**Outlining: Cultural Modes of Producing Memories in the Anthropocene and Ways of Rethinking Cultural Memory as part of an Ecological System**

This thesis looks at cultural memory in the Anthropocene. In particular, it looks at what kinds of items could become symbolic of the Anthropocene in cultural memory. These items are not necessarily items in the traditional sense of collections in cultural memory institutions; they are concepts, relics, and collections of items themselves that force critically thinking about how we might conceive of the Anthropocene in cultural memory.

One half of the thesis will go over modes of human production in the Anthropocene and ask what is and isn’t being excluded from cultural memory. This creates two streams: “waste”, in both the sense of excess industrial waste and the sense of human products discarded from symbolic status in cultural memory because they are a means of production rather than a means of culture; and ecopoetic productions, or ways of how cultures use various mediums to self-reflect on the Anthropocene and create cultural memory narratives of living in it. Ecopoetics is, as its name suggests, mainly about poetry, but this chapter will take the concept and apply it broadly to other art forms to examine the exploration of trauma related to climate change in cultural creations. Taken together, these chapters will examine how the Anthropocene is represented in cultural memory. This will be two chapters.

The other half will think about cultural memory as it relates to broader issues of environmentalism and humanity’s natural heritage in memory, namely in the way we choose to preserve natural memory. It will think about culture memory as a limited way of thinking about memory as a whole; first, because of the historical exclusion of natural or ecological memory from certain cultural memory ontologies, and second, because of the concept of deep time as it relates to human history and memory. The former will think about how natural memory can be incorporated into cultural memory to think more critically about how practices in the Anthropocene affect human cultural memory production due to our role in our ecosystems. The latter will think about how prehuman and posthuman memory practices situate ideas about cultural memory in a human-centered epoch, and how thinking about memory in deep time forces new considerations on our current ways of preserving memory, and whether or not they are effective in the Anthropocene.

**Game (Chapters) Overview**

The four themes outlined above (waste, ecopoetics. ecological memory, and deep time) will create four chapters. These chapters are the “routes” in the game. Each route will collect items related to their specific theme. There are also four “cultures” in the game situated in a different climate, and the route will also have insight into the perspective of that culture\*. There are around 5-6 items to collect for each route, and each route will deposit those items into the main collection to complete the route. I am debating if only item from each route should be deposited to offer a choice, which will impact the ending by thinking about different links between the items.

Once all four routes are played, in any order, the ending sequence will begin. The ending will have you collect some last few items with the perspective of all four routes. It will focus on climate activism and the concept of solarpunk as a form of mnemonic resistance in Anthropocene cultural memory in order to end on a hopeful note.

The “conclusion” of the thesis will be looking at the links within the collection to think about how we make cultural narrative memories in the Anthropocene through linking our industrial and artistic practices, perspectives on ecology and the role of humans within it, and the role of cultural memory and cultural memory institutions in combating climate change.

\*The climates are loosely divided by temperature (polar to tropical) and humidity (arid to wet) to acknowledge factors included in climate classification systems like Köppen climate classification and the Holdridge Life Zone scheme, which both account for living and nonliving factors in ecoregions:

* Hanen: Temperate river basin and inner continental regions
* Ravaaga: Boreal/subarctic regions
* Majaatl: Tropical and heavily forested regions
* Andazi: Arid desert and coastal regions

These aren’t meant to suggest ecological determinism but rather to think about anthropogenic effects and cultural conceptions in localized ecological contexts, which some of the items will touch on.

# Uncollected Waste: Cultural Byproducts

* What do we produce that we do not generally signify in cultural memories
* Waste in cultural memory institutions and ways to capture waste as objects
* Sociopolitical factors and the Capitalocene in cultural production

## The Obsolete Server Farm

The issue of data centers in the Anthropocene is twofold; first, there is the impact of data centers on the environment, which are often made invisible to consumers and visitors in the digital realm. The second factor is the social inequalities of how data centers are made—those who benefit most from online infrastructures are often not the same ones working in silicone factories and clearing land for data centers.

Concerning the first issue, the data center’s greatest threat to natural heritage is the production of carbon. Data centers run on electricity; not just electricity for the task of data processing, but electricity for keeping the hardware cool as they are pushed to their limit. Monserrate (2022) explains that cooling systems strain all aspects of the environment; from being run on a “dirty” electric grid where electricity is produced by gas and oil, or rerouting rivers as part of cooling systems in water-insecure areas, data centers shape the climate of the areas they are built in (para. 7-9). As the demand for computational power grows, old hardware is discarded in favor of newer models; such a practice has made “embodied hardware emissions”, or the emissions of producing physical electronic waste, grow by 6 times over in a period of just two years (Gupta et. al, 2022, pg. 38).

Who, then, is benefitting from these polluting data factories in the global economy? In general, it is the Global North, where the majority of digital production and headquarters for tech companies lie. These West-centric tech companies become “internet landlords” through their ownership of the physical infrastructure required to “run” the internet (Greene 2022). In contrast, these same tech companies build physical components for data centers in the Global South, where labour is cheap and exploitable. The trash, too, is sent to the south, creating significant health and environmental risks for those who live there; most of the quickly disposed of metal is placed in “e-waste graveyards” without safely disposing of toxic and radioactive elements in the now-obsolete hardware (Monserrate, 2022, para. 26).

Such inequality begs the question: how ethical is the production of digital cultural memory? When the physical nature of data processing is ignored, digital realizations of cultural memory can often provide a more equitable and accessible version of cultural memory; Cardoni et. al (2023) explain that the digital ecosystem allows for a much more diverse community to choose “what to preserve and enhance from its past” (pg. 359). Often this means community archives for marginalized groups whose culture is not so easily captured in traditional archives, or other transmissions of living culture hard to capture and disseminate across non-digital formats, can become realized among the mass of digital production, even if they are not the dominant voice. These archives exist specifically because the mass amounts of data means that even marginalized data can reach out across the expanse of the internet to create meaningful connections.

However, Cardoni et. al (2023) also explain that our current digital system, which creates cultural memory archives across social media, apps, and blogs, “has brought us to the age of the zettabyte, in which we are inundated with data” (pg. 356). Cultural memory is not only about remembering; it is also about forgetting. In the face of so much raw data, and so much raw potential, will the digital community bother remembering the physical residue of digital data production? Or is the environmental impact of data processing conveniently forgotten, left in the physical realm where already marginalized groups are left to process its waste? There is no doubt that data processing is a crucial component to digital cultural memory; however, if the means of data production are forgotten in the dominant, collective narrative of digital systems, then one must question the convenient censorship of a cultural memory system that ignores its own methods of meaning-making.

Greene, D. (2022). Landlords of the internet: Big data and big real estate. *Social Studies of Science*, *52*(6), 904-927. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1177/03063127221124943>

Ferreira, J., Callou, G., Josua, A., Tutsch, D., & Maciel, P. (2019). An Artificial Neural Network Approach to Forecast the Environmental Impact of Data Centers. *Information (2078-2489)*, *10*(3), 113. <https://doi-org.login.ezproxy.library.ualberta.ca/10.3390/info10030113>

Gupta, U., Kim, Y. G., Lee, S., Tse, J., Lee, H.-H. S., Wei, G.-Y., Brooks, D., & Wu, C.-J. (2022). Chasing Carbon: The Elusive Environmental Footprint of Computing. *IEEE Micro*, *42*(4), 37–47. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1109/MM.2022.3163226>

Andreas Köhler & Lorenz Erdmann (2004) Expected Environmental Impacts of Pervasive Computing, Human and Ecological Risk Assessment: An International Journal, 10:5, 831-852, DOI: [10.1080/10807030490513856](https://doi.org/10.1080/10807030490513856)

<https://thereader.mitpress.mit.edu/the-staggering-ecological-impacts-of-computation-and-the-cloud/>

Schumacher, S. (2022). Deep Dives into Digital Cultural Heritage Practices: An Interview with Diane Zorich. *Visual Resources Association Bulletin*, *49*(2), 1–3.

Haux, D. H., Maget Dominicé, A., & Raspotnig, J. A. (2021). A Cultural Memory of the Digital Age? *International Journal for the Semiotics of Law - Revue Internationale de Sémiotique Juridique*, *34*(3), 769–782. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1007/s11196-020-09778-7>

Tolga Çakmak. (2018). Digitization in Cultural Memory Institutions: Analysis of the Practices Carried Out in 17 Institutions in Ankara. *Ankara Araştırmaları Dergisi*, *6*(2), 167–182. <https://doi-org.login.ezproxy.library.ualberta.ca/10.5505/jas.2018.30502>

Giulia Cardoni, Francesca Fabbri, Alessandro Iannucci. The Digital Living Archive and the construction of a participatory cultural memory in the DARE-UIA project (Digital Environment for collaborative Alliances to Regenerate urban Ecosystems in middle-sized cities). *Bibliothecae.it*. 2023;11(2):350-380. doi:10.6092/issn.2283-9364/16278

## One Last Drop of Oil

## The Machine that Remains

## Plastic Iconography

The immortality of plastic.

Sociopolitical **and ideological** factors in mass production.

Deane-Drummond, C., Bergmann, S., Vogt, M., & Bedford-Strohm, H. (Eds.). (2018). *Religion in the anthropocene*. Lutterworth Press.

## Photos of Scars

The process of human ingenuity looks different from a gods-eye view.

Edward Burtynsky.

Back to natural landscape/deep ecology archive. Resource extraction in deep time/geological record.

The role of the photograph (static image) meets the ecological record (permanent traces).

Why we need aerial photography to think about deep time consequences.

Bentz, V. M., & Marlatt, J. (Eds.). (2021). *Deathworlds to Lifeworlds : Collaboration with Strangers for Personal, Social and Ecological Transformation*. De Gruyter.

Alun Kirby. (2021). No maps for these territories: exploring philosophy of memory through photography. *Estudios de Filosofía*, *64*, 47–71. <https://doi-org.login.ezproxy.library.ualberta.ca/10.17533/udea.ef.n64a03>

<https://www-taylorfrancis-com.login.ezproxy.library.ualberta.ca/chapters/edit/10.4324/9781315101019-16/remembrance-things-timothy-lecain?context=ubx&refId=3d56b060-c01b-4119-96e8-31ba31b486e8>

<https://colinsterling.com/2021/08/02/emergent-images-matters-of-affect-in-heritage-photography/>

# Applied Ecopoetics: Trauma and Art

* The concept of ecopoetics (thinking about climate in poetry) applied to other forms of cultural products
* Reflections on trauma related to the Anthropocene in cultural memory
* Everyday “objects” of the Anthropocene and living with trauma of climate/doom narratives/etc

## Taxidermy Cows

O’Key, D. (2021). Why look at taxidermy animals? Exhibiting, curating and mourning the Sixth Mass Extinction Event. *International Journal of Heritage Studies*, *27*(6), 635–653. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1080/13527258.2020.1844276>

Niittynen, M. (2022). Apocalyptic Time: Vegan Taxidermy, the Remains of Dolly the Sheep, and Bio-Engineered Art(ificiality) in the Time of Mass Species Extinction. *Green Letters*, *26*(1), 86-101–101. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1080/14688417.2022.2034514>

de Massol de Rebetz, C. (2020). Remembrance Day for Lost Species: Remembering and mourning extinction in the Anthropocene. *MEMORY STUDIES*, *13*(5), 875–888. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1177/1750698020944605>

## Relics of Illness

Physical sickness permeates human culture and consciousness, ravaging first through the body, then in the aftereffects as our fears of bacteria, viruses, and other threats to health are fuelled by the experience of being sick. On the collective level, we have the pandemic: waves of sickness that trigger fear and resilience on a global scale. Responses to sickness, and therefore responses to pandemics, become cultural memory through shared and empathetic trauma of illness. Edvard Munch’s two paintings—*Self-Portrait with the Spanish Flu* (1919) and *Self-Portrait After the Spanish Flu* (1919)—highlight this phenomenon. By the time of their conception, Munch had already developed a distinct way of portraying fear and trauma from his own self-conscious as well as become popular in both art circles and the general public. The juxtaposition created by the paintings of his own experience with the Spanish flu was thus one that resonated deeply, and so the paintings entered symbolic status within cultural memory of the pandemic.

Munch’s paintings were not the only art situated around the flu—John Singer Sargent’s *The Interior of a Hospital Tent* (1918) and Egon Schiele's *Gustav Klimt on his Death Bed* (1918) come to mind. But one of the crucial modes of cultural production in pandemics is not a famous artist’s work, but the production of medical necessities and everyday accounts of pandemic living. And yet, despite these products of illness, pandemics remain poorly constructed in cultural memory “despite the extreme loss of life associated with them and their long-term impact on the economy and society” (Öner et. al, 2022, pg. 730). These “everyday” collections of illness are rare because of trauma; the reason the Spanish flu is more easily represented in a few paintings than in the memoirs of the many who lived through it is because “both writers and readers, individuals and society, got trapped in a vicious cycle of repression, forgetting and unconscious re-enactment of trauma” (Das, 2022, pg. 1368). There are few traces left of illness in memory, and those that do exist are the empty spaces that trauma has deliberately forgotten.

Why, then, is the memory of illness important to consider in the Anthropocene, when it does not seem to be collectively remembered under “normal” circumstances? It is because human-engineered climate change directly contributes to increased illness and disease; climate change has been proven, through rising global temperatures, to “increase the rate of reproduction of parasites and other microbial pathogens by providing a suitable breeding ground and gradually elevating the risk of transmission”, particularly in areas where these parasites once could not live (Akhtar & Roth, pg. 1054). For example, tropical and equatorial illnesses have begun reaching into more temperate zones, and the study of these long-known-about diseases have suddenly driven up mass-research from institutions in temperate climates, despite the tropical zones they originated from still being at greater risk of infection (Van de Vuurst & Escobar, 2023, pg. 7). That is, there is almost a fear-driven instinct to the research: fear that diseases once only for the “have-nots” are suddenly the problem of the “haves”. Other illnesses, such as respiratory infections and cardiovascular issues from pollution, lowered air quality, and increase in dust storms in more arid regions, are also growing consequences of the Anthropocene becoming less “local” and more global (Akasha et. al, 2023; Khammar et. al, 2023; Syed et. al, 2023). The Anthropocene, then, forces illness to the forefront of cultural uncertainties.

As illness becomes a global anthropocenic terror, it is more important than ever to consider how the shared experience of illness—through a pandemic or otherwise—is both remembered and forgotten. When fear overtakes memory and causes forgetting, Das (2022) argues that new pandemics reawake trauma—but also that this trauma can then be mitigated by advances in medicine and other social factors that influence the outcome of the new pandemic (pg. 1371). Because pandemics also alter the ability of gathering and how stories are shared in cultural memory, recalling also works as a strategy when it recalls previous collective strategies for working together in times of trauma and resilience (Zaretsky 2023). Trauma related to illness and pandemics must therefore be recalled and mitigated through a hopeful lens as we are faced with increasing infection rates and climate-related diseases. Certain projects of the COVID-19 pandemic have attempted to collect and reinforce narratives of empathy and togetherness to avoid forgetting; for instance, the Smithsonian’s collection of masks from everyday people of diverse backgrounds, or the multitude of fictional story collections written from isolation meant to speak to an empathetic audience (Däwes, 2022).

Illness, and the collective memory projects associated with it, illustrate an important concept in the Anthropocene: how does one become resilient against a growing, every day trauma? As the risk of pandemics become more commonplace, and localized illnesses become global threats, one must consider how remembering everyday responses to illness—through paintings, or masks, or simply individual thoughts—must be used as a form of mitigation in cultural memory, rather than something to be forgotten.

Naushaba Akhtar, & Shakti Rath. (2023). Climate change and change in transmissibility of vector-borne diseases: A Short Review and Bibliometric analysis. *Microbes and Infectious Diseases*, *4*(3), 1053–1058. <https://doi-org.login.ezproxy.library.ualberta.ca/10.21608/mid.2023.187471.1451>

Paige Van de Vuurst, & Luis E. Escobar. (2023). Climate change and infectious disease: a review of evidence and research trends. *Infectious Diseases of Poverty*, *12*(1), 1–10. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1186/s40249-023-01102-2>

Syed, M., Folz, R. J., & Ali, U. (2023). Environmental Factors and Their Impact on Airway Diseases: Exploring Air Pollution, Indoor and Outdoor Allergens, and Climate Change. *Current Pulmonology Reports*, *12*(3), 162–170. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1007/s13665-023-00319-8>

Akasha, H., Ghaffarpasand, O., & Pope, F. D. D. (2023). Climate Change, Air Pollution and the Associated Burden of Disease in the Arabian Peninsula and Neighbouring Regions: A Critical Review of the Literature. *SUSTAINABILITY*, *15*(4), 3766. <https://doi-org.login.ezproxy.library.ualberta.ca/10.3390/su15043766>

Khammar, A., Nouri, M., Saber, E., Miri, A., Vatani, J., & Roveshdi, M. M. (2023). Dust Storm Effect and Climatological Factors on Cardiovascular and Cerebrovascular Respiratory Diseases: A Literature Review. *Archives of Hygiene Sciences*, *12*(2), 99–104. <https://doi-org.login.ezproxy.library.ualberta.ca/10.34172/AHS.12.2.3.32>

Molecular Mimicry, Realism, and the Collective Memory of Pandemics. Narrative Strategies of COVID-19 Fiction Däwes, B. (2022). Molecular Mimicry, Realism, and the Collective Memory of Pandemics: Narrative Strategies of COVID-19 Fiction. *Diegesis: Interdisziplinäres E-Journal Für Erzählforschung/Interdisciplinary E-Journal for Narrative Research*, *11*(1), 1–24.

Near and far: Tracing memory and reframing presence in pandemic-era Argentina

## Dance for the Burdened

Trauma and embodiment. Concept of solastalgia. Dance as cultural memory.

Bogard, P. (Ed.). (2023). *Solastalgia : an anthology of emotion in a disappearing world*. University of Virginia Press.

<file:///C:/Users/micha/Downloads/revisiting-the-anthropo-s-cene-theatrical-practices-beyond-the-human-stage_Content%2520File-PDF.pdf>

Cushman, E., & Ghosh, S. (2012). The Mediation of Cultural Memory: Digital Preservation in the Cases of Classical Indian Dance and the Cherokee Stomp Dance. *The Journal of Popular Culture*, *45*(2), 264–283. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1111/j.1540-5931.2012.00924.x>

## Painting the Red Sun

Depictions of climate change in art.

<file:///C:/Users/micha/Downloads/on-the-evolution-of-art-and-nature-relationship-bio-informed-art_Content%2520File-PDF.pdf>

Lyn, A. (2023). When microbes meet: Decay and microbial spirituality in the post‐human art market. *Anthropology of Consciousness*, *34*(2), 295–296. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1111/anoc.12216>

Knickerbocker, S. (2012). *Ecopoetics : the language of nature, the nature of language*. University of Massachusetts Press.

## Empty Databases

Constructions of trauma and the right to forget

Brockmeier, J. (2002). Remembering and forgetting: Narrative as cultural memory. *Culture and Psychology*, *8*(1), 15-43–43. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1177/1354067X02008001617>

Hazley, B. (2021). The Vicissitudes of Forgetting: Military Intervention and the Memory of the Troubles in Britain. *Journal of War & Culture Studies*, *14*(1), 45–69. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1080/17526272.2021.1873550>

Stainforth, E. (2022). Collective memory or the right to be forgotten? Cultures of digital memory and forgetting in the European Union. *Memory Studies*, *15*(2), 257-270–270. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1177/17506980211044707>

Assmann, A. (1996). Texts, Traces, Trash: The Changing Media of Cultural Memory. *Representations*, *56*, 123–134. <https://doi-org.login.ezproxy.library.ualberta.ca/10.2307/2928711>

# Eco Narratives: Re-Centering Ecology

Using the Anthropocene as a framing theory “concerns rethinking the relation between humans and the environment, their interactions, interconnections and interdependence” (Lucci, 2018, pg. 2). When applying these concerns to cultural memory and cultural memory institutions, one must ask the question: what is the relation between cultural memory and natural heritage, and how is the environment remembered in cultural memory? To remember the Anthropocene means to be keenly aware of how environmental concerns are portrayed in the passing down of cultural memories.

One way to prevent the convenient forgetting of environmental impacts in cultural memory is to dissolve barriers between cultural heritage and natural heritage. Bangstad & Pétursdóttir (2021) argue that “heritage should attempt to exfoliate the binaries of culture and nature, human and non-human and make room for the appreciation that heritage phenomena are entangled in more-than-human material and environmental processes” (pg. 5). The idea of natural heritage as human heritage is common outside of Western thought in cultural ontologies where nonhuman, particularly natural, entities are acknowledged as active members of a cultural community (Harrison, 2015, pg. 27). Thinking of nonhuman entities and ecological phenomena in such a way also allows for nature to be a potential actor in creating narrative in cultural memory.

To think of natural heritage as an ecological voice in cultural memory allows nature itself to be part of the individual processes that affect and recontextualize collective memory through mnemonic resilience. As Ryan (2010) explains, “resistance to a collective memory narrative is facilitated by both the indispensability of the individual… in its reception and inherent characteristics that allow the individual to resignify it” (pg. 159). That is, by thinking of natural voices as indispensable members of a cultural community, environmental concerns can be at the forefront of cultural memory narratives, and the anthropogenic ways of thinking that drive the Anthropocene epoch can be recontextualized to think about humans-as-nature and nature-as-community. Adding ecological voices to cultural memory helps undermine “power vested in the humanist idea of the conscious and knowing subject” that dominates ideas of how cultural memory should be preserved and passed down (Bangstad & Pétursdóttir, 2021, pg. 6).

Nature is, of course, a broad term. When thinking about how to collect representations of nature in cultural memory, it is crucial to think of how nature represents itself both in collections and cultural practices: is nature the agricultural practices associated with a particular crop, or the natural fibres used to weave a blanket? Is it the memories of a river in a homeland? When thinking about ecological narratives in cultural memory, ask how nature is constructed not as a concept but as a reoccurring member of the cultural community.

Arne Naess (1973) The shallow and the deep, long‐range ecology movement. A summary∗ , Inquiry, 16:1-4, 95-100, DOI: [10.1080/00201747308601682](https://doi.org/10.1080/00201747308601682)

## The Shapeshifting River

Holmes & Goodall (2017) begin with a single argument: that the intertwining of oral and environmental histories offers more discussion about the landscape than an exclusively empirical study, or an exclusively experiential one. In their words, this synthesis of histories “allows us to see what environments and the changes to them mean to people, and in turn allows us to see how they might decide to act in the present and future in relation to those environments” (2017, pg. 12). Oral history is the embodied experience of place and space; it pulls on past knowledge to situate and comment on present realities about the world and the way in which climate changes around us.

For Holmes & Goodall, oral history also “brings the opportunity to explore dimensions of class and race and gender into the experience of place”, particularly for the colonised places whose environments were misremembered and poorly reconstructed by colonial industry and writing (2017, pg. 4). Because oral history is gathered from a community that remembers on deep scales, it offers an enriched commentary and complex blend on what is culture, what is social, and what is natural change in the places we inhabit.

An inhabitable place of great importance is the river. Humans have long lived on rivers and their flood basins, with rivers providing food, fresh water, transport, and a variety of other universally crucial factors. The river, then, provides an ample case study for tracing the blended narrative of ecology and cultural memory in oral histories. Cultural memory provides ecological narratives in two ways; the first is recording, and thus preserving, the impact of a changing environment across cultural and individual schemas.

Dudley (2017) examines the written versus oral history of the Severne river, finding that the oral histories “challenge a declensionist narrative” of the river’s decline as a trading hub in written histories (pg. 18). Those who spoke about the river did so by narrating their sense of place within the river, and “ascribing the river a ‘voice’,” so that “natural agency may be recognised and documented, if not overtly discussed or considered” when discussing history (pg. 88). The oral accounts of the river, like the written ones, recognized the decline in natural resources it provided; however, the oral stories focus on the new embodied practices that have developed as a result of the river’s decline, making their “bodies become repositories of both muscle memory and environmental knowledge” as they found new ways to relate their body and cultural practices to the ecological changes of the environment (pg. 94).

This brings us to second way an oral cultural memory creates an ecological narrative; through resilience and mnemonic resistance. Felci & Altom (2022) explain that “place attachment” in the oral histories of the Tulti people “can be a driver of resilience against change, including climate change“—that is, this community who lives along the flooded river is less likely to leave their place of cultural heritage because their oral histories, which stretch to deep time, provide them with resilience to combat unstable ecological changes (pg. 353). Felci & Altom (2022) also discuss how this narrative provides resilience in other forms of memory, such as having this ecological resilience expand to become resilience against colonialism and economic inequalities (pg. 364-365). The oral history of the flooded river, in other words, also gives the Tulti people a mnemonic resistance against factors of the Anthropocene—climate change, capitalist hierarchies, and colonial resource extraction.

These two threads of oral ecological history—the thread of preservation, and the thread of resilience—give us insight into why oral history is often the tool of those forcibly removed from the colonial history of cultural institutions. Often, the curated exhibit offers a static document—one that can be ruminated on by visitors, but not one that captures the cultural complexities of ecological deep time and how it relates to present realities. The case studies of the Severne river and Tulti people ask how cultural memory helps to preserve the environment when it is an embodied experience, reinforced by oral narration that has been connected to that embodied sense of place for thousands of years. When the people and their stories are removed from the river, how does that impact the preservation of the river? It is a question, so far, that cultural heritage institutions have difficulty answering when thinking about cultural preservation.

*Rivers of the Anthropocene*. (2017). University of California Press.

## The Old Path

Paths are an ancient form of human infrastructure, and the scenery of one (turned to a trail or a road, perhaps, or staying as a humble path) often offers insights into how humans navigate the natural world.

Schlitte, A. (2022). Lines made by walking—On the aesthetic experience of landscape. *Continental Philosophy Review*, *55*(4), 503–518. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1007/s11007-022-09572-1>

Haines, T. (2018). *Walking to the sun : a journey through America’s energy landscapes*. ForeEdge, an imprint of University Press of New England.

Cracknell, L. (2021). Walking in Circles: Making Stories out of Landscapes. *Postscriptum Polonistyczne / Polish Studies Postscript*, *27*(1), 171–190.

Mitchell, J. H. (2015). *Walking towards Walden : a pilgrimage in search of place*. University Press of New England.

Svensson, D., Sörlin, S., & Saltzman, K. (2021). Pathways to the trail – landscape, walking and heritage in a Scandinavian border region. *Norwegian Journal of Geography*, *75*(5), 243–255. <https://doi-org.login.ezproxy.library.ualberta.ca/10.1080/00291951.2021.1998216>

Littmann, W. (2020). Viewpoint : Walk This Way: Reconsidering Walking for the Study of Cultural Landscapes. *Buildings & Landscapes: Journal of the Vernacular Architecture Forum*, *27*(1), 3–16. <https://doi-org.login.ezproxy.library.ualberta.ca/10.5749/buildland.27.1.0003>

Social construction of paths

Commodification (tourism) of roadways and industrialization. (Problems)

Ecofriendly tourism (solutions)

## Weaving Patterns

Giuseppe Amoruso, Mariana Ciancia, Eloisa Casadei, & Alessandro Ianniello. (2023). Preserving Memory, Safeguarding Heritage. Designing the Digital Library of Living Traditions of Jordanian Handicraft. *Pad*, *16*(24), 175–196.

<file:///C:/Users/micha/Downloads/amira-behbehani-art-knitting-between-iran-and-kuwait_Content%2520File-PDF.pdf>

## The Collective Memory of the Mountain

A cultural heritage collection is very often presented to a community about a person, place, event, or thing to introduce these concepts as part of a collective memory. However, these collections are also often curated by a specific set of individual people who “embed [their] own identity and [their] own collective memory and mythologies” (Cook, 2013, pg. 97). The community archive, on the other hand, requires a collective participation, with the institution instead becoming a facilitator for community practices rather than a strict steward.

Cook (2013) explains there has been a schematic shift in the role of the archivist from custodian, to historian, to mediator, to participator, with the participator only one part of the holistic whole of a community archive. Cook (2013) outlines the benefits of this approach:

Community archiving, as concept and reality, evidently makes us think differently about ownership of records, replevin, oral and written traditions, the localism-globalism and margins-centre nexus, multiple viewpoints and multiple realities about recordkeeping, and so much else, including evidence, memory, and obviously identity, and, depending on our responses, around deeper ethical issues of control, status, power, and neo-colonialism.” (pg. 116)

What, then, happens when we consider natural heritage as part of collective cultural heritage, and how do reflections on and in nature become reproduced? When natural and cultural heritage are not thought of as separate entities, the “connectivity ontology” that binds them will “not only imply connections between individual humans and non-humans, but also a level of connection that includes all of them as part of a broader natural-cultural assemblage” (Harrison, 2015, pg. 32). The cultural community, in other words, extends in such a way that non-human entities become active agents in the community archive. Depending on the community and their ways of connecting, the dissolution of natural and cultural heritage as separate entities produces “various different ways of valuing, assembling, and caring for the future” (Harrison, pg. 38). This is a common concept in Indigenous ontologies, but can and should be thought of in other cultural communities so as to ensure land stewardship is not solely the responsibility of Indigenous groups.

One of the great holistic, connective tools is the crowd-sourced, “living”, digital archive. Perla argues that digital methods democratize colonial cultural institutions because digital mediums are better able to represent local or indigenous ontologies of conflicts, the environment, and other factors from a community-based and borderless perspective (pg. 211). In particular, a living archive is an “inclusive and never complete set” of information that better mimics the fluidity of cultural memory compared to more static archives (Cardoni et. al, 2023, pg. 351). A living archive therefore also mimics “the performative celebration of the past through contemporary acts of creation and transmission” that occurs in other forms of collective memory transmission (Cardoni et. al, pg. 353). When combined with Harrison’s idea of nature-as-community-voice, the digital living archive can then offer a telling narrative of natural heritage within the context of cultural memory schemas, and how the dichotomy between collective memory and individual memory seen in a living archive emphasizes or de-emphasizes the transmission of natural heritage.

The living archive, using digital connective structures, can then further the idea of Harrison’s (2015) “natural-cultural assemblage”. As Harrison puts it, a living archive that contains multitudes of individual thoughts—such as an accessible digital archive--does not “resurrect a cosmopolitan universalism” in consideration of the global impacts of preserving natural heritage, but rather recognizes “the multiplicity of overlapping ontologies”, including Indigenous and non-Indigenous perspectives, when it comes to thinking of nature-as-community (pg. 38). Natural-cultural memory is more easily disseminated and seen in a collective, living archive because of the myriad ways digital tools allow perceptions of natural heritage to be connected to each other, which in turn allows for a globalized way of thinking of natural heritage without ignoring localized ontologies and ecologies. That is, the living, digital archive offers a better connective ontology between natural and cultural memory because of its ability to trace both individual and collective voices concerning nature and community archiving.

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Queering the map

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# Deep Time Conceptions: De-Centering Humanity

Cultural memory is a concept tied to time: past, present, and future affect how memory is constructed or forgotten. But cultural memory is also tied to humanity, whose lifespan as a species is but a speck on the scale of deep time. Thinking about cultural memory in deep time forces us to recontextualize why we incorporate prehuman concepts into our cultural memory, and how our cultural remnants preserve our memories for posthuman futures.

Prehuman artifacts have been variously collected and conceptualized by cultures and institutions. The most obvious is the fossil. Fossils remind us that Earth’s memory stretches beyond ours, but that we can incorporate it into our cultural systems nonetheless. Kolbert gives the example of the ammonite, a species long extinct whose fossils have been used as material goods, medicine, and religious practices, giving them a long memory record across many human cultures (pg. 83). Bowker calls the memory practices we use to configure the prehuman past the “mnemonic deep” (pg. 4). In the Anthropocene, the sixth mass extinction event, our ways of remembering the extinct places and things that existed before us force us to rethink how we remember the rapidly disappearing world of the present; or, as Bowker puts it, we must make a move away from memory practices that “currently cast into oblivion” traces of the past on both the deep and present time scale (pg. 4).

Posthumanism thinking also situates our cultural products in deep time, where our present productions become the potential fossils of the future. As Kolbert reminds us, the dominance of humans in the present era “has more to do with dinosaurian misfortune than with any particular mammalian virtue”, highlighting the common fear that humans could go extinct even in their own epoch (pg. 91). What the Anthropocene leaves behind, then, is a topic of interest in posthuman heritage studies. Sterling (2020) suggests that the Anthropocene’s ability to invite spatio-temporal thinking can create more than doom narratives; thinking about memory in the posthuman world creates memory practices that “imagine alternative ways of living and acting that are inherently oppositional to the apocalyptic motif of the ark” (pg. 191). That is, speculating on futures where humanity only exists in memory forces a crucial rethinking of how and why memory is preserved, and thus how an epoch of human dominance might be mitigated in memory.

Both the before and after of humanity force us to think about our current memory practices, and how the Anthropocene could be remembered in deep time. Naess’s (1973) theory of deep ecology argued for a step away from anthropocentric views on environmental issues in order to recognize the intrinsic value of all life, regardless of its perceived usefulness to humanity (pg. 95). Applying theories of deep time and deep ecology to memory, we can force ourselves to de-center the human from memory preservation practices and ask: how do we situate memories of the Anthropocene, the era of humanity, in deep time? When the importance of the human is divorced from cultural memory, we can reconfigure ways of thinking about the Anthropocene and how its narratives can “be discarded, vilified or fundamentally reimagined” by deep time ways of recalling the past and imagining futures (Sterling, 2020, pg. 192).

## The Silurian Stratigraphic Sample

The Silurian Hypothesis asks what traces a sufficiently advanced species will leave on their geological record, but only as a single layer in the history of deep time. This layer, on its own, has no meaning; it requires the layers of epochs past and future, and the cultural and scientific knowledge needed to analyze geological records, to make sense of its traces. As such, it exists as part of a larger memory-science system in which the Anthropocene is monumentalized and available for reinterpretation through memory, science, and natural traces.

First and foremost, the Silurian Hypothesis focuses on tangible traces. Much like the fossils of older epochs, species who have developed technology and industry on the scale of the Anthropocene will create observable heritage on a scale both hundreds and millions of years long. Schmidt & Frank (2018), creators of the Silurian Hypothesis, explain that the Anthropocene will manifest geologically with “specifically persistent synthetic molecules, plastics, and (potentially) very long-lived radioactive fallout in the event of nuclear catastrophe” (pg. 11-12). Their hypothesis argues that these traces are consequences “of the specific path human society and technology has taken” and as such is a specifically Anthropocenic way of recording activity (pg. 17). That is, Silurian Hypothesis asks what traces our modern human era leaves in the ecology of deep time, and how we, as a civilization with the proper set of tools and past knowledge, might recognize the presence of an equally advanced civilization’s impact even after it is gone.

The hypothetical Silurian layer does not just contain traces of civilizations, but larger ecological impacts. The Anthropocene is a product of the intertwining between natural and industrial process, where human activity dominates but also mingles with the natural activity of the Earth, and as such a Silurian layer is differentiated not by unique identifiers but by a unique combination of them (Schimdt & Frank, pg. 11). In this way it is a fitting monument of both human impact and humans as part of a larger ecological system. Szerszynski (2017) argues stratigraphic layers can be part of what he calls a monument-memory system, “in which various structures, spaces and inscriptions are put in relation with each other, with the wider spatiotemporal patterns of social life and with the canonical narratives and values of cultural memory” (pg. 119). In the case of the Silurian layer, it is a noticeable monument we can narrativize in relation to the spatiotemporal traces of other layers. The Committee on the Geologic Record of Biosphere Dynamics (2005) explains, for instance, that acquiring “knowledge of pre-human baseline states and natural variability is essential for discriminating between anthropogenic and non-anthropogenic change” when looking at geological records because it allows us to situate ourselves in natural, rather than cultural, memory (pg. 153). Zalasiewicz et. al (2021) also explain that thinking about human history in stratigraphic time makes “the human/natural distinction “increasingly redundant, with human history and natural history now having merged into one story” in the Earth’s record (pg. 5). Essentially, natural volcanic eruptions and artificial radionuclides alike become part of the narrative of the Anthropocene in the geological record; and, if we think of chronostratigraphic layers as a monument-memory system, then we can use the hypothetical Silurian layer as a monument for thinking about human values towards their own ecological processes during the time of the Anthropocene.

So it is that the Silurian layer, whose hypothesis is grounded in Anthropocenic practices, could offer a tangible trace—a monument—of human values within the mnemonic deep record. Not only that, but it situates those values in a larger ecological system and accounts for a variety of global, not just local, impacts. As Szerszynski (2017) believes, “any monumental system for the Anthropocene would need to signify that this epoch-in-the-making will be actively woven from multiple stories and diverse imagined futures distributed around the globe”; that is, effective monuments for disseminating the cultural memory of the Anthropocene must hold global, long-term, and ecological information all at once (pg. 128). If stratigraphic layers are monument systems, then the Silurian layer is a monument to human resource extraction, technological progress, and our diverse roles in both our current ecological systems and the deeper ecological systems of Earth’s 4.5-billion-year history.

That is, the Silurian Hypothesis is a speculation on the memory-monument system of geological epochs. A recognizable trace of the Anthropocene does not exist on its own, but is part of a larger system of memory-making in which we contextualize the various stories and practices of the Anthropocene, as well as how it intertwines with larger ecological changes. In this way, the speculative traces of the Silurian layer ask how we narrativize the tangible forms of the Anthropocene in memory to situate human activities and remembrances in natural memory, deep time, and global cultural systems.

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## Pleistocene-Oriented Programming

In the early Pleistocene, archaic humans lived in ecological landscapes and practiced ways of passing down knowledge foreign to us. Traces of these prehuman species and their living conditions make their way into modern cultural memory institutions, prompting the question: how do prehuman records inform our modern, anthropogenic memory practices? Or, more specifically, how do we think about the anthropogenic narrative of cultural memory itself?

We can envision the memories of archaic humans only through the geological and material records they left behind. Henshilwood & Dubreuil (2011) explain how prehuman living spaces and bead production suggest a development of collective symbolic meaning before the biological development of Homo sapiens, and Bednarik (2022) sees these artifacts as an “indication of how the human ability to create the ideational world in which the ancestors saw themselves existing” could be predated by or a result of archaic humans creating external artifacts representing symbolic memory (pg. 1519). Watkins (2016) explains that these “repositories of symbolic cultural memory through art, sculpture, and architecture” before the development of language was just as crucial to the development of early humans as climate change was, merging ecology and memory as equally important factors before the Holocene—and indeed, the Anthropocene (pg. 95). But these artifacts are thought to be separate from language; they are *material objects* from cultures that may have not developed language at all, and their narrative symbolism is lost to us because we cannot fully conceptualize the information retrieval system needed to understand these external artifacts.

Why does it matter that we only have objects, and no oral or written tales from our prehuman ancestors? In some ways, it helps us contextualize our modern use of objects. Manovich (2001), explaining object-oriented programming and how it affects knowledge in databases, says:

“As a cultural form, database represents the world as a list of items and it refuses to order this list. In contrast, a narrative creates a cause-and-effect trajectory of seemingly unordered events (items). Therefore, database and narrative are natural enemies. Competing for the same territory of human culture, each claims an exclusive right to make meaning out of the world” (pg. 225, qtd. In Bowker, pg. 29).

In object-oriented programing, the object must hold all relevant information about itself for specific retrieval requests, and does not need to be linked by narrative. But, like the memories held by prehuman objects, the objects in our databases still require narrative context in order to be culturally relevant; Bowker argues that any information retrieved from a programming object is information used to craft a narrative of the past that suits present sociopolitical forces, creating extrapolations of a past that never existed by forgetting some or all parts of the object because no system is capable of categorizing or retrieving all the object’s potential information (pg. 32). To compare the two, the Pleistocene object’s memory can *only* be narrativized by present forces because its past is not embedded in it—but the database object must be narrativized by present forces because the information contained within, like the Pleistocene object, can never be presented as whole or complete by information retrieval systems.

The symbolic objects created by archaic humans ask what happens when the objects in the Anthropocene contain information that is no longer retrievable. If, as certain doom narratives suggest, the Anthropocene is not just the epoch of humanity but its swansong as well, then should we manipulate our memory functions so that they are properly, and fully, embedded in the objects we leave behind? Or, should we accept that the information in the objects we produce, like the objects of our archaic ancestors, are imperfect products of an “eternal present and linear chronology” whose information structures will always disappear (pg. 33)? Whether it is a digital object or material one, relating Anthropocenic objects to Pleistocenic ones ask us if we can make peace with the death of the human narrative in both our lifespans and the objects we leave behind.

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## (Un)Recognizable Ruins

It is not hard to conceive of ruins as cultural memory. They are built by human hands; they are interpreted and re-interpreted as civilizations change; they provide valuable insights about cultures that were and cultures that could be. But ruins also outlast the cultures that build them, and in the Anthropocene, there are fears that ruins will outlast not just a single group of people, but the end of humanity in a post-apocalyptic crisis.

Do ruins, then, still become part of memory when there is no one left to remember them? The idea that human memory will remain when humans may not is part of “speculative memory”, or the concept that cultural memory could exist in a non-human, or more-than-human, world (Sterling, pg. 207). Sterling suggests that ruins “in this context are spaces of precarity and of potential resurgence… because the very processes of ruination force us to imagine and negotiate” memory without a human-focused lens (pg. 208). Ruins are not precarious in the sense that they will disappear as easily as more fragile heritages in the Anthropocene, but instead serve to highlight the real precarity of human dominance and its possible extinction.

Combining the fears of the Anthropocene with the memories embedded in ruins, we use memory and ruination to think of a future that “is both a projection and an attractor, shaping how we think and behave in relation to the contemporary world” (Sterling, 2020, pg. 215). The fear of the future becomes tenfold when we think of modern production of ruins; that is, ruins not produced by ancient cultures, uncovered hundreds or thousands of years later, but ruins discarded as quickly as they are built in the name of capitalism, industry, and progress. Beck (2021) refers to this process as “accelerated ruin”, which creates “decrepit but not yet demolished relics of modernity” (pg. 89). These ruins project the fear of a “stagnant and rotting future” because they are mired in an “inaccessible recent past” that comes and goes too quickly to form a sturdy schema within cultural memory (Beck, 2021, pg. 89).

The dichotomy between accelerated ruination and speculative memory is thus: how do mass-produced ruins interrogate the image of humanity within the speculative timescale of human extinction? Beck argues that such apocalyptic thinking should not separate human ruins from humanity, but instead force us to critically think of “the image of the post-apocalyptic city as an available space for creative reefashioning” (pg. 102). Sterling (2020) furthers this point, arguing that cultural heritage can use ruination to combat the egotistic idea of human progress and heritage-as-immortalization; thinking about memory and ruin can instead promote “a fundamental reorientation towards decomposition and the complex multispecies worldings likely to emerge in spaces of neglect and despair” (2021, pg. 210).

Ruins in cultural memory can then become, as speculative memory promotes, places of disassembling and interrogating the dominant narratives in cultural memory. Ruination—and the fear of it—can challenge ideas of heritage and memory by going past the human and considering the posthuman significance of memory and monument. Do humans need to be remembered? Do we need to be the main character of the Earth’s archive? The monumental significance of ruins, then, turns our thoughts away from human progress and significance, and instead challenges us to think about how cultural memory visualizes futures without humans.

<http://www.openhumanitiespress.org/books/titles/deterritorializing-the-future/>

## The Scent of an Extinct Flower

There are systems we use to try and archive the existence of other species, whether that species exists alongside us or has existed in epochs past. One is the use of scientific taxonomies and classifications as a way to try and create an “objective” view of the species. Bowker (2005) argues that a physical, paper archive is similar to taxonomic systems, where the archive becomes a series of “disaggregated classifications that can at will be reassembled to take the form of facts about the world”; in both the archive and the taxonomic system, the personal memory of the thing being categorized is lost (pg. 18). And, in the strict guidelines of taxonomy, “an ineffable smell is harder to capture… than a Latin binomial” (Bowker, 2005, pg. 137). Our systems, so critical to our cultural memories, cannot even capture the scent of a flower, whether it has gone long extinct or has just been classified in the modern era.

The second is the presence of life on the natural, deep time archive; that is, the traces of life in sediment and fossils and bones. Bowker argues that life seen through Earth’s natural record is another form of memory, and that more traces of that life’s memory in the natural record correlate with better natural success (pg. 19). This archive, too, lacks the context of memory. In every medium (the archive, the binomial nomenclature, the layers of sediment), the data is but a fragment to which we superimpose our own narrative memory of the life forms being described. Like our own archives, we are remembering the geological record as it relates to our present time and cultural importance.

This issue comes to the forefront when we try to recall an extinct species. We tend to first classify and document the species most important to us; Humphreys et. al (2019) gives us the example of trees, a group of life that forms the backbone of “cultural, ecological, and economic interests” across so many cultures that their documentation of not just their life, but their extinction, is much higher than that of other plant species (pg. 1045). In other words, we carefully monitor the tree through our classifications and records, and properly mourn it when it disappears. Other plants are not so lucky. Herbaceous plants and flowers are not as closely recorded, meaning their extinction goes “unreported, resulting in underestimation of [extinction] rates” (Humphreys et. al, 2019, pg. 1046). There is, for the unassuming flower, not even a proper system of forgetting it, because it was never remembered in the first place.

Does an undocumented extinction matter to us, then, if it only exists in the deep time geological record, and not in the “the tools of our own archive”—the tools we have to remember what is important to us (Bowker, 2005, pg. 18)? The answer is that we are not discussing the extinctions of epochs past, but the one we live in parallel to, where deep ecology and present time converge. Humans transform land at a massive rate, but it is the “pure”, untouched, and “charismatic” species whose biomes are protected and examined in the Anthropocene; the others have already disappeared in the constructions of urbanism and tourism, because we have prioritized that which we already viewed as culturally or aesthetically crucial (Bowker, 2005, pg. 146-148). The geological record cannot keep the scent of the flower preserved for us; the city built over its seeding ground cannot keep it either. When the inevitable extinction of the undocumented occurs—or has occurred, millennia ago—we must wonder what it tells us about our systems of memories for the extinct species we did choose to remember.

## A Piece of Space Debris

What are astronomy and space travel to the environmentalist? How do we configure cultural conceptions of Earth, its resources, and its people when faced with the vast frontier of space? The anthropocenic lens suggests that we currently treat the universe much the same way we treat Earth: as a resource for extraction, and as a place to expand the ingenuity of humanity at the cost of everything else. And so, when we conceive of how we will be remembered on a cosmic scale, we must conceive of how humanity creates remembrances in the current epoch.

The idea of a Space Anthropocene is not one that solely exists in posthuman or transhuman narratives; it already manifests in the current Anthropocene epoch. Morin & Richard (2021) explains that space debris grows as society becomes increasingly reliant on satellite technology, but will eventually create a layer of debris that restricts both the reliability of these technologies and the potential of space travel through the dangers of excessive space waste (pg. 568). Much like any other form of technological waste, space debris never lessens because the financial profit of clean-up pales in comparison to the profit of simply making more (Morin & Richard, pg. 568). Importantly, space is not Earth: there are no people living in space, no territorial claims, and very few government regulations, that work to understand the cosmos as a place for sustainable living (Morin & Richard, pg. 569).

The current issue of ignoring space debris is part of the larger problem with “space optimism”, or the idea that humanity will undergo an evolutionary and/or technological change to thrive in the cosmos. Most techno-utopian views on space are rooted in colonialist and expansionist ideals, originating from the 1960s where “peaceful space explorations were simply not self-justifying activities, politically speaking,” and “science of any sort was popularly supported because it was expected to have valuable worldly applications” (McQuaid, 2010, pg. 164). These “valuable applications” were “popularly” determined by capitalist governments interested in pushing the importance of resource extraction and territorial claims onto the public conscious, and not the scientists who saw forays into space as new ways of understanding Earth, and, more importantly, understanding the duty of humans living on it. Sideris (2018) argues that “a turn to the universe… fueled by cosmic ambitions carries with it contradictory and often troubling implications for humans’ capacity to exist within natural and human limits”; or, that posthuman ideals of a cosmic humanity conveniently ignores that humanity has not solved its own limited existence on Earth (pg. 400).

That is, debris in space becomes the new radioactive decay in the geological record; evidence of humanity in deep ecological time, but pushed beyond the boundaries of both Earth and human existence, creating a posthuman cultural memory of extraction and waste. Considering humanity’s fascination with creating cultural memories in space, for both ourselves and the potential of the more-than-human or other-than-human, there needs to be a cultural shift in how humanity treats remnants of themselves in the geological record before they understand themselves in the cosmic one. Sideris, for example, points out that space optimism, transhuman futures, and the belief that humans are a crucial spatiotemporal force on a cosmic scale will “naturalize and normalize human domination of—and even, ultimate departure from—our planet as an inexorable and even desirable evolutionary development for a complex species like ourselves”, rather than drive an ecologically sustainable future for the cosmos (pg. 415).

How, then, can we understand cultural memory on a cosmic scale, divorced from debris, extraction, and the idea that we must leave Earth to continue our remembrances? After all, time capsules and other archives sent into space “become redundant antiques of their creator’s lifetime, traditions and other customs once removed from associated cultural, social, linguistic and semiotic influences”; that is, our current cosmic archives of memory simply become another form of space debris (Beyond the Earth, “Companion Guide”). For cultural memory to exist as more than excess trash, environmental preservation and ecological heritage initiatives must be embedded in the remembrances we leave in the cosmos. *Beyond the Earth* and other space-ecology heritage foundations offer the idea of sending not songs, writings, or rituals into space, but the knowledge of taking care of Earth to provide “deep time stewardship information” (*Beyond the Earth*, “Our Work”). For instance, they argue that records of radiation in the Earth’s crust and the history and causation of climate patterns, sent to live in our orbit, will impart the cultural know-how for distant or more-than-humans to take care of the Earth in much the same way any form of cultural memory imparts narrative lessons of the past (*Beyond the Earth*, “Our Work”). By creating ecological records in space, there is a recentering of Earth not as a forgotten and dying beginning for humanity’s expansion, but as a continuous place in human and posthuman memory to return to again and again in cosmic history—in other words, cosmic heritage must reaffirm our stewardship of Earth even if we become distant to it. As Sideris argues, “if there is to be a future worth celebrating for human and more-than-human life on this planet, it will be one where we learn to embrace and live within limits” of ecological sustainability (pg. 417).

What these initiatives impress upon our conscious is that there is no way to divorce human memory from geological memory—no way of turning to the cosmos to avoid the imparting of human culture we have already left on the geological record. The importance of space debris is how it is configured by both human and more-than-human memory, or rather, how it symbolically represents cultural heritage. If it exists only as debris, then it represents only the cultural practices that led to the Anthropocene: extraction, greed, and trying to make the limited limitless. If, however, the debris is configured to be remembrances of the Earth as it once was, or the Earth as it could be, then memory may be used as a way of reinforcing ecological heritage within cosmic heritage.

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# Solarpunk and Mnemonic Resistance?

* An end to the thesis
* Tying concepts together: how does thinking about humans as part of a deep time ecological system impact our cultural and industrial productions, and how do we use these thoughts as a form of mnemonic resistance?
* Focus on degrowth, mitigation of trauma, recalling past

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