

Spring 2023

It's Hard to Believe There are People There

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Recommended Citation

Peña, Lily Rose, "It's Hard to Believe There are People There" (2023). *Senior Projects Spring 2023*. 145.
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It's Hard to Believe There Are People There

Senior Project submitted to

The Division of The Arts

of Bard College

by

Lily Rose Peña

Annandale-on-Hudson, New York

May 2023

Dedicated to Mama, Pops, Lyle
Ging, and The Brothers

Special thanks to Alex Benson

*Those who dwell, as scientists or laymen,
among the beauties and mysteries of the earth,
are never alone or weary of life.*

— Rachel Carson

It's hard to believe there are people there. People like us...

— *The Twilight Zone*
Season One, Episode Four “Third from the Sun”

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Water and Life

I want to share a vision with you before I tell this story. It was the most romantic vision I knew, as comforting and impossible as being a child pretending to time travel in a cardboard box.

Picture an old adventure movie. It doesn't have to be old as long as it's nostalgic. In this movie, the main characters have just found a rare plant or specimen in a cave, and they have no idea how to identify it. Cut to: the main two, the buff explorer and his bodacious blonde ingénue as they meet up with an old scientist who teaches in an unnamed college in a small laboratory, lined with cramped chalkboards full of equations that certainly hold the key to the entire universe. He stumbles out, this scientist, spectacled and gruff, not wanting to get sucked into any conspiracies about the center of the earth, surrounded by dusty books he likely wrote ages ago that made ripples throughout the biologist community. He teaches, reads, and holds all his knowledge close to himself, occasionally breaking out his old tools and doing studies on a particular species of lichen. Of course, he will succumb and help the main characters with their journey and his esteem will live on powerfully behind the scenes.

That is the old man I wanted to be when I grew up. And I was a young girl in a world that moved as if powered by luck and glass.

I entered the classroom that Tuesday for the first day of my second year of college with a loose grasp on what climate biology meant to me. The Biology of Climate Change (BIO 202) classroom was lined with high shelves full of old equipment. Some I imagined were still in use, as our school's budget for new equipment was notoriously small. But some of the items on the shelves I assumed were just for show. They were time capsules of the instruments once used to gather data that I could now quite easily find on my phone in a matter of seconds. From the looks

of these relics, they were once used for forecasting the weather, measuring air pressure, and determining the cardinal directions. Sometimes I wished I could have learned how to use one of these instruments first, before the calculators and apps got involved, if not simply for the acquisition of a new skill, then for the magic of feeling like I was discovering something new. What a joyful little scientific puzzle that would provide me.

But this was a new semester which always made me feel more optimistic. Perhaps I was also hoping that my favorite old scientist would take hold of my spirit through osmosis if I spent enough time surrounded by these microscopes and yellowing maps and copies of National Geographic.

As I looked up toward these items, the rest of my class filtered in. A boy named Isaac who I'd had some classes with before, some Freshman girls I'd never seen, and a tall fellow with a patchy beard all filled up the room around me, and suddenly I remembered that I would have to be present in order to learn and that things wouldn't just sponge themselves in my brain as they would a toddler's brain. Our professor walked in then, a younger woman than I expected, wearing pigtails and a big knit sweater. She introduced herself as Professor Meadow. She was a climate biologist with a focus on and a passion for agriculture and soil studies. Her graduate school thesis was an in-depth analysis of Indigenous farming practices and seed cultivation, which were aspects of biology I hadn't explored much and truthfully looked forward to knowing more about. I say 'truthfully' because sometimes, even after a semester of shamelessly plugging their personal research, I couldn't summarize the fieldwork of some of my biology professors if you paid me to. But I liked and respected Professor Meadow from the very beginning.

After a brief introductory circle in which I had to memorize everyone's name in the room and a fun fact about them (I'm Penny and I did a month of circus camp), Professor Meadow

introduced the structure of the class, and unfortunately, I had already started to tune out, thinking about how I might have portrayed myself as a clown on day one. But I fell back into the rhythm in time to learn that we'd begin the class with a critical review of the Water Cycle. We'd unpack how we'd been taught to view water in the past, with an emphasis on the links between water's journey and the changes in our climate.

We began the year with the beginnings of life.

Learning about the world that we were living in suddenly felt oddly disjointed against the nostalgic scientific imagery surrounding us. Professor Meadow then projected some photos onto the pull-down screen of the Gowanus Canal starkly next to a chart of contaminant levels, color-coded by contaminant, followed by a brief history of the life of the Hudson River.

“So you'll see...that having the knowledge of the micro will inevitably enhance the understanding of the macro, no matter what the topic. But *water*,” she reiterated “will keep coming back”.

We were then handed a sheet of paper with the following questions written on it:

1. What are the prominent water bodies in your hometown?
Who interacts with these water bodies?
2. Where is your nearest water treatment plant?

Prominent water bodies? If I was being honest, it was the addictive quality of uncertainty that brought thousands of folks out to Montville, Connecticut every year, followed closely by the draw of the beach. The uncertainty that could be found at the Sun Club Casino and Spa in Montville was different from the daily, more dreary kind of uncertainty. That kind of uncertainty

was the type that had my neighbors squirreling away money, creating fallout shelters in their basements, and tacking on extra layers to their houses after the hurricane caused disastrous inland flooding. Everyone's mom and dad worked at the Sun Club in one way or another, including my own. My high school-friend Barbie's mom was a cocktail waitress for fifteen years on the same floor where my dad oversaw the Roulette wheel. My mom worked at the spa counter on the other side of the casino floor, right next to the large cement and resin palm trees.

Back in the 20s, before the construction of the Sun Club I heard that there was an all-access beach for the town, complete with a small boardwalk where kids could buy circus peanuts and popcorn, and a huge diving board where you could jump straight into the Atlantic. My grandmother knew someone from high school who was alive when the boardwalk and festivities were still around, but everyone else I knew regarded this idea as if it were an urban legend, even though grandma swore she had some photo evidence somewhere in the attic. The beach was still there when I moved away to college, meaning there was still sand and shoreline and water, but it wasn't quite the same beach one would picture from grandma's accounts. I tried one night, to hop onto the sand, with my old girl group from high school but we were quickly apprehended by the Sun Club security team and scolded firmly that we were lucky not to be "held overnight in custody", which I knew from my parents who worked there was just a supply closet with a bench. But the prospect of my father hearing about the whole ordeal was enough to scare me straight and I never tried again. Lots of homeless people tried to get on at night too, and most were likely met with a lot more force than my buddies and I. I didn't blame them, the people on the streets, for preferring the soft sand, the bungalows, and the canopies to the surrounding streets, where motels gathered at the feet of the Sun Club like satellites for those gamblers who couldn't afford a room inside. My father would get teary-eyed on his way into

work sometimes, especially on days when the weather was bad, and say something about how all the homeless people had come to get lucky, to feel the sun and the sand. It made me feel sick on those days when Dad got me a beach pass, and when things were financially looking prosperous for us. I'd sit in the cabanas and keep to myself with a Virgin Colada, watching the water. I had a feeling in the pit of my stomach on those days, a melancholy that I couldn't name as a thirteen-year-old, or however old I was then. But I always said yes to this opportunity because it made my dad so happy to provide this luxury. Now, if I had to translate that aching childhood confusion into something I could plausibly write as an answer for Question #1, it'd be this: The Atlantic Ocean, and those who can pay for it.

* * *

The answer to Question #2, about the location of a water treatment plant, would be about two blocks from my childhood home, in the small suburb outside the Sun Club territory. Some days the smell of sulfur would waft over and my mom would light a few candles until a little me would stop complaining. Maybe it was because of the lingering smell from the plant, or some undiagnosed hypochondria but ever since I'd been extra cautious about where I got my water, what had been done to it, and what could be floating around in the dissolved matter.

This is why I spent a good ten minutes in my car after class pondering the water. I'd turned in my question sheet to Professor Meadow and nearly bolted out the door, rather than strike up any kind of conversation with my peers. And though I understood that a crucial part of the world of academia is the opportunity to network with like-minded creative individuals, I was willing to postpone that awesome collaboration in exchange for a few minutes alone. That's when I felt a slight pang of thirst and saw that suspicious Poland Spring.

It was 82 degrees that day, and maybe that's not too hot. Perhaps I could have just drunk it and it'd have been fine. My roommate Olive would have definitely just drunk it and called me blue-pilled or something for being nervous about it. *I should just drink it*, I thought. But, then again, it was 82 degrees and the sun was hitting the windshield just so so that a single ray was enveloping the bottle in a perfect spotlight. It felt warm to the touch. But that was not the problem. I could deal with warm. The problem was the oily look of the plastic. It was as if the solid frame of the bottle was in the early stages of turning back into a liquid. The very minuscule beginning of melting was afoot in the cup holder of my car. I was only a little bit dehydrated, and I certainly wouldn't die without it. However, I thought of the relief that might occur with just one lukewarm sip of water.

The next problem to contend with was the taste. If it were only the knowledge of drinking the water and knowing that perhaps a little molecule or trillion of petroleum would grace my digestive system, the decision would have been much easier. But it was not just the knowledge, it was the fear of the taste. I feared it might taste like an overheated laptop. But then my phone rang and I picked it up promptly. It was Bobby, my boyfriend of about a year who went to a state school nearby. When I first told my roommate Olive about him she thought I was making him up. 'A boyfriend who goes to another school? Sure, Jan'.

He spoke so quickly about his day that I could hardly pay attention. I decided to just pull out of the parking lot and field his questions at the same time, to practice multitasking. 'Mmhmm, of course, Bobby I think that your political engagement with local leaders is equal if not more important than soulless attempts at school spirit from the basketball team.' Then, without thinking, I grabbed that Poland Spring out of the cup holder turned the toasty cap, and took a small swig. I could have taken or left the water. I didn't really want it anymore.

The drive to Bobby's house was my favorite part of the day. It was a simple drive with a pleasant destination and little rolling hills to accompany me. Coming up along the road was one particularly large field that I passed almost daily. It harkened back to some sort of revolutionary war painting I couldn't name, but you'd know it if you saw it. I could almost picture cloudy cannons among spindly trees, and men wrapping their wounds in cloth. And before these soldiers, the Lenape had lived here and subsisted here and grown it all from the same soil. And now I was driving over it to eat dinner with my boyfriend and his father, otherwise known as the royal family of marketing science. Who would have thought?

Upon my arrival at Bobby's industrial cottage of a home, he greeted me with a hug and disastrously called me by the name of his best girl friend. The utter shock and offense I felt from this blunder stayed with me until dinner time, where we sat caddy corner at the maple wood banquette in the dining room in silence until his father joined us with a big pot of something and horn-rimmed glasses that I had to stop myself from chuckling at.

According to Bobby's dad, William, the environment can be defined as any space in which we live, work, or play. William works in a highrise in Manhattan. My dad of course works at the roulette table on the shores in Connecticut. Needless to say, though I wanted to say it more and more as our relationship progressed, our environments had always been very different. This thought came to me again as I looked out the family's kitchen window at the barrel of compost beside a sculpture of a rock (Plymouth Sized) painted neon pink. It was a perfected minimalism. I stared at it for quite some time before William continued his dinner table conversation, which was more like a Ted Talk aimed at no one in particular. He stabbed at an endive salad with his fork, and Bobby barely touched his food, likely sore from the cold shoulder I'd given him since our initial meeting that night. William spoke about what I vaguely understood to be a form of

battery charging technology that involved gravity and how this technology may transform something about something in big cities at a lower cost than something else.

Blocking out William as he spoke had unfortunately become a talent of mine. He sounded too much like my old professors. But unlike the melancholy outlook held by most of my peers and professors, William believed it all to be the “next big thing” and if we could just “perfect the tech and build up city infrastructure” then all of our problems could be solved. I hadn’t the courage to mention that they lived in rural New York farmland in what looked like a NASA space hub complete with solar panels and that their access to technology differed vastly from the average citizen. But perhaps it was better to be more glass half full about these things. So I nodded my head along with his rant and offered my two cents.

“It makes you wonder how this could be distributed to the masses in a useful way,” I proposed, to which they both hummed in agreement. I felt satisfied with that and peeked over at Bobby who offered me a sad smile. Dammit. I couldn’t hold animosity in my heart.

I had met Bobby during a snowstorm, in CVS, the year prior. He was buying hair clips and vitamin water and I noticed right away that his jacket looked really well-insulated. I liked that he had the type of swoop in his oil-black hair that could be pulled back with a clip and that he had the type of freckles that looked almost drawn on. He had a face I wouldn’t be able to forget. And though I wasn’t one to approach people I didn’t know, I felt compelled to change my tune that day. The primary color palette of his outfit immediately brought me a sense of familiarity and joy that I can only liken to looking at your 2nd-grade backpack on the first day of school. Vibrant and secure.

So I made the leap.

“Snow’s really coming down, huh?” I interjected from behind him in the checkout line.

It was cliché and absolutely not my most eloquent attempt at courting someone. But, for whatever reason, he was so charmingly receptive to my weak entry into a conversation. It was as if he was waiting for someone to make such an astute observation, or make any sort of connection with him. It didn't occur to me then that this was likely because he, like myself, was very lonely.

“Some weather we're having!” He laughed back, hamming up his tone a little.

“And they say that the climate is warming up!” I exclaimed, leaning a bit too hard into the joke, prompting him to shoot uncertain eyes at me. I assured him that I was kidding, and he assured me that he thought I was cute and was glad I was kidding. It turned out he was a year older than I was, and went to the state school 20 minutes away studying pre-law. The law he liked, but the locale he accepted begrudgingly in order to stay close to his father, as a sort of apprentice. I got the impression immediately that he was quite wealthy, though he didn't say it in any words.

We went on a date a weekend later and watched the seagulls fly over the Hudson River, which I only then understood to be the majestically historic waterway that art had always told me it was. Had it not been for the very modern car we'd driven up to the river in, it might as well have been 1825. The cattails and reeds that poked before the train tracks, the small boats that glided over the sandy water, all looked hand-picked as if an artist was setting up a still-life from high above. Maybe it was the way Bobby spoke of his childhood of hiking and foraging, but suddenly I was fixing to birdwatch and learn about medicinal herbs. He just spoke with such a sharp wit and with such vivid and enticing words that I'd thought perhaps he was a senator's son or something of the like. But I learned that day that Bobby was not a socialite, nor was he all that social. He kept to himself, every now and then going out with some girl he'd met through his

garden club or online dating apps or tagging along with his older sister and her friends. Because his father was so wealthy and so entrenched in science, Bobby had become what I can only describe as...a young man raised on nothing but PBS. Though I was immediately taken by his delicate features and free intellectual spirit, to most in his school and age group he was “a raging know it all”. That is not to say that I didn’t see his flaws plainly myself. I saw them, but I liked them. I felt I knew nothing, and wanted to hear everything he had to say. I felt I’d never really walked on the earth, and wanted to see everything that he’d seen. And for that, I wanted to be around him even more. He pretended to be pessimistic about both the future of politics and the planet, yet unable to stop himself from holding out some hope in the ability of humans to *change* things. (“Surely one of these technological advancements will make a difference!”)

But that date by the river was not about pessimism or even pragmatism. That day was about falling in love, with this new school, with this new enlightenment I felt, and with a person who made me feel like a crucial key in unlocking the vision I had of my own future, rather than being a passive rider. I guess that was something I hadn’t realized I could be before I met Bobby, and I guess that’s not something you’re supposed to take lightly.

And that is how our year-long companionship had begun. I went fishing for the first time with Bobby and tried tea-flavored ice cream that I thought lacked something that I couldn’t quite put my finger on. We spent a lot of time together, as I only took a small number of classes that first year, and he only had one singular friend beyond me.

Olive thought he was pretentious, and he thought Olive was a “city type” whatever that meant. But with Bobby, and that gorgeous face, and those gorgeous day trips, I had tapped into a child-like excitement that even Olive couldn’t deny was charming to see.

So, perhaps I found myself forgiving and forgetting quite often when we found ourselves in some disagreements. I reached for the pitcher of water in the center of that wooden slab of a table and scooted closer to Bobby on the bench. One of the best things about his house was that they always has good lemon water on the table. I filled my glass up particularly high and savored an ice-cold mouthful. And for a moment, while looking out at that neon rock in the yard, I thought that that water might have been as sweet as if it had come straight from the spring.

Carbon and Life

The first week of school always moves too quickly for me to recall anything in very much detail. Economics was just sterile enough to zone out in, and French New Wave cinema was like a sweet candy to start my week off with some beautiful, disjointed, black-and-white existentialism. And while I'd always enjoyed linguistics, and the curves of diminishing returns and all that, it was BIO 202: The Biology of Climate Change that was shaping up to be the real headliner of my weeks. In the middle that hectic second week of my Sophomore year, I began to note where I stood, beyond the very shallow idea that I had of my standing previously. I understood that I was a 20-year-old girl from a middle-class family in Connecticut who was very lucky to have received financial support to go to the school that I went to. I was the proud owner of a Hyundai Elantra and a not-so-proud citizen of The United States. But what I hadn't quite thought about was all the other axes that existed; the social, interpersonal, political, and academic lines that I alone was responsible for placing myself upon. I thought I knew a great deal about myself.

I think that semester I must have let my brain become bisected by all these new axes at the very same time. But, I am getting ahead of myself.

We were beginning unit two of the semester, which focused entirely on carbon and its many properties, forms, and states of being. Like carbon itself, this lesson was certainly going to be a "building block" for all the rest of the lessons to follow. I'd always been terrible at recognizing that fact through high school. If I didn't fully understand the current section that the next section would be a thousand times harder to get a handle on, and I really wanted to avoid doing the same thing now, as a much more seasoned and mature student. However, the second Professor Meadow opened her mouth to talk about the many interconnecting ways that carbon

enters our atmosphere, I started to tune out. Shit. It's not that I didn't care about committing the carbon cycle to memory. But when I saw the arrows connecting everything to everything else, all the individual things seemed to blur together. Well, let me not lie, my spaciness that day was not entirely a product of burnout or perhaps even of anxiety. I was also particularly sidetracked by the prospect of the first party of the year that was to take place that very evening. I forced myself to look back at the screen. I recognized the land from the ocean, the lake from the forests, and the little gray buildings emitting clip art smoke. Words jumped out here and there: erosion, acidification, atmospheric. At a certain point, all of the processes blended into one another. Carbon was burned, released, absorbed, and extracted over and over again until it seemed that all of the transitory particles would meet and fuse together. It was at this point in my mental carbon cartoon that I ended up worrying about what I was going to wear that night.

I was halfway through outfit option number three when I felt bad enough and just copied the diagram into my notebook as neatly and accurately as possible.

After 90 minutes, the rest of the sleepy, half-engaged students and I left the lab with a lot of matter on our minds. Olive came to pick me up outside the science building, already ready with iced coffees and expensive mozzarella sandwiches in tow and plans abound for the evening.

"TGIF, right?" she muttered, maneuvering us out of the parking lot with a 35-point turn. Olive was an art student with radical political fervor behind all of her pieces, and a little VW bug that she barely used in Queens, where she lived when she wasn't at school. She was my roommate Freshman year by chance, and my best friend ever since. We watched 2000s dramedies together and cooked a lot of soups. We were both confident enough in our collective intelligence to spend most of our time discussing the simpler things. We dissected pop culture

like a scholarly journal and debated the pros and cons of attending weekend parties for hours before inevitably showing up hours late and overdressed.

That very night we did our usual dance. A twirl in front of the mirror, a second touch on makeup, another shot of tequila for “confidence”, and a light coating of a body glitter I was gifted by my grandmother for my twelfth-grade prom. Olive called a cab while I brushed my teeth. I was warmed by the thought of how many other young women had performed this ritual with one another throughout the years.

* * *

I drank too much at the porch party. I found myself on the front railing of the event, looking out into the lawn for some feeling of security and stability. The little flakelettes of glitter that covered my body began to concern me. I couldn't stop picturing them piled up at the bottom of the Atlantic, where a little fish might come up to it to grab a bite and end up choking to death. This image swam in circles behind my closed eyes as a movie rewound over and over, angrily by some all-mighty hand. *Breathe*, I begged of myself, trying to quell the swirl in my stomach *and slow it down*. Step by step.

The story continued. The fish gets caught in the talons of a gull. By the time the gull reaches the fish, he's ingested a good amount of other fish, complete with their own palettes of glitter inside. Not all at once, but over time the bird becomes sick, croaks, and falls to the earth, and onto the soil. About five days later it is no longer discernible from the dirt and leaves and sticks around it. It is the dirt and leaves and sticks. Over those last 5 days, the bacteria was hard at work, breaking down those building blocks of life, and releasing gaseous carbon particles into the atmosphere via CO₂, where it is everywhere. The disintegrated particles, broken down into their smallest, molecular parts float aimlessly, pushed and pulled by the ever-changing

atmosphere until they suddenly rest, relieved on top of cool wetness. The surface of the ocean. *We've been here before*, the ghost of the gull remembers. Perhaps years pass, or perhaps months. The carbon doesn't have a clue how, but somehow it's ended up at the depths of the ocean. The carbon is whisked along, linking arms with oxygen as they enter the deep. Soon they both end up surrounded. It's the phytoplankton, absorbing them for fuel. Carbon is finding its calling: energy. It meets itself in bulk again as the phytoplankton collect, and die on the floor of the ocean. Suddenly, a million years have passed (that's like not a big deal if your carbon), and it's slippery, thick, and black. And people are dying for it. Lots of things are dying for it. But it continues on its journey of self-discovery, its fuel, its power, its life. Then it's burned in a beautiful combustion, a spewage of pure energy. Spewage...

That's when I clumsily excused myself from the porch and fast-walked into the nearest bathroom. I threw up the overpriced sandwich.

* * *

I woke up to the sound of the TV. Thank god, it was the news. The news was like a warm blanket to me. I could absorb the horrors for a moment. But Olive was already awake and making toast. I tried not to imagine the char coming off of the burning toast that was now entering the air in the room, into my nostrils, and finally into my lungs where it might find a home. It'd certainly be cozy next to the cigarette smoke, the firewood, and the ashiness of the air from the previous night. My head pounded at the thought.

But somehow, my tasks continued, just as my lungs continued working. With each breath, I was reminded of the moving parts. The pumping of blood from each atrium of my heart. Isn't that so grotesque? The thought of the heart pumping, writhing and pulsating. I pictured how easy it would be to puncture, to squeeze all the blood clean out of the vessels. And suddenly I'd

become dizzy again and I had to sit down. I figured I'd use this weakened state of mine to get some research done. For about an hour and a half, I read about the respiratory illnesses associated with particulate matter inhalation in areas where fossil fuels are burned before I got the urge to smoke a cigarette. I know, I see the irony here. Olive let me open up the window so I didn't have to walk all the way downstairs to smoke.

Energy

I don't mean to sound dramatic or apathetic or echo the tone of a fifteen-year-old who quite pointedly renounces their belief in God, and makes a big stink about everything being a "lie", but every now and then, in class especially, I began to feel a confusing emptiness about the rate at which our climatic changes were playing out. Both too fast and too slow to perceive. Yes, this feeling could be quelled by a little mental distance, a little compartmentalization, but the sensation of dread on a global scale really did wash over me during moments of reflection, like a sharp pain in the abdomen or the cold beginning of a panic attack. Like thinking too hard about what happens after we die.

That said, after a few weeks of studying the ways the building blocks of our entire world in perpetuity are changing and fighting with one another, it felt good to get a little more tangible with the trajectory of the conversation. It felt good to talk about the current people I could see having real debates that I could hear about real current solutions I could picture on real streets that I could touch and smell. On this particular Tuesday, our focus was clean, renewable energy creation, and what makes it such a challenge. Professor Meadow broke us up into small groups, each representing a different proposed solution. As always, the group's energy, no pun intended, was low. I found myself in a group with two Freshmen girls who hadn't spoken a peep in the last two weeks. Not that I was much of a talker, but I did my best to do my hypothesizing and theorizing aloud with the hope that someone with more prerequisite knowledge of the topic would bounce off of me. I found that I wasn't too bad at rashly starting a conversation and asking the dumb questions. Bobby told me that this was one of his favorite "leadership" qualities of mine.

The Freshmen were named Alice and Annie and our team name was Hydropower. I was glad to be assigned to this energy source because I truly didn't know too much about it. I know that movement and gravity generated the energy, but the logistics and environmental implications were new. As we only had 15 minutes to formulate our arguments and half the time was spent reading our little handouts and looking at each other with slightly frightened eyes, I took away solely the basics and little more, making mental notes to look into this more substantially in my own time. The list of things I'd noted to "look into on my own time" seemed to be growing exponentially.

"I can talk about the 'how it works' part?" Annie offered, which thrilled me, as I'd been hoping to talk about the drawbacks, not because I'm a pessimist but because hydropower sounds so good in theory, I figured I'm better off knowing what goes on beneath the surface than go on believing, as I did at that moment, that there was nothing particularly negative in this process beyond the money it might cost to achieve. Luckily Alice was more than happy to present the benefits.

We had a brief group huddle that I initiated awkwardly and then felt silly about. A lanky guy with a booming authoritative voice, whose name I never remembered, began talking about coal. He put on a kind of sarcastic tone, assuming that we already knew everything we needed to know about coal, using phrases like "and I mean obviously we know that" and "Famously". But to be honest, it was not obvious or famous to me. The process of trapping 300 million-year-old carbon in peat, and its burning dating back to the Aztec Empire was new to me. He was a confident speaker, though his points regarding the "great progress" of North America and Europe in reducing the use of coal felt a little ironic in the light of some of our President's recent remarks about coal being "to date, the most important powerhouse of our nation".

Following the next group's presentation, we all decided that solar power was contentious. I took some notes during this section, to keep my hands and mind busy. I wrote in the neatest handwriting I could, it was one tangible thing I could make perfect. I was glad I did decide to take notes though, as I was shocked to hear that demand in the market for panels had rendered solar the cheapest energy source, even over coal. I recall some of my neighbors getting panels installed in 2009 and the whole block regarded this as a show of immense wealth, as though they'd just bought a yacht and traipsed it down the block with confetti and a T-shirt gun. But despite this cheapening of manufacturing cost, there were a number of cons to the operation, which were presented by a girl named Sarah from the sunshine state herself. Sarah was the type that said 'like' between every word, which I thought was endearing, but most people seemed annoyed by. In fact, I could see that Coal Guy was tuning out, disregarding her. What she was actually saying was quite intelligent, but it seemed that he associated this uniquely feminine speech pattern with stupidity and triviality.

The truth is like silicon mining is like needed to create solar panels, and like this process is like just as much of a concern for like environmental and like human health as other types of mining. Also, limited open land is like a huge factor deterring solar from being the most common like power source, despite it's like low price. But most importantly, when solar energy is like limited by the clouds and during the night it's like a taxing process for the power grid to like switch back and forth between like solar and like natural gas, which they have to do when like the sun isn't enough, especially in the like afternoon when usage is highest. This causes power to be like way more inconsistent.

Our turn was next and I listened intently while Annie outlined the mechanics of the technology, gravity, turbines turning, and energy being transferred from the plants to the grid.

Alice had a shaky voice but knew more than she let on in our small group, clearly having known a lot more about the topic before today. She explained to the class how hydropower could be expanded in existing non-energy-creating dams around the country, how we could be putting old things to new use, and how water flow can happen during the day or night. As Alice was talking, I was half listening. I spent most of the time thinking about all of the things I wished I knew, all the things I'd cursed my public school for not teaching me, and thinking about how Annie and Alice and the Coal Guy and all the other future environmental biologists in this room and I will be sitting side by side in the lobby for our future job interviews. I couldn't stop thinking about the nasty way my hair decided to part that day, the way I might have left my light on at home, and the way I wasn't doing enough in my personal life to be a good advocate for the environment. Then it was suddenly my turn to speak. To speak and make it sound informed. Why couldn't I have just felt like the two were synonymous?

“What I gleaned from this paper,” I began, “is that the construction of dams not only displaces the wildlife that lives in the water but the human populations that live in construction sites.”

My heart was beating fast.

“Therefore, it would be disastrous, uh, to suggest that we should construct more dams. Rather the real debate around hydroelectric power is whether or not Non-Energy Producing dams should be converted to energy-producing dams, keeping in mind that, uh, only, uh 3% of the dams in the United States are currently used for power generation. Dams still release large amounts of methane and other greenhouse gasses when they function to create energy, which deters many environmentalists from fully supporting the... uh, creation of more hydroelectric dams.”

Duh.

The nuclear team was up next, a group entirely made up of stoners who Olive knew from her art class. They were divided on the subject but mostly expressed a collective worry over the long-term effects and the fragile nature of our political position as a country. It was becoming more and more of a polarizing topic in the world of environmentalism, the valor of nuclear energy, with some extremists leading the uranium bandwagon. The takeaway from their presentation was that if it could be guaranteed to be a safe option, with no chance of a meltdown, or of being hacked, then it would be a miracle solution. But, there is no guarantee, and there is always a danger in calling anything a miracle solution.

Professor Meadow wrapped up the class by untangling some of the more recent developments in energy production, proposed legislation in different states, and the role that a good campaign can have on the type of energy that we embrace as clean enough, or safe enough.

She always had a wonderful way of making things feel hopeful but still complex, letting her students come to their own conclusions while backing them with the knowledge to make the choice. The problem I found with that was, if everything had its own complex political and environmental implications, what could I confidently advocate for? What could I email my mayor to do about our city's energy consumption, or tell my parents to do about our home's gas? Certainly, whatever power was running the Sun Club would continue to power the Sun Club regardless of what I or any concerned citizen may think about its impact. Maybe it was just a matter of choosing your horse and backing it, feigning complete certainty. If that was the case then I was inclined to root for a natural gas and solar combination. Then again, you heard Sarah...

* * *

Bobby picked me up after class and we kept the windows open the whole drive, it was one of those nice days. The leaves were changing a little and he held my hand while we drove. And quickly, the world didn't feel like it was going to end anymore.

He made Brussels sprouts and I set the table, watching the sunset through that epic window, casting his face in a solar glow.

“Staring problem?” He laughed, watching me watch him.

“Where do you want to live?” I asked him, “Like for good?”

We sat beneath a midcentury modern light fixture in the family room where he told me he didn't know, that he just knew he didn't want to be in this little corner of the world anymore, where people had rolled their eyes at him, and the gas station was 15 minutes away.

I was actually quite shocked to hear that Bobby didn't plan to live here for the long haul. I mean I didn't plan on living at home after college, but I didn't live where Bobby lived, fruitful and plentiful and full of the kind of life I'd want to study. So I asked him where he'd rather be. This was a more complex conversation than I imagined it would be, as we took into account both the near-distant future and distant future, the former becoming conflated with the latter in picturing our possible living situations. We both feared the current prices of New York City, the future rising of the sea, and current and future trends of gentrification and movement and change. The prospect and ethics of living in our closest city became daunting, so I let out a sigh.

“Good Heavens, where shall we live, then?” I asked, putting on my best 1920s star-of-the-silver-screen drawl.

“We ought to be sure about things like this, for Christ's sake!” Bobby responded, doing a botched impression of a young Jimmy Stewart, imaginary cigar between the lips. That's when I suggested we visualize our country at large and make a little map of sorts.

“By George, there’s an idea!”

He scribbled a rudimentary rendition of the United States of America on a torn sheet of loose leaf paper, and some little circles to the side which were meant to represent the Hawaiian Islands. We considered for a moment drawing the world, but there was no place in which either of us felt justified in buying property beyond the United States. Maybe that was some lingering gene from my Italian grandparents who bought at that shining moment in time when two second-generation children could fall in love and have a house built perfectly for them and all of their would-be children.

“Okay,” he laughed, and his nose turned up in that way I liked, “Let’s figure this out, aye?” I nodded and put an arm around him intently, watching as he scanned the outline of our country with the end of a pen, looking for our first potential plot of land. I liked exercises like this in a relationship, where you hypothesize about the future, family, houses, and jobs, with the person you think you love. That little individual, delicate pleasure in talking about both of your respective visions for the future and wondering if the other person sees you in theirs. When Bobby mentioned wanting to live somewhere where he could have a little garden, I wondered if he knew I was picturing myself in the tomato patches, and himself in my own.

We landed first on the West Coast where Bobby hovered his pen over California. I deliberated this for a moment.

“Well LA is out on account of sea-level rise,” I began, “same for San Francisco.”

“Part of me thinks I could be a really good actor, so I’m torn” Bobby laughed, “But I guess you’re right, I kinda have to give up that dream.”

“Inland might be alright though, I mean besides the drought, of course,” I offered, “You could hunker down in the desert in your silver bullet?” This made Bobby truly giggle, nodding

his head in bashful agreement. He'd mentioned countless times his dream of traveling the country, all by his lonesome, a silver bullet in tow. A regular *Into the Wild* protege. If he weren't such a believer in technology and politics to save us, I'd imagine he'd be a wicked doomsday prepper. He's got enough gear for it already in his hiking backpack alone. But, I thought to add that the hiking would be worse in this hypothetical far future, as the coniferous trees were already dwindling to sticks in the California State parks. Bobby put a big X on most of the state, and a little fire and water symbol next to the problem areas.

We went slightly East to Nevada where we decided that the prostitution-drought cocktail didn't spell home for us. This was a little bit disappointing because I'd always had a pipe dream of joining a cabaret act on the strip, I was a pretty decent juggler thanks to that circus camp. Another X.

We X'd Utah pretty quickly. Although the drought was less extreme than in Nevada, an article had been released earlier that week about a long uninspected uranium mine outside of Salt Lake City that left surrounding communities feeling ill. Whether it was hearsay or not, I wasn't sure, but the lasting image of uranium bits radiating into families' kitchens was enough to bump the state off our radar.

South Dakota, Nebraska, Kansas, Eastern Colorado, and the Northern Tip of Texas were all eliminated as the "Tornado Alley" Unit.

Tornados, while not increasing in frequency, were still changing with the climate nonetheless, which maybe is scarier than a minor increase in number. I'd learned, that for a while, the changes in our weather will seem neither explicitly good nor explicitly bad, just different, setting us into bipolar, uncharted territory.

New Mexico is part of this territory as well, just slightly. If I'm being honest, it's more the nuclear testing site in the desert vibe that made me write this one off. They say it's unlikely for lightning to strike twice, but it was enough for me that it struck at all.

Wyoming we joked was probably alright, though neither of us had any interest in the landscape, and the laws regarding reproductive health were always riding the line. X for Idaho drought, but Montana managed to get out unscathed. Though, this might just have been because we couldn't think of anything at all that had ever happened in the state of Montana.

The east coast was easier to wipe out. New Jersey, Delaware, Florida, Louisiana, Georgia, Parts of New York (Manhattan and Long Island), Maryland, Rhode Island, Washington D.C, my Connecticut, and North and South Carolina would be washed out, property slipping out from under itself. I'd seen enough in that hurricane to know what people's houses look like pushed off their stilts, wading in basements, mildew couches.

"I think I'd like Vermont" Bobby declared, moving his pen up the coast, "New Hampshire and Massachusetts too." Spoken like a real Kennedy. I agreed that New England would probably be spared, aside from almost certain flooding around the Bah-ston Hah-bah.

"That's what you sound like," I said, like Marilyn Monroe, "Mr. President"

"Oh shut up," he replied, feigning bashfulness.

Bobby was absolutely ridiculed by the weight-lifting, party-going, conservative boys at his school since he was a little boy, maybe for his gentleness which was certainly interpreted as homosexual, or maybe for the way he so rashly challenged the status quo to the point of condescension. I think he liked it when I compared him to those well-liked, man's men. God knows no one else was doing it.

All the dustbowl states were ruled out on account of erosion. Perhaps it was the ignorant East Coaster in me or the visions of Professor Meadow and her arid soil studies in Iowa, but every time I went to picture the middle of the country it was tumbleweed central. Whether or not that's true (it surely is not), topsoil erosion absolutely was.

“What about, you know, like Tennessee and Nebraska and all the little land-locked ones with the good country music?”

“I don't know, you can't be gay or have an abortion, so..” I trailed off.

We X'd that region of the country somberly.

Iowa, Illinois, Minnesota, Ohio, Indiana, Missouri, and Kentucky all fell within a region of the country whose air pollution chart read ripe tomato on a scale from light green (safe) to dark red (dangerous), so they were eliminated as well in one big scribble.

* * *

Playing a game of “Future” required being able to chuckle at each blockade, each time our little pawn had to turn around on the map and retreat from towns with expired nuclear power plants, or beaches that receded to nothing. I'd sat in on one of Bobby's DnD campaigns and it had felt a lot like this, a different inconvenience at every turn. I saw the look in Bobby's eyes for a moment as we scanned the page, that there was something twisted in what we were doing, where the irony cracked, hairline down the center and we saw the bleak way that we regarded the state of the land itself, our country, and our world. He gave a shudder and raised an eyebrow. But that is when I realized two very important things about our visions of the future, what they meant and where they differed.

First, it was clear to me that Bobby was moving his pawn across the board without the restraints of children or spouses, of good school systems, or access to reproductive healthcare.

He had concerns of course, but his concerns and my concerns could never truly be the same. If he wanted to, he could move to Arizona for 15 years, learn to ride a horse, impregnate a cowgirl and come back to New York with ripe gametes, have another child, and a promising future in politics or environmental law or modeling. He had said nothing to this effect, but I still thought about it.

The second thing I realized while we doodled over the 50 states was that this was a privilege, to talk hypothetically. It is a lucky thing to be one of the moveable pawns on the board, to voluntarily look for a new home base and assume you'll find yourself in the best, safest, cleanest, healthiest place to be.

The last state we arrived at was Michigan. The media had told me since 8th grade that there was poison in the waters of Flint. But it wasn't until I was older that I learned that it was the concerned mothers who didn't want lead in their children's bodies that started public notice, and it was that very reason that the issue lacked resolution for so long. It was the concerned mothers. The water pipes were switched over to an alternative source for the clean manufacturing of cars but still ran red in families' homes for years to follow. And how can they leave? Who would buy those homes, now?

X.

By that moment, at age 20, this story was not an uncommon one to me. I wondered how many more times we'd hear it ring out in slight variations with different concerned mothers at the forefront.

Bobby's sister Lyndsay, who was studying to be a defense lawyer, once drove me to get coffee through the city of Beacon while her brother had his therapy appointment. She thought it'd be nice to get to know me better.

“It never looked like this, you know?” she’d told me, pointing to the buildings as we passed them, “At least when Bobby and I were smaller. All these buildings were like the original Victorian colors, green and pink and purples, and everyone in the community would have like flea markets on their lawns on the weekends. Good bagel place used to be at that corner too.”

As we drove I looked at a set of identical townhomes painted sleek gray and black, with *For Sale* signs on each side of the front yard. A piece of wood leaned on the curb with a heart and earth symbol spray painted on it.

“Why is that?” I asked. I was earnestly confused. When your town runs entirely on the fortune of part-time tourism and thrill addicts, nobody really worries about changing community dynamics. You work there and live there or you don’t.

“They’re raising the rent like crazy. People from the city want a piece of tranquil, ‘rural’ land pretty bad right now. And they’ll pay way more for it too,” she sighed, “I intern around here at the courthouse...it’s 90% eviction cases at this point.”

We passed the church, the old diner, and a new set of gray and yellow apartment buildings in the middle of being constructed. I saw them finished later that year and wondered how much they were going for, but never got around to checking the listing on Zillow. Part of me didn’t want to know.

When I brought this information to Olive after my drive with Lyndsay she politely said “Obviously”, and that single black mothers had been getting the brunt of this treatment in her neighborhood for “like the last 5 million years”.

Back in Bobby’s living room, we looked over our scratched-up and scribbled-over map of America as if we’d find an answer in there.

Eutrophication

I woke up abruptly that next Tuesday for Biology. We were meeting slightly earlier that day, at 8:15am rather than 9 for our lab, which met downtown rather than in the classroom for the day. While standing in the municipal parking lot, holding little nalgene bottles and clipboards, I wondered if the world really needed any more environmental biologists anyway. Is it okay to admit that we might not be able to turn this boat around? The night before I'd looked up the statistics about how many years we "have" to make a change, but it took me to an article from the Times. My subscription had run out so I guess I'll never know.

Professor Meadow stood before us in an awkward half-moon in the center of the municipal parking lot. She asked us why we thought we were asked to meet there, at the pond by the parking lot instead of in class, or instead of the small ponds that existed throughout the woods on campus. It was not a hard question, but one that at 8:15am felt like an impossible feat. I felt bad because Professor Meadow definitely had a busier morning than any of us, dropping her kid off at school and driving 45 minutes from home just for us to stand before her silently. The great minds of our generation! Our makers, doers, changers, and innovators! (Quote William), dead silent on the asphalt. I don't know why but I thought about Professor Meadow a lot. Probably because she always seemed a little frazzled when she showed up to class. That morning she wore a yarn hat with a pom pom on it that I would guess, from the looks of it she knit herself.

She was consistently talking about "streamlining" her school schedule with the parent-teacher organization. It made sense to me that an older millennial with a four-year-old son, who knows heaps about biology would be struck by the urgency of climate change. I found out that she had spent last semester teaching "abroad" in Wyoming, conducting field work

around soil bed health and its effects on root vegetable yield. Spoiler Alert: the root vegetables were not looking good! She had spent her time “abroad” working, gathering, sorting, observing, testing, and comparing these little particles of dirt, for the hope that somewhere in her hours of devoted work there’d be some answer or bit of data that would snowball into an answer or part of a solution for the little root vegetables. I wondered if she thought about her son a lot while she did her studies. Her son, who’d just turned three years old when she was in research mode, was likely just learning that carrots are really good for your eyes. How can you then begin to explain that sometimes the things that are supposed to grow don’t grow as much? Or that the rain that’s supposed to help carrots grow will stop falling as much, and that there’s (maybe) nothing that Mom or all the superheroes can do to fix it. But I admired that she was trying, actively to do something to fix it, starting with the very soil itself, that very life-giving material. It seemed like pure bravery to me, to dig into our earth and help things grow the way her child grows before her eyes, and still wake up early enough to make his PB+J lunch and get to the municipal parking lot before 8:15 am. And for a fraction of that dreary morning, I felt inspired.

The boy named Isaac who was always high finally chimed in.

“Uhhhhhh” He began, “I think probably because it’s near the parking lot, and like infrastructure that like we don’t have on campus”.

He was correct. We’d talked briefly about eutrophication last class and it would make sense that we’d be monitoring this lake to look for early signs of it. I was hit with a wave of relief because this was something I already understood, and had used multiple times to debate my great uncle in talks of “climate change bullshit”. I’ve found that eutrophication is a really good talking point because it’s one of those rare phenomena that have a outward result that looks as ugly to the naked eye as it really is. It’s a real good before and after. The lake equivalent of a

botched plastic surgery that you can't deny looks worse than it did before. Except, instead of puffy cheeks and stretched eyelid skin, these bodies of water developed an oppressive green coating, clogging and choking their inhabitants. And much like the wonders of plastic surgery, this sludge was born from the genius of man. What caused this muck, exactly? Exhaust, salt to melt the snow on the roads, and the sickly sweet lavender fumes from laundromats and dry cleaners. I thought hard about how to add these examples to Isaac's answer, to exhibit my knowledge, and perhaps disappoint Professor Meadow a little less, but someone beat me to it.

Once a tired little dialogue had started around the topic at hand, Professor Meadow instructed us on the logistics of our task and handed us a small packet of questions. My favorite thing (sarcastic) about the questions on an environmental biology worksheet is that everything asked is either overwhelmingly broad or overwhelmingly specific.

1. What is the chemical formula for ferric chloride?
2. What human actions will be affected by a major shift in the global water cycle?

Under these introductory questions were instructions outlining the bulk of our activities for the morning. Each lab group would be assigned a small section of the pond to sample for levels of phosphorous, pH, turbidity and conductivity. The testing of the phosphorous levels was likely to tell us how much junk from the parking lot, the laundromat, and general excess nutrients had made their way into the water and how likely it would be that this pond would meet the fate of the green ones, or if it was already on its way.

I zipped up my little rain jacket and shivered through the unflattering hood as I read the instructions. Isaac was assigned as my lab partner, which was fine with me, I liked him enough. He was holding the bulk equipment, the turbidimeter, and the backpack. He made some half-hearted conversation about his lake house in Washington which has been seeing less and less steelhead trout in the past few years. It was because of the dams, is what I gathered, that these fish were dying at such rapid rates. I was mostly shocked that he had a lake house in addition to a house house.

I was on scooping duty, which meant squatting above a tepid pond and ducking a gloved hand into the murky water, and filling our up test bottle. Some of the groups were working flush up against the fence that separated the pond from the parking lot in which we were standing, others took the far side of the pond that intersected with a mossy hill, and some were assigned to an area somewhere in between. I answered the hypothesis question in my head: the area directly beside the parking lot should see the highest levels of phosphorous, as well as acidity, due to the CO₂ created from excess plant life. However, the whole pond would see the effects, and that should not be ignored, Professor Meadow would want us to emphasize this in the Lab report. There are places where it will be worse, but there was no hopping from one pond to another. It would spread. Then, as I reached in for the second scoop, I saw a bright spot under the gray. Yellow gold scales came by and circled the edge of the pond. If it had come any closer to the side it might have brushed my hand. I thought of my little beagle at home running circles in the yard. It was cute. I felt my lips part into a smile for the first time on that nondescript Tuesday, watching the little dumpy rear of the fish, who I'd identified as a carp, explore his little world. I imagined what it would be like, had I not had gloves on or the bottle in my hands, to have the

fish swim into my cupped palm and feel the warm tube of his body. Isaac was scribbling his conductivity results onto the clipboard when I finally filled my last bottle.

“What do you think, Penny?” He drawled, “Seeing any of those base stages of eutrophication over there?”

The base stages of eutrophication. The base stages. It occurred to me that the carp didn't know this. Of course, I knew it, it was plainly obvious, the fate of the pond, whether I ran the samples in the lab later or not. You could see it. A human could see it. But the carp didn't know. There was a huge bloom of algae that he swam past, indifferent. *It's going to kill you*, I almost whispered to him. God, he doesn't even know that the gooey green things are going to kill him. I don't know why but suddenly there were tears in my eyes as I watched him weave in and out of plant life and rocks. He's bound for death. *It's going to kill you*. I couldn't stop the phrase from looping. As I capped the lid onto the final bottle I felt the first tear fall and heard it drop into the pond. Perhaps I made it up in my head but I thought for a second that the carp looked up at where it had landed. Another salinated drop of water that we'd put there. The tears kept falling, chilling my whole face as the carp swam farther and farther away. *Yes, get out of here!* I cheered silently. Before my tear gets eaten by the algae, thick and hungry, forming the seal between you and oxygen, cellophane over the mouth.

“You alright?” Isaac asked, as I wiped my face with the scratchy end of the velcro on my jacket sleeve.

“Yes,” I said, putting the bottle in our shared field backpack, “It's the wind”.

And that was the first time that that thing had slipped out. That thing that we all feel at certain moments, where the diagram is there in flesh and blood, staring you in the face and gulping at you.

* * *

We returned to the Lab in about 8 different cars. I drove myself, though I felt guilty after that demonstration about adding one more car in the parking lot. But the prospect of making conversation with someone about the lab we'd just done, even for 10 minutes, felt worth the slightly expedited eutrophication process. Anyway, Isaac said he'd return the bottles to the lab for testing.

It was no surprise to me that three days later our results showed a slightly acidic pH level, and high conductivity.

Dredging

That Tuesday I skipped class for the first time ever since starting college. This perplexed a lot of my friends, that I had never missed a class, Olive especially who was often oversleeping for a sculpture class without too much of a guilty conscience as she was “way ahead of everyone else in the class” who “hadn’t even started glazing their pots yet”. I wasn’t afraid of academic repercussions, or of having a real perfect attendance streak, rather I hated nothing more than the principle of catching up. Being a step out of sync. It always brought me to a horrible moment in elementary school theater where The Bee Fairy called out last minute, and I had to learn her dance really quickly on the night of the showcase. Suddenly I forgot what the whole show was about, and got caught up in my spinning, as if the whole musical rode on how well I knew how to spin, and not rather, what it truly was about, which was pollination. The prospect of the rabbit holes I might spin down while left to my own educational devices frightened me.

But that was too bad, I would have to craft a sympathetic email and review the lesson plan in my own time. It was raining beautifully out, and a crow meandered around a tree outside, incentivizing me to light a candle. That was the first reason I decided I couldn’t make it to class. The second, less cinematic reason was that I had found it harder and harder to get out of bed that whole week. I was watching art being made around me, volunteer events going on left and right for amphibian data collection, student faculty luncheons, and talks being held by some famous alumni about success and progress in a world that is expanding its reach through the digital sphere. And instead of participating in any of it, I had decided, pointedly and exhaustedly, to do absolutely none of it. The most I could muster was a bi-weekly trip to Bobby’s house, lunch with

Olive on Tuesdays, and watching a few of the most melancholy French short films that one might hope to scrounge up for some 20-somethings to view.

What was I really going to do, that day in The Biology of Climate Change that would make any radical difference? The syllabus had indicated that today's class would center "PCBs and the Hudson River". I sent an email claiming stomach troubles and turned on the TV. *The Twilight Zone* intro flashed its eyeball and disembodied doorframe through space as I flipped through the channels. *Yes, this is exactly the trick*, I thought, and left it on. Chicken soup for a sick child.

Around noon Professor Meadow sent over an email offering a vague apology for my vague excuse and attached at the bottom a link to a scientific journal article and a Times Article with a timeline of all the EPA dredging efforts on the river since the late 1970s that I was meant to react and respond to. I could certainly muster a reaction and a response.

The scientific journal was dry, meaning I forgot exactly where and when in time these studies took place and everything seemed whittled down to a decurved graph. Someone Someone et al. had written, "General Electric dumped 1.3 million pounds of Polychlorinated Biphenyls, a toxic waxy material used in many products and factories through most of the mid 19th century, into the Hudson where it lay building up on the ocean floor."

I believed this, but I couldn't really imagine it.

Rod Sterling spoke on television,

"And underneath it all, behind the eyes of the men, hanging invisible over the Summer night, is a horror without words..."

Still half asleep I pieced together that this was a not-so-loose metaphor for nuclear war, and wanting safety, some sort of an escape. But I think that that's true about almost everything we've created in America. There will always be the loose implication of nuclear war.

Maybe I'd actually napped for about 2 minutes when a young woman pleaded with her father on screen. She was insisting that he tell her what was going on with all the bomb talk, and that all the kids at school could tell there was something wrong.

"There's something in the air," she whispered.

Maybe I really was sick, having manifested some bad karma from my fabricated excuse, but suddenly there was a feverish feeling behind my eyes and an ache in my neck.

There was something about those nuclear families in these 50s shows that put me in a state of unease. I was both jealous of and disgusted by them. There was something in the air, indeed. Fear.

The young girl's mother came into the room and looked at her husband warily, setting down a tray of lemonade on a glass table.

What, I wondered, made this girl's fear, other than being clothed in a mod dress and chunky headband, any different from my own? Then I saw many things at play, my fever giving me the impression that I was solving some key to the universe, when in fact I was doing nothing but laying prone and worrying.

I saw radio waves first, moving through the air into identical homes, into identical brown Zeniths with black dials, first, it's FDR, then somber war updates, victory, and then big brass band music. Some husbands coming home alive. The government popping out suburbs like babies, for white families popping out babies like USA-made ovens. Like buns in the oven? More ovens, more breadmakers, more mixing bowls, and whisks. Then the waves of television

broadcasts, of science fiction and princess stories and cartoons. Order and safety and family. Family. That felt most important in this haze. I opened my eyes again to see the mother, father, and daughter scrabbling about their black and white living room with worried looks on their faces.

Well, then what happened? Communism, or the threat of it. The fear of bombs, those kids and their rock and roll, the Lazy Susan, the television set, and those kids and their bombs!

Sure, that's the zeitgeist, but what about me? What would I fear, a girl like me, who'd probably enjoy a jazz record and writing in my diary? Yes, the war, the bomb, but there's something else. It's the possibility of being taken over, by a darkness that I can't quite or have never been given the chance to understand.

Or maybe I'd fear that Charles, the boy I'd started going steady with would be drafted to go kill some Nazis or the children that we might have down the line would grow up without a father. And all the while, there was something else brewing...

Charles gets a good job, which makes us feel safe. But what am I to do? What's a girl to do in a world like this? For one, I could buy. It is one of my civic duties to purchase American-made goods for my good American-made babies. I'd purchase the strongest brightest fridge on the market, cook up a casserole and listen to Bing Crosby on the radio. I'd treat our wooden counters with shiny chemicals, maybe I'd worry they might not be as sleek as the neighbors if I didn't. I'd spray the lawn to make it extra beautiful, and spray my hair and face too! As I'd see it, things were made for me to buy and use, and the country would be enriched because of it.

A suspenseful flute trill on the television startled me into a sitting position, the real me, that is, who was skipping biology class that day.

It isn't until twenty years later that a brave woman named Rachel Carson will recognize that there is a silence in a spring where there ought to be chirps and write about it. All that lead paint, those pesticides, aerosols, dyes, synthetic fabrics, and of course, the PCBs insulating my refrigerator wires, have permeated themselves into the river, into the soil, and into the skin.

And it wouldn't be until even later that we'd publicly begin to untangle the piles of toxins that had been swept in disproportionate clumps towards non-white communities from the very moment the choice of where to dump toxins had been presented.

But we are dredging it out now. All of it, bit by bit. The toxicity, scooped out like excess oil on the frying pan, sloshing debris into trashcans, or sediment processing facilities.

We continue to scoop and monitor. Bobby's grandpa says that he's seen some kids putting their feet in the water again and that the fish are breathing and being eaten again.

I averted my attention back to the screen, to the actual muffled plot and not the one in my brain. I didn't catch most of the dialogue because I was daydreaming too loud. The men in suits debated on the fate of the world. It was the most beautiful white noise, much like the news.

I'd snapped back in time for the big plot twist. A couple of smarty-pantses took their wives and children and put them in a spaceship, hoping for an escape to any place without the fear of contamination, war, and bombardment.

"Behind a tiny ship heading into space is a doomed planet on the verge of suicide. Ahead lies a place called Earth, the 3rd planet from the sun. And for William Sturka and the men and women with him, it's the eve of the beginning in the Twilight Zone".

I felt my forehead, slick with sweat, and rolled over in bed as the crew headed toward a planet just as doomed as their own. Sucks for them.

* * *

There was a smell of success in the air at Bobby's house that evening as he cooked us up some lunch. I watched as Bobby lit the sandalwood candle in the center of the kitchen island. I could almost taste the excitement on his face, as well as the lemongrass in his steaming pan.

"Penny!" he grinned, "Come on in"

This was something I'd seen him do before, the put-on tone of professionalism that echoed his father. Hiking boots littered the doorway to the kitchen like brambles, the well-made laces thick and indestructible. *He did look cute in hiking boots*, I thought.

"God, it smells good in here" I hummed, pulling out a stool and taking a seat at the island. Bobby approached from behind and gave me a hug, offering me a sip from his mug, which I accepted. It was in moments like this that I could see the whole painting, with myself in it. It was the smell, the sandalwood smell that brought me there. I didn't know that wood could be rich or poor until I saw that kitchen for the first time.

In this painting, I'd look out the window into the expansive backyard, at the entire state. I'd have my back to the viewer, and I'd know that I was doing something right. I wouldn't have any particular job title in this picture, but the audience would see me and immediately recognize my inquisitive and scientific minded-ness and know that I had big plans on the brain. But mostly they'd admire my rustic mountain view through the window.

"Come on," Bobby beckoned me, making his way to the living room, plates of our food in hand. He'd already started up the wood stove, and layed out blankets for movie night. As Bobby turned on the TV, I could hear William's voice booming through the wall on a business call.

"He's been in there all day on the phone, Pen, this new project is..." Bobby groaned, putting a hand to his head. I didn't know what he meant, the way he sighed told me this was

stressing him out, but there was also a glow of pride to him, that signaled big money and acclaim could follow. He always clamped up when I asked about his father these days. Everything had been about the project this week. The Building, he called it. I didn't know the specifics of The Building, other than that it was going "revolutionize" what we think of the "landscape", and William had been put in charge of documenting "the process".

I wanted to be in the know. I had attempted several times to ask about what exactly The Building was and I was struck down with half-answers everytime. It just felt as though so much time had passed that if I asked about it now, Bobby would be shocked that I'd gone all this time pretending to know.

"He seems really overwhelmed," I tried, "...with the Building."

"It's worth it though," he reassured, maybe himself, or maybe me, "It's an honor to be part of this".

Part of what? God, he was always so unbelievably vague. But worse yet is the fact that I didn't have the courage to push the issue.

"Choose something good to watch" I requested, getting up and excusing myself to the bathroom. The bathroom was a showcase of mosaic and ceramic and was located directly beyond William's office. Not that I intended to snoop. But if I did peer my head in on the way to the bathroom, it wouldn't kill me.

* * *

I did peek. I looked into William's office. Through the angle at which the door was cracked, I could see just a slice of it. On the wall immediately in my line of sight was a board connecting images of wheat stalks, wood in piles, dirt, pipes, and tubes, and a central image connected to others like the wires of a police investigation. The image about which everything

else floated looked to me like a black box with little hexagonal windows scattered sparingly throughout it. Like a single patch cut out from the entire night sky every few light years, at varying heights, from which a small face could look out into the utter darkness. Maybe it was a charcoal drawing but I couldn't tell from this proximity. But it planted itself in my brain from that moment on. Something cold, hard, and utterly opaque. A vessel for a man and his wife and children to escape? I walked a few paces to the bathroom, sat on the toilet for a moment to justify my trip, and washed my hands. I let the water run for too long.

This was a moment that the Rockwell painting wouldn't capture; my confused posture hunched over the sink, silently wasting water, resigned in this lonely moment to mourn the fact that there may be nothing I can do that would make a difference, besides find the man that'll take me on his ship.

Genetic Drift

Tuesday rolled around yet again. Bobby called me early to say hello, and to let me know that he'd be busy all that afternoon canvassing for the greenest candidate in the mayoral race, whose name and campaign promises I can't quite remember now. Bobby believed in this nerdy little guy for whatever reason, and I believe I did too. At least, I rooted for him against the front runner, another old fellow whose primary talking point was the books being taught to his grandchildren in public school. I admired that Bobby had such a conviction in the political system to do its job. But he sounded exhausted. He was like a hummingbird, whizzing around from extracurricular responsibility to responsibility, barely doing his school work, going about his life like he was on a press tour for nature itself.

"I'd love to talk later Penny, but Dad's got this big meeting about The Building and he wants me to sit in and, I don't know, take notes or something. And who knows how long that'll be, ya know? But I'll try."

It'd been two full days since we spoke at any meaningful length and I was starting to feel like the wife of a rockstar calling pathetically on a payphone, with nothing better to do with my own time but sit and wait. The Building was front and center, yet looming. He'd been helping his father on mockups for this very meeting over the course of the last week. What little I'd gleaned about the project in that time was that The Building is a structure meant to be conducive for our modern way of life and which takes into account the unique needs of human energy consumption. How exactly that was to be achieved, I was not privy to know, but I had a sneaking suspicion that this whole operation was a lot more extreme than Bobby was letting on. The words I'd heard between their phone calls included: power, future, modern, consumption and decoupling. It was a question I heard a lot in class, whether or not we should return our

undivided attention to the land, or separate ourselves from it by means of steel walls and let the land go, let it be whatever it was or could have been without the tainted touch of human greed. But every time I pressed on what a feat like this might really look like, for people's lives, I felt the walls of steel go up around Bobby. It made me wary and for some reason, bitter.

“Yeah, okay sure,” I mumbled back, passive aggression seeping through the phone.

“Is everything okay, Pen?” he asked genuine concern in his voice. I felt guilty for causing this tone, but more than anything I felt aching anger and sadness. I assured him that everything was fine, and hung up politely, wishing him luck on his canvassing.

I made a mental note that I'd have to plan transportation back to Connecticut for the mayoral election in my own town. The elections are usually concerned with reviving our tourism economy beyond nightlife, but sometimes a young, spunky candidate will mention the unhoused, or the rampant meth problem. I wanted to go back anyway, I missed my home friends and the sound of the waves. My best friend Barbie started working at the Hooters beach bar and from what I heard was making an absurd amount of money in tips despite the hurricane warnings becoming more and more frequent over the last few months. But storms never stopped tourists from coming down to the Sun Club in the past, and I wondered if they ever would. Even during the worst hurricane in Connecticut's recorded history, there were people staying at the resort because the power was still intact on the casino floor. The mayor was quoted in the newspaper for saying that ‘it was like a big exciting, adult sleepover’. Mom always said that working at the Spa during the big storm week felt like being one of the violinists on the Titanic. It's easy sometimes, to forget, while I'm canopied by trees and thriving forested ecosystems and biologists and artists, that that life at home still goes on, and there will always be flocks of people that flood our little neon cornucopia, feeling lucky.

Until then, more studying life. Raw from the conversation with Bobby, and my own racing mind, I dressed quickly into something sturdy and monochrome, something that felt simple to grasp. I walked to Bio that day feeling open to anything, easily movable, and ready to learn something that would change my pessimistic attitude. Why couldn't I believe that my actions would change the world the way Bobby could? I spent the entire walk cold and hazy. Professor Meadow showed up in a rush, all olive green and yarn and stripes, apologizing for her late arrival on account of her child's bus driver being late. It turns out a lot of kids have been frightened of the buses, she told us, after all the news of crashes and inclement weather events, and refused to get on the bus, or cried the whole way down. There are certain things in the air that I think children are somehow more attuned to, like those frightening little kids in horror movies who draw themselves holding hands with the monster in the walls before any of the adults have seen it. Incidents like this, like natural disasters or train derailments or disease all have logical explanations, but when their frequency becomes stronger, it's hard to disguise it from the kids. They ask so many good questions.

Genetic Drift. This was one of those embarrassing concepts for me, which I'd heard countless times but it refused to find a way to stick in my brain. Using a particularly bold green pen, I copied down the definition into my notebook and circled it over and over.

Genetic drift: *Random variation in allele frequencies between generations. In summary, the passing down of the dominant or recessive traits based solely on the luck of the draw.*

Professor Meadow made a clear distinction between genetic drift and natural selection, wherein natural selection requires one trait be preferred over the other in terms of survival and reproductive success, and genetic drift is the randomness that makes life exciting and

frightening. Your mother's eyes, your grandfather's illness, your father's freckles, all of it is yours because it can be. It was always a 50/50 chance. Red or Black on the roulette wheel.

I walked back home after the lecture, tired but holding close to me the sprinkle of victory I felt from understanding something just a little bit more than I did before. As I walked into the common area of Olive and I's shared space, I stumbled upon Olive in the midst of a gamble herself, kneeling on the bathroom floor.

"What's up?" I asked, but as she turned to me I could tell she'd been crying, and my greeting was rendered casual and jarring, "I'm sorry." She sat staring at a piece of white plastic on the tiles beneath her.

"It's still cooking," she mumbled, nodding to the plastic, "still have two minutes left". It was a pregnancy test, I realized, and took a seat beside her. It was silent for a few seconds, and I thought of all of the things I could say but struggled. I was the one who often talked openly of my dread of responsibility, and my dread of bringing children into this precarious world with its dwindling quality of life. I thought of every possible angle I could approach this with to make her feel some sort of relief, but that proved to be too difficult a task.

"Did you know," I began, "That despite practically founding the research around offspring viability and genetic relationships, Charles Darwin was boning his first cousin, leading to the eventual death of all of their shared children?" She laughed a little, airy laugh.

"To heck with those kids!" she whispered through laughs, "That tells you what kind of a man he was... was never about the children. He was just too horny for his cousin to care!" Then it was my turn to laugh. And we both sat for a moment thinking about what we'd said and suddenly drew within ourselves again. A comfortable silence took over until Olive peered again at the stick, and blew a sigh of relief.

“God is real,” she said, as we slipped out of the bathroom and turned out the light.

* * *

Olive and I sat watching two hours of Project Runway. It was our new Tuesday night tradition. Sometimes it was exhausting pretending to have all the answers, and pretending that we weren't just children raised on screens and colors. Olive scrolled through her phone and I worked on a crossword puzzle on my own phone (I'd finally remembered to renew my Times subscription), and Tim Gunn observed a young woman working on a blouse on the TV and we took in all of this satisfying content at once. I was nothing but a patron of the adult sleepover at times, most comfortable in my anmiotic sack of lights and sounds and stimulation. Maybe we all really did deserve The Building, a place to be coddled in electricity and sleek black HD rectangles.

I took a shower and washed the day from my hair. I'd left the window open for ventilation and when I came out I stayed by the sink for a moment and felt the breeze on my cheek. A kiss from the great outdoors. I don't know why but I felt emotional, almost as if by magic from feeling the simple cool breeze. I remembered that there are birds that come back to this spot in New York year after year to lay their eggs, where the coast hasn't been gobbled up yet, and where fires from arid air haven't yet burned their trees down. I remembered Olive telling me that she had been born in a big tub in a farm where her mom raised goats and chickens and her father planted pollinating flowers. We were very lucky to have this option, of blending ourselves with the natural world. And all at once I understood why I had such an abhorrence toward what The Building looked like in my mind, and in the drawings that I had been granted piecemeal permission to see. I thought of giving birth. Giving birth in there, surrounded by glass, one hexagonal window 10 feet above you.

Olive was born in a tub on a farm. And I'm not saying there always needs to be goats present for the birth of a child, but even my own mother who'd avoid a long hike like the plague fled New York following the terrorist attacks that rang in my first birthday.

"I want grass under Penny's feet," she pleaded to my father before we took off to Connecticut.

There's something in motherhood. There's a reminder of our primal screaming ability to be a force of nature ourselves.

I recalled my own cynicism from the week prior. *What's a girl to do?* I asked myself snidely, my head cramped with 1950s politics and river sludge. What's a girl to do? God... a girl's got to do quite a lot.

Speciation

I woke up that Tuesday, quite refreshed, though a pounding in my chest remained. It had become a constant soundtrack, a sort of metronome that I sometimes was lucky enough to forget about for a moment or two before I remembered I had something to worry about. Blinking open my eyes I was met with horrifying faces, mask-like almost. For a minute I thought I was still dreaming but then I remembered Olive's sculpture class. Olive had spent the last week frantically molding and painting and glazing these cryptids for her midterm project, which she had called "Facing The Uncanny Valley". It was all part of her latest foray into fusing the visual forms of artificial intelligence with natural-looking materials. She'd told me all about the origin of The Uncanny Valley, and how it is in our very human being to be frightened by these images and depictions of human-like-but-not-quite figures. It implies at one point or another in human history, we had to differentiate ourselves from a species that was similar, but undeniably "off". Those more inclined to the horror, the gory and morbid, myself included, have come to surmise that the scariest part of this story is not that there were others out there like us at some point, but that we were the winners, the hunters, the ones to truly be feared.

Olive, in the last week, had gotten a kick out of placing her "uncanny" forms all around our apartment for me to stumble upon, where I'd squeal in fear every time. At a certain point I'd caught on to the joke, but I kept hamming it up because it made her laugh so much.

She burst into the room just then as I stared at a rubbery off-kilter face, and she began packing up her leather bag with books and pens. I peered over at her from the bed. She was dolled up that day in a ladybug-style blouse and a thousand layers of skirts, scarves, and belts, and she had done her makeup a bit heavier than normal.

“Good luck” I sang, taking the guess that she was dressed up for the presentation of her humanoid sculptures.

“Ugh, thank you” She replied, opening our door and kicking a mary jane shoe out of her path “I can’t even look at these things anymore, bye bye Pen”. The door closed, and the last thing I saw was a face, melting off of its frame, intentionally, revealing a motherboard type of material beneath, eye sockets stretched and pulled over the form. Bye bye!

Something had been happening within my last year of college in which everything I saw in the classroom suddenly appeared vividly in my personal life as if I was on some sitcom and the theme of the week was neatly imbued into the plot. It was moments like these that made me feel like perhaps I was losing my mind. Let me explain.

That day I arrived to Professor Meadow’s class and on the pulldown screen in the front of the classroom projected another one of my favorites (not): a black and white graph. I guess I felt less jaded that day, however, and I took the first few silent moments of class looking intently at the chart while the class filtered in. A phylogenetic tree. A beautiful timeline of evolution and all of its branches and diversions and plot twists. This particular tree focused on the birds of the Hawaiian islands and how some of the little yellow and orange guys that appear to be nearly identical from the outside, are in fact genetically quite distant. Islands apart these birds found reason to look the same and work the same, despite something so fundamentally different between them. I couldn’t stop thinking about Olive’s masks that morning, and whether the Hawaiian Creeper looks upon the Kauian Creeper with a sense of distrust, fear, or confusion.

Professor Meadow then stepped to the front of the class and began to untangle the graph on the board. She unpacked the different types of speciation and their respective causes. Geographical barriers, mutations, new niches. It’s impossible to talk about humans in relation to

any of this. We have made it so much more complicated. I can't imagine a world in which we'd need to separate ourselves by means of our survivability, or how well we think our partners will bear viable offspring. We are so beyond the rules.

After learning all of the ways species bounce, interplay, exchange and regrow, I regained a sense of wonder for the day, as I often did when Professor Meadow really got on a roll.

"Now I want you to think about speciation and its connection to extinction," she began, pulling down the projector screen with some difficulty, until it snapped back up abruptly, "What might be the reason those two so often go hand in hand?" Her voice raised to match the sound of zippers zipping and jackets being fetched, "There's no bigger barrier created between groups than a mass extinction! Isolation, species wiped out, habitats shifted. Over time they have no choice but to formulate distinct species, right? That's survival y'all!"

On that happy note, our class was let out. It was a beautiful day, and my light jacket was enough to keep me warm, hot even. It was one of those days that prompted comments like "A little too warm for November, huh?". That was the first year I really noticed it with any degree of concern. And I was certainly not the only one.

Olive met me for lunch at the dining hall. She was debriefing me on every moment of her presentation as if it was the first time anyone had ever presented before. I loved that about her storytelling, there were somehow twists and turns that I never predicted.

As it turned out, an acquaintance of ours, who had become a recurring character in our lives, had a particularly unprepared project that day and the professor couldn't hold back her disappointment. Olive gave a spirited impression of her professor's dismayed face, and I laughed so hard tears formed in my eyes.

“Everyone, please give Matt a hand” she imitated, sighing deeply, and rolling her eyes. Her big smile made me smile back. I found it hard sometimes to let go of the things in my mind, but I found a way to give it a sense of irony when Olive and I got to talking. Like the little jokes about the weather, I think a little bit of irony is necessary.

I don’t believe that the world will one day go up in flames. I think that the one-big-wipe-out-explosion fantasy is a story from comic books. But if some big fire did come blazing across the land, isolating us all like those birds, in little factions, needing to slowly rebuild for generations to come, I’d like to end up wherever Olive lands. I’d like to forage for whatever mushrooms had survived the blast with her, “because they will be the future, you know” and start a garden from the remaining soil with her, along with an eclectic cast of characters that will band with us. It’d be one big experiment, like one of those zombie shows, and somehow everyone in our little faction would be sexy and beautiful and we’d all suddenly know how to use a gun. And I’d be laughing a lot despite the ruin in the distance. That big ugly building with its lack of windows sticking out of the ocean, iceberg style. *No one needed it anyway*, I’d think, in this new life. We were meant to touch the earth.

The reality is, in a world like this, if such a clean break could even happen, all of our loved ones would be dead, and entire histories, cultures, and countries would be wiped from existence. Say nothing of the lack of medicine. This zombie show I see in my head, it’s not real, it’d never happen that way, never that quick and painless. In reality, I’d be dead the second my inhaler ran out of juice. Breathing in my plastic manmade survival mechanism for the very last time.

I turned out the lights in my room and plugged in my phone to charge overnight. In the dark I kept getting catching glimpses of Olive's masks in my mind's eye. Why was I still worried about them, even after a day of enhancing my grasp on speciation? And why do I hesitate to use the words "I plugged my phone in", like someone far far into the future won't know what the hell I'm talking about?

It must be a fear of losing recognition of one's humanity. It's hard to imagine a future without ourselves in it, where the technology we've created will stand, purposeless, existing but without our input. With Olive's words and presentation to back them up, the sliding wax and sutured latex on wireframes have a definition and a thesis statement. But when she's gone?

I think more than anything, we fear the day when someone will forget what we mean, and what our art stands for.

Biodiversity

There comes a time when the inevitable conversations come to light. They always do, even in my limited experience with love and friendship I knew that nothing could be swept under the rug forever. It's just that you don't expect those things bubbling beneath the surface to break the crust in the middle of the night, in the middle of the woods, in a pair of children's hiking boots.

We began our biology class that day in the campus greenhouse, where Professor Meadow often volunteered, giving workshops on seed cultivation. The air was warm and still between the panes of old warped glass. The whole place smelled faintly of spring onion and rotting pepper, but not in a way I would describe negatively. In fact, the whole thing resembled my childhood vision of what a gardener's space was meant to look like, like a pen and ink drawing from a book about fairies. Professor Meadow stripped dry indigo leaves from their stems over a silk screen while we trickled in around her. Today, she reminded us, would be a chance to look, feel and explore firsthand the ever-complicated intersection between agriculture, indigeneity, and climate change. The story went something like this: before colonial influence/violence, manicured lawns, privacy shrubs, and the patriarchal planting of allergen trees, the flora was specifically and carefully adapted to the land, cultivated with seeds that would continue plentifully.

“There is a disconnect now,” Professor Meadow continued, “Just as we begin to recognize, or rather, remember, the value, both spiritually and productively of the seeds that would have been utilized by the indigenous stewards of this land, the climate has sent upon us a new challenge.”

I couldn't help but notice the wording that Professor Meadow had used there... "sent upon us". Like a god. A Climate God.

"The challenge comes from the fact that the flora that once was perfectly acclimated to this region, is struggling. It's one of those things that among my colleagues seem so pressing and prominent and so obvious. But a lot of people don't see the significance. They don't connect the dots. What we used to plant right here in the Hudson Valley, is now more suited for climates such as Vermont, or parts of Canada. Conversely, species of trees that famously used to thrive in the Southern half of the country are finding more success up here."

She paused, gathering in her hand a few Tupperware filled with a number of seed packets.

"What is so wonderful about being an agrobiologist at this moment, is that recently, our role has become more and more concerned with giving attention to the land first and foremost. Because if you're paying attention... they, the plants, are actually laying a path for us. Signaling to us where they need to survive. Look! Here we are way up in Quebec! Niagara Falls!"

Though I always felt that she was an inspiring professor and speaker, Professor Meadow being here, speaking in her element was the most valuable moment of the semester for me. I felt a bit shameful for not having looked for those little signals from the world around me earlier. How many times had I missed the call of an insect's premature arrival at the beach, or whether or not the peaches were back at the Health Food store a bit earlier than usual? They'd been showing off their small but important changes and I hadn't even noticed.

"What my colleagues and I are doing right here on this very campus," Professor Meadow continued, "is trying out these species that were once more successful in the South, and some that traditionally were successful right here. So everyone, find a flat and find a seed packet, and I

want today to be kinda relaxing, something hands-on, I want you to get a few of these started, okay?"

Perhaps it came from the indecisive standpoint I tend to take with conflict resolution, but I felt comforted and inspired by this manner of addressing the movement of flora: taking careful notice of the things that are changing, and allowing them to move and adapt, but also continuing to plant the things that were traditionally meant to be growing here before any drastic changes have occurred. Planting them both just in case and watching their success without judgment and with full support and inquisitiveness. That's something an admirable biologist would do. It sounded like something I would want to do.

Returning vs separating, building vs cultivating. For two people in such interrelated fields, whose end goals aligned so much, Professor Meadow and William were moving far away from one another. One digging into the earth, and the other building a ladder as high as it might go above it.

I was set up with a packet of New England Aster, a purple pollinator flower. From the image on the package, the flower part looked lovely, like the fraying ends of a tapestry. These flowers had stood the test of time, they'd been here, doing their best since before any colonization, any manicuring, and exclusion, and they would continue to come back, year after year. And though I meant no offense to the other seeds, nor the valor of the scientific process, I was glad that my seeds were resilient because I'd be able to come back later in the Fall and watch them doing well.

* * *

Maybe it was just that feeling when you watch someone take a run in a movie and think, *god I gotta start doing that, that's such a good idea*, but I decided to take Bobby up on his

constant offer to go camping “before it gets too cold, and you hate everything”. To be honest, he’d asked many times and I’d chickened out, but I knew the opportunity was about to expire. So I agreed that the next time he asked, enlivened with new excitement about what the flora was telling me, I would say yes. Though I was still quite terrified at the idea of an open forest.

Bobby picked me up that Friday for the last time. No, neither of us died.

I was in high spirits, and he noticed and that made him happy too. He asked if I wanted to stop and grab some snacks on the way to the site. His car was loaded up with our supplies, complete with the largest duffle bag I’d ever seen in my entire life. I brought a little pack with me, with a water bottle and some granola bars, and a pocket knife, I don’t know why.

The nearest bathroom it turns out was located in the basement of a dive bar called “Liquid Dreams”.

We stepped down the long black stairs to the basement floor. There were old license plates all over the walls and one singular pinball machine. It smelled a bit greasy and a bit sour, and the treads of the hiking boots I’d borrowed stuck to the sparkly red, black, brown, and purple floor with each step. Bobby made a groan of disgust and went off rapidly to find the bathroom. There was a bar along the back wall where four bearded strangers sipped beer. I figured I could hold it for a minute and explore the bar. There was a jukebox and ashtrays on every conceivable surface, and about 60 decoy ducks were on the long shelf above the bar. It was so different from the places my peers enjoyed frequenting, in clientele and aesthetics. It seemed beautifully representative of the parts of this county oft-forgotten, untouched since what seemed to be 1994 based on the patterns on the booths. Rather, I should say booth, the place was only large enough to fit one beside the ashtray. I decided to sit down for a minute and make sure my boots were

fastened well enough, Bobby had been kind enough to give me a pair that belonged to his sister when she was 12.

“You want something?” the man at the counter asked me, gruffly, he had a flannel on and a yellow shirt beneath it that I didn’t want to read, for fear it’d be a political message that would frighten me. I heard the scurrying of feet below him. Was there a dog behind that bar?

“Uh,” I pondered. Dark woods, insects, tent building, “Sure, a can of beer, please?”

He chuckled.

“\$5, student discount” he scoffed.

I wished he knew how much I liked this bar and its little license plates and outdated furniture.

I chugged the beer and used the bathroom at the same time, which felt like canceling out some inner liquid balance. Then we left, Bobby and I, and I tipped the man at the counter.

“Night of the living dead in there, huh” Bobby quipped, giving me a kiss on the cheek and opening the passenger side door for me. I meant to tell him what I thought about the interesting local community and the time that had passed by on that dive, but I didn’t feel like that anymore. Bobby started up the car and after a minute of quiet and we headed down a bumpy dirt road.

Why had it bothered me so that Bobby wasn’t as interested in the interior design of that place as I was? It occurred to me that all the talking points that Bobby was often spewing about education and unequal opportunity and bridging the gaps in our social structure had been just that: talking points. For the many who didn’t approach the world already having the education to take the same stance on life as he did, he held a sense of judgment and blame primarily.

My uncle on my mother's side, Matthew, for most of his life was a construction worker on Staten Island. He got a job by happenstance working for a solar installation company. He went on to teach himself, a lot like I had done in class a few weeks prior, the points of concern, benefit, and debate around the panels themselves. He'd told my mom of all of the fascinating politics he'd discovered around solar energy in certain states, debate and fallout from communities, and where they are most successful. He'd even done some protesting against the construction of a pipeline somewhere in the West while on vacation. He joked that my aunt had a couple of cocktails downtown and waited patiently while he did his civic duty and that he felt like a regular "Tree Hugger".

I was proud of him when I heard this, but I always loved him and listened to him, and believed he was worth listening to, worth talking to even before this. I thought of Matthew's newfound personal pursuit of researching energy. I also thought of William, who had a certain quote that he often repeated when talking about the types of infrastructure projects that were volleyed amongst intellectual circles in academia and his business circle in Manhattan. The quote was simple but it stuck with me. "We're going to need everyone". By this, I believe he meant in order to construct and employ and power these brilliant concepts, we'd need men on the ground, the worker bees to come together and commit to the vision. But I was always curious when he himself was finding the time to get on the ground and relay this vision. Until then, these ideas talked themselves to death above the heads of the "everyone".

But I didn't say anything about this to Bobby. I feared I'd stumble over the words and just sound combative for the sake of combat. Maybe I was just feeling defensive because, for most of my life, I embraced a certain level of tackiness and camp that I was now realizing wasn't always accepted or expected in tandem with the sustainable visions of the future and liberal

politics that I held simultaneously. I bit my tongue, but no matter how I tried to shake it, I had been affected by his snottiness.

We pulled up to the gravelly entrance of the campsite. I already felt itchy but pushed through.

I was, ironically, never more attracted to Bobby until the sun was going down in the forest that night. What's the phrase... any port in a storm? I was nervous as anything, and Bobby was nothing but brave. I was attracted most of all to his certainty and his sudden duty to protect. This was not his first rodeo after all. Not even his tenth rodeo. Often in day-to-day activities, he'd flex his resourcefulness, measuring the distance between my car and the fire hydrant with nothing but his own two eyes to assure I wouldn't get a ticket, employing the buddy system when he accompanied Olive and me and our girlfriends out to parties on campus. It was one of my favorite personas that he had up his sleeve, Park Ranger Bobby I sometimes called him. Not only was I attracted to Park Ranger Bobby, but I was impressed by him. I think I'd die if I had to undergo boy scout training, even now at 20 years old. I actually don't even know what boy scout training consists of to be honest, I didn't even do the girl scouts, but I imagine I'd need to start a fire and collect rainwater in a hand-woven basket. It's probably also pretty handy to know how to tie a good knot. But I think that that's one of those things that are so far down on the list of "learn how to do"s that I may very well never know how.

We had set up camp between a few pine trees and a little lake in the center of the site. I had made myself useful by holding some sticks in place for the base of the tent and gathering dry wood. I liked feeling capable like this. We heated up some chili on the fire and started in on ghost stories. I didn't have many good ones from past the age of 8, when I became a real skeptic, so instead I showed him some pictures of Olive's mask sculptures, and how crazy I'd be if

suddenly we saw one of them, bodied, flesh and blood walking through the woods. I had scared myself too much just imagining it.

“Anyway, god, tell me something good and normal” I encouraged, nudging him with a smore stick, that I then loaded with a marshmallow.

He mentioned that The Building had received a large sum of money from an anonymous donor and his father was overjoyed, and spending most weeknights in the city to plan and campaign on behalf of the infrastructure.

“Some slogans are being tossed around right now, dad’s been writing and rewriting them over and over. It’s crazy how much the way you sell something matters, maybe even more than the thing itself, not that I don’t believe in it...” he trailed off.

I nodded, I wanted to ask a follow up but my marshmallow was burning.

“It’s something like, ‘Decoupled and Sustained’” he continued, “But who knows it could all be different in a week. They might pull out and the whole thing will be over, just an idea. But I think it’ll be more than that”.

He had a thoughtful smile on his lips. I ate my burnt marshmallow. The fire was releasing massive amounts of particulates and my teeth were coated in charcoal. I couldn’t think of anything intelligent to say, I just knew I didn’t like what I was hearing.

On the other hand, the sounds of the woods were beautiful. The whistling of wind through coniferous trees, an owl far away, the crackle of fire.

“I love the real pine smell” I mumbled, half to myself as a burst of wind wafted in a baker’s dozen worth of tree right to my face.

“Real pine? As opposed to what? A Candle?” he laughed as if that was the most preposterous sentence I could have ever strung together.

“No!” I laughed a little, though I was a bit ticked off, “I had a fake Christmas tree growing up, but we missed the smell, so mom and dad would buy those sticks that smelled like pine or Douglass Fir or whatever and stick them around the tree like ornaments. They were green so you couldn’t notice it. I don’t know, it was a tradition”

“That’s so unbelievable” Bobby shook his head.

I loved our synthetic Christmas tree and my grandmother’s rubber tulips that sat in a vase of gel in the entranceway to her house. But I loved the real things too. I think the real things need attention, study and appreciation. I wanted to feel closer to the earth. I sank my head down on a patch of moss.

“Plus, they never die” I added.

Bobby suggested we clean up our fire before we got too tired. I was already half asleep on my moss but dragged myself up somehow, and a twig dangled from my hair.

I’d never cleaned up a fire but it involved a lot more dipping individual sticks into water than I imagined. I poured more water over the charred earth and stuck my fingers into the ground to make sure it was no longer hot.

“I’m positive it’s completely out, Bobby”

“Well I’m doubling checking” he replied. I was too tired to say anything back, I knew I wasn’t an expert, but I didn’t think I was an idiot. I put myself in the tent like a petulant child.

Bobby followed shortly and turned on our battery-operated lantern.

“I was just thinking,” he began, unzipping his big coat, fresh from double-checking my handiwork. “It just occurred to me recently, that there are people, like full adults who don’t know how the seasons work!” He stated, incredulously.

I don’t know why but that was the last straw.

“Not everyone knows all the same things,” I replied.

“That’s like basic, childhood science!” Bobby cried.

“Some people have 9-5 jobs, had a poor education, they have kids and rent and groceries to buy and they’re busy as hell! Maybe they’re not really concerned with relearning the positioning of the world on its axis!”

I was nearly shouting.

“Geez, Okay” was all he said back.

He couldn’t see the variety of lives that people lead for reasons far beyond their control, determined by generations before any of us had ever graced the earth. My personal psychoanalysis of this was that he was trained in stewardship and science the way some kids are taught the family business or are pushed to be doctors or lawyers. He was pushed to be the future itself. There was no other option but to believe in miracles, in magic technology, and that everyone should already be doing their part regardless of their opportunity in life. When I was annoyed with him, I found him hypocritical, as if he were pointing to a developing nation and saying “Quit it with those fossil fuels, would you?”.

Then I remembered all the times I found his high standards of humankind to be beautiful, and reassuring, the way he pictured humans existing beyond the present moment with joy. And then I remembered all the times he found my ability to mediate along social lines and see the gray in every situation to be beautiful.

Maybe we had just let the rose-colored glasses fall off until all we saw were absolutely opposed, incompatible perspectives on everything from buildings to trees and all the things manmade or natural in between. The things we’d found so beautiful about each other had grown rancid and weak with time.

Under the stars, he told me he was upset. I'd barely seen him since school started he said. I barely agreed with any of his ideas, I said. We sat in silence that night, sleeping in separate bags facing separate directions. And the car ride back was just as quiet.

"You want to stop for a bagel?" he asked. He was crying.

"Yeah," I was crying too.

The hardest thing about that moment was that I really believed Bobby was good and would always be good. He had spark, and life and optimism, and I might have loved him. The truth of the matter is that Bobby was not prepared for the diversity of life.

I went home and watched Project Runway for three and a half hours. It was a clean break. I never went back to that house, to the shuttle to the moon in the middle of New York. Maybe I could have been the heiress to the world. Who knows.

Climate Solutions

It is silly to think that I am the center of this story, or even that Bobby is, or Olive or the work being done in the midwest on soil erosion, or the buildings we build. As I walked back and forth the following afternoon, passing the same benches over and over again, debating lighting my cigarette (which, my god is the most manmade creation, breathing in smoke for fun), there was a still bald eagle watching me. Scrap that, I've made that up that he was watching me, for all I know he wasn't watching me with anymore attention than I might glance at a leaf falling twenty or so feet away. Regardless, he was there and had been for a while before I came outside, and he went on to stay in that tree for another three hours (I kept an eye on him from my window periodically throughout the afternoon). He wants a mate, he sits on the branch, and a crow yells at him, rather the crow caws at him, 'yells' makes it seem too much like he is angry, intentionally causing conflict. Yell is the word of a human. The crow caws at him nevertheless, and this happens above my head. This will happen after I'm dead. We could write this story from his eyes if we wanted to. Maybe we should.

Since my camping trip, I'd taken a lot of these walks, in order to forget myself as an actor upon the world, and simply observe. Of course, by simply being there, walking, I was acting upon the world, but for the half hour or so that I was out, I forgot that there was anything else to worry about other than my feet moving one in front of the other.

After my tenth walk that week, Olive suggested that we should spend the beginning of Winter break in my hometown, since "she'd never seen it before". I think that this was a ploy and that she was actually just concerned for me in this state of mind after everything that happened with Bobby. I wanted to tell her that I was fine, and maybe walking on the ocean side

for a few weeks alone might be the best thing for me, but I wasn't good at saying no. And Olive wanted to do a slot machine.

My BIO 202 final essay was due in a week, and the prompt was loose.

Address one real-world example of a climate change event and outline all the ways in which biological processes are present and/or changed by this event.

Other than this assignment, all in-class meetings had officially ceased. Olive and I packed up some dresses and skirts and shawls and big dangly earrings, anything that felt like proper attire for blending into a casino floor. We packed up a few bags and threw them into my Hyundai Elantra, alerted my parents that we'd be coming back early, and began the trek to Connecticut that random Thursday.

* * *

The air in the Sun Club Casino and Spa was stale. Victoria's Secret *Bombshell* entered my esophagus, along with Marlboro Golds, Newports, Hibachi, and the mist from the chlorinated fountain in the center of the floor. When I was small I imagined what it would be like to live in the fountain. Perched on the lip of the highest ceramic basin of water, the pink and green, and blue light features pulsing around me. I'd swim among the pennies, the nickels, and beaded necklaces. It didn't occur to me then that there is a separate bulb for each of the colors that lit the water. It ran all day, the lights, the movement, the chlorination. We checked in briefly with my father who was watching over a group of hopeful patrons putting themselves into camps of red or black, 0-12, or right in the middle of the board by marking the board with their chips. He was a quiet man, my dad, and observed a lot without chiming in, while so many around him held steadfast and aggressively in their bets. He gave Olive and me a wave and a smile but looked too busy to chat. It was good to be home and reminded of people like Dad.

Olive was shocked by the pure mass of the place. I think people who aren't familiar with this kind of excess forget that thousands of people like debauchery, and there needs to be room for them to engage with that.

She'd chosen an outfit that looked entirely crocheted yet somehow glittery, and I wore something that I think a Spice Girl might have liked. I forgot for a few hours that I was down a boyfriend, and a vision for my future. I hated more than anything realizing that somewhere along the lines I had conflated the two in my mind. But for a portion of that night, I was on a mission to be as unphased, unbothered, and unmoored as possible. And it worked for some time. After three karaoke numbers each, an apprehensive lap around a club that was filled with millennial businessmen, and a shot at the taqueria, we stepped out of the final bar in the circuit, a wild west saloon where I had three slushies called "The Gold Rush" despite their being neon pink in color.

It was when we got caught up in some slot machines that I started to lose some steam. I drifted away for a moment, a few rows away from Olive, wanting a moment to myself. It was ironic, I thought, that I felt more solitude in a room full of strangers than I had in a very long time.

My head pounded at the watermelon, lemon, and liquor that stuck dry and thick on my tongue. I wanted to smoke something, but the air was so clouded already that the idea made me sick, adding more particles to a collective haze. Isn't that the problem I'd had all along? That realization made me laugh. Maybe I was going crazy. I took residence in the nearest stool I could find, right in front of *The Wizard of Oz* slot machine. You could get three ruby slippers in a row, three wicked witches, or three yellow brick roads. There must have been more options but the last player had been unlucky and spun one of each, so those images remained frozen on the machine's face. The sound of a thousand pinballs being shot at once chorused around me, the

tinkling of little metal bells and whistles. I watched a man beside me put some coins into an identical machine. His suit fit well, and his hair was slicked back and a cloud of Calvin Klein hung about him. He was jittery and sweaty. He pressed the big red button and the wheel began to turn.

“There’s no place like home, there’s no place like home, there’s no place like home” the machine crooned at him. Double Emerald City and One Scarecrow. I didn’t know what that meant but the man looked pleased and spun again and I spun away from him because I got dizzy. Bobby would be appalled by all of this. *I shouldn’t even be thinking that* I scolded myself. Why would he be appalled anyway? This man, just like everyone else here was investing in their future, putting money into a glittering machine that might make the rest of their days more prosperous...

A woman passed me by with a tray full of Manhattan’s and a dirty martini. Everything was so loud. At that moment I hated being in the casino and everything it represented. But the worst part was the guilt I felt for the resentment. After all, it was no one’s fault that this building had become the most prosperous slab of glass in the county. It was no one’s fault that you couldn’t see the water from your house anymore, or that it was more affordable to have everyone’s 12th birthday spent in the arcade next to the Go-Go Dance Dance, and take our group photos next to the big stone-embedded ashtray. It wasn’t anyone’s fault that people still wanted excitement and lights and visions of 1950s lounge singers.

How can we forget about all of the things we have now? How can we ask everyone to turn their backs, dismayed at the technology we dreamed of for centuries, and the progress we’ve made? How can we force ourselves to look in disgust at our grandparents’ lives work? The hope

they had to make our little lives easier, a little more beautiful for us. We want to be proud of ourselves. We were taught nothing but to move forward.

Sometimes I'd cry too hard when watching those ads for cell phone companies where the grandparents get to see their grandchildren's first steps through the video call. And I was really glad that birth wasn't synonymous with bleeding to death anymore. I was enamored with the art Olive had been making on her computer, digital masterpieces paying homage to women throughout history who learned to use the tools they weren't meant to use, all using the tools of our modern age! My grandmother had been watching openly gay women on her television soap operas and found their stories compelling. There is a great number of things that have washed up on our shores along with the trash. It isn't stupid to hold on to the belief that we can keep going, the way we have.

But I didn't believe we could keep going the way we had been, not entirely. Some problems are beyond technological progress and require more care. I wondered, with Bobby's persuasive voice further away in the distance than it had been, whether these big projects like The Building were monuments to the humans that birthed them, rather than solutions for humanity's problems.

I thought this over for a moment. A monument to one's existence, proof that you existed on this earth. That's something we all secretly hope for is it not? Three watermelon slushies deep, is how I finally figured out how to formulate the question I'd always been afraid to ask William. Is it the joy of knowing there's a footprint on Mars, or knowing that it was your shoe that made it?

I signaled to Olive that I was going to use the bathroom. I appreciated her lust for life in all of its forms, but there was someone else I needed to talk to then. I made my way, slightly off-kilter, to the Ocean Spa across the great marble floors.

The second I arrived Mom took me out with her to the cold metal lawn chairs of the employee patio. We sat looking out at the ocean like opera-goers in cement box seats. She took out a cigarette and I followed her lead. She'd never seen me do anything like this, and I suddenly became very sheepish about my actions.

"It's alright" she muttered, but I knew she was a little disappointed, "You've got a lot on your mind."

I nodded and looked out at the rippling waves.

"He wasn't the right fit, I guess?" she asked, not pushing the issue too hard.

"No, I guess not" It was hard not to cry.

"You'll know in your heart when something is right, and you know when something feels wrong," she said in that way that can only be attributed to a mother's magic.

"It could have been good. I thought it could have been good. That whole life"

Mom nodded.

"There's not just one right way to do anything Pen," she added, taking a small drag of her cigarette, "You know a lot more than you think."

At some point, Mom had gone back downstairs to close up the spa, and I was left with nothing but the sound of faint bass from the club inside and the waves. The ocean beneath me looked as black as the sky, only faint waves delineated one from the other. Seagulls looked iridescent on nights like this. I'd been on this employee balcony many times since I was three

years old. I'd seen this beach through the years and never thought anything of it beyond it being a sinkhole for money and plastic champagne flutes.

I tried to think of a better way, to redo this structure, the whole town for that matter! An environmentalist's dream, what did it look like? What if we transferred my entire hometown into The Building, what would that do? Maybe the shoreline could heal itself with time without our acts of excess. But surely not everyone could afford a space in this monolith of sustainability. And the ones who'd stay behind would have no job to speak of, there'd be nothing else left for them but the bones of our old homes, now repurposed into pollinator gardens. And what if everyone quit and decided to live off the land? But that was utopian thinking... there is no magic way to rally all of the people to your camp.

There will always be people in the middle.

* * *

I had one last assignment to do.

Olive and I walked along the boardwalk the next morning with orange juice cartons from the convenience store on the casino floor in hand. I didn't feel truly sick, just a little ache in the chest, though I couldn't say the same for Olive. It was too cold to take our shoes off but she insisted we at least sit on the sand for a minute. I appreciated her commitment to experiencing every part of this place, even while hiding her drowsy eyes behind sunglasses. She said she liked it and could see how nice it must have been to grow up with all this openness. I didn't quite see it that way, but I nodded.

The beach had changed in many ways throughout my life. Was there biology in it? Surely. I studied the life here for a long time without knowing it.

The shoreline had receded, and people got laid off from the Sun Club. The drug problem caused the beach to be roped off one spring by caution tape, but families still came back in the Summer. There are hotels for thousands of tourists along the shoreline, and hundreds of people homeless. The oysters were always being restored slowly but surely with the help of the wildlife refuge group in order to improve the cove's biodiversity, and my second-grade teacher met her husband working at the Oyster Shack Bar and Grille on Route 9. It meant both things to me. The ecosystem within and without.

I turned around to look into the Sun Club through a little window on the third floor where a man popped a cigar between his lips. There are people in there, and if I want, I can meet them where they are.

Bibliography

- Banzhaf, Spencer, et al. "Environmental Justice: The Economics of Race, Place, and Pollution." *The Journal of Economic Perspectives*, vol. 33, no. 1, 2019, pp. 185–208. *JSTOR*, <https://www.jstor.org/stable/26566983>. Accessed 20 Apr. 2023.
- Carson, Rachel. *Silent Spring*. Fortieth Anniversary Edition ed., Houghton Mifflin, 2002.
- Cecire, Natalia. "Environmental Innocence and Slow Violence." *Women's Studies Quarterly*, vol. 43, no. 1/2, 2015, pp. 164–80. *JSTOR*, <http://www.jstor.org/stable/43958483>. Accessed 20 Apr. 2023.
- Chakrabarty, Dipesh. "The Climate of History: Four Theses." *Critical Inquiry*, vol. 35, no. 2, 2009, pp. 197–222., <https://doi.org/10.1086/596640>.
- Choi-Schagrin, Winston, and Raymond Zhong. "What We Know About Tornadoes and Climate Change." *The New York Times*, 23 Apr. 2023, <https://www.nytimes.com/article/tornado-climate-change.html>. Accessed 30 Apr. 2023.
- Edmunds, Susan. "Accelerated Immobilities: American Suburbia and the Classless Middle Class." *American Literary History*, vol. 15, no. 2, 2003, pp. 409–21. *JSTOR*, <http://www.jstor.org/stable/3567923>. Accessed 30 Apr. 2023.
- "Environmental Impacts of Natural Gas." *Union of Concerned Scientists*, 19 June 2014, <https://www.ucsusa.org/resources/environmental-impacts-natural-gas>

Fitch, Eric J. “WHAT’S UP WITH WATER?: Postponing the Apocalypse.” *Water Resources IMPACT*, vol. 18, no. 6, 2016, pp. 34–36. *JSTOR*, <https://www.jstor.org/stable/27031851>. Accessed 20 Apr. 2023.

George, Zach St., et al. “As Climate Warms, a Rearrangement of World's Plant Life Looms.” *Yale E360*, Yale School of the Environment, 17 June 2021, <https://e360.yale.edu/features/as-climate-warms-a-rearrangement-of-worlds-plant-life-looms>.

Hine, Dougal, and Paul Kingsnorth. *Uncivilization: The Dark Mountain Manifesto*, The Dark Mountain Project, 2009.

Hua, Xia, and John J. Wiens. “How Does Climate Influence Speciation?” *The American Naturalist*, vol. 182, no. 1, July 2013, pp. 1–12., <https://doi.org/10.1086/670690>.

Hudson River Cleanup, United States Environmental Protection Agency
<https://www.epa.gov/hudsonriverpcbs/hudson-river-cleanup>

“Hudson River PCB Dredging Project: Dredging Is Working.” *Hudson River PCB Dredging Project | Dredging Is Working*, <https://hudsondredging.com/river-dredging/ge-completes-dredging>

Hurst, Lawrence “Is Human Evolution Speeding Up or Slowing Down?- Laurence Hurst.” *YouTube*, TED-Ed, 22 Sept. 2020, <https://www.youtube.com/watch?v=NTeOhj6dxsU> Accessed 19 Apr. 2023.

“Hydropower 101.” *YouTube*, uploaded by Student Energy, 17 May 2015,

<https://www.youtube.com/watch?v=q8HmRLCgDAI>. Accessed 19 Apr. 2023.

Kahn, Matthew E. “The Environmental Impact of Suburbanization.” *Journal of Policy Analysis and Management*, vol. 19, no. 4, 2000, pp. 569–86. *JSTOR*, <http://www.jstor.org/stable/3325575>.

Accessed 30 Apr. 2023.

Nixon, Rob. “Neoliberalism, Slow Violence, and the Environmental Picaresque.” *MFS Modern Fiction Studies*, vol. 55, no. 3, 2009, pp. 443–467., <https://doi.org/10.1353/mfs.0.1631>.

Snow, C. P. “The Two Cultures.” *Leonardo*, vol. 23, no. 2/3, 1990, pp. 169–73. *JSTOR*,

<https://doi.org/10.2307/1578601>. Accessed 30 Apr. 2023.

“Twilight Zone S01 E14 - Third from the Sun” *YouTube*, uploaded by Quikvu Classics, originally broadcasted by CBS, written by Rod Sterling 1960,

<https://www.youtube.com/watch?v=LT6oj2dYS7Q>. Accessed 30 Apr. 2023.

“The 'Duck Curve' Is Solar Energy's Greatest Challenge.” *YouTube*, uploaded by Vox, 9 May 2018,

<https://www.youtube.com/watch?v=YYLzss58CLs>. Accessed 1 May 2023.

Thomas, Julia Adeney History and Biology in the Anthropocene: Problems of Scale, Problems of Value, *The American Historical Review*, Volume 119, Issue 5, December 2014, Pages 1587–1607,

<https://doi.org/10.1093/ahr/119.5.1587>

“What Is The Future Of Hydropower?” *YouTube*, uploaded by CNBC, 28 May 2022,
<https://www.youtube.com/watch?v=ZSUoClnyyN4>. Accessed 30 Apr. 2023.

Zipp, Samuel. “Suburbia and American Exceptionalism.” *Reviews in American History*, vol. 36, no. 4,
2008, pp. 594–601. *JSTOR*, <http://www.jstor.org/stable/40210966>. Accessed 20 Apr. 2023.