

Gaia Theory and the Anthropocene: Radical Contingency in the Posthuman Future

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Introducing the Gaia Hypothesis

In the article that follows, I argue that Gaia *does not providentially protect humanity*: she can be benign but wrathful as well. She may have a tendency towards life, but not necessarily *human* life: no teleological preference for higher mammals or rationality is implied by the theory. I refer to this below as *radical contingency*, the open-ended, iterative nature of terrestrial evolution. Gaia is an overarching metaphor, yes, but one with scientific backing. To be clear about the implications of Gaia for the dawning epoch of the Anthropocene, we must first be clear about what the Gaia hypothesis means. The Gaia hypothesis is the idea that the many interlocking earth systems--hydrology, geology, and biology among them--work together to create conditions favorable to life, and that living entities actively reshape their environments in ways that prove advantageous to them. The Gaia hypothesis posits not an overarching goddess-figure providentially governing the earth, but myriad tiny agencies working chaotically and non-teleologically, to sustain the biosphere. Lovelock writes that “[t]he entire surface of Earth including life is a self-regulating entity and this is what I mean by Gaia” (Lovelock 82). Putting it a little differently, Gaia is a “theory in which all life and all the material parts of the Earth’s surface make up a single system, a kind of mega-organism, and a living planet” (Lovelock 1979 99). And yet Lovelock acknowledges the potential misunderstanding of subsuming all of earth’s systems under an overarching term, with the attendant danger that Gaia could become a new version of a humanist deity, along the lines of the natural theology of Paley (c. 1831) or the character of Cleanthes in Hume’s *Dialogues Concerning Natural Religion* (c. 1775). Lovelock continues:

Occasionally it is difficult, without excessive circumlocution, to avoid talking about Gaia as if she were known to be sentient. This is meant no more seriously than is the appellation ‘she’ when given to a ship by those who sail in her, as a recognition that even pieces of wood and metal when specifically designed and assembled may achieve a composite identity with its own characteristic signature, as distinct from being the mere sum of its parts (Lovelock 99).

Lovelock, an independent scientist and inventor, is acutely aware that he might be charged with or lumped together with mysticism (as indeed he was, see Williams 1992; Matless 1991; Gorham 1991), and he takes great pains in his writing to demonstrate the experimental validity of the theory. His first book on Gaia demonstrates that the concentrations of oxygen in the Earth’s atmosphere remain at the right state for the continuance of life. Too much oxygen would lead to highly combustible fires even in damp conditions that would render the planet uninhabitable, while too little oxygen would make respiration impossible. Similarly, too much salinity in the oceans would make it impossible for sea creatures to maintain homeostasis, while too little salt in the oceans would stop the ocean “conveyer” from working, changing the entire climate of the earth. Global temperature, as well, remains more constant than should be expected based on the amount of solar radiation hitting the earth, more stable than the “goldilocks” factor of distance from the sun alone can explain.

As Latour states in his Gifford lectures, prior to Lovelock and his fellow researcher, Lynn Margulis, scientists and philosophers alike easily thought of the environment as the backdrop against which the drama of life unfolded. Through the extension of agency into unicellular organism in the ancient seas, and other humble forms of life, Lovelock flipped the drama, “as if there were no more distinctions between the main characters and the extras” (Latour 93). Human beings, so used to seeing themselves as the pinnacle of evolution (which is itself not far metaphorically from the Medieval Great

Chain of Being), came to seem the beneficiaries or dependents of “lower” forms of life. Latour compares Lovelock to Galileo and Pasteur, two visionaries who completely upended the way that scientists saw the earth:

The Earth’s behavior is inexplicable without the addition of the work accomplished by living organisms, just as fermentation, for Pasteur, cannot be started without yeast. Just as the action of micro-organisms, in the nineteenth century, agitated beer, wine, vinegar, milk, and epidemics, from now on the incessant action of organisms succeeds in setting in motion air, water, soil, and, proceeding from one thing to another, the entire climate (Latour 93).

Lovelock discovered that it is not only the case that there is life on earth because conditions were favorable to life, but that the present ecological conditions (such as the distribution of atmospheric gases) arose precisely as an *outcome* of life. “The atmosphere is not merely a biological product, but most probably a biological *construction*: not living, but like a cat’s fur, a bird’s feathers, or the paper of a wasp’s nest, an extension of a living system designed to maintain a chosen environment” (Lovelock 408, emphasis added).

If Gaia is a goddess, then, she must have trillions of fingers (and no head!), from bacteria to slime molds to protozoa to oak trees and whales. Gaia, as a poetic name for very real and concrete distributed processes, makes that unmanageable cacophony of causations thinkable. This became the central dilemma of Lovelock’s writing: how to make planetary systems understandable without oversimplifying them, how to acknowledge myriad agencies without missing their combined effects, how to see both the forest and the trees. The difficulty is to never resolve the tension between whole and parts, to remain in the uncomfortable zone where agencies overlap and transform one another. In Latour’s analysis, it is the role of the sciences to multiply agencies, to follow the threads all the way down, from the organism to the cells to the molecular processes, and so forth, producing a vertiginous effect in which there is always more to be understood, always an ellipsis at the end of the sentence (49). Agency, for Latour, refers to any entity that exerts an influence, and may be human, extra human, or chemical in nature. An organism is a nested system of systems, non-hierarchical in nature, that arranges these agencies in a cogent manner, that is conditioned and conditions myriad processes. Lovelock’s particular emphasis was to neither “deanimate” nor “overanimate” the agencies composing the biosphere (87). Further, Latour stresses, “contrary to what Lovelock’s detractors claim, that it [Gaia] is made up of agents that are not prematurely unified in a single acting totality. Gaia, the outlaw, is the anti-system” (87). To locate agency at the human or “sentient” level, for example, would be to commit the error of deanimation, neglecting agencies that lie beneath the level of thought. The opposite error would be to endow Gaia with powers resembling those of a providential Judeo-Christian creator deity, which equally misses the point of Lovelock’s work. Latour stresses that Gaia is a (“finally secular”!) theory of the earth, as it distributes agencies all the way down without the need for providential care (Gaia’s origins as a chthonic deity) (75-110). Gaia resists theologizing even more than some evolutionary accounts, which hide theological assumptions in reserving a role for humanity as the pinnacle of the evolutionary power struggle. Gaia does perhaps privilege life, but there is no reason to see in Gaia a preference for *human* life.

No Special Status for Humanity

If human life, or even all terrestrial organisms, were to be destroyed tomorrow, we would expect the Gaia system to “try” to revert to baseline, to bring the earth back to equilibrium, mending the net by stitching together its remaining nodes. What makes Lovelock different from other ecological or environmental writers is that he does not use “natural” in a normative sense and rails against invocations of nature to protest nuclear energy or the use of chemicals in industry. “Nature,” an all-inclusive term, cannot tell us what to do: in Lovelock’s vision, normative discussion should take place in the public sphere. Latour is aware, along the lines of more recent ecocriticism by Timothy Morton, that “to write about nature is to

write about society” (Morton 17). And yet his work also takes him beyond narrow anthropocentrism: “to act for the good of humankind is not enough,” he writes (224). The Gaia perspective puts humanity into place, down to earth, so that human life is situated *within* natural processes that include trillions upon trillions of other organisms. The connectivity across domains (living and non-living, animate and inanimate, human and non-human) ought to give us pause, as the effects of human actions ripple outward in all directions. The science cannot tell us what to do, but it can tell us more about our situation. It can also give likely projections of the *if x then y* sort, which do have a role to play in debates about policy. If our ethics and politics have inherently humanist bias, the Gaia theory asks us to truly see what enables human life, which takes us immediately outside the human realm to talking about hydrology and climatology and all of the sciences. Claiming to value the human while ignoring the biosphere is just a form of willful denial or obfuscation, a magic trick in which only one card is held up for display while the rest of the deck remains hidden beneath a black cloth. Anthropocentric humanism (a variant of Judeo-Christian theism, whether or not this is explicitly acknowledged) hides its reliance upon extra-human life while claiming to speak for the good of human beings. My point here is that while Gaia theory need not be normative or prescriptive, it can tell us what might occur if we push too hard on planetary mechanisms. Gaia informs normative and political discussion of climate change, habitat loss, mass extinction, and other problematic interfaces between humanity and extra-human nature.

Tipping points make it probable that once certain thresholds have been crossed, it will be difficult for the previous equilibrium to be regained: anthropogenic climate change has a certain ratcheting effect. Turning the socket wrench, so to speak, by introducing more greenhouse gases into the environment, causes certain feedback loops to lock into place. The albedo effect, for example, means that when polar ice melts, the darker surface of the earth will absorb more of the sun’s light than the previously reflective white ice, trapping more heat in the atmosphere. The ocean conveyor belt or thermohaline circulation may also be subjected to runaway change, accelerating warming effects. Likewise, methane, previously trapped in permafrost, also becomes an accelerant, as methane is a much more potent greenhouse gas than carbon dioxide. These effects are best described in terms of systems theory:

Complex systems are characterized by highly nonlinear behavior, emergent properties (properties arising in a system because of the interactions between its components), time lags, and unpredictable surprises; they function at multiple, interconnected scales of space, time, and organization. Complex systems also self-regulate; they keep their behavior within certain bounds so that the system as a whole continues functioning as in the past. These bounds are really *thresholds* because once they are crossed, the system’s regular structure and function change, sometimes irrevocably (Farley 81-82).

We can view energy regimes as different set-points or different “clicks” of the ratcheting effect between humans and climate. Humans have, indeed, always changed the face of the earth through their activities. Hunter-gatherer bands played a role in decimating megafauna and used fire purposefully to hunt and manage forests: as these bands bumped up against one another, population pressures led to “cultural intensification” as a means of managing stress (Brooke 103-108). The shift to settled agriculture, preceded by intermittent experiments by transient populations, massively disrupted ecosystems and caused periodic societal collapse. The first industrial revolution, with the transition to steam, began the carbon-intensive lifestyle, leading to the present crisis. The second industrial revolution, with the transition to oil and internal combustion engines, propelled the Great Acceleration after World War II, in which burning fossil fuels has been a prerequisite for nearly every form of economic activity (Scranton 2015, 18, 58-60). Perhaps another shift happened with the advent of the internet, mobile computing, and social media, as fossil fuels are turned into pixels on screens. With each “click” of the ratcheting effect, greater energy expenditures produce ever smaller gains in terms of quality of life.

It can easily be forgotten that the internet is, for the most part, every bit as carbon-bound as the first steam engines. According to a report by the *New York Times*, data centers in the United States alone use power equivalent to 30 nuclear power plants, with a single data center using the energy of a medium-sized town (Glanz 2012). The majority of that energy—up to 90 percent—goes towards keeping servers idling in the event of an upsurge in traffic, and not towards actual computation (Glanz 2012). It can easily be forgotten, contra the “cloud” moniker, that the giant dream factory of the internet is just as earthbound, just as Gaia-dependent, as a hog farm or a coal mine. Big tech investments in solar energy amount to little more than window-dressing for what is essentially a carbon-intensive, polluting industry. If the processing of data is highly extractive in nature, the production of electronic devices is even more so. According to e-waste experts Yi and Thomas,

computer equipment is a complicated assembly of more than 1000 materials, many of which are highly toxic, including chlorinated and brominated substances. Workers involved in chip manufacturing have started reporting cancer clusters and computer recyclers are found to have high levels of dangerous chemicals in their blood (2007, 842).

They go on to state that “a 800 kWh of electrical energy is consumed in the manufacturing of a single 200 mm semiconductor wafer—enough energy to supply a typical household for 2 months” (843). As electronics manufacturers go on to supply ever-more complex devices, like sentient toaster ovens, robotic alarm clocks, and pizza delivery drones, the expenditures of energy and other resources, like rare earth metals and water, will only intensify, continuing the general trend toward greater extraction with less payoff in quality of life. Just as agriculture represented an intensification of cultural activity over the hunter-gatherer society, the internet and the internet-of-things (IoT) are an intensification of earlier forms of mass communication, like radio and television. The question remains as to whether the wow factor of such technologies will pay for itself in terms of increasing the sustainability of human civilization. Undoubtedly, technologies like smart electrical grids will provide some offsets, but will they be enough to support what might be called frivolous uses of new technologies? If my waffle maker can talk to me while I make breakfast, will that compensate for further acceleration of climate change, with the droughts, famines, and wars that go along with it? It seems unlikely that such a trade-off would be worthwhile, and it seems likely that the world’s poorest will suffer so that the world’s wealthy can have more complicated means of entertainment or a slightly easier lifestyle.

From the perspective of Gaia, a sentient toaster oven would be just as much a part of the planetary system as a potato patch in Idaho or the Amazon river basin. Gaia undoubtedly has defense mechanisms that can compensate for overly extractive practices and unwise uses of technology, but these defense mechanisms are not infinite. With each intensification of carbon extraction, the ratchet clicks the climate system into a new and unprecedented state. Human beings could, in theory, turn this cycle around, making a vicious cycle into a virtuous one, but none of the international agreements and scientific warnings so far have seemed to make much of a difference in the pace of the increase in greenhouse gas emissions. Humanity seems to be running full steam ahead, like Watt’s engine, toward catastrophic change. Gaia will respond and life will continue, but in what form and at what cost? To use Heidegger’s terminology, humanity is so “enframed” by the technological process that it cannot simply drop the progress narrative and return to a simpler time. As humanity and technology co-evolve, individual human wills cannot stop the evolution of society towards technological complexity. The prophets and acolytes of the Singularity may be correct to say that a new human future is arriving, one in which humanity and machines merge, producing superintelligence, but how just or unjust will this future be? How many more species will be sacrificed so that we can have, say, augmented reality retinal implants or prostheses with superhuman strength? Some will say that I am drawing a false dichotomy here, between technological progress and environmental sustainability. But if in the previous technological revolutions, extractive activity has only increased, and exponentially so, why should it be any different this time around? These

questions must continuously be raised by those who care about humanity, technology, and the more-than-human world.

If “print is flat” and “code is deep” as literary critic N. Katherine Hayles writes (2004), humanity has undergone several information regimes in tandem with changes in energetic regimes. We have transitioned from oral storytelling to written communication to computer code to machine learning, each information regime an intensification or deepening of the previous received form. The upheavals in society wrought by the Gutenberg press now find their parallel in the transition from code (iterative script that encodes information) to machine learning (reiterative script that learns through feedback loops). Just as the Gutenberg press eliminated the need for hand-copying of texts, machine learning begins to displace even professional-level, highly skilled occupations (including, it seems, the writing of code!). The unpredictable changes happening within the climate systems have a parallel in the unpredictable outcomes of machine learning. Both have the potential to produce extremely rapid transformations within human societies, in the relationship between humans and other lifeforms, and in the relationship between earth and the cosmos. Undoubtedly these rapid transformations will entail some violent shocks to existing institutions, but it will be impossible to say what the resulting civilization will become. Once intelligence moves beyond what human beings can currently fathom (which will likely occur in a rapid “foom”), exponential change takes over (Hanson and Yudkowsky 2013). Every dark imagining and every noble scenario suddenly becomes plausible as the reins are passed to the machines, keeping in mind that the machines may themselves become biological or partly so. The new transintelligence, crossing over domains previously believed to be metaphysically distinct (human, animal, machine), promises to be one of the biggest wild cards of the twenty-first century (Mazis 2008). The shepherding of these developments into good directions represents one of the biggest challenges to philosophy, ethics, and politics. The “good” will have to be defined so as to minimize human suffering while protecting biodiversity and earth systems. The word “shepherding” acknowledges that *control* of these new technologies will not be possible once the threshold to superintelligence has been crossed: systems must be designed with philosophical and ethical reflection in mind, a task that Armstrong, Yudkowsky and colleagues at MIRI (Machine Intelligence Research Institute) have engaged (Armstrong 2014; Hanson and Yudkowsky 2013).

And yet this shepherd who would set the future on its way to arrival has already been compromised, since the human being already partakes of animality, or that which is to be shepherded (Broglio 2008). The troubling of categories (animal and human, natural and artificial) occasioned by posthumanism or the posthuman moment means that human processes are already bound in that which they would govern. The shepherd may be selfish, as in Plato’s *Republic*, caring for the sheep ultimately to slaughter them, and the ruler may be mistaken about her own advantage. The posthuman shepherd, conflicted internally, a walking contradiction, is tasked with taking care of earth and animals while at the same time devouring and destroying them. There can be no escaping this fundamental violence, this self-rending within Gaia, simply because of the physical laws of thermodynamics and the cosmopolitics of being human. We may try to tread lightly through techniques of self-discipline, but, through our very existence, especially as first-world, privileged people, we do trample other species under foot. We can recognize ourselves as cancer cells upon the face of the earth and yet, at the same time, have no trouble getting to sleep at night. The human subject fundamentally lacks autonomy, depending as it does upon the other orders of nature, and yet we find ourselves free, at least in a limited sense, to make decisions about our lives and the way that we use “natural resources.” The term, “natural resources,” should itself be flagged for its sanitizing, anesthetizing effect, for it presumes already that nature (always “out there”) exists to be used (Brown 203-220). The discourse around “natural resources” forgets, conveniently, that we, too, belong to nature, and that, therefore, the instrumentalization of nature also entails the instrumentalization of human beings (in this sense, human existence is the perpetual violation of the categorical imperative). The same attitude that looks upon non-human nature as a collection of things, *partes extra partes*, also holds humanity under the same extractive gaze. Environmental racism, for

example, is the natural outcome of the fictive autonomy of the capitalist worldview, which is, in turn, a logical extension of Judeo-Christian dominion theology. But it is not at all clear that any existing political movement could somehow undo the existential situation of humanity as both part of nature and yet also exercising power over nature. This rend or split within Gaia cannot be simply excised or ignored: it cannot be engineered or legislated away but will be, more or less violently, more or less wisely, allowed to take its course. Wisdom can be identified with non-violence, emphasizing always that non-violence is never absolute, given the conflicted existential situation of humanity as both extremely powerful over and heavily dependent on extra-human forms of life. Gaia is one light among many lights guiding our ethical reflection, but it pairs nicely with Vedic *ahimsa* (Dillard-Wright 2016). Gaia is the autoimmune system by which earth protects itself from the excesses of humanity.

Plastics and Autoimmunity

In 2014, Patricia Corcoran and colleagues discovered a new type of rock, which they christened “plastiglomerate,” which “formed through intermingling of melted plastic, beach sediment, basaltic lava fragments, and organic debris from Kamilo Beach on the island of Hawaii.” Human-created plastics have now entered into the geologic record in the form of this new type of rock, lending further support for the creation of an Anthropocene epoch now under consideration. But the existence of this human intervention in geology cannot tell us whether this development is good or bad or why we ought to refrain from depositing plastics in the oceans. The much more publicized detrimental impacts of plastics on marine creatures also need more than factual description in order to tell us what we ought to value and why. It intuitively seems bad that human beings have created a new type of rock that includes plastics, but it can be much more difficult to parse the reasons for this unsettled feeling of wrongness. Perhaps it is because we think of nature as something apart from us, the backdrop for our actions, that we find it to be disturbing when the nature/culture binary is troubled. Mass extinction and climate change are troubling, because we think of nature as something over and against the human as a canvas onto which to project our desires or as presenting obstacles to be overcome. The weird commingling of “plastiglomerate” makes us realize our power, which simultaneously conjures great dread. And it also leads to the question of whether we really can control our own behavior when a giant raft of plastic trash swirls in the ocean. It is as though our late capitalist industrial systems have run away without us, escaping the meager restraints of politics and ethics. Not only can we not control nature, we cannot even control ourselves.

In the same year that Corcoran and colleagues reported the new rock labeled, “plastiglomerate,” Marcus Eriksen and colleagues from the Ocean Research Project published results from 24 ocean expeditions spanning from 2007-2013. The researchers write:

We estimate a minimum of 5.25 trillion particles weighing 268,940 tons. When comparing between four size classes, two microplastic <4.75 mm and meso- and macroplastic >4.75 mm, a tremendous loss of microplastics is observed from the sea surface compared to expected rates of fragmentation, suggesting there are mechanisms at play that remove <4.75 mm plastic particles from the ocean surface.

To paraphrase, the larger chunks float to the top, while the smaller plastics break down and are ingested by marine life or entangle marine life, causing health problems and possibly death for these animals. The ingested plastics enter into the food chain and become part of these sea creatures:

Numerous species ingest microplastics, and thereby make it available to higher-level predators or may otherwise contribute to the differential removal of small particles from the sea surface, e.g. by packaging microplastics into fecal pellets, thus enhancing sinking. Furthermore, there is increasing evidence that some microbes can biodegrade microplastic particles.

On display here again is the weird side of Gaia as opposed to romantic conceptions of nature which see it as the pristine opposite of human activity (Morton 79-108). While we may be repelled from an environmental perspective (whether ecofeminist, Kantian, deep green, etc.) at the idea of marine life ingesting plastic or the thought of a patch of garbage in the ocean the size of Texas, Gaia allows for such troublesome permutations. Gaia allows for extinctions and mass death, contra Williams, who accused Lovelock of promoting “nature worship” and “group selection” (1992), that arch-heresy of biology. Gaia seems to have developed here already mechanisms for dealing with the profligate dumping of plastics into the ocean, even though plastics have not been on earth for very long, from a geological perspective. Does this mean that it is “safe” to dump plastics into the ocean? Well no, far from it, only that what we might consider “unnatural” behavior can become part of a Gaian network. Gaia can deal with the depredations of human beings, but probably not indefinitely. Here it is important to stress again that Gaia is not a provident Judeo-Christian deity: nothing will prevent us from making huge mistakes. The feedback loops are complicated and long-lasting, and sometimes effects can only be seen in retrospect. Gaia can accommodate human activity, but the earth doesn’t need human beings: life on earth is perfectly capable of continuing without us.

Gaia prefers life to non-life, but we must prepare ourselves for the shock of *radical contingency*. I am here defining radical contingency as the recognition that the kind of life that survives the Anthropocene might not be anything recognizable to us today. Civilization could be utterly different, and humanity, if it exists, may be completely different biologically, either due to genetic engineering or to evolution-on-overdrive or to some new synthetic hybridity. In the meantime, before the end of the Anthropocene, humanity will face Gaia’s self-correcting mechanisms. The processes set in motion by anthropogenic climate change will have to play themselves out, and this will happen not in some remote future, but today and over the coming decades. The consequences for human tinkering in the climate system have been widely published: more frequent and intense storms, drought and fires, glacial melt and permafrost thawing, proliferation and redistribution of insect populations, changes in animal migration, reduced agricultural output. Then there are the knock-on effects: destabilization of vulnerable regimes, increased refugee flows, sectarian strife, mass extinction, insufficient water supply, famine, disease, and death.

Gaia has powerful defense mechanisms that will push back against anthropogenic climate change: nothing exempts humanity from going the way of the dinosaurs. If these defense mechanisms exist in what traditionally has been seen as “outside the human”—in geological and climatological forcing mechanisms—they also exist in ways interior to human processes. Gaia’s immunological responses can be found in the infra-human sphere in those visionaries--artists, scientists, activists, and protesters among them--who work to minimize human impacts on planetary systems. Sloterdijk sees in “social and cultural evolution...[an] upgrading of immune systems,” which he further divides into two tiers (9). The first set is composed of “socio-immunological methods, especially legal and solidaristic ones,” to include the use of armed forces. The second set of human immunological responses includes “symbolic or psycho-immunological practices... in the form of imaginary anticipations and mental armor” (9). The immune responses of social movements may insulate them temporarily from change: uncontrollable factors in the milieu eventually overwhelm an ideology, exposing its weaknesses. The social immune system must then re-work itself, in much the same way as a piece of software must be continuously updated to eliminate bugs and patch vulnerabilities. In the context of Gaia theory, both of Sloterdijk’s forms of immunological response occur within earth’s processes as aspects of the fierce goddess. Recall that human activities are subsets of Gaia’s processes and not independent of them. Both sets of immune responses have their “dark sides” as adaptive or maladaptive responses to changing climatological circumstances. Legal mechanisms can be used to curtail CO2 emissions, preserve forests and wetlands, and protect vulnerable human communities, but they can also be used in exactly the opposite ways, to further entrench vested interests seeking to preserve the business-as-usual scenario of exploitative capitalism. With regards to “symbolic or psycho-immunological responses,” the primary reaction on the right has been to flee from the reality of

climate change and simply deny that the problem exists. A more constructive response might be found in the Resilient Communities initiative, in which communities proactively prepare for disasters on the horizon rather than simply hoping that no harm will come (www.resilience.org). Strong immunological responses make communities “antifragile,” to use Nassim Taleb’s coinage, while weakened immunological responses render communities brittle. “Antifragility” means not just being able to recover quickly from some shock, but actually gaining from disorder in the system.

Continuing the theme of autoimmunity, troubling signs can be seen in attacks upon the press and activists in the United States, in Russia, in Turkey, in Brazil, and elsewhere. In these instances, the human body, or the anthropogenic subsystem of Gaia, attacks its own immune cells--the artists, journalists, and activists--in order to preserve the momentum of capital towards human extinction. The global elite, who feel themselves completely insulated from the effects of climate change, have the imperative to put the brakes on movements for climate justice, or any form of social change they deem as unflattering or inconvenient for elite prerogatives. Journalists face the risk of death for reporting on corruption by public officials, money laundering by the ultra-wealthy, or the slaughter of indigenous or marginalized people. Naomi Klein has documented the phenomenon of whistleblower, activist, journalist as immune cell in her book, *This Changes Everything*. Klein uses the term “blockadia” to refer to acts of sabotage, artistic expression, and physical disruption in the face of attacks by capital on ecosystems and indigenous people:

Blockadia’s fast multiplying local outposts, the fossil fuel divestment/reinvestment movement, the local laws barring high-risk extraction, the bold court challenges by Indigenous groups and others...have not only located various choke points to slow the expansion plans of the fossil fuel companies, but the economic alternatives these movements are proposing and building are mapping ways of living within planetary boundaries, ones based on intricate reciprocal relationships rather than brute extraction (8221).

Regardless of whether or not Klein has produced an adequate “answer” or “solution” to the problem of climate change (which seems unfair to even ask of one author), she does demonstrate a certain antifragility on the part of these movements. She chronicles many instances of people who had not previously been engaged with regards to ecological issues coming on board the environmental movement when they saw their drinking water and land at stake. The blockadia/autoimmune movement is antifragile in the sense that each new outrage on the part of corporate and government actors becomes more grist for the mill of dissent. This becomes even more true when people are willing to put their lives and livelihood on the line, in the Arendtian sense of “action.” Enormous latent political potential lies waiting for a party that would claim the green mantle in earnest. Al Gore, the would-be environmentalist president, shied away from his green *bona fides* in a misguided attempt at broad popular appeal, only to have defeat snatched from the jaws of victory by the Bush clan and the Supreme Court in 2000. Environmentalism has gone mainstream in the sense that everyone has some vague sense of what the word means, but it has yet to become a serious political force in the United States, or, indeed, in most developed countries. Activism keeps alive the possibility that environmentalism will go from being a fringe or “special interest” movement to being the main plank of a major political party.

And yet philosopher Dale Jamieson correctly called his book on climate change *Reason in a Dark Time*: the political process has failed to bring a meaningful response to the problem of climate change despite decades of exhaustively-researched warnings from the IPCC. Even if the United States under Trump had not withdrawn from the Paris Climate Accord, which specifies only voluntary targets, it is doubtful whether carbon emissions would return to the 350 ppm level. False hope in the climate debate represents a great danger, as it ensures complacency on the part of the general public. Returning to the theme of Gaia, the planet will respond no matter what human beings do. Planetary processes and political processes interlock with one another: taking cues from both Whitehead and Lovelock, we might view human activity as a cosmopolitical unfolding, a reciprocal coordination or antagonism between human

activity and the life systems of the planet. “Coordination” and “antagonism” are two ways of describing the same interlocking processes: Gaia will tend back towards equilibrium over the long haul, but that journey can be more or less gradual, more or less jarring, depending upon the course of action that humanity chooses. Industrial systems, transportation networks, agricultural practices, and extractive mining and drilling all belong to Gaia and are “natural” in the most basic sense, but humanity, in the sense of *Homo faber* (Arendt 199-304) has the freedom--and therefore the responsibility--to do and make in ways that will be less deleterious to the common good. The commons must be construed as involving all of the members of cosmological networks, to include human beings, yes, but also microorganisms, plankton, fish, birds, aquatic mammals, and rocks, glaciers--in short, any entity, living or nonliving, that has a measurable effect on planetary systems. Anything belonging to a planetary process, any agent of any status, must be considered, must count in a planetary philosophy attempting to come to grips with climate change. Any privileging of the human over the non-human will necessarily be illusory (and viciously so), since human beings depend upon larger, highly interconnected planetary networks (to include the undertakings of plankton, bacteria, and other less charismatic entities) for their well-being.

To think of ourselves as belonging to Gaia is to admit that human beings have never been the masters of nature but the inheritors of vast riches left to us by our ancestors, like the one-celled organisms who once colonized the ancient seas, the plants who learned the trick of photosynthesis, and the dinosaurs who held the title of apex predator long before the first humans walked the face of the earth. To think of these Gaian others with shades of reverence rather than disdain, to regard geohistory with astonishment rather than neglect, is to make not a solution to the problem of climate change, but to open a space of possibility in which creativity can operate. Creativity in this sense belongs not simply to human agency, but to the general milieu to which humans belong. Artificial intelligence and synthetic biology become strange kin (Haraway 99-103) within this space of possibility, fellow agencies in the search for a less cataclysmic future. The future does not happen to humanity, nor does humanity create its own future. *Homo sapiens* can push and pull, nudging its plastic future on its way to arrival, but the future does not belong to us, as a possession. The conquering mentality of the colonial age, in which “Man” (using the term in its historic sense) dominates “savage” nature, must give way to reciprocity between lifeforms and thoughtforms, old and new, in the search for a viable common existence. Gaia gives us a powerful metaphor for our planet’s systems of equilibrium, systems which make life on earth possible. Gaia has provided a niche for human life on the planet, but it does not guarantee that our niche will last forever. Indeed, Gaia theory allows for mass extinction and rapid change within its framework. The Gaia hypothesis resists romantic interpretations of nature that view it as a pristine “other,” but it also should give us pause in our current ecological crisis. Radical contingency allows for the possibility of an utterly different future for life on earth, one that may not accord with our preconceived notions for how humanity should live in the cosmos.

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