Introduction

> We all share the same water, the same air, and the same earth.
>
> —J. DREW LANHAM

I have lived in many places. I spent my childhood on prairies, by rivers, and on mountainsides—and I was always aware of the constant music of the natural world around me. I can remember a time when this plethora of nonhuman beings—like fireflies and birds and frogs—was not disappearing as quickly as it is now, a time when the silencing was only beginning. From then until now, this silencing has reached epic proportions. In October 2017, entomologist Caspar Hallmann and his colleagues published a paper in *PLOS One* that revealed evidence of a 75 percent reduction of flying insects in Germany over the past twenty-five years. Seventy-five percent. This stopped my breath. I expected this news would hit like an earthquake and shake everyone into an awareness about the importance of insects and the dire future we will face if they disappear, but like much of the news about environmental devastation, it seemed to go unnoticed. I tried to pacify myself with the thought that perhaps the decline in Germany stood alone.

Shortly after reading that paper, as if to quell my optimism, Jacob Mikanowski published a piece in the *Guardian* asserting that the German study was not unique. According to his sources, insect habitats—and insects themselves—were disappearing at alarming rates all over the globe. Many of us are familiar with what experts have called the Sixth Extinction, but one aspect of this dramatic shift that goes largely unnoticed is extinction in the class Insecta. In the piece, Mikanowski evokes the words of renowned entomologist E. O. Wilson,

who argued that without insects, humans would only last a few months. Entire ecosystems would quickly collapse. For me, the news of this rapid and impressively large decline of insect populations felt apocalyptic. I wanted to know more about our relationship with insects and what was making this shift happen.

As a child, I thought of all living creatures as part of my extended family. Several years after my father left my mother, and a month after her artist's residency in Colorado had come to an end, my mother took her two daughters—my little sister, Anna, six, and me, eleven—and her dog back to the Midwest, where she had lived when she was still married. Life in cooperative art centers had been rich in many ways but did not produce much money, so when some friends offered to let us live in a barn on one of their unused properties, she took it. At the time, I did not realize that we were living in poverty. Poverty was never something I really thought about as a child. Owing largely to my mother's ingenuity, my life seemed rich in many nonmonetary ways. The reality I lived in was the only one I knew, and so it never struck me as unusual, and certainly not sad, though when I tell stories to my daughter now, she often uses those words. But my mother has a shining, relentlessly optimistic spirit, and to her, living in a barn seemed like a rare opportunity to experience something unique and adventurous—and its being free made it especially attractive. So we moved into the barn.

The barn nestled between two thickly wooded hills, divided at the base by a small creek that ran fast after big storms but was otherwise a trickle. Coyotes, raccoons, owls, rattlesnakes, deer, and even an occasional bobcat resided in those woods. The barn seemed like an anomaly, as it was not surrounded by flat farmland. Years prior, it had been useful to a neighboring farm, accessible through the narrow valley, but it had been long abandoned. My mother's friends had bought it thinking that turning a barn into a living space would be a great architectural project, but they discovered they did not have the time or money to actually fix it up.

The design of the barn was traditional for the Midwest. The lower part of the barn, the basement, was made of stone and concrete, a space for cattle, sheep, or hogs, with large openings for air flow; the bulk of the barn, the upper level, was a huge open space once used for storing hay bales, with plywood floors, knotty-plank uninsulated walls, and thirty-foot ceilings. We lived on that level. The one untraditional feature of the barn was the addition of some windows. On the side that faced the valley, three four-by-eight-foot holes had been cut into the side of the barn and plate glass had been installed. The opposite wall also had a couple

of finished windows. But not all of the holes had been filled with glass. One particular hole, a four-by-four-foot square up close to the eaves, was open to the evening air. My mother erected a couple of dividers made out of two-by-fours and drywall to create two ceilingless bedrooms, but the living space was mostly open. A big table near one of the large windows became the hub, the spot where we gathered for art projects and meals. During the day, the tractor-sized sliding door was open. My mother hung up a hammock between two of the giant structural beams, which was a great place for reading. There was no running water, but we did have electricity available, and extension cords allowed us to have lights at night, a boom box for music, a small TV that got two local channels, and a tiny refrigerator on the first level, where the livestock had lived. My mother's pottery wheel and the portapotty also resided on the ground floor. As kids, Anna and I settled into this new spot with ease. We had moved so often that there was little stress about sleeping in a new place or keeping clothes in boxes.

The one feature of the barn that my mother recognized as distinctly different from other places we had lived was the number of nonhuman creatures living with us. Because the barn had so many unclosable openings to the outside world, the communities of creatures living in the surrounding woods frequently came into the building. My mother did not even raise an eyebrow at the mice, but the raccoons coming in for an easy snack unnerved her a bit more. I never saw a snake in there, but I would bet they traversed the basement, as we often saw them outside. My sister and I spent as little time in the basement as possible because it did seem cold and damp and slightly creepy. But the bats and insects upstairs did not bother us much at all, in part because of my mother's strategy of naming everything.

When my mother realized that there was no way to control the number of wasps and June bugs and bats with whom we cohabitated, she decided to prevent her children from fearing them by consciously embracing them as part of the family. I realize now that she must have been influenced by E. B. White's *Charlotte's Web*. I don't remember her ever calling a spider anything other than "one of Charlotte's cousins." Winthrop the Wasp and his friends needed to be given space because of their sensitive temperaments, and we were directed not to swat at them but to move slowly, so as not to startle them; we were never stung. We understood that Junie the Junebug and her friends were not very graceful fliers, and if they ran into you, you shouldn't freak out but just pluck them off your shirt and take them back outside. Filmore the rabbit and his babies would have

been most welcome inside, but they never seemed to want to move in. And the bats—and there were a lot of them—were all related to Angel.

Every night at dusk, the bats would fly in through the highest opening in the barn that had no window. My mother, my sister, and I all had very long, curly hair, and although the likelihood of a bat getting stuck in our hair was probably quite low, my mother had us put on hats and tuck our hair up inside them. "Time to put on your hats, girls!" she would say cheerily each night as the tiny black bodies started flying erratically around us. They came in to eat the bugs whirring around our table lamps. I have no memory of being bothered by mosquitoes in there, most likely because Angel and her relatives feasted on them. The electric thrill of having them sweep past your head never ceased, though. Once in a while a very brave friend would stay overnight out there with us, and I remember us being side by side in my makeshift bed with the covers up to our necks waiting for the bats to swoop down near our heads, and when they did, we would squeal and bolt under the covers, giggling in a combination of terror and elation that most people only experience at haunted houses set up for Halloween. But we knew not to be truly scared, because it was just Angel and her relatives, after all.

My mother's creature-naming strategy helped solidify my belief that all of the nonhumans around us have amazing, complicated lives worthy of respect and honor. The foundation of this idea started even earlier for me, when my parents were still together and we were living next to a prairie where I spent days with my dog, inventing stories about all of the insects and toads and birds that lived there. The fact that all of these beings did not share a language with me did not strike me as something indicative of their inferiority. If anything, I thought humans were the ones with limitations. To this day, it feels like a gift to be in the presence of wild things. One of the most powerful aspects of this kind of experience for me was the sound.

I remember so clearly the sounds of frogs singing on spring evenings and how that ringing in the air helped me sleep, how the crickets' thrumming soothed me, how the cicadas' relentless vibrations seemed to clearly articulate the intensity of the heat and humidity of summer afternoons. Wrens, robins, mourning doves, and cardinals created an inviting chorus early each morning. And those sounds allowed me to define spaces: singing meadows, creeks, hollows. Years later, when I began keeping honeybees, the sounds of the hive gave me an immense sense of peace—as they do to this day. A landscape in this part of the United States

being devoid of sound is terrifying to me. And more and more, as Rachel Carson so clearly imagined and illustrated in her opus about DDT, silent springs are now becoming a reality. Wild things are disappearing all over the world.

Part of the lesson of living in that barn was that not all of the creatures with whom we coexist are ones that make us feel comfortable. The wasps and the bats were part of the fabric of life, and we were taught to respect them, not to fear them or try to destroy them. Once during one of my classes in college on a hot, humid afternoon, a very practical application of this lesson came in handy. The professor had propped a door open to let a breeze in. Suddenly a young woman started screaming, jolted out of her seat, and started pointing breathlessly to a wasp that had landed on the floor near her desk. Others responded similarly, jumping up from their desks and backing away. The class was devolving into mayhem. I suppose it may seem self-aggrandizing to tell this story now, but at the moment, it was simply an obvious course of action. I knew that the wasp would become alarmed and eventually sting if we all became frantic, so I walked over to it and crouched down, lay my hand down flat in front of it until it took a few cautious steps onto my palm, then carried it out to freedom. The professor expressed gratitude for making it possible for the class to resume. That wasp had no interest in hurting me. It was just in the wrong place at the wrong time. So often the knee-jerk response to finding something that is not convenient or pleasant for us humans is to kill it. But our blithely destructive practices have terrible consequences. Pesticides and herbicides may be eliminating the things we don't like, but they are also destroying ecosystems.

In 1902, a Russian biologist named Pyotr Kropotkin became frustrated with the co-opting and oversimplification of Charles Darwin's idea of evolution, which had been distilled down to the phrase "survival of the fittest." In direct response to a writer named T. H. Huxley, who was using this phrase to justify all kinds of societal oppression and atrocity against the "weak," Kropotkin built on a lesser-known imperative of evolution, one acknowledged by Darwin: the existence of mutual aid. In the first chapter of Kropotkin's book entitled *Mutual Aid*, which expounds upon his understanding of this phenomenon among animals, he meditates on the cooperation of honeybees. His argument was that the habits and success of the honeybee community refuted the idea that fierce competition, or "struggle," between individuals was the key to survival. He found the opposite to be true and found the idea of violence for advancement repugnant. According to his theory, the firm distinctions between individuals and communities needed

to be troubled as we thought about survival as a species. Unfortunately, Kropotkin's critique of Huxley did not get much traction, and the "survival of the fittest" version of Darwin's narrative continues, in most cases, to be the predominant one. This idea fits nicely into a capitalist system but has devastating ramifications as we face the environmental and cultural emergencies of the Anthropocene.

More than one hundred years after Kropotkin wrote, we are seeing the consequences of an unhealthy idea of species fitness and domination. Humans are bearing witness to the rapid decline of bees, all other flying insects, and, arguably, all other nonhuman species. A beekeeper trained in Zen philosophy named Michael Thiele writes about what we must now learn from the honeybees. He pushes beyond Kropotkin's idea of mutual aid within a species and suggests that we acknowledge what the bees recognize and live daily, which is what he calls "interbeing," a term borrowed from the Vietnamese Buddhist monk Thich Nhat Hanh. His notion draws on the idea that pollinators are exemplary in their relationships of mutual aid, incorporating not only other bees but plants, water, and even humans as well. The interbeing concept suggests that the success of one individual or one species requires a transgression of distinctions between the life of one organism and another. This is, of course, ecosystem thinking. Bees could not survive without plants; humans cannot survive without insects, which pollinate our food, or plants, which create air we can breathe; and so on. Many of our current practices in agriculture and resource extraction are contributing to the destruction of this web of relationships.

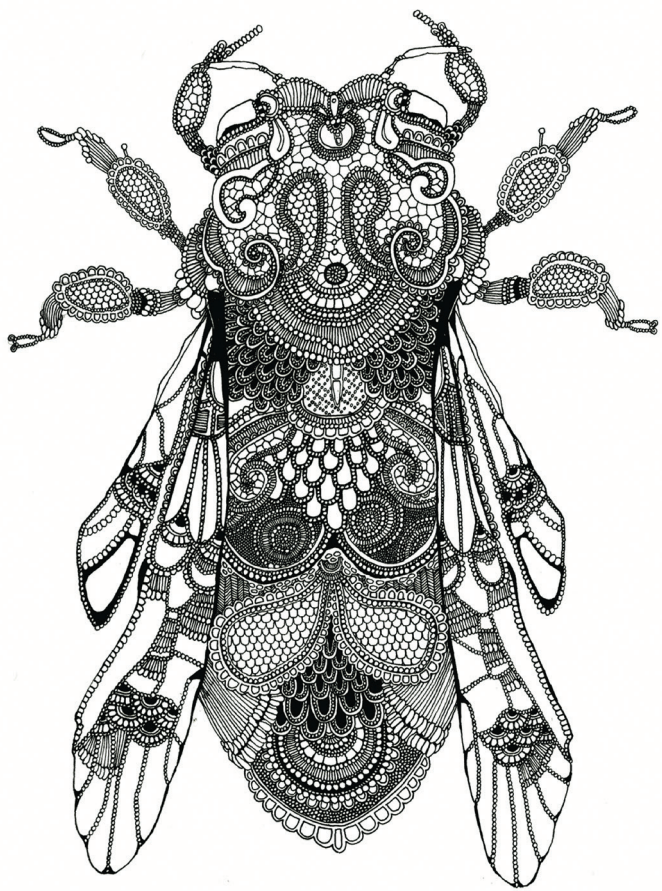
How can we shift this narrative? The answer, for me, was to learn more about the web of relationships we depend upon and then to write this book, which aims to bring to light the stories of people who have deeply inspired me, who are living this idea of interbeing, who are supporting ecosystems, and who have become insect advocates in our precarious moment. This book is a collection of wonders and sorrows as well as a playbook for the survival of our planet. It integrates scientific data, poetry, art, and the daily practices of farmers, entomologists, conservationists, and artists whose work—seen together in a mosaic—can help us begin to think differently about cooperation across the nonhuman/human boundaries and about how to preserve a healthy, biodiverse planet.

Beginning with a visit to an insect museum curator and then on to meetings with people in Ecuador and Colombia, two of the most biologically diverse countries in the world, and eventually to the midwestern United States, where you can witness the devastating effects of industrial monocropping with agrochemicals,

the book illuminates our precarious and crucial interdependence with insects. Each chapter introduces another story about innovative people and projects aiming to preserve an appropriate balance so that insects and humans (and other nonhumans) can thrive.

After each chapter, I include a gallery of artwork. The artists are doing different but equally important work in illuminating our present or our past and often offer pathways to a different future. Some of the work responds to scientific knowledge, such as the prints of the Cherokee artist Emily Arthur, who says of her work, "Art is not in the service of science. Art and science share the responsibility of observation and witness. It is through observation that science gives us proof of our material make up. It is through observation that art gives us material proof of our spiritual make up. Encountering a great work of art or a great leap in science changes our perception; it asks us to see and then to see once again, more deeply." Some of the work reflects forgotten wisdom that needs remembering. Some of the work celebrates the miraculous and the strange. Some offers a vision for the future.

I am indebted to the writings of Rachel Carson, Annie Dillard, Jane Hirshfield, Robin Wall Kimmerer, Elizabeth Kolbert, J. Drew Lanham, Rebecca Solnit, Terry Tempest Williams, and E. O. Wilson, from whom I have been inspired to blend scientific information and lyrical language in a way that invites readers to rekindle their sense of wonder and perhaps experience a sense of urgency to care more deeply about our planet, to work on building kinship with each other and our fellow earthlings. I hope to honor the unexpected and often invisible intimacies of humans and nonhumans in order to help us navigate a better coexistence. I want our descendants to know the magic of standing in a field late at night as the air vibrates with song and fireflies create a tapestry of light.



Rosalind Monks, *Honeybee*, 2011. Pen and ink, 297 × 420 mm.