Oath of the Downhill

by

Bria Metzger

Thesis Advisor: James Egan
Second Reader: Kate Schapira

Thesis
Submitted in partial fulfillment of the requirements for the
Degree of Bachelor of Arts
in the Nonfiction Writing Honors Program in the Department of English
at Brown University

4/9/2020
I hereby declare that I am the sole author of this thesis.

I authorize Brown University to lend this thesis to other institutions or individuals for the purpose of scholarly research.

I further authorize Brown University to reproduce this thesis by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

______________________________
Signature

______________________________
Signature

2
Brown University requires the signatures of all persons using or photocopying this thesis. Please sign below, and give address and date.
Table of Contents

An Introduction to Your Home:
Know it Bodily:
Waltz Through the Swamp:
The Proprietary Eye:
Geologic History of New York:
A Hole Opened Up:
Say it With Stone:
Weather Meditation:
Speculative Path of Carbon:
Autoreflective:
Claverack Carnivore:
Speculative Path of Phosphorus:
The Written Stitch:
Something I Have No Excuse For:
An Introduction to Your Home:

A fact: A home thinks about you just as much as you think about it. Maybe more. This may be surprising, but it remembers you.

A question: what does memory look like, outside of the context of synapses and grey matter folds, lobes and recesses?

Place says: The dips in your mattress. The shape of your waking body in the morning. A shape of holding and being held.

The life of a place is constantly reworking, constantly reaching, constantly recontextualizing; no creature is ever done evolving. This state of flux ensures that Faced with an almost evolutionary choice of hey, what do we do, when we’re faced with that illegibility that we turn to the resolved illegibilities of the natural phenomena around us for guidance, assurance, and answers — and the phenomena around us, the ones that we feel comfortable enough to bother with such questions, I should probably mention, constitute the place we call home. But how do we learn to be at home?

A snowy owl started to show up in Warwick the winter of 2014. When we first saw it, my mum and I, we were late to school and going 50 in a 35. We thought it was a plastic bag caught in a tree until its wings unfolded. Without even a bend in the branch, it slipped into flight and cut a low, clean line across the field. It was gone by mid-April and returned each winter for the next few years.

I remember the excitement. Groggy eyes trained on the field each morning and caught on patches of snow and cloud. Every whitish smudge could suddenly be an owl, and any morning could be the last of the season before it made the long flight back to the arctic circle.

There was never any doubt that it would — migratory birds are skilled at what they do. Whether they’re flying to a well-established seasonal haven or somewhere new entirely, they’re always able navigate the thousands of miles back home with persistence and precision. How do they do it?

Some birds learn their routes from older, more experienced fliers. They follow along, mapping the journey by way of mountains and valleys, land and coast, until they’re able to teach the route to others. Some birds migrate exclusively at night so that they can use the stars. Other birds migrate during the day, and many others fly solo, untaught by their parents. Still others reliably chart their course over hundreds or thousands of miles of unremarkable terrain. All of them find home.

A fact: there exists a coded language between life and place, and it is capable of exquisitely varied and minutely detailed expression.

Place says: well, yeah.
Birds that don’t learn their routes or read the stars do it a little differently. For a long time, people speculated that iron found in the beaks of migratory birds allowed them to orient north, like a compass needle. The truth is even stranger. A protein in the bird’s eye casts a sort of filter over the visual field, creating a curved vignette effect that bends towards north.

When humans think of animal migration, we often think of birds first, but animals in every major kingdom do it too: butterflies and blue whales, crabs and caribou, fish and frogs. Every breeding season, sea turtles traverse thousands of miles of ocean to chase the signature of the beach where they hatched themselves. Like some birds, turtles use the earth’s magnetic field as a biological, inherited map.

But the magnetic field of the earth isn’t constant. Every few hundred thousand years or so, it actually reverses — the north pole becomes south, and everything from birds to rocks reorient. In between these major reversal events, the field shifts and flexes in minor ways. While some signatures draw closer together, others drift further apart.

A team of biophysics researchers from the University of Illinois at Urbana-Champaign reasoned that if juvenile turtles stored a magnetic imprint of their home coast, then nesting locations should reflect yearly changes in the magnetic field. They found that shifts in the magnetic signatures along a beach strongly predicted where adults turtles would lay their eggs. On beaches where signatures converged, the nests were closer together. On beaches where signatures diverged, the nests were spread out along the beach.

Roger J. Brothers, one of the scientists behind the sea turtle study, said that they still don’t know how turtles detect the geomagnetic field — only that they do, with enough longevity to track maternal beaches across generations and enough specificity to respond to minute shifts in the magnetic signatures. His favored explanation is the presence of tiny magnetic particles in the turtle’s brains.

---

There’s precedent for this idea. In salmon, tissues right beside the nose contain magnetite, the most magnetic element. The magnetite leaps in response to changes in the magnetic fields, and specialized bundles of nerves, fire in response. Salmon, like turtles, use this magnetic sense to return to their birthplace when it’s time to reproduce. Salmon hatch in the gravel bed of a freshwater stream and follow the current out to the ocean. Years later, when the mature salmon are ready to reproduce, they travel sometimes thousands of miles back to the same gravel bed of their ancestral spawning stream.

However, not all salmon migrate. Fisheries stocks have been stuck inland for several generations. A research team out of Oregon State University wanted to test the longevity of this magnetic map. They used a population of salmon from Maine that hadn’t migrated to the ocean in probably thousands of years. Even these salmon, countless generations removed from their migratory past, oriented themselves in the direction of a generated magnetic current — demonstrating that the information encoded in this inherited magnetic map persists over thousands of generations. A salmon escaped from a fishery could, by virtue of a few special cells near its nose, find its way to its ancestral spawning river.

Salmon, turtles, and owls all have the ability to read the earth’s magnetic field, but none do it in the exact same way. There are many solutions to the same evolutionary conundrum.

Place poses a question, a challenge. How do we respond?

Fact: true north, for all of us, is a very subjective truth.

Fact: A home does more than remember you. It crafts you to fit its shape, so that it can hold you easily, well, without its arms growing tired.

Evolution equipped migratory organisms with a faultless compass. What are the odds?

Low. Most changes to an organism’s genetic sequence are going to be either harmful or utterly inconsequential to survival. The harmful changes usually get purged from the population. The inconsequential ones can drift freely, gaining traction or fading out by random chance. Only a tiny, tiny proportion of changes are beneficial.

But the genetic and physiological underpinnings of a near-faultless compass aren’t from a single beneficial letter-switch, a purposeful optimization. They’re from thousands of miracles that masqueraded, quite successfully, as tiny, useless changes, mixed with encounters of serendipity.


I’m speculating here, but bear with me. Noses are important. Salmon use their olfactory sense to pick up on any number of signals swimming in the current, so strong connections between olfactory tissues and the brain are favorable. These connections may have been built for a different purpose, but they would also a perfect primer for quick neural connection to — for example — cells with tiny deposits of magnetite. There’s no insight yet as to why these magnetic cells sit near the nose. But isn’t it fun to think about smelling magnetic fields — about smelling a place, a home, that hasn’t been known to you for thousands of generations?

These stories, whether they skew further to science or speculation, fascinate me, because that’s exactly what they are: stories.

Science first asks for the stripped-down plot of it. What happened? How do birds know north, and how do salmon wriggle up the right stream? This is the mechanism. These are the parts, and this is how they are assembled. Supposedly, the science stops here.

But people do not. We build connections between a mutation here and an adaptation three thousand years later. We see reciprocities and listen in on million-year conversations. We also get bogged down by confusions, by missteps and mistakes — by biases and prejudices hidden under objectivity and clean logic. The draw of the illegible is only fueled by the little fragments of it we manage to decipher. Put another way, the more we know and the more we realize we don’t know, the more we are convinced that there is valuable truth to be read in the arrangement of all these molecules, and the more we want to know our place among them. It’s up to us to know these stories well, and learn from them when we attempt to read, and write, our own.

Whether through science, writing, art, or a thoughtful walk, we learn the codes of belonging from attention to the nature around us. It patiently reminds us that home is a place made up of million-year intimacies, and promises to hold all our molecules while we try to decipher them.
Know it Bodily:

A question: If we are held, then why does it feel like we are squirming?

The weekend before coming back to college, I finally took my mother up on her offer to learn to kayak. Taught by her new friend Cecelia, she’d only learned herself a few months ago. After her first time on the water, she called me up. I was lying on the floor in my Providence sublet, pleading with an intransigent line of code to please, please give me a graph. I could all but hear the wind in the rush her voice; listening to her reminded me of the days I rowed in high school, being buffeted by the Hudson winds, splashed by its whitecaps, left gasping from the cold. I hadn’t held an oar in four years. I was glad to leave behind the blisters, pre-dawn wake ups, and the tang of sweat and metal that settled heavy over our indoor practices. But I did miss the water. Once I come home, I said. And maybe let’s avoid the Hudson?

It will become pertinent that Cecelia is also our family physician.

We decided on the Wallkill River Restoration Area, a calm marshy patch of the river known for its thriving community of migratory shorebirds and the oft-overlooked boon of decent bathrooms.

Cecelia pushed me off the dock and turned to help my mother situate herself. I drifted, oar draped across my lap, and simply watched. It was a stunning day: blue sky, a cloud or two scudding over the marsh grasses that rose as sudden and solid as a cliff face from the water’s edge. The wind urged a few ripples from the slow current. Algae clustered in silky clouds and feathered streams on the bottom, or in dense, gleaming mats on the surface. Further down the river, an egret banked in silent flight, flashing orange legs before folding into the marsh edge. I let one hand trail in the water, sun-warmed and clear. I must have closed my eyes then — to watch the sun pattern my eyelids, or parse the crickets’ song from the cicadas — because I have no way to explain how I ended up with one leg straddling the upturned kayak, the other leg snared in river weeds, and both hands white-knuckling the bright yellow oar.

Cecelia and my mother stared from the dock. They had both turned away for a flash second, to fetch the oar, to adjust the seat, and had missed the whole inexplicable affair. I pried a piece of algae from my cheek and managed a laugh, because what else is there to do in a moment of profound embarrassment? Four years of fighting whitecaps on the Hudson, and the gentle Wallkill bested me. I hadn’t rowed a single stroke. There were a mere 10 feet between the capsized kayak and the dock. I freed my legs and kicked out. Then the kayak began to sink.

As it turned out, the kayak was third- or fourth-hand and had seen its fair share of use over the generations. The shell held up, but the seal, the airtight rim of silicone that makes the hull into a dry box, did not. Water seeped into the hull, and my efforts to kick my way towards shore rewarded me with less and less distance. That’s when I realized that I hadn’t left my phone in the car after all. Too
busy marveling over the clean, spacious bathrooms, stocked with a real roll of toilet paper and empty of flies.

There’s nothing like the threat of technological death to propel a girl through a tangle of river weeds with a quickly perishing kayak under one arm. I needed to be away from the river, that beautiful betrayer. I needed a bowl of rice, a wet phone’s version of CPR. I needed to panic in peace.

I clambered up the slope of the launching dock, fingers scrambling for purchase. Cecelia hauled the kayak up and out and I followed, face-first into a steel pipe. I laughed. I swear I did. Even in the moment, it felt like a plot line swiped off a sitcom’s cutting room floor. I tossed my sodden phone in the car, took a long string of deep breaths, and got back in the kayak. For the next two hours, I paddled, and I enjoyed myself — as though proving my worthiness, my wildness, to the Wallkill might spare my phone.

It did not work. It may, however, have contributed to the three-hour grace period in which I enjoyed the sun and water before I had to face the consequences of my folly. By mid-afternoon, my head hurt, my nose throbbed, and, for some reason, all the teeth in my upper jaw were wracked with a dull ache. More surprising still was the vibrant stinging nettle-like rash that enveloped both my legs, stopping at the line of my shorts. Slippery green strands and grit still lined the pockets.

I slept for 13 hours. The raised red specks vanished overnight, and the topography of my legs returned to normal. The next morning I sheepishly slunk into Cecelia’s office to check my head. She probed the sore spot. I winced. There’s barely any tissue between skin and bone on the bridge of the nose, she explained; I would either have a subtle red spot or two black eyes. My sphenoid bone, on the other hand, had been yanked up on the left and wrenched down on the right. The sphenoid bone, she explained, was this lovely little butterfly-shaped thing that connected to all but one bone in the head. Hence, the ache in my jaw. And everywhere else.

The string of bad luck felt cosmic. I always forget my phone, and yet I accidentally remembered it. That pipe came out of nowhere. Hours of extensive googling and leafing through a few dusty field guides assured me that there were no stinging freshwater plants period, let alone any lurking in wildlife reserves in New York. Home was pushing me out, back towards the Providence cityscape. At least, that’s how it felt until I remembered an old email from my dad.

As a power plant manager, he’s fairly knowledgeable about a good deal of things I have no concept of. In fact, until second grade, I thought that he worked to harvest energy from the leaves of a massive plant. I knew plants made their own food, and we didn’t; it made sense at the time. I pictured him climbing into the seat of a hover-craft, Jetsons style, and plugging little tubes into stems high as skyscrapers. Of course, power plants don’t run that way. They run on a currency of comedy and the highest quality click bait. Over the years, I would get what he deemed the cream off
the top: a classic Garfield comic strip, 50 funniest presidential quotes, and the occasional clip of local news. His latest email reads: check this out — glad you’re not doing crew this summer.

A link sent me to a video. A woman stood at the edge of Greenwood Lake, which stretches out over the New York / New Jersey border. Locals swim in the summer and tired high schoolers still, I imagine, row whenever the water’s not frozen. Wind whipped hair into the reporter’s mouth and crackled in the microphone, but the words were clear. The lake’s beset with algal blooms. Jersey officials warn people to stay out of the water. Contact with the algae can cause a rash, but ingesting it, whether by swallowing water or by eating catch from the affected area, can cause severe stomach problems. Liver damage. Nerve damage. Boating was still alright. So long as you didn’t fall in.

Bloom has always felt slow to me. Maybe it’s the languid stretch of those double o’s, or the soft footfall of that final m. But really, its meaning is suffused with energy. Literally, to bear flowers; figuratively, to come into full beauty and vigour; to flourish. These algal blooms start from the proliferation of a small group of cells, swirled in slow water, fed by long days of late summer sunshine, and can quickly cover anything from a few feet of shoreline to an entire lake.

The current understanding goes something like this: algae, and accompanying cyanobacteria in this case, are built to be opportunists. When conditions are right and resources are abundant, they’re well-equipped to take advantage. They are simply built and replicate asexually, without the extra burdens of fertilization or courtship.

For contrast’s sake, raccoons are also called opportunists. Even in rapidly urbanizing areas, raccoons are thriving, because they’re well-equipped to pry their dexterous little paws into your compost bin. But not even the cleverest, best-fed raccoon can reproduce by the hundreds the moment they find a trove of human discard.

Like algae, cyanobacteria are photosynthetic: through a series of internal conversions, they can receive light from the sun and store it as nutritionally-packed sugars. Unlike algae, however, these cyanobacteria produce secondary metabolites that are toxic to humans and wildlife, as my own legs demonstrated after the kayak incident.

The history of harmful algal blooms can be traced through records of these bad reactions. Interestingly, the human record is pretty sparse, but several dogs have died after playing in affected water bodies; the record of dog mortality due to encounters with toxic blooms stretches all the way back to the 1920s.

The record explains the what of the bloom, but not why it happened when or where it did. These harmful algal blooms are not supposed to occur in rivers. They span the length of the Finger Lakes,
many miles upstate, and crop up in the reservoirs just often enough to terrify a whole municipality. Still water, absent of a current, is essential for the kind of growth that makes rafts of green so thick that people occasionally call up the local environmental agency with reports of spilled green paint.

The Wallkill River does not offer much in the way of still water. Near the source, its flow follows narrow rivulets and ripples over limestone reefs; it carves out wide channels, disappears into the sodden soil of the marsh, and emerges fresh-faced from the grasses. The current runs north, then south, then cuts a switchback curve back north again.

One proximal cause: increased phosphorus and nitrogen runoff. Changes in climate, land use, and agricultural and gardening practices have all contributed to this increase. Most blooms occur in the summer months when the long, blue-skied days provide ample sunshine as nourishment. Summers in the Northeast are increasingly typified by brief but intense storms followed by long days of sunny calm. The sudden influx of water after each storm results in massive volumes of runoff. Cascading through nearby towns, the runoff runs over impermeable surfaces like pavement, roofing, and concrete; instead of soaking into the soil, it gains momentum, collecting fertilizer from lawns and farms on its downhill trip to the lake. Once in the water, the same nitrogen and phosphorus that nourish lush gardens and productive fields also nourish prolific harmful algal blooms. Understanding why the Wallkill turned green could shed some light on why algal blooms all over the northeast are longer-lasting, more frequent, and more widespread than they have been in a century of records. Yet, even as the narrative expands, counternarratives push back.

Simple answers are evergreen guilty pleasures. Some theorists believe that this is because quick judgment calls — food or poison? shadow of a tree or shadow of a lion? — were evolutionarily advantageous. But let’s remember that genes don’t move in a straight, teleological line any more than the environment that shapes them. This progression is more of a current: branching and converging, lingering and disappearing, with change written into each moment of flow.

A question: why are we squirming?

Place laughs: why would you stop now?
When I feel hollowed out, I go down the hill. These are the times when the world looks at you with such curious intensity and the sky tilts like the head of a bird, wondering if its beak is sharp and strong enough to crack your hull. The answer is always yes. So, split down the sides, I go down the hill.

This time, I don’t have so much a destination as a mental checklist of landmarks I want to cross. Even these are not so much places as sensations. I want the lurch and lull of leaping across the tops of hummocks only to fall, with the first misstep, into the autumn-dried mud at their base. I want too to run my hands through the cattails at the far end, and perch precariously on the leaning tree scrawled with worm trails, the one that should have fallen into the ferns several storms ago but still hooks its roots into rock and soil. My boot makes a soft impression in the season’s leaves. Dry grass twists in the russet ferns and, together, they curl up at the foot of the rock that has always looked like an altar to me. Lichen covers its mottled grey surface and, through some trick of the forest filtered light, it looks illuminated. Through this lens, the red leaves become a copper-cast band and flute its edges in shadow.

I sat here, on this rock, when caught in the rain one time. It came out of a bright sky. I tilted my head, catching drops in my eyes and feeling their path on my throat, before sprinting over the leaf litter. I leapt over each fallen log, cores exposed and barred with fungi, not trusting them to hold my weight, straight to the altar.

Altar to what? Well. In the Church of England, an altar denotes the table on which the communion bread and wine are blessed. Before sitting, I brushed off a scattering of twig ends and discarded seeds, remnants of some squirrel’s supper. The craggy half-shell of an acorn skittered over the grass at my feet. An oak arched overhead. A squirrel, stomach full and eyes bright, bounded into the rain. In my memory, now, I place the acorn back atop the rock; blessed is the body.
Instead, I stilled my hands and lifted my eyes to watch the mist shimmer up from the sun-warmed swamp. Those waters run shallow and sluggish, and they feel like a footbath. Barefoot, you can barely tell you’ve stepped in them until your toes sink into the mud and suddenly it’s freezing, the sediment sunless and spiked with twigs. Even in the summer, the clouds are seeded with rain in the upper atmosphere. It’s a good ten or twenty degrees colder when it finally falls, and, finding the swamp, hits with a hiss. This time, I could just make out a blur through the trees.

It was nothing more than a smear upon the vision, like breath fogged on the window glass that would reform as soon as it’s brushed away, but there’s an indescribable joy in trying anything fruitless for a while. I wonder if, among the colors and sensations, one of the swamp’s most potent restoratives is humility. The beauty doesn’t come at the end but is strung right through the middle. Try, try; this is what the leaves are saying. Brush your hand through the cattails and lose your shoe in the mud. What other reason is there to leap like that, unconscious and ungainly? To stumble with a smile and leave grace for more social endeavors? Even more than the grey squirrel and the pileated woodpecker, you are its creature, not owned but an operant. Alone in the swamp, you are not a leaf floating downstream, passively following its currents, but a gust of wind, pulled over the swell of a stone by some unseen hand to draw up the fallen leaves and ruffle the stalling water.

If I had to describe in a sentence why I love the swamp, I would turn instinctively to its colors and forms. These are the urgent things people must know about it. There is no brighter green I know than that of a swamp still thriving a month after the first frost turned the surrounding forest brown. There is no red more vibrant than a high arc of ripened rosehips. Shadows are soft as down in the cradles of its topography, and light and ice find a thousand new forms. These sights are remedies against the wearing away of the days. But they themselves are only a small fragment of the swamp: the empty cap of an acorn, delightful as a whistle but missing the meat.
If vision is insufficient, the swamp makes suggestions. Honeysuckle and wild roses drift in with the warmer weather, and layer a brighter sweetness atop the swamp’s decay. The swamp can be silent or a profusion of noise. Sometimes, noise is the only way to detect the unseen. Newts and frogs are too well-trained by the relentless flight of owls and herons to wait patiently for me to stomp by, casting shadows and sending vibrations through the banks. They announce their disappearance with a chirp and a splash. The conifers creak even in a gentle breeze, groaning in a soft-voiced protest; in storms, they crack and hiss against each lash of wind.

Taste is tricky. In my opinion, if you taste too much of the swamp, you’re doing it wrong. There are the wild onion relatives with silvery-green leaves, like chives, that scatter between the clods of churned-up dirt and rocks. They taste sharp and have a slippery crispness. There are the crab apples that fall too soon, unless you are willing to search the leaf litter for some half-ripe, half-overtaken discard. No two taste alike. When they fall, they fall scattered on the spectrum of newness, ripeness, and rot. There are the ripe rosehips, which I ate — once — in small handfuls to ward off an encroaching cold. Then there are the accidental tastes: facefuls of grass and mud from a graceless fall. The thick, gray, clay-rich mud is sour and smooth, cold and gritty as you’d expect it to be. The best taste of the swamp is the barely-there aroma of it, settled on the skin. You know the quality of your walk when you sit down for lunch. Especially if lunch is a sandwich, or something eaten with the hands, a bright and earthen note comes through soft and full as a swath of moss; you taste the day.

The final sense is how the swamp works through you. If you can know a thing by its texture, then the thing can come to know you too. Brushing against the fractal ferns, breaking open the shimmering silk-filled milkweed pod, pressing into the mud until it intrudes between your toes; these are, at the heart, exchanges. Through touch you meet the swamp skin-to-skin.
Returning to the frogs for a moment. When I was younger, I had a very specific approach to the time-honored pastime of frog-catching: first, leave urgency at the top of the hill. You are not a heron or an owl. You don’t need to hurt them to sustain yourself. Then, wind leaves and grass between the fingers, turning the hands into a curved green-and-brown mitt; apply a thick layer of mud; and wait crouched in the current. The more the body is submerged, the better. Move slowly, gently, and the frog will rest in your palm. Watch the click-click of lids closing over molten gold eyes. Watch the heartbeat waver in the pale skin of its neck. Close your eyes. The mud is washing away, pulled by the current. Uncurl your palm. Even through the remaining mud, you will feel the cold and slight pressure of its hind legs pushing off from the heel of your hand.

I rarely got more than a glancing scrape in the swamp. When I did, and when the wounds would scar, the tissue would be beautiful — the pallor and texture patterning my legs in cold lights, like the early moon through a window. It felt good, to watch the skin knit together and the excess fall away as healing happened. Good in a way that’s not simple to communicate, then or now.

The bones of deer and mice. A near-complete skeleton embedded in the mud shallows where the creature fell. A lone shoulder orphaned at the base of a leafless tree. A jawbone, with its row of tiny teeth arrayed, intact in the compact fur and down of an owl pellet. These are not just images to me but shapes and forms, dimensional and insistent; their texture is the evidence of bodies past and present. Through mud and water, digestion and decay, the swamp seals over them. New tissue spreads over the ruins of the old.

This is the texture of the swamp I love to feel the most. This is the oath of the downhill. No wounds but those that heal.
The Proprietary Eye:

How we are human in a place confuses me. I have to confess that I’m not very good at it, in practice. We can startle deer like predators or, if we’re unlucky, rouse the interest of a coyote pack on the hunt. Or, in theory, we can dissolve our presence completely. Be like a rock, invisible and abiotic. Is this what takes so much time and attention to accomplish? Is this the ultimate goal of knowing a place? What is the most authentic, versus the most comfortable, ecosystem function of the human in place?

Place smiles: I thought you’d never ask.

A history of Orange County describes the swampland when it still stretched out long across the ridge and rode low in the valley. In one section, it references the swampland home of Mr. Peter Bull. He “was quite a free-thinker, and a great lover of nature in all her various works, but did not fear Purgatory much, as a place of spiritual punishment.” This was evidenced by the fact that “Mr. Bull fancifully gave out that he lived in Paradise, as his residence and farm were pleasantly situated on the sunny side of the dismal swamp — that the country over the stream and beyond the swamp was the world at large; and of course it was necessary for all persons who come from thence to his place, to pass through Purgatory. 10

As a fellow swamp-dweller with no great fear of purgatory, I appreciate the late Mr. Bull.

I’ve deduced that the swamp down the is one of the many remnants of Long Swamp — a giant stripe of rich wetland that was drained in patchwork pieces every few years to create new land for agriculture. From centuries of intensive rewriting of the landscape, there remain pockets of those original swamps. These crop up in seemingly impossible places.

From the top of the hill, you can see everything — the dotted rows of orchards, the new housing developments across town, even the bare rocky peak of Sugarloaf Mountain. When the snow falls, especially the light, powdery snow of a cold snap, the wind hits the slope unchecked by trees or houses and whips the snow into devils and clouds. On the edge of the fence at the top, a snowdrift around two feet deep can come from two inches of snow. All this to say, the hill is high for the massive valley of Warwick.

A few years ago, the land was scouted for possible development. Our house is 102; our next door neighbor is 112, causing no end of confusion for new postal people or the poor parents of my

---

friends just trying to drop their kid off at a 7th grade birthday party. There were supposed to be houses built between ours, but the initial developers had moved on to other projects.

The new developers planned on placing 120 housing units on the hill. After a preliminary inspection, their estimate was halved to 60, and then even further whittled to 40; the ground was just too wet to dig that many septic tanks and expect them to stay put. Every year the water table rose up and out of the formerly dry networks of grass and milkweed, nettles and goldenrod, and turned the muddy trails of the swamp below into a series of seasonal canals. The water table does not care about elevation. It cares only about bedrock, and the solid shale ridge that underlies a long, narrow stretch of Warwick.

The project fizzled out, with developers looking to less complicated parcels closer to town. Two years ago, the owners sold the land and it was purchased with PDR funds — effectively turning it into a natural heritage space, publicly owned, unavailable for further development projects. I cried, when my mother told me about the PDR process over the phone. Of course I did. This was the swamp’s promise, the beat of self-protective cycles that flip between yes-and-no, fertile and fallow, ice and mud. It is a purgatory of water, of beauty, of human utility. Here one moment. What is the in-landscape role of a human in a place like this?

I am almost always the only human in the swamp or on the hill. Sometimes, I can hear the sounds of tractors or cars. The field at the top of the hill is used to grow hay, and in the autumn the remains of the summer grass and wildflowers are cut and rolled by massive machines into bales that stay until the very cusp of winter. When I think I hear these machines, my body goes into immediate high alert. I duck from the path into the trees. I take off my brightly colored scarf or hat and tuck my hands into my pockets, hoping to produce a visual that blends in with the mottled greens and browns should anyone drive by. Each step, I lay the outside curve of my feet to the ground first, making contact with my heel and slowly lowering the rest of my foot until the toes press into the leaves, just to dampen the sound should anyone be listening attentively.

Contrast this with the time I was doing homework on the flat, table-like rock by the pond’s edge, and I heard the huff of a black bear from the woods. My heart beat ticked up. Not in fear, but anticipation — would it come through the treeline? Would I get to see the width of its paws press into the mud and the curve of its omnivore’s claws churn up the looser clods of soil at the stream banks? Would I see the sheen of its thick fur and the way it set upon the body’s frame in that particular way bears have, where the well-muscled limbs are enveloped in a layer of winter fat, casting a deceptive shape? Would I see the gleam of its intelligent eyes, the sweet curve of its round ears, the tawniness of the fur around its huffing nose?
Bears huff to warn those who infringe upon their space. They are steadfast guardians of their surroundings, particularly when they have young; the vast majority of bear attacks on record have been in the presence of a mother bear with nearby cubs. They are excellent defenders against perceived threats. The huffing continued, and I weighed the possibility of seeing the black bear in flesh against the probability of greatly aggravating that black bear. I packed up my things and left. But there was a significant delay. Not fear, but sensibility, and a gentle tug of disappointment that I should be a thing in a body with a scent and a gaze that unnerved my co-inhabitants, and not an abiotic element, as inoffensive to a mother bear as the face of a stone.

I have heard the nighttime yip and yelp of coyote packs grow closer at the crest of the field, and done much the same — taken a brief moment to imagine the shagginess of their winter fur, tufted and thick, and the elegant taper of their heads into the sharp snap of their powerful jaws — packed up my things, and walked home.

But one night, during the final suffocating weeks of summer, I walked down the hill, past the pond, through the woods, and up to the picnic table of unknown provenance that sat at the highest point of the field's slow rise. There was no moon, and the stars were shielded under heavy clouds that had brought rain earlier and not yet been whisked away by shifting weather fronts like most summer storms. I just started talking. I told no one everything, and felt a curious inversion of my visits to the swamp. In the swamp, I felt as though a cavity was being filled in by the swells of clay-rich mud, broken thorns, the winter-browned arms of hummocks and sawgrass, and the constant upwelling of red-streaked water. Here, I felt as though I was relieving a built-up pressure, outpouring the mess of days into the blank space of the heavy-clouded sky. There was room for anything, there. The wind picked up, unchecked by the usual breakers of trees, and I felt it tear through me as though there was nothing to block its path, no clothes, no skin, no mass of muscle and bone. I was a frame, the curvature of a leaf shaking in the wind, stirred by an unseen hand. It was a necessary collapse.

Until I heard voices coming over the hill. There was barely any evidence of them, or at least the people I assumed they were — but I had seen bottles and cans near where our closest neighbor fished, and the cars pulling in to the other neighbor's drive in the early hours of the morning. My eyes blurred, blending the dark of the treeline with the absent sky, and I ran, breath and blood pounding. I hid behind one hay bale. Closed my eyes for a second to listen more closely, trying to gauge how much closer the voices had come. Their laughter sounded like coyotes. Then, dashed to the next hay bale.

I will never forget the surge of fear I had that night for very, very little objective reason. Yes, I was trespassing, but I was always trespassing. The property owners never came to the field except to mow its grass, and I had met them once and exchanged nothing more than a hello-how-are-you. This wasn't a fear of being somewhere that I shouldn't have been. It was the fear of being no longer
alone — no longer powerful, but vulnerable. I ran like the white-tailed deer that raise their heads from where they graze in a dip in the rise, and, seeing me — slack silhouette with heavy footfalls, maybe the white gleam of eyes or teeth — run, bobbing the ghost-white undersides of their tails with each leaping bound. I was reduced to my instincts, fleeing like a prey from a predator, and more confused than ever about being human.

Place says: Try again.

When the hill was purchased with PDR funds, I wasn’t the only one celebrating. The news brought new people to the hill. One afternoon, when I emerged from the swamp covered in mud from my toes to my torso, ready to read a book and wait for sunset, I came face-to-face with people: specifically, little girl with a mane of red curls and unicorn rain boots. She stood on top of the picnic table of unknown provenance, humming distractedly and staring at the mountains. She was also accompanied by three dogs and six adults, who I learned — after a stumbling introduction in which I forgot how to move every one of my facial muscles — were house-sitting for the family that lived on the farm on the other side of the hill. They were there for the sunset too. I sat down a good distance away and read my book until the light left. Then, I called out an incoherent goodbye and walked briskly back towards home.

If I was baffled by that encounter, I was stunned by those that followed. All of a sudden, I saw people. They took walks and played frisbee. I found the remains of three red balloons tied with white ribbon to the picnic table one day. When I came back the next, the ribbons were cut and all traces of the balloons carefully removed. I watched a solar eclipse with my best friend of twelve years and two strangers idling in a rented golf cart about thirty feet away. I was still the only human most of the time, but most was no longer always. I had no idea what to do with the idea that others might love this place in the same way that I did, or — even more incomprehensible — the idea that others might love it in a way I would never know.

I remind myself of the way I move in the swamp to combat the deeply ingrained tendency to think of it as mine. The resistance of the mud tells me how to move my foot. The presence of a rock urges me to turn left. The sudden incline of a hill and the sheer slopes of exposed slate, slippery in the rain and snow, suggest that today is a day best spent on low ground. For all the discomfort I’ve felt in my body, I’ve found an abundance of comfort in a place that tells me where I fit and how I move. Now, though, I’m suspicious of conflating comfort with familiarity, or observation with intimacy. The desire for some comforts stem from fear: we chase after knowledge and stitch together stories to chase away the unknown.

Along with the shape of my eyes and my undying passion for Scrabble, my autoimmune disorder is inherited from my mother. Before we had a diagnosis, the untraceable progression of it scared me
more than anything. The decay would be slow and secret, stretched out thin like a muck film over the pond in summer. Beneath it, answers dart like fish between sunspot and shadow. They flash their sides but never reveal their whole shape. It’s this almost coquettish yes-and-no-ness that makes me furious, and deeply afraid. I couldn’t interpret the outward signs and I had no way to read the inner ones. I felt like a tourist that hopped on the wrong flight and realized it just a second too late: watching the clouds, waiting for them to part, hoping for a glimpse of some telltale topography below. I was convinced that my body could not be a home to me.

I’m like my mother but I’m not (yet). I’ve given up but my body hasn’t (yet). I have a disease but I don’t know its name (yet).

Getting the diagnosis was like getting into college, and not just because it happened around the same time. I leapt around, yelling and crying and holding a piece of paper with a portend of my future printed on it, my joy sharp and definite: clear as accepted, final as positive.

It was also like learning to fish. I begged my Dad to teach me just after a hurricane blew through town. Living in a valley meant that the tailwinds and flash floods combined to dump dozens of fish into the shallow, silty pond at the bottom of the hill. It wasn’t that the pond didn’t normally support life. We saw the bronze eyes of bullfrogs and the leopard-spotted legs of pickerel frogs on the bank and heard the panicked chirp of startled newts. Even though we couldn’t see them, we knew there were painted turtles and snappers laying low in the mud, with whiskered catfish gliding beside them. But these storms blew in fish that lived in the open, clearer waters of lakes and reservoirs. They were redfin pickerel, rock bass, and sunfish shining like gold coins in a fountain — tossed there on a stranger’s whim. We dug out a dusty pair of Dad’s old fishing rods from the basement and spent a good hour hunting worms in the compost heap. It took another hour for me to actually get the worm on the hook, and when it didn’t stop moving even then, I had to take some deep breaths and a few laps around the yard. Casting was a new challenge, though Dad caught most of the fallout. He learned not to stand behind me, and I learned to cast ahead of me, and we were alright from there until the red-and-white striped ball disappeared. I yanked, and reeled it in. A sunfish dangled midair, suspended from the line. It was so small, flashing incandescent gold and green stripes I never would have expected to exist hidden in the muck-brown water of the pond. I wanted to look closely, run my fingers along the scales and see how they circled the unblinking eye, but any looking cost the fish precious seconds. I dropped it in a bucket of water and carefully extracted the hook, the J shape caught neatly in its cartilaginous mouth. Dad made a comment about how it was too small to eat. But I was never going to eat it. I was fishing because it was there. The hurricane blew it in, and I had hooks to spare. Why should I punish it for living where I can’t see it?

When knowledge is taken, without permission, out of fear, the meaning remains subterranean.
When the greens are too bright to be believed, or a mossy root takes on an impossible shape, or the clouds dip down into the sunset and come up red and incandescent, I take a photo.

The photograph takes a moment and lifts it out of time. When the photo is taken, it severs the moment, making it discontinuous with the present and relegating it — with however much appreciation and ceremony — into the past. From the living, procedural nature of its subject, a photograph takes its capacity to change, a fossilization of sorts. In her book "On Photography," Susan Sontag says “Photographs are a way of imprisoning reality…One can’t possess reality, one can possess images—one can’t possess the present but one can possess the past.”

When a photograph is taken, it makes a representational object that can be fit to the size of the human palm, hung on the wall, slipped inside an envelope, brought indoors. A field that feels the size of the sky can be folded in half. The drop of rain suspended in a spiderweb can be enlarged, so that each pinprick of light and can be seen individually, and the world reflected upside-down can itself seem a second image, a portal within a portal, an eye gazing to the space within an eye. Restructuring things to a more human scale is a kind of self-indulgent myopia.

“The miraculous and horrific often happen when we do things on a scale that is different from the one on which we live every day.” — Katrina Vandenberg, Essence of Lavender, pg. 50 in Autumn 2019 Orion
Think of the postcard. A person writes a personal message to accompany a photo of a distant, beautiful place, encapsulated by a hill or fountain or stream, and send it along to a loved one. Wish you were here. Wishing made manifest. Wishing stamped and priced at the post office. Wishing coins drawn from the bottom of a fountain and turned into paper. Wishing a place could be held and given. Making it true.

I have to wonder, though: if we can set aside proprietary eye, what could photography help us do?

For all the factual claims of a photograph — its nonnegotiables of time and place and person — it’s a narrative image first, and the story told is as much about what’s in the frame as what’s left out. For all the knowledge a photograph claims to have of the thing it depicts, it’s the unknowability of everything outside of the frame that engages us. For me, taking a photo means extensive pacing. This usually involves circling the subject to negotiate with the angle of the sun, or obstacles to a clear view. Then, getting into position. I kneel down with my knees in mud, lower into an ungainly squat, balance on a log — anything for the angle. In my mind, I hold the image that struck me. In my hand, I hold my phone, and compare. Inch to the left. Squat down lower. Still a tremor in my hand, and click.

Only afterwards do I realize that I usually end up enjoying the process of taking the photo more than the resulting image itself.
Geologic History of New York:

“Our pain hides beneath these fluttering, random thoughts that run through our heads in an endless loop. But there's so much freedom in getting to know what's under there, the bedrock.”

- Dani Shapiro

175 Million Years:

The bedrock underlying Warwick, New York, was millions of years from being laid down, and New York, the self-styled North, was lodged firmly in the Southern Hemisphere. Life was still single-celled and confined to the crevices untouched by the sculpting forces of the Earth. These microscopic beings bore witness to the millennia of sand, ash, and clay collecting in the shallow sea, and they outlived the Grenville orogeny, mountains formed by supercontinent collision and eroded into the even plane of a continental shelf before marine invertebrates could be blinked into existence. The shelf, undisturbed, collected the washed out clay and sand and slowly turned to sedimentary sandstone, shale, and limestone.

Not to undermine the timeline here, but at a modest 175 million years ago, Mount Adam and Mount Eve had been standing so long their legs fell asleep in the Cambrian period. Where the granite intrudes the Franklin Marble, there’s a contact aureole — a thin veneer of wollastonite that prickles against the mountains’ sides, like pins and needles.

Reference:

Painted by Jasper Francis Cropsey, 1823 - 1900.
The streams around here like to disappear and go underground:
To linger in liquid caves where the limestone makes them feel young.¹³

Subducted ocean crust made the seafloor shudder with earthquakes before bubbling up again; volcanic islands sprouted from the too-thin surface, linking together in an island arc. This chain, across from the continental shelf, bounded a deep, narrow rift that became a catch-basin for tarry mud. Loose sediment settled and compacted in the absence of oxygen. These deep layers of marine mud coalesced into black shales interbedded with the stories of cataclysms: ash from massive eruptions and layers of sandstone made from the loose sediments of mountain-sized landslides caught up in the current.

There’s this feeling when you’re in a stream and the mud sucks in your toes and knees, half your leg gone to this tawny mud, soft as silk, like you’re already half lost.

References:

¹³ Both images of Warwick Creek courtesy of Terry Hann.
This ravine with its marine shale was swallowed up when coast and chain collided and folded into the Taconic Mountains, still bearing distinctive black on their slopes. Sedimentary rocks were crumpled and pressed into schists and marbles. The Taconic range built, fell, and was washed away to the west piecewise by braided, sediment-loaded stream channels and floodplains. The Hudson Valley collected quartz-rich fluvial sediments and the coast was washed in tidal mudflats. Marine life flourished in the turbid waters, nourished by mineralized runoff, but life on land was limited and the mountains, while they still stood, stood bare: the trimmed sides of sculpted pottery with debris loose at the base.

[They tried to build a dozen new houses in that field above the valley.]

The view is stunning. They would’ve sold for almost a million,

But when they surveyed the land,

the water table was too high, too high

---

14 Courtesy of Terry Hann. Postmarked 1905.

Look at the long line of the mud bank. Look at the tree in the water, its roots lifted demurely above the waterline. The short, stiff-stalked grasses stick up from the creek’s edge and continue in the background. The creek offers little more than the muddled reflection of the above trees. No fish forthcoming.
New limestone laid over disappearing mountains, their sediments dropped into the expanding Helderberg Sea, immortalized scores of marine vertebrates in fossil form. Folding and faulting, this limestone was uprooted when fresh mountains sprang from collision in the form of the Acadian orogeny. When the Acadians crumbled, they fell wedge-shaped into a fertile delta that held forests and insects and amphibians discovering life above the waterline as fish grew spines.

[I found an old tooth from a Dutchman’s cow,

I think, fully fossilized with leg bones and

---

15Courtesy of Terry Hann. Postmarked 1910. This isn’t my hill, if I could call that hill mine by sheer number of hours spent sunburnt at is crest and ticks nourished in the crook of my knees. That hill’s view could shame this one to death. That hill on a clear day, you can lie in the grass, any grass — the thigh-wildflowers or the fresh-cut stubs after the hay harvest — and see nothing but blue and the faint, airy deepening of the sky, right at the edge of your vision, where it meets the dusky ring of mountains. It feels like a dream, or the absence of dreams. It feels like lying at the bottom of a pool. You just want to exhale, watch the bubbles rise to the top, and break against the surface.
the pelvic wing flung all over the slopes.

It was good and flat for grinding grass.

I threw a bone in the pond and

the ripples startled the newts.

Then, around 350 million years ago, the record turns sparse; the coal-rich rocks in neighbor states hint at coal swamps, home to early intrepid reptiles, but New York was pummeled by erosion. Wind, water, and scrape of rock against rock wore away virtually all traces of the record but the last orogeny of the Alleghenies, when Pangaea was first converging with Africa. On this time of turmoil, the geological record is, again, silent.

[Three years ago someone asked me about Warwick bedrock and the Drowned Lands, their irrigation ditches the only known floods.

I too was silent. I didn’t know we could suck moisture out of the ground like that. Now,

We are earth-movers.]

16 She wouldn’t really dig old cow bones, would she? She Sherwood! Postcard courtesy of Terry Hann.
When Pangaea first cracked at the edge of the newborn east coast, the crust was stretched thin and deeply furrowed. Freshwater lakes nestled into rift valleys and magma rippled up from the rent in the earth, layering new igneous sheets over the bedrock. Exposed to the atmosphere, these iron-rich sediments oxidized to a deep russet, and, as fresh layers weathered away, these coarse sediments settled into the lakes and turned them into the red beds that dot the New York border. Dinosaurs must have walked lightly because the only evidence in New York of their presence was found in a single set of tracks, small, bipedal, pressed into Triassic sediments. Magma intrudes through the Newark rift, lava flows, and for over 200 million years the record goes silent.

[I swim in lake Wawayanda. It's not a glacial lake;

They bring sand in every winter, by the truck-load

And dug the lake bottom out with machines

But I pretend it is when I build sandcastles

Because I want to build them out of

Sparkling flecks of garnet stuck in granite

And the remains of fish like the ones

That hover here still beyond reach.]

---

The Hudson Valley was carved by the advancing glaciers of the last ice age, and, long hidden underneath a chain of glaciers that linked from coast to coast, threw off the long winter after 1.7 million years of the patient, slow workings of ice on stone. As the glaciers receded northward, chasing the cold comfort of higher latitudes, meltwater poured into lakes new and old, filling the rifts and valleys with richly mineralized freshwater. These lakes, grooved with deep striations, owe their distinctive patterns to a massive ice sheet that overrode the Hudson Valley glacier and scraped the rock face with ice and till as it receded. Littered across the landscape are glacial erratics, massive boulders dropped by melted ice and left stranded.

19 Courtesy of Terry Han. This is Wawayanda Creek. Actually, I had thought every inch of running water in Warwick was the Wawayanda Creek; the wood surrounding the lake is run through with waterfalls, bridges, and those long, tumbling shallows that flow as white-gleaming sheets over the rocks. But several other postcards depict the virtually indistinguishable sepia-toned flow of a Warwick Creek. Names aside, it’s all just water; but why put names aside? Wikipedia’s description clears up some of my confusion as to what water, exactly, the Wawayanda Creek describes: “Wawayanda Creek is the name of Pochuck Creek above its confluence with the tributary Black Creek. It is long.”


To look at these erratics now, so out of touch with the new scale of things, is to crane your neck, blink in the sunlight, and wonder how best to summit them. They are dramatic additions to the landscape, out of touch with their surrounding place; one in the center of a Warwick pumpkin field is over 15 feet tall and has a tree growing out from a deep split in the side. A few years ago, someone braced an American flag into the flat-cracked top.  

---

All the popular press on Pulpit Rock right now is about the plans to build Pulpit Rock Inn. Stephen Kitar, a lifetime Warwick resident and hopeful developer, claims in an interview with the Times Herald Record [1] that he wants to make this place a nexus for Warwick tourism. “There’s a lot to do here with wineries, hiking trails, and people cancel because there’s no place to stay,” he explains. “In 1900, there were five hotels in Warwick, and 6,000 people living here. Today, there are 40,000 people and no hotels.” Opponents say the development of a main inn and six 2,000-square-foot eight-unit cottages threatens the integrity of this place as part of Warwick’s identity. In a Warwick Dispatch letter to the editor [2], Timothy Hull, son of the town historian, expands on the significance of the 15-ft monolith: “Pulpit Rock is purported to have been a hunting ground for Native Americans, a
pulpit for fervent religious preaching and, from the time of the railroads a magnet for tourists to the valley.”

Tourists, indeed. “We are leaving six acres untouched, Kitar explains in the interview. “We’re going to put a light on (the rock) with a plaque and landscaping, and make it a focal feature of the hotel.”

References:
   Not worked upon or at; not touched or treated by way of improvement, alteration, operation, etc.
   Not affected physically, esp. in an injurious manner; not damaged, harmed, or meddled with; unhurt, uninjured; intact. Const. by, †of.
A Hole Opened Up:

On November _th, 2018, a hole opened up in the ground. Two marbles rolled into the hole. One might have been blue. “You know what they mean,” Grandma Susan said to the hole. Then she held on to my Dad’s arm and continued to cry as the stream of black, hired cars and ill-fitting suits, rushed up behind her.

My memories are fuzzy of that day now. I don’t know if the image of placing flowers into the grave is real or something I saw on tv, and I don’t know if the trill of nerves I felt, anxious not to fall in my one-inch black heels on the way to his grave, is real or referred from some other poorly logged recollection.

During holidays, the big ones, we participate in a familiar bizarre parade of flat niceties and vague questions (vaguer answers) that reveal how little we know each other. We read decades-old sleights into emails and cut our cheeks on bitten-back insults. We blame each other for making us an hour late, for taking too long to say a round of perfunctory goodbyes. Make sure you remember the casserole dish. You’ll never get it back.

But I remember standing in the funeral building, the cousins teasing Aiden about his first girlfriend, talking about how hard it was to find a first house. The next year, Bob and Jeanette would stay in Rochester. The cousins dispersed to the Christmases of their husbands and wives. Susan went to Rhode Island. Without Grandpa Roger, Warwick was no longer a center of gravity but a rock in distant orbit. The funeral was the last time I saw them all together, let alone felt recognized and recognized in turn. Is it possible we knew all this then, and matched impending distance with instant closeness? Is it too perverse to call such a thing, occurring when it did, a survival instinct?

It’s widely believed that our memory is biased towards negative experiences. The idea is that negative experiences represent challenges to our fitness, to our chances of survival; they’re more important than the cozy, good ones. That’s the theory, anyway, but I don’t want to tell anyone that dwelling on the daily deaths is what keeps us living.

A friend told me the story of how she broke her wrist as a child, maybe six or seven. Her San Francisco house is old, wooden; she didn’t notice that her front steps had rotted until she took a step, fell right through, rolled down the hill, and crashed into a bush. We both laughed when she told me, because these are the kinds of memories that we laugh at now. I took a turn and we laughed at my scraped knee mosaiced by blood and driveway gravel, the poison ivy scars starring my legs. The imprint is still there but the texture is changed. It’s strange, but some bad memories really do go soft to the touch.

I remember a story my mother tells about the first and last time Roger and Susan babysat. Grandpa Roger offered me a squished bagel from the bottom of the bag, and I asked if I could have a different one. He locked me in their room and wouldn’t let me out until I wet myself, and their bed,
at which point he started to scream. To this day, I’m embarrassed that I wouldn’t eat a squished bagel. I mean, really? That’s what comes from being an only child raised with New York bagels.

My cousin Renee was running a marathon that cut through Providence. My Uncle Jed and Aunt La live just a bit away in Barrington, RI, so they volunteered to drive around and cheer her on mile after mile and invited me to come along. Jed got bagels. I stood in the kitchen, acutely aware of how I fit into my too-large body from the other side of the family, sporting the Metzger gap between Dad’s teeth, shamed and awed at the comfortable bustle of their home. “Pick whichever one you want,” he said, and listed the varieties. Something socially vital in me jammed up, and I hesitantly joked, “Asiago bagels? I never knew these existed,” followed up by a quavering “My Dad would pry these from your cold, dead hands.” To his credit, Uncle Jed managed to laugh before bolting to the safety of their minivan.

Writing about yourself is hard. As a kid, I wrote plenty, always with the certainty that I would use a pen name if I ever decided to publish. I would spend hours and hours on name sites, scrolling through the annual social security list, looking for something that felt right — like me enough to suit me, unlike me enough to act as a new, better self, one that could allow all my language overflow into the world as naturally as a cloud collapses into rain. This independent self would put her words into someone else’s hands, so intimate a gesture: passed like a whisper from mouth to ear. I know I’m not alone in this fantasy. I’m ruled by fear, but I don’t know what I’m afraid of. I don’t think I’m alone in that, either.

Jimi Hendrix said in an interview that “A musician, if he is a messenger, is like a child who hasn’t been handled too many times by man, hasn’t had too many fingerprints across his brain.” This quote muddles me. I think he means that a musician’s message can be blurred by a loud world that shouts, rather than speaks, its demands and distractions. But I can’t stop thinking about this mythic state of creative cleanliness. What would it mean, not to have too many fingerprints across the brain? It seems like you could create anything, write about anything. But I can only write about this. It’s all cicada hums and the slow growth of fungus over anything still enough, the drag of sunwarmed water over surfaces rough and smooth. Its fingerprints are all over me.

What happens when I’ve written it? Will it let go of its hold, wipe off its fingerprints like any good criminal? Will I be blank and limitless? Or will it, having handled me, having held my hand through blood and sweat and school portraits, stay? Let the words fly like leaves in autumn while the winter trunk relaxes into its roots. I don’t know what I’m hoping for. It would be nice to live somewhere without seasons, I think. Endless summers sit well with me. But I don’t know if I could write about them.

Not about me, though, is it? On accepting the National Book Award for The Sea Around Us in 1952, the marine biologist Rachel Carson said: “The winds, the sea, and the moving tides are what
they are […] If there is poetry in my book about the sea, it is not because I deliberately put it there, but because no one could write truthfully about the sea and leave out the poetry.”

So, just the facts: on November _th, 2018, a hole opened up in the ground. The poetry of that got buried when the grave closed up.
Say it With Stone:

A fact: We can read the surface of a rock with our eyes and hands. We can read, with modern methods, the patterns of its molecules, and intuit the history of how they first joined electron elbows from its crystalline structure. We can read, and know and know and know.

A secret, if you want it: we can read much more than all that, and, more than likely, you’ve done it before.

Rocks are like the best books. They invite us to live, for however long we’re willing, in another mode.

Big enough to make up a mountain or undercut a whole town.
Small enough to be carried by the rain, or carried in pockets.
Old enough that bedrock comes to mean permanence and unshakability.
Young enough that we can watch them wear over our lifetime.

[Mr. Yurman said] “Spinel has this mystical quality of being alive at night. It feels like an antique gem; it speaks of the world that’s come before it.”

In the late 18th and 19th centuries, eager to prove ourselves worthy of the world’s attention, the newly formed nation turned to rocks. The appeal was something like this: If we are rich in minerals, then we are cut from good rock. In the Hudson Valley the fascination lay in Franklin Marble, cutting a multicolor swath through New York and New Jersey. Its pastel array of grey, green, blue, orange and pink mesmerized geologists, but beneath the swirl of color were the zinc-iron-manganese deposits that promised new discoveries.

Warwickite, Clitontite, Edenite and giant spinel crystals had their first findings in Orange County. Giant spinels in particular were characterized by a coterie of local geologists, including Dr. James P. Young of Edenville. There’s a portrait of Dr. Young hung in a private collection, the owner anonymous. In one hand, he holds a giant spinel crystal.

In the lore of crystal properties, spinel was said to cause latent evils and malevolent intents to well up, instantly exposed. If spinel was warded against a deceitful soul, they would be overcome with spasms in the arms. I have to wonder if these giant spinels were cut just a bit too heavy from the rock.

---

Spinels themselves have a long history, over 1000 years, of misleading the eyes of their beholders who knew nothing of their crystalline structure or mineral composition. Their color is varied and kaleidoscopic, ranging from perfectly clear to pink, red, orange, blue, purple, brown, or black. The rarer deep reds and rich blues resemble the corundum of rubies and sapphires. They are sensitive and finicky; they form different crystalline structures in nearly-identical geologic conditions, leading gem traders and jewelers astray. Mistaken spinels sat in famous crowns, uncontested and admired, for hundreds of years. Famed cases of mistaken identity include:

- The Timur Ruby of the British Crown Jewels, worn by Queen Victoria as a necklace: *a spinel*.
- The Crown of Catherine the Great, under a glittering cross and beside 5,000 diamonds: *a spinel*.
- The Cote de Bretagne of the French Crown Jewels, the gleaming red gem: *a spinel*.
- The Samarian Jewel in the centerpiece of the crown of the Empress of Iran, said to have hung from the neck of the Golden Calf when Moses received the Ten Commandments: *a spinel*.
- The Black Prince Ruby, worn by English monarchs since the days of Edward III until it was soldered into the helm of Henry V before the battle of Agincourt: *secretly, almost spitefully, a spinel*.

These forgeries become shadow-selves of sought-after jewels, dopplegängers of value. Even though red and blue spinels are far rarer than natural rubies and sapphires, they are relatively unknown. As such, their value is only a fraction of the value ascribed to their more famous geologic cousins. When first cut from the rock, these minerals were glittering wellsprings of pride and acclaim; when found in a crown, their glitters dulls to a devalued, if still somewhat lovely, disappointment.

Orange County’s black spinel was first unearthed in another hamlet of Warwick: the small town of Amity. It followed the pattern of Franklin Marble that cut across northern New Jersey, shot through quiet Amity and Monroe, then flew eastward towards the Hudson. The marble had once been limestone, and spinels grew in pockets carved out by the persistent flow of water. Minor spinels were common growths in these metamorphic pores.

> “About four miles from Greenwood in the direction of Fort Montgomery I found a rich locality of the ceylanite or black spinelle ... The crystals were very small rarely larger than a pigeon shot and most of them much smaller but quite perfect. Some were larger but imperfect. They were so thick and in such numbers as to form large black stripes several inches in breadth and feet in length in the limestone.”

In the Autumn of 1822 Dr. Samuel Fowler, minerologist and operator of a New Jersey ironworks, enjoyed a leisurely walk near a local farm. Strewn across his path were the discarded contents of a cart. Massive lumps of deep green and a near-black brown seemed, at first glance, to be loose coal, but in his hands they weighed dozens of pounds.

Disbelieving, Fowler sent the specimens to a well-regarded mineralogist and lecturer at Yale University. He waited 9 years for a reply. When it did come, modest fame followed.

懿

Isn’t it amusing
That a stone to expose evil
Was found in Amity?

Treasure hunters and amateur mineralogists flocked to the zone around Fowler’s find, though some were discouraged by the floods. Amity lay near the Drowned Lands that had not yet been riddled with drainage canals; in the springtime, the land would flood completely and provide an ideal breeding ground for mosquitoes and the diseases they carried. Dr. Young convinced Dr. Shepherd to make the trek, and Dr. Shepherd featured Young’s co-authored map in his published geological review. Omitted entirely from the work was Dr. Horton, who Shepherd constantly categorized in his credits as “anonymous mineralogist”. Horton’s son, Silas, accompanied his father on expeditions when he was young, carrying a rucksack of finds to free his father’s hands for meticulous notes. When Horton passed, Silas took up the search for spinels with a new companion, John Jenkins. He trekked the hills “…wielding against the rocky trails, rattlesnakes and brambles the venerable walking stick of his ancestor Barnabas.”

---

[Nobody’s seen a Warwick rattlesnake in ages, and, to be frank, I’ve never seen a spinel. I only know one person who’s even heard of them, and that’s Mum. She remembers kicking the crystals aside, common as gravel but a bit harsher on the toes, when she walked to the Amity schoolhouse.]

---

http://www.albertwisnerlibrary.org/Factsandhistory/History/YoungMap2.jpg
Weather Meditation:

There is a meditation I like to do now. The first time I did it, I was looking for something that would alleviate fear. I didn't know why I was afraid. My physician suggested that I was one among many experiencing the disease of modernity — according to this line of thought, the evolutionary mismatch between the behaviors that ensured our survival and the habits that now encourage our success is exacting a toll on our mental and physical health. We are no longer haunted by the dim shape of bears between the barred trees. We walk to the sink instead of the stream miles away. We sit, mostly motionless, at our desks and devote ourselves to the mental exertion we have been praised for at every step of our existence — the intelligent, creative mind is the tool wielded to bring about success. So we give ourselves over to the mind and loosen our grip on the rest. We do what is profitable and encouraged. We do what we think we must in order to make ourselves useful, and, in our confusion of riches, what makes us useful is assumed to make us happy. All this to say, we inhabit our minds to a dangerous degree. The excesses of fear and hesitation that would have kept us alive in more strenuous conditions is suddenly here to overwhelm us into anxiety, depression, malaise. It is a manufacture of our society rather than a personal failing. Of course, when the dark is pounding against your head like a hammer's stroke, explaining it away as an ancestral fear of getting hit by falling rocks is rather cold comfort.

So, fear, and this one meditation. First, it asks you to cut all ties with the external world.

Imagine yourself walking down a forest path, surrounded by threads of conversation, worry, etc — any thought that connects you to something external. You cut these ties, trimming your connection to friends, family, job, stress, even the imaginary trees of the forest path you are using to guide the meditation, until you walk unanchored in the mindspace.

From here, you access the core of your worry — the deep knot in your stomach that latches onto exterior things and distorts them.

You are asked to hold this knot and to compress it into a pebble. No larger. Then, you place this pebble into the heartspace, the imaginary pocket right behind your sternum, aligned with the center of the body.

You breathe in and out, turning over this small stone, and wear it away with the action of the breath. I like to imagine that my muscles compound the pressure. The expansion and contraction of my lungs, the hard arcs of my ribs, the rippling striations of microscopic muscle fibers absorbing the strain — all of this physical and emotional action doing the work of wearing away at the pebble's exterior. After all, it's just a rock. A piece of bedrock shattered off. Maybe it comes from the Franklin marble deposit, and glows with a soft dawn-like lavender. Or maybe it sparkles like granite flecked with the deep red of garnet, the stone of my Granny Rosy's earrings, the ones she found in the garden bed almost a decade after losing them. Or maybe, under the unassuming grey of the
stone's surface is yet more grey, striped and striated, a metamorphic center that recounts every moment of unbearable compression when the raw heat and weight of the earth crushes and folds it into a new identity. Eventually, the meditation asks you to imagine light shimmering through cracks in the exterior. The grey flakes off to reveal a still-smaller nugget of gold. In this iteration, gold inevitably dims to pyrite.

At the center of every fear, however twisted or misplaced, is a truth, or maybe a lesson. Perhaps it's only there to tell you which rock you are cut from, or perhaps it's there to reveal its compression lines — the stripes of white marble — or the crystal pockets, where gaps in older stone were filled by the slow growth of molecules linking atomic elbows in the slow peace of repeated structure. I find value here in the stories told by the rock — stories that can be layered or shifted, folded and faulted, oxidized to green and rusted to red, but never truly erased. Some fears are palimpsests: truth overwritten and changed.
Speculative Path of Carbon:

Hot magma spills from a fissure deep, deep below the surface of the earth. Calcium and carbon atoms swirl in a molten soup that cools in a pocket of air, slow enough for the molecules to orient themselves along invisible lines of attraction and repulsion. They bind, and bind, and bind. A calcium carbonate crystal forms.

Meanwhile, aboveground, other carbon cycles freely: expelled from lungs, drawn into leaves, eaten, excreted, incorporated into the muscle fibers of a large creature with a long nose that bends at the knees and sits down to die. It sinks into the layers of soft mud. Anywhere else, and the decay would happen too fast and too completely. The bones would be scattered by scavengers and gnawed on by herbivores for their phosphorus stores. Here, bacteria trim away the soft tissue.

The grind of shifting rocks crushes and pulverizes the calcium carbonate. It enters the slurry of soil and sloshes in years of rain.

In the bones, blood cells, fats, and collagen empty out from the inorganic frame, a fragile mineral framework in the shape of a bone. Rain picks up iron and calcium from the surrounding sediment. Water intrudes, sweeping minerals into pores in a microscopic flood, until the replacement is complete. Permineralization turns bone into rock with an intricate shape. Layers of cool, silken mud compress with a thousand-year sigh.

Above the mud: flash floods scrape the tangle of roots down to the rock and lay down topsoil several feet thick when they settle. Farmers draw invisible lines on the land and lay down fences to make them real. They cut irrigation channels that fill with eels, then mats of duckweed, then fertilizer runoff. In the gully of a drainage ditch, at the edge of a potato field, farmer Richard Van Sickle sees something sticking out of the soil.
Autoreflective:

Once you perceive something, how do you trust it? How do you feel comfortable enough to feel at home in or with it? And, in the absence of absolute answers, how can we reckon with a certain amount of ambiguity or illegibility without tossing the whole thing away?

There’s an ongoing debate in the study of memory. When you remember something, are you recalling the event itself, or is it something a bit more circuitous? Maybe even deceptive? A 2012 study from Northwestern University demonstrated that memories are not static entities. With each recollection, the brain lays down a new memory over the old, subtly rewriting the neural pathways. Over a sequence of recollections, even a minor change can accrue into a full distortion. The lead author of the paper, Dr. Donna Bridge, underscored just how fluid memory can be: “If you remember something in the context of a new environment and time, or if you are even in a different mood, your memories might integrate the new information.” The study has major implications for witnesses in criminal trials, opponents in decades-old family arguments, and pretty much anyone interested in the truth-telling business. Writers included.

Nonfiction writing, particularly autobiographical writing, leans heavily on the writer. It’s no coincidence that author and authenticity share the same root. How can I place trust in myself, knowing that my mind is doing some creative rewriting of its own?

Reading the study, I’m reminded of mornings spent lying in bed seconds after the alarm goes off, chasing the tail end of a dream. Jotting it down in a journal or a notes app would mean moving — out of the question for at least the next ten minutes. I go over the dream several times in rapid succession, committing each detail to memory first. The moment one passes from scrutiny, it blurs. Key parts of the plot wink out one-by-one. Things that once seemed clear are obviously nonsense — nothing that I would dream. By the time I pry myself out of bed, I’m left with a paltry handful of out-of-context stills: a hand half-raised; a strange shadow; a herd of massive giraffes galloping through the woods outside my house.

Now, I keep a dream journal. That dream journal is precious to me. It preserves these ephemeral things that my brain would otherwise deem too far from true or useful to store in the first place, let alone preserve unaltered. Graphite, ink, and pixels fix in place what could otherwise fade into a smeared sensory impression. I may not be able to fact check some memories, but I can write one down.

---

With word hooked to word, the act of writing preserves something beyond the finer detail. It preserves a version of myself: the narrative arcs twisting off like the veins of a leaf, impressed and compressed in sedimentary stone.

As a caveat, I’ll admit that dreams are shadowy territory. Their neural origins and storage instructions are even more obscure than those of memory. Still, the many mornings spent repeating this pattern were excellent lessons in forgetting. The application is imperfect, but it comes in handy. All I have to do is skim over the memory countless times in progressively less detail, skipping from fact to fact and winnowing away the parts that make it lively, full, and disturbing. For example, I’ve almost completely erased the semester of college that I took organic chemistry. It’s all peanut butter jars and cat shenanigans to me now. The finer points might still be there, but they’re buried under a memory mountain of carefully constructed and multiplied mundanity.

So then, beyond what I so deliberately try to shed, is everything not-preserved a loss worth grieving? I don’t think so. I’m reminded of Thomas Cole’s painting philosophy. As he told his friend Asher Durand, the painter should “wait for time to draw a veil over the common details, the unessential parts, which shall leave the great features, whether the beautiful or the sublime, dominant in the mind.” For Cole, the distinctive grains and gradients of various rocks seemed to be necessary casualties to create great art. As Rebecca Bedell notes in her book on the history of American landscape painting, he “tended to paint his rocks with the same swirling strokes of pink, gray, and tan whether he was describing the granites of the White Mountains or the sedimentary formations of the Genesee region.” Despite these liberties, Cole clearly studied his landscapes diligently. His vistas and landforms were faithfully reproduced in shape and scale, and his field notes used geological terms like conglomerate and granite to evoke key textures, pebbled or glittering, even though they seldom informed future painting efforts. The geological knowledge was at Cole’s disposal, along with his engagement with the landscape itself. I can disagree with Cole’s personal definition of “common details” and “unessential parts” while still appreciating the trust Cole placed in the imperfections of his recollection. Rather than seeing the mind as a bowl riddled with inconvenient holes, he believed it to be a sieve.

As I leaned further and further into the Romantic-inflected Hudson River School’s view of nature, my thesis advisor directed me to a foundational piece of literary criticism called The Mirror and the Lamp: Romantic Theory and Critical Tradition, written by M. H. Abrams. The title comes from the two metaphors Abrams uses to distinguish 18th and 19th century attitudes towards writing. In the 18th

30 Ibid., 19.
century, writing was perceived as a means of mirroring: meant to reflect an outward reality. In the 19th century, the Romantics viewed writing more akin to the lighting of a lamp: the act of writing let something (the poet) shine through something (the words) and illuminate something else (the world). While both traditions aimed to make meaning and possibly reveal something truthful, the Romantics placed more stock in the writer-as-medium, or writer-as-interface, an idea I both enjoy and find useful. If reality is written, then it inevitably passes through the mind, body, and being that linked word to word. I’m ready to buy into this vision of writing. But, like anything in theory or reality, the lamp and the mirror sit on opposite sides of an inescapable spectrum. The light of the lamp cannot help but reflect in the mirror.

With a lamp in one hand and a mirror in the other, you can accomplish some truly astounding illusions. The idiom smoke and mirrors comes from one such trick. A projector would cast an image onto an angled mirror, which would throw the image onto a plume of smoke. Nowadays, by virtue of the common knowledge of the 21st century as opposed to that of the 19th, such phantasmagoria probably couldn’t trick us. But, put a box around the projector and the mirror. Slim, low profile. Make the lighting diffuse and subtle, so that the smoke does not stand out on its own. Take away the knowledge of how light habitually tricks, doubles and leaps, and come face to face with a ghost.

Helen Oyeyemi opens her novel Boy, Snow, Bird with mirrors, which is apt for a retelling of Snow White:

Nobody ever warned me about mirrors, so for many years I was fond of them, and believed them to be trustworthy. I’d hide myself away inside them, setting two mirrors up to face each other so that when I stood between them I was infinitely reflected in either direction. Many, many me’s. When I stood on tiptoe, we all stood on tiptoe, trying to see the first of us, and the last.

In this infinite doubling, I find resonance with autoimmunity. How does the immune system make a critical error in identification? The cause for many autoimmune conditions is still a dense tangle of genetic, environmental, and other factors. For my mother and I, it’s most likely a combination of inherited predisposition and a shared environmental trigger. For example: a bacterium enters the body. It has markers on the surface of its cell that the immune system recognizes as foreign, prompting a response. The bacterium has other markers too, ones that mimic, by sheer bad luck, those on the body’s own cells. A simple infection that’s cleared away in a few days launches a lifetime attack. That’s all it takes. Enemy and self face each other in endless reflections.

A friend texts me, furious and almost in tears about a recent weight gain. She sends me a picture of a band of cellulite around her upper thighs. I tell her to wait a minute. I stand about a foot from my mirror, where a cold, flat light slants through the closed blinds to cast a weak spotlight on my own

---

thighs. The dimpling and rippling is dramatic, pronounced — it stings, like a bitten cheek, to acknowledge this unkind topography of my body. Then, I take several steps back, hopping over a litter box and a few books. The light is diffuse and warmer, bouncing off the warm green of my walls before landing on me. I take another picture. In this one, the skin is smooth. She’s shocked by the two photos, taken seconds apart, and so am I. It doesn’t matter that some 90-98% of women adolescent and older have cellulite, because it’s simply how subcutaneous fat gets stored under the regime of most estrogenic hormonal cycles. We’re still degrees of disbelieving when we see it ripple across our own skin, or watch it disappear in more benevolent light. Knowledge of the physiological facts does nothing. Only awareness of the illusion, the trickiness that can be accomplished with light and mirrors, gently disassembles what appears to be knowledge.

The real problem with mirrors is that they’re neither honest nor deceitful on their own. They require an expectant pair of eyes. A flat sheet of reflective silver nanoparticles may seem impartial, but its onlooker never is. To pretend otherwise divests all trust, and the weight of a certain responsibility, from the self, and places it within the mirror. It is all too easy to blame a mirror for making illusions. It only does what’s in its nature.

Even if I didn’t look in one mirror, there was always another. As familiar, as much my own, as a shadow cast. As a teenage girl, the bodily dissatisfaction and aesthetic imperfection that haunted all my mirrors was haunted by something else, too. I never looked at myself without seeing the shade of me-but-worse, me-and-diseased. Me, like her. It’s a terrible way to see your mother. She’s doing well now, better than ever, but when we look at each other I still feel shades of Oyeyemi’s protagonist in the opening lines. She raises a hand. I raise mine and squint my eyes, trying to reconcile the different figures in our own hall of mirrors.

In the original fairy tale, the mirror is supposed to be the arbiter of truth (*mirror, mirror, on the whatnot*). When the mirror claims that Snow White is now the fairest of them all, the Queen is outraged, and not just because she’s losing her looks. She can not force the mirror to tell a different story, and neither can she seem to choose to believe something else — not very Romantic of her. Oyeyemi’s mirrors are much more mercurial, more like the mirrors used by illusionists than by insecure queens. Sometimes, they refuse to show a reflection at all. Whether or not a mirror tells the truth is a matter of how honest we expect (*or command*) the reflection to be.
Claverack Carnivore:

In 1705, a tooth was found on the banks of the Hudson. The Dutch tenant farmer who hefted it out of the soft edge of the river probably had to use two hands: the tooth came in at just under five pounds. The root was decayed and discolored, but the top was a worn white and the cavity purportedly held a generous amount of liquor. Perhaps in light of this capacity, a member of the assembly from nearby Albany purchased the tooth for a half pint of rum and sent the strange thing off to the Royal Society of London, more out of idle curiosity than anything else. At the time, nobody had conceived of dinosaurs. Awareness of prehistoric nature was in its infancy, and the majority of the colonial and European public believed in the Biblical account of the Earth’s history. The size and heft of the fossilized tooth, and the bones the ground started to yield soon after, were unlike any creature the colonists had ever seen in the wilderness. The discovery launched the search for the identity, and moreover, the story of the massive mystery creature. At this quiet beginning, it was dubbed the American *Incognitum*: the American unknown.

This was the time when the Lamp still reigned over the Mirror. Long before the Romantics put ink to paper with a flourish or cast a fanciful eye toward the landscape, the discipline of natural history was a home to myth and metaphor.

I had my own brush with an *incognitum*. On a sticky-hot summer day, I was walking midway up the steep slope that descends from the high point of the field to the low bowl of the woods, where a seasonal stream marks the boundary between forest and swamp. It’s challenging walking because of the angle. Loose clods of clay-rich soil, opportunistic moss, and smatterings of broken shale make for an unsteady surface. Heavy runoff or an uneven footfall can send it, and me, tumbling. It was one of these miniature landslides that revealed a scattered mess of bones and teeth, spread out over a few yards. I nudged the bones with a stick first — my mother drilled in to me that fresh bones, ones with meat and skin, could carry nasty things — before deciding that they hadn’t been a part of a body in a long time, and were safe to touch. So I did. I felt the strange heaviness of an incomplete bone the width of my wrist, and picked through several teeth the length of my thumb from end to end. I stuck five of them in the pockets of my shorts and made for home. After about an hour of diligent internet research, I had a pretty good sense of what I had found. The tooth that had looked so intimidating resolved into a long, tapered root and a smooth grinder meant for crushing plants, belonging to the jaw of a domestic cow.

Even with an unfamiliar fossilized tooth in hand, I can’t imagine myself in the place of the Dutch tenant farmer or the Albany assemblyman: holding a strange, organic thing without knowing what it is, what circumstances brought it to my hands, or what circumstances kept it from stalking the treeline beside me. It took about a century to definitively declare the *incognitum* an extinct species,

---

and it was one of the first. I’ve read too many relevant textbook chapters, walked through too many relevant museums, and probably read too few Bible passages for the experience to be comparable. It’s easy to scoff at the proud scientists that looked at mastodon fossils and saw Antediluvian giants, unicorns, and carnivores. It’s also easy to think we’ve got it all figured out now. The textbook chapters and museum plaques certainly urge me to think so. The quantity, availability, and immediacy of information about the differences in the grooves of fossilized bison teeth and fossilized cow teeth urge me to think so. But the story of the mastodon pushes me to view knowledge less like an accumulation, where fact piles on fact until it gets so heavy that it compresses into truth, and more like any other living system, where its components are in constant negotiation and flux.

The hundred years following the tooth’s discovery tells a story of divergences: geological study foisted an ever-increasing number of millennia and cataclysms onto the Biblical account of a young earth and a great flood; biological discoveries similarly challenged the notion of a fixed number of unchanging species; and, in the wake of the revolution, newly sovereign American colonists sought a cohesive national identity. The sudden materiality of prehistoric history collided with, and catalyzed, these periods of change.

The first tooth was quickly joined by a litany of similarly large fossil finds. In 1706, they caught the attention of Cotton Mather, a notably anxious and eccentric Puritan clergyman from Boston. Like many other clergy, Mather saw in the bones an opportunity to bolster the Christian creation myth of Noah’s Ark and the Deluge; early speculations surrounded the idea of human giants that walked the Antediluvian Earth, felled in the flood. He took up this view in the first report of the *Incognitum* sent to the Royal Society of London. In aligning these geological discoveries with the Biblical narrative, adherents saw the Earth’s topography as a sacred landscape, a ruin suggesting the shaping force of the Deluge’s waters.  

This landscape of past ruination and future threat captured later Romantic writers and painters, including Hudson River School founder Thomas Cole. Natural formations far beyond man’s capacity to make ignited his imagination and religious belief. Many of his paintings feature jagged heaps of stacked stone or precarious boulders. Even though these striking formations were viewed as the work of a shaping hand as opposed to accidents of ice and fire, they impressed a similar sense of cataclysm upon the viewer. This lent common landscape features a certain gravity; contemplating the forces of upheaval that shaped them at once made the Deluge feel faraway and the Day of Doom much closer at hand. In this way, the dawning awareness of the Earth’s true age fed a sort of national navel gazing. This all came at a time when America was feeling its youth as a country. European emigrants were eager for something that carried the same clout as the ruins of Classical civilizations across the sea. Stones, and all they contained and conveyed, promised an ancient past.

---

34 Ibid.
with much more to reveal. Despite the increasing divergences with Biblical canon, the thrill of this potential gave natural history a critical momentum\textsuperscript{35}.

English scientist Robert Hooke, the first person to study fossil structures under a microscope, articulated the need that ancient prehistory seemed to fill:

Now, these Shells and other Bodies are Medals, Urnes or Monuments of Nature. These are the greatest and most lasting Monuments of Antiquity, which, in all probability will far antidate [sic] all the most ancient Monuments of the World, even the very Pyramids, Obelisks, Mummies, Hieroglyphicks, and Coins, and will afford more information in Natural History than those other put altogether will in Civil.\textsuperscript{36}

It was as though they were on the cusp of something, and, idly dragging a finger along the rim, had heard it sing. In a young nation hungry for reassuring symbols, the epic mystery around the bones seemed to be a fountain of promise. While the notion of human giants failed to be substantiated — and was in fact quite harmed by the accumulation of decidedly nonhuman 11-foot tusks in more complete skeletons — the overall mystery remained. Here, it becomes necessary to think about the stories that people tell. Just because a narrative can be drawn does not make it truthful, or benign. Narrative isn’t neutral.

There was a far more complex and troubling sociocultural backdrop to this search for symbolic affirmation. The French naturalist George Louis Leclerc, Comte de Buffon, set forth the theory of American degeneracy, which claimed that an inferior climate in the North American continent produced smaller, weaker forms of life than comparable species in Europe and Asia. This was not only objectively false but undeniably racist, as Buffon extended his theory to include people. Anglo-Americans like Thomas Jefferson likely wouldn’t have been too bothered by Buffon’s assertion if it had only included native flora, fauna, and Indigenous peoples, but he later clarified that he believed that European emigrants were also subject to the effects of this pervasive, climatic weakness. Jefferson took it upon himself to convince Buffon to retract his theory. His correspondence invoked stereotypes of physical strength in Indigenous peoples and enslaved Africans. Buffon remained unconvinced. Where these written arguments had failed, Jefferson hoped that physical evidence would prevail. The bones of the American \textit{incognitum} promised an irrefutable rebuttal of Buffon’s theory, and, more broadly, an assertion of American strength and vitality\textsuperscript{37}. This nascent symbolic link fueled more fervent searches, including the famous Hudson Valley discoveries associated with Charles Peale.

\textsuperscript{35} Ibid.
\textsuperscript{36} Quoted in ibid., 11.
\textsuperscript{37} Ibid., 213-245.
In 1801, nearly a full century after the first tooth was tugged from the river bed, Peale pieced the first complete skeleton of the *incognitum* together from digs dotting the Hudson Valley. Newburgh Farmer John Masten found the first bones in the midst of digging a marl pit. These pits were deep, rectangular excavations, in which subsoils rich in glacial minerals were dug up and redistributed as fertilizers. Peale bought the first few bones Masten had found and struck a deal to return at the end of the summer to begin his own excavation in earnest. By the time he came back, the pit was a pool of silty water 12 feet deep, presenting an engineering challenge. If the painting is taken as an authority on the event, then the elaborate contraption Peale rigged was as much a marvel as the bones. While a drawing of leg bones unfurls behind Peale’s triumphant figure like a flag, the water wheel commands the center of the painting just as surely as one of Cole’s dramatic peaks. The wheel, 20 feet in diameter and pedaled by 3 men in the interior, rotated a chain of buckets that, in

---

38 Charles Willson Peale’s painting *Exhumation of the Mastodon*, 1806-8. Oil on canvas, 50 x 62 1/2 in. (127 x 58.8 cm). On display Maryland Historical Society, Baltimore.
combination with people tasked with emptying the full buckets when they reached the apex, removed about 1440 gallons from the pit every hour. The draining permitted a team of a dozen laborers to dig (323, ref24). Ultimately, the soft walls of the pit soon started to collapse on the people digging them out, and Peale had to call a quick stop to the operation. Though Peale’s painting made the Masten dig the visual emblem of the search for the full skeleton, the whole endeavor returned remarkably few bones.

After a few more fits and starts of mostly fruitless digging, Peale’s search crossed the Wallkill River to the tenant farm of Peter Millpaw. Millpaw had found several bones in a bog fenced off to protect his cattle from getting stuck in the mud and joining their long-ago land mammal ancestors. The dig was an immediate success. Though the skull was just a mushed jumble of teeth in black marl and yellow clay, they uncovered the coveted lower jaw that had been absent in the previous skeleton. Peale, like many others, was fixated on the notion of the incognitum as a fearsome carnivore.

Why? In his book American Monster: How the Nation’s First Prehistoric Creature Became a Symbol of National Identity, Paul Semonin explores how the mastodon came to reflect a uniquely American conflation of wilderness, violence, and domination. Though the fossils themselves were natural artifacts of impassive stone, they held narrative appeal for those that wanted to sustain inequalities of power. Modern natural history cannot ignore that appeal any more than it could two or three centuries ago. As Semonin cautions in his preface:

> Every scientific theory has its metaphorical meaning, from the ‘survival of the fittest’ to the ‘big bang theory’ [...] naturalism is a kind of myth itself, and as such, it helps channel our thoughts toward a belief in literal truth — a value-free mind-set that is a dangerous illusion when it comes to understanding our use of knowledge and the motives for our actions.

In other words, science is narrative, and narrative is never neutral.

Clergy first used the bones to prop up the Christian creation myth. Then they, alongside painters, writers, naturalists, and others in positions to craft narrative, used the bones’ prehistory to instill cataclysm and moral imperative into the landscape. When extinction was at last accepted as fact, the eradication of the beast was the Christian God’s way of paving the way for conquest of the land and the people that had been calling it home for thousands of years. In the wake of revolution, the size and viciousness of the imagined carnivore knocked down the claims of American degeneracy while upholding the systems of White supremacy. That the facts of the bones supported none of these stories made them no less compelling nor any less harmful. It is not enough to find a scientific story

---

40 Ibid., xiii-xiv.
engaging or enjoyable or even true. We also have to look critically at what that story is tied to: which fears its taps; and which hopes it encourages; and which relationships it reflects and distorts.

To do that, we need to think about our practices of seeing. The mastodon is far from the only instance when systems of scientific thought were used to maintain systems of power. The Great Chain of Being and the racist skull measurements of craniometry both used claims of evolutionary progression to support White supremacy. Things that took the form of scientific fact upheld both of these theories for a time, and though they held no truth, their consequences did. Our stories, like anything living, take real things and make real things. The gravity of storytelling necessitates a meaning that extends past surface likeness; this meaning is not owed by the act of observation, but earned by the practice of intimacy.

In her essay “Speaking of Nature”, Indigenous biologist and writer Robin Wall Kimmerer references a student who talks about not naming animals on her farm, because everyone knows that you don’t name things that you eat. The ‘it’ is a protective measure against an intimacy we fear will lead to culpability. She contrasts this linguistic distance with the intimacy:

> In contrast, indigenous philosophy recognizes other beings as our relatives, including the ones we intend to eat. Sadly, since we cannot photosynthesize, we humans must take other lives in order to live. We have no choice but to consume, but we can choose to consume a plant or animal in a way that honors the life that is given and the life that flourishes as a consequence. Instead of avoiding ethical jeopardy by creating distance, we can embrace and reconcile that tension. We can acknowledge food plants and animals as fellow beings and through sophisticated practices of reciprocity demonstrate respect for the sacred exchange of life among relatives.  

This is good advice, and, as Kimmerer suggests, it extends beyond the biological imperative. If we have to eat, we must do it kindly. Whatever we take in. Whatever we remove. Whatever we must let change, or change ourselves, or hold only in memory. If we hope to be a part of anything, inscribed neatly within its wide circles, then we must be willing to engage in the ecology around us.

---

Speculative Path of Phosphorus:

Coming to a fruit, the oak makes an acorn, with phosphate stitching the backbone of its DNA. The acorn ripens, drops, then meets water, mud, and aerobic bacteria that decompose it into nutrient soup.

The sun comes out from behind a cloud and algae divides freely until consumed by a copepod, which is consumed by a water strider, which is consumed by a tadpole that would have grown into a massive bullfrog with gleaming bronze disks at each ear, but is eaten instead by another tadpole growing just a bit faster. This tadpole already has two still-translucent legs budding off from where the tail meets the bulb of the body. The legs emerge fully and phosphorus strengthens the delicate, curved bones.

The mature frog sits in cool mud, breathes through every cell of its skin, and vanishes into the water at the slightest suggestion of shadow. It evades the heron’s beak for the last time, and then, in the shadowy base of a hummock, aerobic bacteria greet it with the fast familiarity of an old friend.

The phosphorus floats free of the DNA backbone and clings to dirt instead. It jostles for space between the molecules and squeezes out the air as it sinks down, down, with the weight of new sediment settling above it. The top layer stays soft enough to catch and release the prints of deer, raccoons, and barefoot children navigating the sawgrass. Phosphorus stays here a while, in layers of compressed soil and the unremarkably preserved dead; aerobic bacteria need oxygen to fuel the process of decomposition. Since there is none, they do not come here.

The blade of a shovel does, though. Phosphorus is carried in a dense brick of peat and fuels someone’s fire, which produces smoke full-bodied enough to feel stick to the skin and ash ideal for fertilizer. Phosphorus is spread at the roots, then uprooted. A hand brushes dirt from the skin of a new potato and phosphorus falls into a pile of loose soil. When the next rain falls, phosphorus flies almost joyously downhill. It finds the sluggish waters of the swamp once again, and settles in its soft soils.

The shallow roots of a young skunk cabbage sweep it up, and phosphorus fits back into the DNA backbone. The plant is encased in ice and several inches of snow. Months before the melt, the cells of the skunk cabbage kick into high gear; cyanide-resistant cellular respiration generates enough energy to fuel the plant and shed the excess, creating a heat pocket up to 63F warmer than the surrounding winter. Ice shrinks from the heat, and the skunk cabbage sends up a fleshy purple-splotched bloom. When spring catches up, the bloom is replaced with massive leaves that stink like carrion when snapped and burn the mouth when bitten, which wards off everything but flying pollinators and bears.
A black bear idles through the swamp. It bends a stalk underfoot, but nothing snaps. The bear takes a bite of the bright green leaf, and phosphorus goes down the gullet.

It emerges in a clod of berries, nuts, seeds, and grubs. It is stuck to a tiny fragment of untouched acorn hull. In the density and darkness of this single scat, hundreds and hundreds of seedlings wake up, shuffling molecules in the bustle, and begin to sprout.
The Written Stitch:

Writing involves the physical body in a way that engages the whole body, and the person inhabiting it, as Virginia Woolf writes in Orlando: For it would seem - her case proved it - that we write, not with the fingers, but with the whole person. The nerve which controls the pen winds itself about every fibre of our being, threads the heart, pierces the liver.” If language is able to draw things into relation, then I am interested in how we can pull tight the written stitch.

In his keynote address “How Do We Language So People Stop Killing Each Other, Or What Do We Do About White Language Supremacy?”, Asao B. Inoue asks how we can change the way we speak, teach, and perceive language to stop committing acts of violence. In it, he turns to the teachings of Thich Nhat Hanh, the Vietnamese monk and long-time social justice activist. To change these acts of violence through compassion, Hahn advocates deep listening, or, as Inoue prefers “a deep and mindful attending to the other in our presence” (17). He is invokes Hahn’s suggested practice:“sit close to the one you love, hold his or her hand, and ask, ‘do I understand you enough? Or am I making you suffer? Please tell me so that I can learn to love you properly” (80).

At its best — when I am less distracted than empowered by metaphors and lyricism — my writing about the swamp is me, asking these vital questions. Laying out my understanding to see where it falters and fails. Where the suffering is, and how it is shaped. Where I can make it stronger, deeper, with softer edges and a gentle touch. way of attending to the natural world, to my home in the swamp, wherever I am. It lets me spend time and make space for the swamp to do its work.

Whether as a writer or a reader, following the path of good a story is fun. There’s a sense of satisfaction and accomplishment, a certain click confirming rightness, to moving through it. It’s like hummock hopping. In the swamp, the moss-covered remains of fallen trees and mounds of peat bog rise out of the mud. Water curves around these obstacles. Its flow deepens the mud hollows between hummocks and deposits rich sediments at their base, quite literally laying the foundation for the vegetation that springs from every inch of a well-established hummock. Sawgrass shoots up and spills over the edge, dramatizing the hummock’s dome — and obscuring the shape of the stable foothold underneath. It’s easier once you build up some momentum. From the center of one sawgrass to another, with the occasional sapling to grasp after a particularly long leap. Trees take root in the mounds high enough to keep the roots from getting waterlogged. But lean on them too hard, and you might find that the whole hummock, tree and all, tilts on its axis. The shifting leaves and bending trunks invite you to slow down. When the hummock tilts you follow its angle, peering into the hollow. Peel off your socks and shoes. Come down from the hummocks and sink into the mud. Get it between your toes and under your nails, and know it bodily. Let it know you too. When you start to walk, wait for each step to settle. The mud at the surface feel so airily soft, warmer or cooler perhaps but no denser than the water sliding over it, but it will hold you. Each step is equally evaluative. You find yourself walking somewhere new. At first glance, nothing seems different.
There are still sawgrass heaps and swamp rose thickets make the same patterns of green and brown. Black-capped chickadees dart between gaps in the brush and wolf spiders hunt at their base. The air still tastes sweet and bitter, and the sun beats the same on the back of the neck. You realize what it is. The hummocks are further apart here, too wide to jump between, and the hummocks are broad and low, too near to the water to support trees. The water is deeper and flows faster. You feel resistance on your legs where at first there was just a faint cold, and then, something else. A gentle tapping at your shins. You look down, but the water is like a mirror in the sun, showing you only clouds and a white-hot brightness that leaves spots on your eyes. Some of the brightness might be silver — like the flash of a minnow in a swift-moving school — but you couldn’t say for sure. It is easy to feel and hard to know. For now, that feels like enough. Circle back. Extract your feet. Gather your socks and shoes where you left them and head up the hill, indoors, towards home. Come back again and again, when the humidity cloys your breath, when the sawgrass is freshly barbed, when there are no birds singing and the insects always find you. Let the swamp turn you over, work you over, and greet you as a participant of its slow cycles.

Why do we turn to — Lean on? Lean in to? — nature writing? Various theories try to explain the calm and solace we get from simply being in nature. Some say we evolved in natural settings, so our senses are soothed. They contend that nature doesn’t demand anything from us but offers more than enough to contemplate, but only when we’re ready, only on our terms. Others take this evolutionary argument in another direction: we’re hard-wired to pay attention to natural elements, and the depth of detail gives our overstimulated brains something to cling to. Still others speculate that being in nature, particularly alone in nature, invites us to be a part of different rhythms and spatial scales. I’m sympathetic to this one, because of that untouchable relief in feeling, at once, very small and too big to contemplate. Yet I wonder if it’s something else, too. I wonder if partaking in nature’s dynamics reaffirms that it’s enough to strive. We never know what will come of our efforts. If we grieve, fall sick, falter in our chosen path forward — at the heart of things, there is no shame.

I won’t claim a universal experience, but I’m finally starting to understand why I feel compelled to write about nature. Throughout my childhood, I’ve seen the swamp makes things vanish. Sometimes, it happens quickly. A grey sky can take the luminosity from a leaf in an instant (though rain makes it glow again). The deer skeletons too always go faster than I expect. Others happen more slowly. Years of sun have been bleaching the brightness out of the yellow no-trespassing signs. They have a name on them, but the ink is blurred from years of rain and sun defying its thin protective plastic. I’ve never been able to read it. I only know it’s a name because I know somebody owns the swamp, the woods, and the field. This decay of words (a rewriting, an unwriting) shows that the swamp’s processes of decomposition can extend to knowledge, too.

What do I hope to get out of writing this? It’s more a question of what I hope to put in, so that I can give it over to the procedural, and the living. This writing gives the swamp my proudest thoughts and my favorite memories alongside all my perversities and failings, and it asks the swamp
to help me learn. The swamp frees up the facts so that they can be taken up in new forms of thought.

Swamp says: It will take time. It will take a willingness to let things stay hidden, subterranean, while they cycle.

I say: I trust you. Trust in me.

While the swamp trims away the soft tissue, I strive. I keep coming back and showing up. I am learning to be content to hold things for a time — facts in mind, molecules in body — and then, to let them go.
Something I Have No Excuse For:

Dear _,

I wonder what the swamp looks like now. I know, distantly, that things must be changing with the seasons like they did before. But trying to remember the exact shade of the leaves, or the precise temperature of mud around the ankles, feels more like trying to capture a dream than a memory.

Remember that dream I had? I’m reluctant to write it — I know dreams tend to be something of a torment to anyone but the dreamer — but I hope you’ll like this one. Behind the counter of the local pet store, beyond the foiled dog food bags and stacked cat food cans, at the end of an aisle exclusively of litter boxes, there were three doors.

I opened the first, and stepped into a garden rather like Granny’s. The tea roses were blooming, and, though they were beyond the weathered white fence, I could smell the tree peonies and hear the stream rush as surely as I could brush my hands on the ferns and taste the rain. Above me, bubbles. Some were the size of marbles. Others were massive, but all held at least one fish with flashing fins. Green, rippling into gold and red-hued bodies. I left only after I had touched every single one.

Opening the next door, snowflakes flew in. Wawayanda Lake stretched out from the inexplicable opening in space, frozen several feet down. Through blurs of drifting snow I saw the island in the middle of the lake. Its trees were dark against the empty sky, like the marrow of a bone. Then, a cloud of mist and wind and snow gathered at the base of the island, and the sound of cracking ice followed. Still, I did not move, frozen almost to the surface, until a herd of horses was visible in a dense tangle of white. I ran then, the ice fracturing beneath me, the air sluicing my lungs, and something colder, like fear, tensed in my stomach. That door, I locked.

I did not go through the third door. I only opened it, and sat on its threshold. The only movement was the soft rustle of the underbrush. Leaves pooled at the swamp’s edge, mid-decay, curled into yellowed tubes or upturned rusted hulls, ribs exposed. On the ridge of each bramble, rosecups ripened to a flame. The browned hummocks shifted in windless waves. One opened. A spiderweb, bright and sullen as a ghost, sat in its center. Another bent to an unseen wind, and I saw that the constant rustle was really dozens and dozens of red foxes skirting their low, silent routes through grass. Their russet tails vanished in the twist of fallen leaves and rust-colored mud. I watched them until I woke up.

I would like to walk through that third door again. Mum said the leaves started to turn on Tuesday, and it’s only a matter of time before the summer’s green is re-painted in varying shades of autumn sleep. I would like to rest like that again. Even the water sinks below the soil in these times.
I’ve been thinking a lot about the Drowned Lands, that term for the Black Dirt region that describes how home looked once upon a few hundred years ago. When it rained in Warwick, back then, the rivers would churn out these massive torrents, rushing like snakes over the fields. Pebble stones and crops were lost in the wash. Cows vanished in the flash floods, because cows cannot swim very well against currents. It’s hard to imagine an animal that cannot climb down stairs having any grace in the water.

But mammals have gone back to the water several times over the course of their long evolutionary history, grown fins and lost hair, traded grazing teeth for predatory piercers. Orcas are more closely related to cows than to seals and walruses, did you know that? And seals, with their snowball babies and black button eyes, share closer ancestry with wolves than with orcas. But yesteryear’s cows have no way of reactivating the DNA they share with the ocean’s apex predators, and so they likely drowned.

Can you picture it? Suddenly this fertile valley was a swirling, mudded sea, and the gentle swell of Pine Island rose up with its few craggy conifers held high. The herdsmen and farmers wanted firm, arable land, and I imagine the cows did too. To tame the Wallkill River’s seasonal temper, farmers meticulously dug out ditches by hand and shovel; but factory owners petitioned to build dams, reverting the river’s course to power their mills; and those with dirt still fresh under their nails destroyed them immediately. This bitter rivalry over the river’s proper course, battled between the sects of industry and agriculture, took on the name of the Muskrat-Beaver Wars. So-called — and I’m inferring here — because beavers build dams, and displaced muskrats rile against them fruitlessly.

Even though we didn’t know the history of the Drowned Lands as kids, we still felt the name and read meaning in its quasi-mythic appeal. Even though we didn’t know the long series of diversions and dispersions, we still knew that the ponds and streams washed out into marshes that rose and fell with the water table. We knew the water that disappeared between the pores of limestone and rose up again to water our spring bulbs, stray crocus and jack-in-the-pulpit, or encase mudded bubbles in inches of sheer winter ice. We knew those bubbles, too. Like blown glass, or the remnants of some great chandelier. We could see the sawgrass contained underneath, preserved spring green, and the rich red iron-oxide swirls halted mid-path overnight, overlaid. Perfect, clear. The cut blue-glass edge of a mirror, if it was shaped so lovingly around each crestfallen hummock’s head. We called each other by different names and wrote stories we preferred. Those bubbles were trapped souls, and they belonged to someone. Slide your feet across the ice to pacify the budding cracks. Quiet — don’t brush too much against the ice-encased briars, they are the tinkling bells of a front desk, and who knows who will come when called. More snow would fall. A new white inch over the spray of souls beneath. We’ll get you out soon, we’d whisper, and with gloved hands brush the snow away.
Warm inside our coats and scarves, we were untouchable. The withered sawgrass could not ribbon our legs with cuts when we ran.

Remember that summer storm? The muskrat ducked under when the first drops fell and I tucked my notebook into my backpack, but we were both too late. The sky let loose a torrent — a torrent brown and fast, like a diamond-backed, sharp-toothed copperhead, a torrent that could tear up the topsoil and rip the sadness from our skins. We laughed, then screamed, and heard nothing but the roar. We laid down. Raindrops battered our cheeks, so we closed our eyes. Together, we buried weary arms in the water — fallen from above, risen from below — and drowned all heartache in the din.