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INTERVENTION

Refashioning Origins in the Anthropocene: Reflections on Pedagogical Practice

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This contribution to *Anthropocenes* Interventions brings together the narrative accounts of five undergraduate students from the Purdue University John Martinson Honors College (JMHC) enrolled in the course *HONR 39900: The Anthropocene* in fall 2021. The students' starting point for writing was Erle Ellis' commentary about human origins, which he identifies as narratives deeply challenged by the Anthropocene; in rewriting the role of humanity on planet Earth, Ellis argues we are likewise rewriting history, refashioning our understanding of the diachronic processes that shape our world and inform our actions within it. Students were asked to explore these ideas through a re-examination of their own origin stories. Specifically, they were asked to identify their origin stories, to consider how these stories have shaped their understandings of their place within the Earth system, and to explore how these understandings might be challenged, amended, undermined, or upheld by the Anthropocene concept. The five selected accounts capture a range of responses that touch upon important, current themes in Anthropocene discourse, including questions pertaining to belonging, ruination, global flows, and the stratigraphy of the archaeosphere. As a historical record, they also serve to document emergent understandings of place, agency, and planetary power among a generation of 21st-century students in a US institution focused intently on technological advancements. The themes of each student's contribution are explored and highlighted in a brief introduction written by the course instructor before presenting each student's authored contribution. They are followed with the instructor's summary comments that consider implications for pedagogies of the Anthropocene.

Keywords: student; ruination; stratigraphy; archaeosphere; hyperobject; rhizome; dark pedagogy

Introduction

The Anthropocene is not only a phenomenon that creates speculative futures. As Edgeworth et al. (2015) demonstrate, the Anthropocene is also a formation process that impedes upon the past, permeating deep into stratigraphic time and changing the composition of human interactions with the Earth system that have already come and gone. It is a phenomenon which de-stabilizes our pasts and calls for their re-examination; an entire genre of discourse has emerged that now recognizes the Anthropocene as a bioturbation, something which punctures our established reading of origin strata and drives new perspectives on the ways living and non-living beings form, disturb, unearth, churn, and seep into the human past (González-Ruibal 2018a; Latour 1993; Moore 2017; Tsing 2012, 2015; Zalasiewicz, Waters & Williams 2014). Meaningfully engaging the Anthropocene thus requires a broad consideration of diachronic impacts, specifically the ways that it simultaneously re-fashions past, present and future as it expands both laterally and vertically within anthropogenic stratigraphy (Edgeworth et al. 2015: 51).

As a starting point for the course *HONR 39900: The Anthropocene*, students in Purdue University's John Martinson Honors College (JMHC) were asked to embark upon this meaningful engagement through a re-examination of their own origins. Students were specifically asked to consider how their own origin stories might be retold in relation to the concepts of the Anthropocene that they were learning. This was achieved through a multi-step writing assignment. At the outset, the students were introduced to scholarly works that explore how the Anthropocene refashions the past, first, by questioning philosophies of science based on a presumption of human subjugation to the laws of nature, and second, through an ontological turn that speculates about human syntheses with the material world as driving the formation of past, present, and future (assigned readings included an excerpt from Darwin 1859; Marsh 1848; Quammen 2019; Schellnhuber 1999). Students were then asked to think about and contribute one origin story from their own past – either a narrative commonly shared and re-shared by them or others pertaining to

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their own beginnings, or a story which they felt defined or best represented their concepts of themselves in relation to nature or the Earth system. They were required to be specific about how their learning about the Anthropocene might disturb or otherwise provide a new lens through which to understand this story.

Specifically, they were provided the following prompt:

> 'Erle Ellis (2018: 5) makes the point that "…origin stories tell us who we are, where we came from, the role we play on Earth, and our relationships to the rest of nature." The Anthropocene proposes a radical re-envisioning of human origins. Please describe this for your readers, and explore: What were your origin stories before starting this class, and what did they tell you about your role on planet Earth and your relations with nature? How might the concept of the Anthropocene change this for you and/or your readers?'

In order to open their narrative to audience (rather than write for an assignment directed only at the instructor, in which students might be more focused on requirements than on writing with intent for communication), the students were asked to complete pre-work for the writing assignment. This involved identifying a community for which to write; a group that they might have in mind as they drafted and edited their work. Students utilized the Yale Program on Climate Change Communication (YPCCC) SASSY survey instrument and tools (https://climatecommunication.yale.edu/visualizations-data/sassy/) to survey a group of their choosing (a peer network, a family group, etc.) and assess the group's general orientations towards discussions centered around humans and planetary change. In class, preliminary discussion focused on the potential for writing from personal narrative accounts as an effective strategy for connecting with the broadest range of audiences, per recommendations provided in YPCCC documentation (Roser-Renouf et al. 2014).

Students submitted their work to a shared discussion board, where all students in the course could view and read the work of others. Prior to final submission, the students brought rough drafts to class and spent a class session reading and providing feedback to their peers, editing their work, and working with the instructor to consider aspects of content, intent, and language appropriate to their goals for communication. From the final submissions, a sample of work was selected by the instructor for further development for publication, based upon the ways that the different narratives seemed to capture a range of important, current themes in Anthropocene discourse, including questions pertaining to belonging, ruination, global flows, and the stratigraphy of the archaeosphere, as discussed below.

About the Student Authors

The student authors are all undergraduate students who are dually enrolled in disciplinary colleges and in the JMHC at Purdue University. *HONR 39900: The Anthropocene* enrolls students from all colleges and majors, bringing together an eclectic mix of students able to work at advanced levels of intellectual independence, and who are interested to engage faculty and their peers in cross-disciplinary discussion on current topics in scholarship. JMHC student enrollment is somewhat more diverse than the university at large (11% and 13% underrepresented minorities in the university and the JMHC, respectively).

Purdue University is a public, land-grant institution in West Lafayette, Indiana. Reputationally, Purdue is especially well-known for its pre-eminence in engineering, science, and technology, and many students seek it out for these specific qualities – it boasts a storied history of educating astronauts and other aeronautical and aviation pioneers, and strongly promotes a culture focused on progress through technological innovation (e.g., Purdue's Giant Leaps campaign, https://takegiantleaps.com). Today, the university offers the full spectrum of disciplinary subjects, but interest in and attention to STEM fields predominates in the culture and education that many students experience. The University Core Curriculum includes many courses that tackle the complex entanglements between humans and the material world (for example, courses in the 'Science, Technology, and Society' core), but students can make selections from a large menu of course offerings and there is no explicit requirement for Anthropocene-related content or climate change education. Anecdotally, students often enroll in *HONR 39900: The Anthropocene* with strong background in science and technology, but little or no knowledge of climate change topics. For many, the course is their first experience engaging questions about how the current geologic era might impact them and their chosen work.

Student Author Contributions

Five selections of student work are presented below. As the instructor, I briefly reflect on the qualities of each and highlight why they were selected (italicized text) before presenting their self-authored contributions. In the Concluding Remarks section that follows, I then summarize findings from this corpus of narrative examples that might inform Anthropocene pedagogies going forward.

Bryce Colón

Fourth-year JMHC student, Bachelor of Science candidate in Pharmacy, College of Pharmacy, and Bachelor of Arts candidate in Sociology, College of Liberal Arts

In this first narrative, Bryce Colón offers a reframing of the account of his family's emigration from Puerto Rico to the United States. Often told as a story of opportunity, Colón instead considers the ecologies of colonial wastescapes and ruination that have constructed the pathways along which his family travels. Notably, though it is a story of emigration, Colón seems more concerned with experiences of return, which appear to embed him at least as much within his family's point of origin as in his current residence. In this

respect, his story suggests that the ties of colonial migration are threads that can remain uncut, perhaps constructing not only a complex fabric of people interconnected across geographic space, but also tunnels that can be traversed by descendants through the stratigraphic boundaries between colonial and postcolonial epochs.

Colón's vision of the ruination of Aguirre reminds of other, similar accounts that present a ghostly world of deindustrialization (Gonzalez-Ruibal 2018a; Ebron and Tsing 2017; Dawdy 2016). For the author, while these frozen temporalities of exodus open possibilities for re-inhabitation by other beings or even sinister apparitions and 'febrile dreams,' they do not seem to do so in any meaningful way for his own future or those of his kin. Instead, there is the mundane, vibrating hum of the Aguirre power plant that pervades his experiences and memories of the town, a generator of disturbance for his past, present, and future. This is an evocative element for readers to absorb, a kind of vivid and notably sonorous sense of place that reverberates through the soil and atmosphere, and in all living things whether alive, awake, dead or asleep. If the postcolonial ruins of industrialization have a soundscape, surely Colón has helped to capture it here.

My father's immigration to the United States is often framed in a very particular way: after spending the majority of his childhood in rural Puerto Rico, his older sister received a scholarship to attend Purdue and the whole family followed for better opportunities in the mainland United States. I have heard the story of the trials and tribulations of immigrating my whole life. The part of the narrative that is lost in the 'opportunity' framing is the utter *lack of opportunity* in Puerto Rico. When the United States 'acquired' Puerto Rico after the Spanish War, much of the island was used to grow cash crops, particularly sugarcane. The company town of Aguirre in which my father grew up was centered around the cultivation, processing, and distribution of sugarcane for the first half of the twentieth century. By the time my father was born, this process had become largely mechanized and fewer laborers were required to process the sugar. Moreover, many agricultural companies had left Puerto Rico in favor of growing sugarcane elsewhere (Pérez 2002).

The company town remained long after the company was gone, but today it is dilapidated and largely abandoned. Many of my relatives still live in Aguirre, but nature has reclaimed most of the town's former jewels. Vines weave in and out of the hospital's glassless windows, and the wind howls through the old hotel's husk. The smokestacks of the sugarcane factory rise high above the town, but the majority of the building has collapsed and rusted. Abandoned plantation houses have become nesting grounds for tropical birds. Are these features of deindustrialization simply adaptation to a changing environment, as evidenced by archaeological records in Puerto Rico (Collazo-Rivera et al. 2015), or is this something more complex and sinister?

Peculiarly, Aguirre has become the center of much of Puerto Rico's energy production – the Aguirre power plant lives here. Puerto Rico's energy grid is famously delicate, and blackouts are a part of daily life. Indeed, one form of energy (electricity) has supplanted another (sugar), even with all of its imperfections and inadequacies. Houses in Puerto Rico lack air conditioning, and the oppressive heat lends itself to febrile dreams for unprepared Americans staying in Aguirre (like myself). The only constant in the town is the hum of the Aguirre Power Plant Complex as it heats and cools and releases its effluent into Jobos Bay. For more information about this complex, see the 2018 Environmental Protection Agency (EPA) report in the References.

Visiting Puerto Rico throughout my childhood felt illuminating. Here was a place the EPA governed but could not grasp, a place owned by the first world but living in the past, and a place of pristine tropical beauty soiled by industry. In this way, nature seemed like a force that could be dominated and cajoled through industrialization, mechanization, and colonialism. My relationship to nature became disjointed; the powers that forced nature into submission seemed so violent and out of my control. Their consequences seemed eternal and the domination of Earth seemed fruitful only for Americans living on the mainland and urban Puerto Ricans living in San Juan. And this fruitfulness that drove millions into poverty appeared to be driving ever increasing carbon dioxide levels in the atmosphere (Davis and Caldeira 2010). It raised perplexing questions for me, but the most important question was: Could a consumer culture with imports and exports and internationally traded goods ever be healthy for the planet and the people involved?

The Anthropocene is a synthesis of stories like this that span the world spatially and temporally. This kind of story is recognizable to anybody who has lived in a company town like Chillicothe, Ohio, anybody from a dominated island like the Philippines or Hawaii, and anybody who lives in the shadow of industry like those who dwell in sight of Michigan City's massive generating station. The feeling that forces beyond any single person have transmogrified the Earth is shared by many, especially those who have seen Earth wrought by irresponsible farming and sapped for her worth. The lamentation that pollution has irreversibly altered some ineffable quality of Earth is shared by everybody who lives near the sea. The concept of the Anthropocene offers a narrative that encompasses all these observations, feelings, and lamentations. The Anthropocene is the hum of the Aguirre generator heaving and sighing, like some indolent Kraken emerging from the coast, belching greenhouse gasses into the air in perpetuity.

Humans (including the indigenous people who inhabited Puerto Rico) have adapted to climate aberrations in the past, but will modern realities allow for adaptation as the environment degrades and the Anthropocene warms? Will the environmental movements of Western Europe reach their precarious (former) colonies, or will they abandon their prizes as climate change intensifies? Will island nations have more than just a seat at the table at COP26 – will the urgency of their plight be acted upon? Current literature discussing the resiliency

of many island nations in the face of climate change has moved beyond protection – it has moved entirely in the direction of discussing assisted relocation and focused on the inevitable inhabitability of many islands (Ferris and Weerasinghe 2020). For the island nations that are not at such immediate risk of inundation, hopefully action is instituted that prevents such inundation in the first place.

Grace Johnson
Fourth-year JMHC student, Bachelor of Science candidate in Natural Resources and Environmental Science, College of Agriculture

In the second narrative, Grace Johnson re-evaluates their origins in an Oklahoma farming town. Johnson's story raises and provisionally settles certain questions about connections to place and home. Historical memory seems to play a significant but also nebulous role in de-centering the author – a vaguely unfamiliar settler past and a legacy of earlier generations' work, through which the author recollects a clear but alien sense of times of intensive production that serves as contrast with lived experiences. There is also a distinct awareness of the historical moment of drought in which their farm life has been lived in relation to the Dust Bowl of the 1930s. Interestingly, it is not only these observations, memories, or pragmatism about these circumstances which Johnson cites as inviting removal, but also the struggles of the land itself, which is operating under an array of global forces assembled against it.

Johnson's re-embedding in the home farm comes about through the author's education concerning these broader soil and water conservation problems. Notably, these must be understood at regional and global scales, rather than local ones, leaving unspecified where home is exactly – whether in stewardship of the farm, of Range Valley, and/or of the Ogallala Aquifer. These read as synonymous. In this, the problems and challenges of 'future becoming' in the Anthropocene become apparent (Chandler and Reid 2019, 2020). In place of a construction of home based on an understanding of legacy, inheritance, or other forms of historical-rootedness, Johnson comes to understand home as something acquired through engagements with everywhere else. The author is perhaps working towards an imagination of a speculative future for the Anthropocene home, one which is based in an evolving and forward-facing allyship with its land, water, and soil, and that is less attuned to material or cognitive engagements with its chronological past.

As adamant as I was in my childhood that I would not be tied to the land my family has tended to for generations, I now find my future inextricably linked to its success. While very little is known about where my family originated and how they found their way to western Oklahoma, Range Valley Farms is the last evident piece of their work. Formerly situated on the outskirts of a bustling town, the farm has gone through periods of intense crop rotation, hog farming, and goat breeding. Now, it stands alone as one of the only remaining homes to survive the Dust Bowl and continue to house Range Valley residents.

My brothers and I were born into a time when the farm continued to operate solely for the purpose of continuing my grandparents' legacy, producing only a small amount of wheat, alfalfa, triticale, and calves. Our insistence to separate ourselves from the land came from having never seen it at prime production; our childhoods were additionally engulfed by the worst drought that had occurred since the dust storms that originally caused Range Valley Farms to decline. I saw the land was struggling as a result of environmental events that were seemingly out of our hands and found it difficult to picture the farm continuing under these conditions, much less see it as part of my own future.

However, I simultaneously became interested in environmental phenomena that, at the time, seemed to have no relevance to what was occurring at Range Valley Farms. It was not until I moved out of my community and began studying natural resources that I made connections between the farm I grew up on and issues of water resources and soil degradation. As I began to understand that depletion of the Midwest's largest water resource – the Ogallala Aquifer – had a direct impact on western Oklahoma, I started to recognize my own family and community's roles in our groundwater crisis. We, like almost all farmers in my region, utilize water-intensive farming practices that contribute to lowering water tables in the Ogallala (Ledbetter 2021). Our lack of soil conservation practices most likely also contributed to the dust storms that occurred in the 1930s and caused Range Valley as a town to collapse. I no longer viewed the issues affecting my family's farm as isolated to that area but as global – without water from the Ogallala, no Midwestern farmer can produce the grain that feeds people worldwide (Ledbetter 2021).

Since making these connections, the trajectory of my life has changed and my relationship to Earth has been altered. Previously, I was disconnected from agriculture and the environment, unaware that human actions could so drastically impact global systems and landscapes that we would need a term to describe the time in which we have made such an impression on Earth – the Anthropocene. Now, I recognize humanity's need to assure that our impact going forward benefits the planet instead of worsening the global and local environmental phenomena we are experiencing.

I also recognize that my story is not unique. People across the nation are experiencing issues within their communities that are indicative of global changes. Cities in California are experiencing reduced air quality due to climate change-induced wildfires (Camero 2021), towns in Nebraska have undergone extreme flood events since 2019 (Schwartz 2019), and Florida's shores continue to recede as sea level rise occurs (Staats & Mills 2017). However, despite the issues we are facing, I believe there is great potential for change. While there may not be a one-size-fits-all solution to our problems, our communities have a tremendous opportunity to craft solutions that

meet our own needs as well as benefit others far beyond our localities.

Jordan Harris
Fourth-year JMHC student, Bachelor of Science candidate in Mechanical Engineering, College of Engineering

In the third narrative, Jordan Harris grapples with placing the boundary of the Anthropocene in contexts of personal experience and the ethics of personal responsibility. He starts from a compelling place, his childhood memories of Hurricane Katrina and its impacts on his community. Harris describes the ways that these experiences developed in him a sense of the overwhelming capacities of nature, which through his education he now understands as both entangled with human power, but also perhaps at times (and only temporarily) superseded by the ability of suburban landscapes to push nature to the margins.

In comparison to Johnson's narrative, Harris's understanding of the Anthropocene is deeply rooted in the competing material agencies he observes in his local environment. For Harris, these have the potential to be resolved through mitigation derived from personal behavioral changes. Rather than a social or political ontology that views structures of inequality as key to processes of disaster formation (e.g., Huber et al. 2017), out of his experiences Harris instead defines an ontology which is significantly more material, and which sees the forces of nature synthesizing with human power at grand scales. From this, he develops a reflexivity rooted in both a self-monitoring biopolitics (Foucault 2008) and a relational biophilia (Nørreklit & Paulsen 2022). Like Johnson, here the subject is also not the product of history; it is instead a product of Earth's socionatural power, and the regulation of the body and care for other bodies determines the relationship to Earth's structural violence. This is notably informed by the discourse of the Anthropocene, and in particular its science, which for Harris forms the observable link between human power and the violent forces of nature, and thus provides his impetus to change at the level of the subject body. As he states, 'the Anthropocene is now,' meaning for Harris it is both the present outcome of human agencies and the medium for all relational behaviors going forward.

Before starting this class, my origins were greatly influenced by the forces of nature. I was taught from an early age how we as humans are not impervious to the forces of nature. I was born in Baton Rouge, Louisiana, in 1999. When I was four years old, my family moved to Kennesaw, Georgia. Shortly after, Hurricane Katrina wreaked havoc in the state of Louisiana. We saw family members left dealing with flooded homes and streets. Many people saw many years of hard work, gone in an instant. The city of New Orleans was hit especially hard, as it is the middle of the 'bowl' shape that the center of Louisiana is fashioned after. There was a lack of structural integrity in the levee holding back the waters of the Mississippi and the Gulf of Mexico (Fussell 2015). This is a simple example of humans failing to bend the will of nature. The major flaws in humanity had been exposed. We simply cannot completely control nature, so we perceived it to be this way: Nature is more powerful than us, no matter how much infrastructure or devices we build to counteract natural effects.

From four years old, my origin story was understanding that nature is a force to be reckoned with. Since then, I have lived in Georgia where I have learned a substantial amount in regard to the human place in the order of nature. We should care for the Earth because 'it's the only one we've got.' It is our duty to protect and nurture the same earth that we, and other creatures, inhabit. I have been taught that humans are the single most impactful creature on the environment. We are the only creatures who permanently modify ecosystems for our benefit (deforestation, farming, suburban development, etc.). Living in a suburb that has developed over the years, I can see just how much my local environment has changed. I've seen a lot of deer with nowhere to go and less and less birds as trees are cut. As suburban developments expand, there is a significant reduction in habitable land for woodland creatures. This density of woodland creatures is especially low in urban areas where almost all natural habitats have been converted into pavement lots and high rises (Magle et al. 2019). Being in the South, the summers are hot and the other seasons are also fairly hot. It has snowed and stuck a total of three or four times that I can remember, but not in the last six years. I have been taught that human actions greatly influence the occurrence of natural phenomena and I have observed that myself. For example, I have been taught about urban heating causing cities to be degrees hotter than the surrounding regions simply due to the amount of pavement and lack of greenery, a relatively recently discovered phenomena in cities, especially larger cities with a large amount of pavement and buildings with a distinct lack of nature. This local temperature rise can affect energy demand which, in turn, leads to more burning of coal or other fuels to generate electricity which is proven to release greenhouse gasses into the atmosphere. This idea of human-centered effect on the environment is greatly encapsulated by the Anthropocene.

The Anthropocene aims to pinpoint the exact point in geologic/chronologic time where humanity has entered a new era. One where humans have a dominating, sustained impact on the environment, nature, and wildlife (Wu, Zhang & Zang 2019). Currently, the industrial revolution is a relatively accurate marker that shows evidence of the sustained human impact on nature**.** From increased concentration of greenhouse gases in the atmosphere to increased frequency/ severity of natural disasters, it is evident that the Anthropocene is now. This concept only reinforces the observations I have made over my formative years. At some point, there have to be ramifications to the actions humans have taken to modify nature for their own comfort, often at the expense of other wildlife. The Anthropocene allows us to categorize the events we see and have a tangible causation for them aside from purely natural cycles (Subramanian 2019). I think definitive

knowledge that humans are a dominant influence on the environment gives us the means to act. If our actions can cause these issues, then to some extent, there are actions we can take to mitigate the repercussions of our behavior. One of the most impactful actions individuals can take is to monitor their own lifestyle and make environmentally conscious choices. Mindfulness is beneficial because it allows us to understand just how much one person can really affect the environment. Your carbon footprint can be reduced by tons of CO_2 yearly just by making smarter choices about how often you drive, how fuel efficient your car is, to buying locally sourced food and less processed foods, among other considerations (Cordero, Centeno & Todd 2020). Without individuals taking personal responsibility to care for the environment, it will be very difficult to mitigate the damages done to the environment by previous generations. In short, nature is a force. Humans can alter nature all they want, but they cannot bend the will of nature to do their bidding (see Hurricane Katrina). The Anthropocene conceptually allows us to categorize the human-centered threat the environment is facing and give us the chance to act before it is too late.

Nicholas Borders
Second-year JMHC student, Bachelor of Science candidate in Geology and Geophysics, College of Science

In the fourth narrative, Nicholas Borders draws our attention once again to suburban influences on the development of these students' relations with nature. Borders describes his experiences moving between 'inside' and 'outside,' and the relative impacts these different contexts have had on his personal and professional development. The boundaries between the two contexts seem clearly demarcated for Borders and do not appear to permeate each other in either direction – inside is a fully internalized world of individualized play on phones and video games, outside is the realm of social interaction, a fact understood not only by Borders but also his family members. Nature exists in the outside world, but there, for Borders it exists as something more than just a backdrop for socialization with friends and family – rather, he describes experiences with nature in which it is an interlocutor itself, offering physical dialogue (in the form of sunrises and dew on the grass) that inspires him to new and more intense forms of engagement.

Borders's construction of nature is as something out there in the world to be intentionally accessed, experienced, and then internalized. His description of himself as 'transcendentalist' (and here, he draws upon some of our class discussions) is a helpful way to capture some underlying themes of nature (as something fostering purity, goodness, and self-reliance) that are implicit in his narrative of personal growth. As with Harris, the suburban environment appears to be an important structuring device in these perspectives towards the natural world. But Borders's interpretations of what his ongoing physical and behavioral engagements should be with this world are also remarkably dissimilar from Harris. Whereas in the latter case, future engagements are understood as disciplinary acts and relational care that are necessary to manage conspiring material agencies of humanity and nature, for Borders there seems instead to be a need to preserve strict boundaries of nature that already firmly exist. In this, his role is understood to be a steward of pristine nature. This stewardship is moreover pivotal in motivating Borders towards future work as a scientist (a geophysicist); he is inspired to study the stratigraphic record out of a desire to confine, observe, and preserve perceptively natural places as exceptional terrain for humanity's spiritual transformation. Perhaps this throws anthropogenic bioturbation on its head (Edgeworth et al. 2015; Waters et al. 2016) – it is a critical Earth-formation process, but one in which soil digs into humanity, rather than the other way around. A not inconsequential result is that the discipline of the natural sciences is upheld, though the scientist is transformed.

To this point in my life, nature has helped my mental and physical states remain positive and active. Moreover, from this point and on, my role is to serve and protect nature. My relationship with the natural world is symbiotic and is a huge part of who I am. This is something that I am proud of; however, my life has not always been this way.

In my early childhood years, I was always active outside building small stick-forts or engaging in baseball and football or whatever games were happening at the time. I have always loved the outdoors but have not always understood what its role in my life has been. Slowly, over time, my love for the outdoors diminished and by the seventh grade I spent most of my time alone and playing video games. Between my phone and my gaming consoles, the outdoors seemed obsolete. Consequently, my parents were concerned that I wasn't getting enough social interaction or physical exercise, so they signed me up for cross-country practice.

I remember how angry I was at my mom. Like many people I've met since then, the idea of running for fun was appalling. I whined and complained but my mom was adamant that I try cross-country for a season. At first, I would skip many of the practices and ride home and play video games. Eventually, after a few races of being near last, I started to try and train more consistently. At the end of the season, I had gotten into decent shape and was even awarded the 'most improved' award. After my eighth-grade season I decided to join the high school team.

After my freshman and sophomore seasons, I knew I wanted more than to simply stay in shape – I wanted to run varsity. While I knew that about myself at the time, what I didn't realize was that the nature of the sport had grown on me. I loved riding the team bus early in the morning and watching the sun rise over the foggy fields and forests. I loved walking each course and feeling the dew on my toes. These feelings were the start of something bigger in my life that I had yet to realize.

The next two years of the sport were even better since I was improving so much that I could almost run at the varsity level on my big team. By the time I started my senior year, I was completely committed to the sport. I

was running fast times. I was running varsity meets, and I even ran at the state meet. More importantly, I finally understood the sport. I understood not only how to efficiently race and train, but also what the sport means to me and what role it plays in my life. I realized that running acts as a de-stressor in my life. It's my outlet for being able to enjoy the outdoors whenever I want, and it keeps me in good spirits. Running helped me to realize that I need nature in my life. As I progressed in this sport and ran longer and longer distances, my interest in long hikes blossomed.

The summer before my freshman year at Purdue, my dad, two friends, and I went on a backpacking trip in southwestern Colorado. We traversed over five mountain summits and 130 miles through the most beautiful scenery I have ever seen. It was after this that I knew that I wanted to spend my life running and hiking around the world. When I'm immersed in nature I feel at peace and complete. Moreover, this passion for the outdoors and physical activity extends beyond being a hobby. I came to Purdue to become a geophysicist. I want to be a geophysicist because I want to learn more about nature. It is my dream to spend weeks out in the wilderness researching, hiking, running, climbing and getting the full experience of nature. Additionally, it is my calling to protect nature. I believe that pursuing a career in geophysics, specifically one day becoming a professor, is the perfect way for me to live my dream. I also know that becoming a professor will allow me to commit to research and educate others on different methods to protect nature.

With every day, protecting nature becomes more difficult in the face of global warming. In fact, the extent to which humanity has altered nature can be seen in the earth's geologic record. The term 'Anthropocene Epoch,' is a label many scholars use to describe this physical change in the geology of the earth. Specifically, J. R. McNeill and Peter Engelke, two acclaimed environmentalists, define the Anthropocene as the epoch 'in which humankind [has] emerged as the most powerful influence on global ecology' (McNeill & Engelke 2016: 1). The Anthropocene is a scientific label to describe how much humanity has influenced nature.

I bring this up because the Anthropocene is the biggest threat to my life goal of protecting the natural environment. Both the geophysicist and the transcendentalist in me are concerned over how much influence humanity has over nature. I know what my place is in mitigating climate change, and I also have ideas on what I think humanity's place is in this situation. I don't believe that humanity is in debt to nature because of our anthropogenic mistakes, rather that we need to keep our sphere of industrial influence away from it. That's not to say that humans can't enjoy the treasures of nature like hiking or sightseeing, but I believe humanity should impact the environment as little as possible. How this will happen is quite uncertain but I and many others whose lives revolve around nature are hopeful that mankind's influence over nature will reach net zero.

Kathryn Malerbi
Second-year JMHC student, Bachelor of Science candidate in Public Health, College of Health and Human Sciences

In the fifth and final narrative, Kathryn Malerbi considers her origins in relation to a series of global capital flows. The first of these is a beguiling story of an ancestor who was an accidental industrialist engaged in the colonial transformations of Brazil in the 19th century. In her own research, Malerbi connects this seemingly mythical origin narrative to direct and observable large-scale consequences for ecological, urban, and political contexts in South America. Overlaying and at times interrupting this account, is another, perhaps more immediate story of concern for Malerbi, which is her parents' emigration to the United States from Brazil twenty years ago. Though both stories are similar in that they capture the moves of the family along lines of global capital development, they differ in one notable way, which is the actors' relative comprehension of the worlds being constructed around them, and to whose construction they ultimately contribute.

One of Malerbi's main points of emphasis is a sense of distance between people and their smallness in relation to these world formation processes, which both stories equally encapsulate. To a certain degree, the question of whether this distance and smallness is initiated by a 'meticulous plan' or by accident appears incidental, and we might consider whether this is the point of the contrast; what is important is the individualized nature of both accounts in relation to the accrual of global-scale change. For Malerbi, how the individual navigates new worlds of geographically delimited abundance, the routes they form as they seek to extract and live from it, are the critical forces that create global flows. These collectively shape the Anthropocene, but they also feel quite isolating – like travel itineraries lined out on a global map, they crisscross and add up to an undifferentiated mass of capital flows, but they do not connect or embed with one another. The lines create a collision of worlds (Old and New; New and newer), but the individuals initiating them never themselves collide (Lewis & Maslin 2015); they might be compared to Deleuzian rhizomes, but in this they are uncomfortably solitary regardless of the mass of bodies that they assemble (Deleuze & Guattari 1987). When Malerbi states that 'We must ask ourselves where the line gets drawn where our human actions become irreversible,' we might consider which line it is that she is asking us to see: Is it the stratum of a geologic boundary, the point of no return into a no-analogue state, or is it the lines of flight which arise and which we must follow alone within the vast dimensions of deterritorialization?

An origin story that pertains to my own family history involves the immigration of my great-great-great grandfather from Italy to Brazil. I myself am a first generation American as both of my parents immigrated to the US from Brazil about 20 years ago. Therefore, a lot of my own familial and cultural understandings come from a separate culture than the one I currently find myself in. I feel that my own origin story helps me

somewhat understand the great amount of physical space and distance between humans and how small we may really be individually when it comes to nature. My role on Earth holds a different meaning to me than it may hold to someone with different origins than my own. My existence here in the United States was not by chance, but a meticulous plan made by my parents who were fearful of having children in a developing or third world country. Knowing the purpose of my parents helps me situate my own self and my own role on Earth to not only continue the legacy of my parents but to take advantage of the opportunities I now have because of my location.

But going to an origin story even farther back than my own would be that of my great-great-great(?) grandfather who was an Italian man searching for new work opportunities in the 'New World,' or America. Along the way he finds himself going to the wrong America – he lands on the shores of Brazil in *South* America instead of where his own older brothers wrote to him about. As an engineer looking for work in these newer developing lands, he decides to stay in the rapidly modernizing country and aids in engineering what will become part of the major railroad systems in Brazil. The entire concept of the New World back in the day is a very interesting one to observe because it involves the idea of more opportunities, more resources, and more freedoms within our own ties to nature and begs the question about the concept of the Anthropocene. The Anthropocene is a proposed geological era that looks at human impact on Earth systems, and specifically those about human-caused climate change. This concept, however, asks us to observe back to not only our own familial or personal origin stories, but the origin stories of humanity and when anthropogenic changes to the physical environment began impacting the Earth long-term.

Historically, one can associate the industrialization time period in human history to the Anthropocene concept. It shows how far back the concept of the Anthropocene goes back far to this time period, or even to eras before when humans began domesticating the Earth for farming. This idea of the Anthropocene can also show us how we may view things such as anthropogenic climate change as a large-scale change done by millions, when it really all begins to happen on an individual level too. Many generations ago, one of my own individual ancestors participated in furthering the concept of the Anthropocene and now I myself am also influencing the Earth in a different way. This becomes emphasized by the origin story that I described earlier. My own ancestor was an engineer involved in the creation of the railroad systems in Brazil and exacerbated the ideology of going to the 'New World' and consuming their resources and harming the environment in the process. During this time period in Brazil, coastal regions were largely impacted by the Europeans who traveled there and brought their own plants and animals. By the end of the 19th century, most of the coastal forests were converted into agricultural lands or '... degraded to the point of uselessness' (McNeill 1986). This eventual change brought on by these Europeans has led to very few areas in Brazil that still have coastal forests today. By the 1870s, southern Brazil had started the advancement of locomotives which invariably ended up burning a lot of wood and penetrating the forest regions. Because of this, three southern states in Brazil – São Paulo, Minas Gerais, and Parana – were able to open up to more agricultural purposes and economically supported the industrial growth of Brazil (McNeill 1986). However, cutting down forests for railroads and the subsequent agriculture in those areas ended up decimating thousands of miles of rainforest. Most notably, the Paraná rainforest (which is about the size of the entire state of Wisconsin), which used to expand up to 200,000 square kilometers, no longer exists today due to this expansion (McNeill 1986).

In the science community it is widely acknowledged that global climate change is a serious threat to the environment and human societies (Roser-Renouf et al. 2014). When we take a look at large historical events such as the Industrial Revolution that greatly impacted the environments we existed in, we must see some of the imbalances that become highlighted due to advanced technology. During this time period, humans were beginning to impact nature in ways they hadn't been able to before, but it also makes humanity observe the limits that exist in the power play between human innovation against the power of nature. Every year natural disasters destroy buildings and towns, yet we continue to destroy our own natural environments to build these structures – even to the point of no return. We must ask ourselves where the line gets drawn where our human actions become irreversible. And that these things have all occurred over many years, even one individual at a time makes a difference. If humans are responsible for certain aspects of climate change, we must also look within ourselves to find a solution. Taking action is essential to emphasize the concern humanity should have for our planet.

Concluding Remarks: Implications for Pedagogical Practice

The five student-authored origin narratives presented above raise questions and provide illustrative examples of the impacts of Anthropocene education on a group of young scholars. Many of these students are poised to take up future careers in science, technology, and related fields. Their narratives, created as an assignment for an honors seminar course on the Anthropocene, raise questions about how students in the 21st century construct understandings of the human and natural worlds, and how these perceptions might be engaged by the learning process at a time of significant ecological, social, and educational change. Does education about the Anthropocene work with or against the 'Holocene logics' of empirical science and modernity in their knowledge worlds, and what meanings do they derive from exposure to both of these pedagogies (Paulsen, jagodzinski, & Hawke 2022a: 6-8)? To what extent does being a learner in the liminal space between epochs either surface or challenge their experiences of landscape change, human migration, capitalism, social power, relational care, and identity formation? What concepts are open to them to

modify, what is discovered anew, what is suppressed, and what is reinforced?

As the editors of the recent volume *Pedagogy in the Anthropocene* point out, how students respond to the Anthropocene is framed by how they understand the world they live in (Paulsen, jagodzinski, & Hawke 2022a: 5). Educators cannot lead them to knowledge and skills for inhabiting the Age of Destruction (González-Ruibal 2018b) if we do not first consider how they perceive it. This, the student perspective, remains an open and critical question for educational scholarship in the Anthropocene – at this juncture, teacher and student are divided not only by the usual gap of generations, but also by a chasm of epochs between us. The chasm is not only geologic; it is also pedagogical. Irrespective of the Anthropocene's disputed beginnings, it is only these most current students, born at the dawn of the neoliberal era, who have absorbed the dystopian literary narratives generated by climate science (Oziewicz 2022), and only in recent decades (and more so, the recent last two years) in which they approach the educational program through a culture of depression, anxiety, loss, wreckage, and hopelessness (Jehi et al. 2022; Koefoed & Burø 2022).

The Holocene pedagogies upon which most educators draw today work to instill identity constructions in students that stand in relation to chronologies of absolute time, where the self is situated along diachronic social timelines of national histories and socio-technical progress (McLean & Syed 2015; Riede 2022). Freire (2018) offered an alternative, co-constitutive approach based on dialogue between teacher and student, but it was nevertheless only a (re-)shaping of this master narrative (McLean & Syed 2015: 324–325). By contrast, many of the emerging Anthropocene pedagogies seem to advocate practices that instill values and strategies for hope, more-than-human kinship, and place-making, in which the self is constructed materially, relationally, and synchronically through a process of discovering one's community (e.g., contributions to Paulsen, jagodzinski, & Hawke 2022b; Lynch & Mannion 2021). But in the luminous sunset of Frierean pedagogies, this would seem to put the cart before the horse – shouldn't we first engage in dialogue with our students to unveil the realities of the apocalyptic worlds they inhabit, before embarking on efforts to help them see a comprehensible totality and navigate through it?

The origin narratives presented above bring forward several key themes with demonstrable impact on students' thinking. These include the separation of humans and nature and their collisions in suburban landscapes, which bear upon on students' perceptions of the Earth's stratigraphy; the global flows of human migration and capital of which these students have been a part, and the ruins that emerge for them in their wake and the meanings that these carry; senses of belonging and alienation, and the questions that these raise for students about their pathways to future becoming; and the ethics of personal responsibility and more-than-human care shaped by the material ontologies that they perceive. Uniting their origin narratives and connecting them to trends in Anthropocene pedagogy is a shared sense of a loss of inhabitation and perhaps, a struggle for grounding in the 'critical zone' (Koefoed & Burø 2022; Latour & Weibel 2020). Each narrative seems to evoke this deterritorialization in different ways, either in the form of colonial migration stories, in the disconnected experiences of the suburban landscape, or the struggle to connect to a home.

At the same time, however, none of them seem especially concerned (yet?) with the material practices of grounding (that is, place- and kin-making). Instead, they focus on perceiving the hyperobjects, those viscous material bodies whose scale surpasses human senses, but which have power to differentially impact lives (Lysgaard & Bengtsson 2020; Morton 2013). For Colón, it is the 'ghostly Kraken' of Aguirre's electricity, which shadows the hyperobjects of sugar (Mintz 1985) and sea that preceded it; for Johnson, it is the dust and groundwater that are the story's protagonists; for Harris, a hurricane whose force threatens on the boundaries of the suburbs and must be faced; for Borders, the Earth's soil that permeates a sense of self; and for Malerbi, global migration and its logistics, in which the force of human agency remains unclear. I read these and think of the students like Klee's Angels of History (Benjamin 1969); however, their eyes are not fixed on the wreckage before them in their quest for somewhere to land; they are looking at the storm of progress itself, the hyperobject, which lies in front but also behind and all around them, hurtling them forward, as they attempt to comprehend it. Yet another way to understand their origin narratives is as redemption stories, in which all of them seem to grapple with accounts of hyperobjects that have been faced and subdued either by them, or in other contexts or generations before (McLean & Syed 2015: 332).

What do these interpretations mean practically, in moving towards actionable pedagogical practices for teaching the Anthropocene? Where does one lead such students? My understanding from reflecting on these students' works is that place- and kin-making pedagogies may be as yet premature, and that the methods of dark pedagogy (Lysgaard & Bengtsson 2020; Lysgaard, Bengtsson & Laugesen 2019) hold promise for immediate steps going forward. As these students have already embarked on the process of narration, they could, for example, be further led to define and explicate their origins' hyperobjects, and their vulnerabilities and self-making in relation to them, through additional, autobiographical creative writing assignments as forms of 'dark excursions' (Laugesen 2019). Another possibility would be to further think through their values in these highly complex and disturbing contexts by assembling; selecting and de-selecting physical items based on what is most vital to preserve, and then bringing them together in the form of memory boxes that they might either confine for personal reflection, or present in partially obscured forms to disturb others, or place on display for shared human and non-human consumption (Riede 2022: 175; Lynch & Mannion 2021). The objective with these and similar exercises would be to better conceptualize and materialize their senses of beauty,

alienation, identification, and apparition in relation to the hyperobjects they deem most present in their worlds. It remains to be seen how such complicated, troubled, and rich perspectives these students might advance will inform their actions in the world going forward.

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The authors have no competing interests to declare.

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