Six-legged Lessons

By Emily Mercer

I'm still groggy as I arrive in the kitchen of my college house and select a box of cereal from an overcrowded shelf. I take in a slow breath and release my first sigh of the day upon remembering that the preparation of my favorite lazy-breakfast meal has been infected with an extra layer of work lately. My early appetite reassures me that the sweet, sweet crunch will make it all worthwhile. With four fingers acting as a mediocre sieve, I pour my morning eats over one hand slowly, eyes in sharp pursuit of any crawling black specks. Every few seconds, one comes tumbling down with the sugary flakes, and without hesitation I squish it dead against the flesh of my hand before disposing of it in the sink. Once today's helping of cereal has all successfully made the journey from its box, through my fingers, to the bowl below, I give it one more close inspection before drowning it in milk. I grab a fresh spoon and hit the comfy recliner in the sun-struck corner of our living room to dine on my hard-earned meal. After a few leisurely bites, I glance at my watch, realizing that my morning is already running a bit behind schedule—rather classic. A chemistry lecture soon awaits me on campus, a few minutes bike down the road. My spoonfuls increase in size and frequency, and after about three more reach my mouth, the dreaded occurs. One has managed to dodge my scrutiny. My jaw begins to slow its crunch as my taste buds tense up in anticipation of the seconds to come. I set my bowl teetering down and beeline to the bathroom—the sour, chemical taste of a single crushed ant polluting my entire mouth in transit. When I arrive, I spray my mouthful of half-chewed, repulsive cereal into the sink in one, foul bout. Panicked from head to toe, I dig around for my toothbrush, finding a tube of toothpaste first. I pick it up only to notice that its cap is crawling with a dozen more black specks; an even more frantic tremble takes over my body. With haste, I power-rinse the newly spotted ants down the drain, load my toothbrush, and scrub, finally relieving my mouth of the unthinkable torture inflicted by the cereal ant. My pounding heart simmers down. The little fella did not want to be part of my breakfast, that's for sure.

For the past several months, every surface, every crevice of our home has been teeming with ants. They move in continuous lines such that from a distance I see not individual specks, but thin, wiggling streaks of black. Parading to the kitchen on a highway of their own, they exit towards the cabinet of sugar or counter-top of spills in intermittent crowds. Every now and then, one will fall stray and find itself trekking across my mountains of feet—its half-a-dozen whiskers

of legs pattering against the skin of my toes, just barely exceeding my threshold of awareness. Other times, of course, the ants are sure to make their presence not-so-subtly known.

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Ant infestations of the home are nothing unusual; I'd like to think ours has just been particularly hellish. We've smushed them, blocked them, and even waged a few chemical wars against them. In spite of it all, our little housemates have continued to far, *far* outstay their welcome. They've imposed on me intimate observations of their ways at every hour of the day from every space in our home.

A few weeks ago, I watched the tiny guys voyage across my bedroom amidst my efforts to stay focused on my college homework. Indeed, that is how you verify that you are enrolled in a boring class: watching ants keeps you more entertained than your assignments. Arriving from my dusty windowsill, they traveled along the glossy wall abutting my bed and down to a mysterious corner of my closet. At first, I found their movements rather uninteresting, but with time, my eyes caught on to something peculiar. The ants, crawling in both directions along the same line, stopped completely every time they encountered another going the opposite way. Frozen head to head, the pair would wiggle their antennae together for a brief moment before scuttling on down the line to the next guy. Without fail, every single ant adhered to this routine. The seemingly smooth-flowing stream of ants from afar turned into a never-ending jerky sequence of two-way stops up close. Half-mesmerized and half-confused, I mulled over the function of these condensed encounters. Why on earth were they doing that?

Remembering the magical abilities of the keyboard attached to a screen sitting right in front of me, I shortly learned. Evidently, ants use their antennae to provide and receive chemical cocktails of information during these brief interactions. In a matter of milliseconds, they are able to exchange an advanced system of pheromones, communicating everything from their colony identification to their territorial conquests. The sum total of all their tiny interactions miraculously allows the colony—thousands upon thousands of moving parts—to be the well-organized powerhouse we observe it to be.

My research couldn't stop here—somehow Google had me hooked on ant articles. I learned that for each human on this planet there exists the weight equivalent of ants—that's roughly *one and a half million* of them! And every single ant species forms colonies, which, as we know, appear to be matriarchies with a queen acting as the group's chief reproducer.
In the early 1970s, biologists dove headfirst into the world of ant research, praising the species for their virtues of division of labor. "A factory within a fortress," they dubbed the exemplary ant colony. At the time, scientists thought that each of the ants produced by the queen was programmed from birth to carry out an appointed task. Some acted as caretakers for the queen and her larvae, while others gathered food and supplies from worlds far away. As they told it, each ant held a role and an unalterable destiny.

We now know this is not true. Ants are not specialized factory workers, but rather interchangeable individuals, ever adapting their efforts to the needs of the colony. The colony is not a monarchy; the queen acts not as a central control but as a mere layer of eggs. Instead, colony organization relies on brief social encounters that allow the ants to adapt to their changing environment by adjusting the numbers performing each task. If a single ant discovers a rich opportunity for foraging, this message will be passed down the line of its colleagues like a massive, yet miniature, game of telephone. Soon enough, thousands of ants will leave their

previous tasks, put on their tiny foraging hats, and form a procession to the new strike of gold. Although for some species, different sizes of ants exist within a colony, there is no evidence that the little crawlers' body type and task coincide. For instance, smaller members will often help out their team in cross-colony battles by each grabbing one of an oncoming attacker's six legs to drag him down.

The modern scientific narrative of ant societies, therefore, defies all that humans had previously assumed them to be. Born the same year I was, the 1998 animated film *Antz* was one of my favorite VHS tapes we owned. In the film each ant larva is stamped either "forager" or "soldier" by a brash bureaucrat. The plot follows Z-4195, "Z" for short, a designated worker ant who tries to swap his destiny to chase the colony's princess (who turns out to be equally displeased with her oh-so-suffocating royal life). A number of other popular tales revolve around false virtues of ants, including Aesop's fable of the ant and the grasshopper. As the story goes, the ant spends the long summer days stocking up on food for the winter, while the grasshopper relaxes and sings away the hours. It's no plot twist to learn who came hungry and begging when the season arrived. As it turns out, humans have long been using an erroneous model of ants in an effort to shape a society of efficiency and selfless, specialized work. But this concept of division of labor based on intrinsic attributes turns out to be no more than a human invention projected onto the natural world.

The more I read, the more I learned that ants aren't the only instance of mass organization relying on small social signals. Murmurations of starlings and schools of fish display similar relations as they glide through sky and sea in perfect unison, invisibly connected. A modern theory of human cognition even suggests that our brains are made up of neurons that are interconnected and adaptable rather than discrete and specialized. Surprisingly, the concept that concerns this theory—known as "distributive processes"—was first described not by biologists, but by computer scientists. Like ants, modern computers are able to process many small calculations at once rather than following an ordered command line from a central control, making them far superior at performing intensive tasks. My short venture into the study of ants taught me more than I knew there was to be learned.

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Raised in a Catholic household, I was told since I was little that I had a vocation—a calling in life that had been decided for me before I was born. With the guidance of my spirituality, I was expected to spend my adolescent years uncovering my vocation.

"Perhaps God made you to be a mother or a teacher," I remember my Sunday school instructor's old, shaky voice explaining to our class, "Or maybe you were called to be a *nun*." A giggle trickled over the room of ten-year-old girls—some vocations were a little less appealing than others.

I spent much of my childhood foraging around for signs, but my vocation was nowhere to be found. No voice from the sky or slip of paper tucked inside a cookie told me what the heck I was supposed to become. Unlike my older sister and neighborhood friends, I didn't have an image of a perfect grown-up job lodged in my mind. And although it shed its religious overtone, the assignment of finding my life's purpose continued to chase me tirelessly as I grew. It turned especially rampant when my adult-nearing age forced me to think seriously about potential careers in late high school. I was terrified by the big decisions that loomed over me. Constantly on the run from choices that would steer my life in a single direction, I developed a tendency to

keep as many doors to my future open as long as possible. If I noticed one beginning to creak closed, I was quick to send it swinging back open by taking another class or practicing a new skill. After high school I elected to go to a liberal arts college—which is really just a crisp way of saying I chose to fend off my big life decisions a little longer by studying broadly. Continuing this trend, I declared my major at the last possible moment a couple years later and switched it twice after that.

I still find myself questioning the decisions that led me where I often am. I wonder if I truly gave every possible seed a fighting chance to flourish into my future. Sometimes my indecisiveness morphs into a deep fear—one that I am simply passionless. But the thought of spending the remainder of my life oriented one direction makes me dizzy. If I know of one thing I was definitely not born to do, it is to specialize in a single thing.

The forces surrounding me seem fixated on the idea that we all have special talents that ought to be reconciled into one, big, beautiful career. I am beginning to believe in a reality less soothing, but perhaps more interesting than this. Amidst all the external pressures squeezing my imagination dry, I'm trying to picture a world where I do not need to follow a particular path and train to do one thing forever. I crave a world that allows me to shift my small contribution to it as I learn of new opportunities. Indeed, it seems like the ants have lived in that world—and in our homes—for millennia, and something about the frequent shrieks of my human housemates tells me they don't plan on stopping any time soon.