October in Prague bears hints of the winter to come; tendrils of cold wind threaten a freeze, and the cobblestones grow slick with rain, foreshadowing the months when they will be treacherous with ice. The city’s inhabitants do not lose their characteristic reserve, but somehow everyone seems closer, seems to face the approaching season with something resembling solidarity. An old drunk on the metro engages me in a twenty-minute conversation, apparently unconcerned with the fact that I know roughly twelve words of Czech and understand what I can of his slurred speech in scattered single-word fragments. Phone. Mother. December. Doctor. Beer. A rather worrying combination of utterances. I continue to wonder about him long after I leave the metro, trying to piece together that fragmented conversation.

On this October evening, from my room in Prague’s Vinohrady neighborhood, I watch the roof across from my window. Pigeons in abundance occupy the eaves, having adapted to human cities perhaps better than many humans—my first week in Prague, a pigeon strayed in through the wide-open window, and I had to flap a towel like some crazed avian matador to herd it out. The ridge and chimney of the roof, however, are the undisputed territory of a single magpie, whose crepuscular flight draws erratic graceful arcs against the rooftops. I follow its movements as if they trace some foreign script I must learn to read.

Tonight I have the windows open again, so as not to forget about that hint of winter. Here in Prague, the coming season is still just a presentiment, but snow has already covered the mountains in Slovakia where I spent my fall break. I have only just returned to the city, to school, to civilization.

I have only just returned to a stack of emails from the boy I came to love half a year ago. The first few just ask if I’m online. Later, he confesses his struggles with anxiety and depression, which my semester abroad has allowed him to keep mostly hidden. They’ve gotten harder in the last few months. Hard enough that I’m suddenly aware of how easily I could lose him.
I watch the magpie, ignoring the insistent glow of my laptop screen at the corner of my eye. I tell myself that I’m composing a response, but my mind is blank. Thoughts eventually begin to creep in: worry, yes, and sympathy, but also some selfish impulse towards guilt. I should have seen signs of this. Thoughts not of him, but of my responsibility to him. I should have tried harder to find internet access, should have made sure to check my email. Thoughts of how, when he needed me, I wasn’t there, although he would never demand such help from me or blame me for failing to give it. He doesn’t have to; I’m perfectly capable of blaming myself. I should have known something was wrong.

The magpie makes a tight turn, inscribing the chimney in the circle of its flight. I should have been there.

The words should have are approaching the point of semantic saturation, dissolving into a string of arbitrary sounds. Should have. I can sense myself deforming their meaning, giving them a new semantics, one of sensation rather than lexical mapping. The falsely soothing sh, promising comfort only to land with a sobering impact on the hard plosive d, a return to reality. And then the heaviness of the exhalation on b, trailing off into the vibrating, fricative v. Wistful, like a sigh. Should have. It’s a silly mental game, as involuntary as the guilt that preceded it. It’s a distraction.

The stars are coming out, and I remember when he and I spent half the night on our backs in the grass naming constellations, comparing astrological mythologies, making up each other’s futures. We stayed there until the dew began to condense around us, and I felt like something intangible and fragmented had been made whole. More than whole.

Tonight in Prague that something feels fragmented again, and email seems a poor way to recover and reassemble the scattered pieces. I should have been there.

M. C. Escher’s Drawing Hands depicts a surface on which is pinned a sheet of paper with a line drawing sketch of two sleeve cuffs. From each cuff emerges a wrist; each wrist continues seamlessly into a hand. But the hands are not rough line drawings like the cuffs; they are delicately shaded so that you can see the veins and bone structure beneath the skin. They seem to emerge into a third dimension, projecting out from the print to rest, lifelike, atop it. Each hand holds a pencil, and each pencil tip is poised on the paper—caught in the act of sketching the other hand’s sleeve cuff.

Two hands, drawing each other: they are contained, circumscribed by the edges of the print itself, but they escape containment, protruding over the boundaries of the sheet of paper on which they both draw and are drawn.
They are flat but escape flatness, because we cannot see them as other than solid and whole. The two-dimensional gains depth, creating a kind of circularity, a reciprocal dependence.

That night in Prague, I tried to recover a certain reciprocal dependence, a kind of circularity. I didn’t find out until that night that loving him meant bearing the burden of his happiness, irrationally, impossibly, maybe even selfishly. I didn’t choose to love him, at least not consciously; my rational mind only ever acquiesced to deeper, less traceable impulses. Evolutionary theory tells us we are hard-wired for empathy. In social animals, thousands upon thousands of generations have selected for reciprocity, for spontaneous acts of altruism that don’t get wiped out because the beneficiaries live to return the favor when it counts. The behavior this produces might look like rational calculation, but love and empathy are more instinctive than that, more involuntary. We don’t decide whom to love, or at least I didn’t; we just love, and figure out how to live with the consequences.

I can understand and accept this explanation, but I find it dissatisfying. Natural selection doesn’t set out to optimize, and the resulting behavior seems inefficient and costly. It leaves too much to chance, places too much beyond conscious control. We have no good way to predict which people we’ll hold ourselves accountable for, nor which people we will give custody of our own lives. And sometimes we are left helplessly watching a magpie on a roof.

I should have been there, and I wasn’t. Like a hand trying to draw, unable to lift itself enough from the paper to grasp a pencil.

Compared to Prague, October in California is balmy—cool and drizzly at worst, and often still warm with lingering sun. It’s for this weather that the monarch butterflies return, each fall, to Santa Cruz. Many migrations intersect along this part of the California coast. Whales come through here, as do shorebirds, and, of course, periodic crowds of tourists and surfers. The butterflies are my favorite, though, tracing their great longitudinal arc down western North America. Some will continue on to Mexico, but many will winter here, clustering like bunting in the eucalyptus grove at Natural Bridges State Beach. As the year turns, they come out of hibernation, and by February they are flying around in droves, feeding on growths of milkweed. They hang at night from the treetops, latching on first to the branches and then to each other until their weight is enough to pull the branches toward the ground in graceful columns. The weight of a single monarch can hardly be felt, but enough of them together can reshape a tree.
Arrive early enough in the morning, and they will not yet have begun flying and feeding and seeking out mates for the day. Without the sun's warmth they are quiescent, unable to fly. Even the colors are quiet, the undersides of the monarchs' wings dull in the shadows. If you are patient enough to wait as the sun angles in over the coastal hills, you can watch the butterflies awaken slowly, just one or two at a time detaching from their fellows and fluttering vaguely about the grove. As heat begins to permeate the clusters that have collected in the treetops, the process accelerates; layer after layer of butterflies takes off, hundreds or thousands rising at once from the trees, until they fill a placid sky with a shifting riot of orange. Butterflies aren't known for being noisy, but this many together make a loud rustling audible from well outside the grove, a disturbance of the air I have never heard replicated anywhere else.

We spend the morning with the monarchs, walking along a boardwalk set up so we don't trample the milkweed or the butterflies. It's when we are returning, dodging the late-morning rush of monarch viewers, that I kneel to tie my shoe and notice that one butterfly has crawled up onto the boardwalk. Unlike the others, it doesn't fly away at my presence, and I soon notice why: its right wing is torn, and it cannot obey the instinct to escape.

I watch, motionless, as the butterfly crawls laboriously along the wooden plank. Its antennae caress the edge of my shoe, and I hold my breath as it pauses, then climbs onto the unfamiliar surface and up over my foot. It crosses my shoelaces and sets one leg, then two, then all six on the hem of my jeans. Its movement is almost painfully slow; the arduous climb takes nearly thirty minutes. My leg cramps, then goes numb.

The butterfly stops on my knee, having reached the summit of its ascent. This close, I can see the scales on its wings and trace the slight creases that web their surface, the pattern of black lines and arcs like some indecipherable script. The jagged holes in its right wing suggest an attack by a bird, a jay maybe, on whom the toxins in the monarch's body will exact a gastronomic revenge.

The butterfly likely won't live long. Unable to fly means unable to feed. Death is no stranger on these migrations; the lifespan of a monarch is a matter of weeks, and a single annual migration usually spans four generations. This swarm, this profusion of life, won't make it very far north. It will be their children and children's children who continue the flight up into the Canadian Rockies. My butterfly's death will be a small thing in this generational dance. Monarch butterflies swarm. They do not personally invest in each other's survival.
I have invested—foolishly, stubbornly, ever so humanly—in this one’s survival.

A class of third graders files past, their high-pitched chatter revealing how superficial their decorum is. One of them asks me if she can touch the butterfly on my knee, but her teacher quickly explains that the oil on human fingers can damage fragile butterfly wings. We ignore them, the butterfly and I.

When did it become we?

I don’t know how long I’ve been kneeling here. I know that leaving at this point will feel like a betrayal. Somewhere along the line—at my shoelaces? at the hemline of my jeans?—this relationship became personal. It became a kind of kinship, a reciprocal dependency, a minute yet cosmic wager. Two beings betting on each other against the universe.

The butterfly and I are still, suspended amidst frenzied movement. I’m keeping my breath slow and gentle, but it can still feel the air currents I produce. Its wings open and close, once, twice. Human beings imbue everything with semantics and see egocentric meaning in the smallest of acts; and out of the same impulse that led people before me to read destinies in the stars and futures in the flight of birds, I read into this monarch’s wingbeats a salute. A benediction.

I let myself read into it a forgiveness.

Only now, absolved, can I move and get up to go. But I still can’t brush the butterfly off. Instead, I balance precariously on palms and one foot at the edge of the boardwalk, and stretch my leg out towards the nearest milkweed. I wait in this position until the butterfly crawls onto the plant. Then I rise, stand a moment in silence, and walk away. When I look back, all I see is a shifting chaos of orange and black, in which any single butterfly is virtually indiscernible.

They will die, here or a few dozen miles north of here. Their bodies will fall to the earth and disintegrate. They will leave behind an empty grove and hundreds of ravaged milkweed plants, and they will send their offspring north in a gamble against weather, starvation, and predators. And by October, the milkweed will grow back.

“You start with a sphere,” he tells me, before geographical and other distances have come between us. He gently pulls my hand from my lap, turns it over, and draws a circle on the back. It’s a bit lopsided, wavering over my bones. He adds an equatorial arc, then a longitudinal one, giving the circle depth and dimension.
“And then you disassemble it. You take it apart.” He's excited, everything about him bright with the joy of sharing a discovery. “So now you’ve got it in five pieces, and you can rotate them and translate them, change the orientation, whatever you want. But the volume of each piece stays the same through all of these transformations.”

“Right, okay.” It’s simple so far, but his excitement is beginning to stir me. “But here’s the thing,” and now he can’t contain his grin, “here’s the thing. When you do all these rotations and translations, and you put the pieces back together, you get two spheres, both exactly the same size as the first!”

I stare at him, eternally skeptical, then at the sphere on my hand. He has absentmindedly drawn wavy threads all over it, so that it looks like a map of some alien planet’s landforms.

“That makes no sense.”

“I know, right? It’s beautiful!” He starts talking faster, as he always does when something fascinates him. “What you have to remember is, you can’t treat it like an ordinary, physical sphere. Because then you could only cut it into a finite number of pieces—you only have a limited number of atoms. But in the Banach-Tarski Theorem, the sphere’s a collection of points.” An infinite set of points, infinitely dense; no two points so close together that you can’t fit a third into the interstice. So there is no problem of finiteness.

“And infinity doesn’t behave like other numbers,” I reply, nodding. My own love affair with the mathematics of the infinite has only recently begun, but we’re already on more familiar territory. He explains that the pieces aren’t crude sections of space. It’s not like sticking a knife into an orange and slicing, or dividing a globe into continents. These “pieces” are much more complex than that, sets of points without well-defined edges or volumes.

“In fact, the only way to build them is to use the Axiom of Choice,” he continues, “which is why some mathematicians don’t accept the Axiom of Choice.” The Axiom of Choice states that given a collection of sets, you can always construct a new set that contains exactly one element from each of the original sets. Like a butterfly collection with exactly one of each species, or a group of people, each of a different nationality, who together represent every country in the world. You’d think this would be easy and intuitive, even without a selection algorithm to tell you which element to pick, which butterfly to pin down. But its consequences are staggering: the second sphere materializes, as if from nothing.

He’s laughing. “The whole idea of volume and size, of when things are equal or less or more—it gets tricky if you look at it hard enough.” I pull my
hand out of his, look at the globe he drew. I don’t know enough set theory to fully understand this, but spheres are dancing in my mind, breaking into elusive fragments and coming together again, multiplying, proliferating. He’s right; it is beautiful. If you take something apart and put the pieces back together, you end up with more than you started with. For certain definitions of more, anyway.

I take the pen from him, but he’s left me no space on the back of my own hand, so I grab his instead. The circle I draw wobbles over his bones, but I let those imperfections go and add two arcs to give it depth. I don’t have to look up to know his eyes will be lit with delight.

There is no clear selection algorithm that determines which beings will lead us to reach out, will pull us out of flatness and into a three-dimensional reciprocity. There is no algorithm that determines how long each of these relationships will last—years, or months, or the space of a butterfly’s climb from boardwalk to kneecap.

But relinquishing conscious control of these moments where the pieces come together is not so difficult if I remember that the conscious mind and the subconscious mind need not be at odds. They, too, are part of the same sentience, the same whole, and I can trust my involuntary impulses to kneel beside a monarch or draw on the back of a boy’s hand. I can be a piece of a fragmented world, and I can let these fragments come together as they may, tracing fleeting lines of connection over the surface of the globe. Maybe, just maybe, I can end up as we, a reassembly of pieces that yields more than what was there at the start.

When I closed my laptop that night in Prague, and turned off the light, the darkened room made it easier to see the roof outside—where, materializing as if from nothing, a second magpie had joined the first in flight.