed for environmentally responsible local power generation. Katey's work is the professional passion of her lifetime.

For the two of us to spend time with Katey in the field is an honor—except I'm worried about falling through thin ice. I'm walking carefully, choosing a route that skirts cracks and bubbles. But I cannot relax. The ice screams warning to me in pops and creaks. A fish fins slowly under my boots. A waterbug skitters along off to its side. There's a sharp snap. It ricochets across the surface.

I gasp.

Ree chuckles. "Debbie you don't have to worry," she says. "This ice is plenty thick."

Ree is invincible, and I have to admit her words carry wisdom. After all, she has lived at the edge of a lake outside Denali National Park for a lifetime. Still, the next loud crack gets to me. I cannot walk so close to two others when we're moving on ice six inches thick. So I keep my distance.

The ice is tinged a light shade of brown. In places near shore it's speckled with tiny bubbles, clustered like a galaxy of stars. Some are frozen in a three-dimensional swarm. When I walk a little farther toward the middle of the lake, I find oblong bubbles eight inches in diameter or bigger. Some are stacked one on top of another in layers—like a series of signals released from below. Other large bubbles rest near the surface in clusters. They wrap around each other, in a fluid embrace.

I've seen these bubbles before. I've snagged a few with my ice skates. Chopped holes in others so I could set my snowhook anchor to stop my dog team. I've always thought that bubbles in winter ice resulted from freshwater clams or beavers and muskrat swimming beneath the frozen surface.

Now I know more. This lake is alive. Its ice is a time-lapse photo documenting the progression of a microbial feast. When water began to freeze last week, archaea on the lake's floor were munching on recently thawed plant matter and releasing methane. The resulting bubbles rose toward the surface, slowing at different levels in the rapidly freezing water. They were captured, through time, in a process that continues today. Now sculpin fin their final strokes and waterbugs struggle for one more hour—and a scientist, an artist, and a writer scurry on the surface, trying to understand.

Katey pauses to kneel on the ice, and I walk closer. "This is a hot spot," she tells us, pointing to a round opening filled with bubbling water. She explains that methane production here is strong enough to prevent ice from forming. As she unfolds a big white contraption that she's pulled from her sled, Katey explains, "And this is my homemade bubble trap." She looks particularly pleased.

Katey pulls on long rubber gloves. Then she tightens her life jacket and thrusts her whole arm, trap in hand, deep into the hole. She's capturing air in water, for transport back to the lab. The collection process is one step in a complex study.

As I stand and admire Katey's determination to collect frigid water, I realize she has captured my full attention. I've always been drawn to visible creatures. The nuthatch at the feeder, the hawk owl perched on a dead spruce. A trio of loons. Now bubbles have teased me into an equally compelling story—about microbial communities that live beneath northern lands long locked in ice. When temperatures rise and thawing occurs, the microbes release methane into the atmosphere, compounding the acceleration of our planet's warming.

My thoughts race to one new storyline after another. Then I remind myself to slow down—this narrative is still unfolding. Katey and others trained for the rigors of research will continue to map emissions in air, soil, and water. They will chart temperatures and water levels, bird numbers, and bubbles. From many angles, scientists will pose questions, peer through the lens, and reach for answers.

Those of us listening to and watching the scientists must gather our confidence and ask questions of them. The resulting conversations—those hearty exchanges between the arts and sciences and humanities—hold the brightest promise of all. The dialogue might play out in challenging terrain, but if we dare to engage with one another, maybe we can find our balance—on the thin ice of a recently frozen lake or along a narrow tilting boardwalk suspended between earth and air.

Perhaps, together, we can give something back to the loons.

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In her writing, Debbie explores her lifelong connections to animals and wild places. Her current work focuses on her relationship to personal sacred landscapes in the context of climate change.

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