Thinking Through Gaia, Anthropocene and Art

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Jules Cashford took us on a wonderful and nuanced journey to understand where Gaia, the mother earth goddess, originates and its various articulations across locations and time. Gaia's long history, iterations and cosmologies are not familiar to me but Gaia--as a *concept or hypothesis*--is one that regularly occupies contemporary cultural discourse. There was a kind of rebirthing of Gaia in the 20th century due to a conversation between two close friends about 50 years ago.

Gaia was an offering by novelist William Golding to scientist James Lovelock who needed a name for his emerging theory of the earth as a living system or how the sum of life optimizes the environment through its own use. This is the origin of the Gaia Hypothesis. Since then, Gaia has come to stand for a way of thinking through *systems* and *processes*. The name was to bridge areas of knowledge, collapse time/space and welcome people in rather than turn them away. It was a kind of thought experiment or provocation; it brings the mythopoetic in contact with experimental science.

But the use of the term, and his language in general, made Lovelock's emerging concepts prone to ridicule and easy to dismiss by scientists as well as those who generally dislike anthropomorphizing and gendering. In the last session, Jules reminded us that in Paleolithic times earth mother encompassed all genders and there was not this strict polarization of male and female that we see today.

The scientist Lynn Margulis, a close friend and colleague of Lovelock's, who was equally controversial for her independence, wrote that she regretted the personification but also called Gaia a "tough bitch." Gaia, she wrote, is "…symbiosis seen from space. All organisms are touching because all are bathed in the same air and the same flowing water."[1]

Gaia does not and has never belonged to one discipline. The contemporary philosopher of science, Isabelle Stengers describes Gaia like this: "A fearful and devastating power that intrudes on our categories of thought, that intrudes on thinking itself. Earth/Gaia is maker and destroyer, not resource to be exploited or ward to be protected or nursing mother promising nourishment. Gaia is not a person but complex systemic phenomena that compose a living planet. Gaia's intrusion into our affairs is a radically materialist event that collects up multitudes. This intrusion threatens not life on Earth itself — microbes will adapt, to put it mildly — but threatens the livability of Earth for vast kinds, species, assemblages, and individuals in an 'event' already under way called the Sixth Great Extinction."[2]

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[1] Margulis, *Symbiotic Planet: A New Look at Evolution*.
[2] Haraway, "Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene."

This “event” under way is caused by the Anthropocene, another ubiquitous concept that was first used around the same time as Golding and Lovelock’s conversation and popularized in the early 2000s. The Anthropocene is not an official geological epoch yet (still under consideration to follow the Holocene), but is well established informally across all disciplines as the era when human activity amounts to a geological force. That is the era of today.

The two terms, Gaia and Anthropocene, share many characteristics and are useful to consider together. Both terms ask us to consider the dynamics of our world/universe and our place within it. Both terms reference the human: taking human form or positing the human as central. Both are thought experiments, not fully resolved or offering clear answers; instead the terms make us do the hard work, if we take them up. Both terms are overwhelming, even incomprehensible, or what Tim Morton calls “hyperobjects” (beyond human scale of time/space and we can only grasp a part for the whole).[3] And, finally, both Anthropocene and Gaia are contested terms (couldn’t we name them better?). But as Donna Haraway states: “Who cares? We work with what we got.” She warns us not to let the concept get too big. “These stories, always threatened to become too big and act like they take over everything.”[4]

In their last session, Tom and Jules discuss what can we do in the face of the divide between nature and spirit (or the break with Gaia) and what can/should be done in the urgency of our existential crisis. The path humans are on literally ensures the end of human existence and the existence of many other living species in our wake (or the Sixth Great Extinction). How do we live and how do we act with such crushing knowledge?

Tom apologizes for asking Jules this question of what can be done because it is so concrete, even practical. But this is exactly the work of the artist/activist and many (including myself) are taking up this challenge unapologetically. It is not the “saving mother earth” movement of the 1970s (that is pure hubris) but instead more of finding different ways of relating -- to each other, the nonhuman and the systems of Gaia—in order to evoke a future that can simply include the human. This crisis is, of course, not evenly distributed nor are all humans and ways of life equally responsible. The Potawatomi scholar and activist Kyle Whyte writes that “the hardships many non-Indigenous people dread most of the climate crisis are ones that Indigenous peoples have endured already due to different forms of colonialism: ecosystem collapse, species loss, economic crash, drastic relocation, and cultural disintegration.”[5]

So why art? What use is art? Art has constructed our nature story since the beginning of time. Tim Morton argues in “Ecology without Nature” that “that the very idea of "nature" which so many hold dear will have to wither away in an ‘ecological’ state of human society. Strange as it may sound, the idea of nature is getting in the way of properly ecological forms of culture,

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[3] Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*.
[4] Terranova, *Donna Haraway: Story Telling for Earthly Survival*.
[5] Whyte, “Indigenous Science (Fiction) for the Anthropocene.”

philosophy, politics, and art. [His] book addresses this paradox by considering art above all else, for it is in art that the fantasies we have about nature take shape-and dissolve."[6]

For me, the category of art—malleable and contingent—is freedom, allowing the means to pull together, cross wires, prod and provoke. It is not purely fun and folly (although there is plenty of that!) but essential thinking through materiality and action. So, can it be through art we can repair this relationship to Gaia? Overcome the fissures and divisions? Re-present nature not as outside and over there, but inside?

Bruno Latour raises this issue in his lecture-performance "Inside," stating Plato's cave is a myth. This strong story of the cave and wanting out blinds us to the fact we are never outside, he says.[7] This is entanglement; we are part of the processes of Gaia which we try so hard to represent as a thing to behold and over there.

As I dive into these thought experiments and pick up the threads made visible by engaging and brilliant thinkers such as these, I have the nagging worry "But is there time for this!?" A reasonable question when we are faced with the blaring headlines that "there is no time left." Thinking without action causes me anxiety. But maybe doing nothing is exactly what needs to be done. Artist Jenny Odell in her talk "how to do nothing" says: "The function of nothing here…is that it's a precursor to something…"Nothing" is neither a luxury nor a waste of time, but rather a necessary part of meaningful thought and speech."[8]

Look at the immediate reduction of emissions during quarantine. In a study by the Global Carbon Project, scientists found a 17% decrease in carbon dioxide (CO^2) emissions related to the global shelter-in-place orders tied to the coronavirus pandemic in 2020.[9] A *Nature Magazine* headline in March of 2020 reads "Coronavirus lockdowns have changed the way Earth moves. A reduction in seismic noise because of changes in human activity is a boon for geoscientists."[10] Stopping large sectors of human activity has been a pandemic of another kind with social and economic dimensions that are not charted here, but this does clearly demonstrate that the sudden and major overhaul to the ways we live will absolutely make a profound difference. How can we do that in compassionate, equitable and life affirming ways?

The architect, systems theorist, inventor and futurist Buckminster Fuller liked to say: "If you want to teach people a new way of thinking, don't bother trying to teach them. Instead, give them a tool, the use of which will lead to new ways of thinking."[11]

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[6] Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*.
[7] *Inside: Lecture Performance by Bruno Latour*.
[8] Odell, "How to Do Nothing (Transcript of Keynote Talk)."
[9] Le Quéré, Jackson, and Jones, "Temporary Reduction in Daily Global CO2 Emissions during the COVID-19 Forced Confinement."
[10] Gibney, "Coronavirus Lockdowns Have Changed the Way Earth Moves."
[11] "Bhungroo Wins the 2017 Buckminster Fuller Challenge."

With that said, I am going to show several contemporary artists projects, starting with two of my own, that use art as a way to think through the troubles of Gaia and the Anthropocene. What can art do and what are these new ways of thinking artists are proposing?

The first project I am going to share with you is *Site Profile Flags*, a series of site-specific flags I made starting in 2018 after the experience of being in a soil pit on a ranch in central California. A soil profile in scientific research is a vertical section of the subsurface used for the study and classification of the layers or horizons that form over time. A deep hole is dug to allow researchers to see the composition below the ground and produce its profile. Each horizon is a distinct layer that has different physical, biological and chemical properties from adjacent ones. The distinctions are obvious because of texture and color differences.

Soil profiles can be appreciated on an aesthetic level. When they are exposed they can be breathtakingly beautiful. Being inside a soil profile ravine affects people differently; it can be calming, energizing and sometimes transformative. Some people have attributed this to being six feet underground (or at burial depth) and others speak to being immersed in a biochemical field of microbial activity.

I have collaborated with scientists on and off for about 20 years now and for the last five worked closely with soil scientists. I am always startled by the strict divisions within the sciences. The division between the arts and sciences is one level of separation but there are hard boundaries within the natural sciences too. For instance, soil science is a distinct field from plant science and rarely do the two meet. To study the biochemical exchange between plant and soil becomes an interdisciplinary affair. My urge in the pit was to knit the below ground and above together, or turn the earth inside-out through a visual representation to expand where the edges are usually defined.

To do this I sought ways to transfer those physical, biological and chemical properties of the layers I was seeing (human, plant, rock, soil, microbe etc.) onto fabric by making dye from clay, topsoil, rock, charcoal, plant, lichen, trees, metals and so forth found on the site. Sometimes making the dyes was fairly straightforward and other times it verged on the ridiculous (like when I made dye from marble).

Lastly, I sewed the dyed fabrics together to create a flag to mark the site and represent the ecosystem parts that are often symbiotic and always enmeshed. The flag in the end is a *bioregional* representation, as opposed to a *geopolitical* one.

This flag in New Paltz, NY, is installed on a dead cedar found at the site which is Unison Arts Center; the dying cedars are a large part of the visible story of the transformation of this place currently. Over time the flag and tree will decay and return back to the ground where I removed them.

The second project of mine I want to share with you tonight is called *Carbon Sponge*, which I also started in 2018 and is ongoing. This is a different kind of work in that it is a large-scale

collaboration with soil scientists, city agencies, cultural centers, urban land stewards and farmers, among others. It started in 2018 when I was granted the opportunity to be a Designer in Residence at the New York Hall of Science in Corona Park, Queens.

I was learning a lot about soil carbon sequestration at the time or the ability of agricultural land to be cultivated in such a way as to sink carbon, returning it back to the ground from where we extracted it. This is a form of biomimicry or a nature-based solution to a manmade problem. This is a graphic promoting the French program "4 Per 1000" which states if we can increase the carbon content in rural soils by just .4% per year we can halt the annual increase of carbon dioxide in the atmosphere.[12] My initial questions were "can urban soils, like rural soils, be effective in carbon sequestration and a means to mitigate anthropogenic climate change?" And, "can anyone (not only scientists) accurately track the increase or decrease of carbon in soil over time?"

So, in the backyard of the science museum, I set up an experiment with scientists from CUNY Graduate Center's Advanced Scientific Research Center. We built 24 raised beds for the experiment which was both a garden and a museum exhibit. The beds were filled with a mix of sediment from a construction site that removed from 50 feet below ground. This sediment was formed about 20,000 years ago when a glacier covered much of New York City. The sediment, which looks a lot like sand, had zero biology or carbon until we mixed it with NYC-made compost that was about two to three years old. The soil we human engineered (making it distinctly urban) was consistent across all the beds and we changed the planting combinations to compare changes in carbon content across time.

We have collected and tested soil samples over several years and assembled a generalist's kit used by a group of urban farmers in NYC (and now rural farmers) that we are reviewing in relation to lab data. We have run tours, workshops and museum-floor demonstrations. We have written a user's guide and a scientific white paper. The research questions and answers are a large part of *Carbon Sponge*. Other important concerns include the blending of disciplines or expanding what art and science are supposed to do.

Finally, I also interested in the stories that unfold. I have experienced a vast sense of wonder and astonishment during the process that I try my best to relate. For instance, the story of rhizobia. These are bacteria that cluster in the billions, forming little sacks about the size of peas attached to the roots of certain plants. When they glow a beautiful shade of pink they are actively transforming atmospheric nitrogen into a plant usable form in exchange for plant sugar. This is a vital, symbiotic relationship upon which a whole range of life depends. Plants can't survive without this form of nitrogen provided by rhizobia and bacteria exist on the food from the plant.

Humans need nitrogen too, so we eat plants or we eat animals that once ate plants, since we similar to plants cannot uptake atmospheric nitrogen directly. Our lives depend on these

[12] "Welcome to the '4 Per 1000' Initiative."

miniscule bacteria, the rhizobia, who you may be meeting for the first time today. Here are the complex systemic phenomena composing a living plant. This movement of energy and substance between the living and non-living, from the atmosphere through the plants into the ground, sucked up by microbes, eating and decaying, to release back into soil/plants/humans and the air is, of course, the maker/destroyer, Gaia.

We have come to expect art to inspire us, even leave us awestruck, and, in more recent times, challenge our ways of thinking. The German artist, Joseph Beuys, famously said "everyone is an artist" and created a practice called "social sculpture" to infuse this orientation across everyday life.

I recently listened to the science fiction writer, Ted Chaing, in conversation with Ezra Klein who describes this sensibility in a historical context: "Many Renaissance scientists … were profoundly religious. And they saw no conflict in that at all. And for them, understanding how the universe worked was getting to know God better by understanding his creation more clearly and feel like that the wonder that comes with understanding how the universe works is very closely related to religious awe. I think that when scientists discover something new about the universe, I imagine that what they feel is almost identical to what deeply religious people feel when they feel like they are in the presence of God. I wish that we could get back a little of that attitude, instead of thinking of religion and science as being fundamentally diametrically opposed."[13]

So, maybe the question is: How do we recuperate and sustain our sense of awe in daily life and in the work that we do?

And now I want to end with sharing a few examples of other artists' works in this arena. Honestly the task of selecting a few to include in this presentation was extremely difficult because there are so many artists working with these ideas and in so many different and fascinating ways. This is what you call a "good problem."

I start with Claire Pentecost's *Proposal for a New American Agriculture* because, well it is a flag. The work is both iconic and visceral. Pentecost composted an American flag in a worm bin for several months, transforming most of it into living soil. There is a back story here (pun intended!). In gardening circles there is a trick to bury cotton underwear into the ground and leave for several months before pulling them out. This is a cheap and easy soil test; the more disintegrated the underwear, the higher the level of soil microbes (an indicator of soil health). The cotton undies are food for the microbes. For me, this work speaks to where our national priorities should rest. Our soil is a national treasure that is most often kicked around like dirt. It also speaks to the power of the invisible or forgotten. It makes manifest the smallest but mightiest of organisms. And the decomposed flag of course represents our failing state that barrels towards oblivion and end of times with unequaled rates of consumption and lack of political will to correct course to ensure a future.

[13] "Ezra Klein Interviews Ted Chaing."

This next work is also a collaboration with microbes. This is titled *Thinking Like a Cloud* by Polish artist Karolina Sobecka, currently based in Berlin. In this project, Sobecka builds a cloud collector to sample cloud moisture and its microbial content. The sample is then analyzed and ingested by human participants. New discoveries about human microbiome is changing the way we think about biology and the way we think about what it means to be human. Not only do more than half the cells in our bodies belong to microorganisms (making us only 43% human), but the human microbiome affects our health, mood and response to certain medications.[14] An article in the *Journal of Psychiatric Research* reads "Collective unconscious: How gut microbes shape human behavior."[15] Furthermore, scientists are learning more about the microbiomes of clouds and how bacteria help to create weather, including lighting. This research is present or influences Sobecka's art work.

Next, I share with you a recent installation by Korean artist Anicka Yi called *In Love with the World* that was commissioned for the Tate in 2021. "Floating in the air, her machines – called aerobes – are based on ocean life forms and mushrooms. They re-imagine artificial intelligence, and encourage us to think about new ways machines might inhabit the world. Yi has also created unique scentscapes which change weekly, with odors linked to a specific time in the history [of the site]."[16]

This next work I will share with you is a collaborative art project that builds and distributes renewable energy sources around the globe and tying them together using a unique form of artificial intelligence by the artists Tega Brain, Alex Nathanson and Benedetta Piantella. The work called *Solar Protocol* asks "What would technologies based on natural or environmental intelligence look like? How might we design with *natural* intelligence?" as opposed to artificial.[17]

I am ending with these images of work by the Greek artist duo, Hypercomf. It seems fitting to end in contemporary Greece. Hypercomf is researching the landscape of the seabed, specifically marine cave ecologies as a "stage of the [Anthropocene] and culture's undoing."[18] They have teamed up with a marine biologist from the island of Crete to study the impact of plastics on a marine cave ecosystem in a work titled *Marine Cave, Benthic Terrazzo*. The terrazzo tiles they make inlaid with the recovered plastics from the cave and when installed invite the subject of the ocean inside our terrestrial homes. The tiles combine function and beauty and are a form of communication for this ongoing research.

[14] Lee, "We're Only About 43% Human, Study Shows."
[15] Dinan and Stilling, "Collective Unconscious: How Gut Microbes Shape Human Behavior."
[16] "HYUNDAI COMMISSION ANICKA YI IN LOVE WITH THE WORLD."
[17] Brain, Nathanson, and Piantella, "Solar Protocol Manifesto."
[18] "Marine Caves Benthic Terrazzo."

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Artist Works in Presentation (in order of appearance)

Sam Liebert, *Orange Venus*, 2018

Edward Burtynsky, *Dandora Landfill #3, Plastics Recycling, Nairobi, Kenya*, 2016

Valerie Hegarty, *Fallen Bierstadt*, 2007

Stephanie Rothenberg, *Aphrodisiac in the Machine*, 2021

Orra White Hitchock, Classroom chart made with pen, ink and watercolor wash on cotton linen at Amherst College, 1828-1840

Brooke Singer, *Site Profile Flag #4*, 2020

Claire Pentecost, *Proposal for New American Agriculture*, 2012

Karolina Sobecka, *Thinking like a Cloud*, 2014

Anicka Yi, *In Love with the World*, 2021

Tega Brain, Alex Nathanson and Benedetta Pinatella, *Solar Protocol*, 2021

Hypercomf, *Marine Caves and Benthic Terrazzo*, 2020