

Gaia Is a Tough Bitch

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Abstract:

This essay stages a critical engagement with the late works of James Lovelock, the famous Gaia scientist hagiographized by Science Studies scholar Bruno Latour. I argue that Latour's celebration of Lovelock's Gaia dangerously obscures a more compelling version of Earth systems' theory, belonging to Lovelock's collaborator and co-founder of the theory, Lynn Margulis. Lovelock's version of Gaia is embedded in a masculinist, bellicose and imperialist discourse reliant upon an emergency rhetoric and justifying geoengineering and A.I. control fantasies. Meanwhile, over the last decade Bruno Latour positioned himself as a thinker of ecology, partly by casting himself as a supporter of Gaia theory. Yet he made no mention of the problematic politics with which Lovelock's work was entangled. Turning both to Lynn Margulis' and to feminist philosopher of science Isabelle Stengers' understanding of Gaia, the article resists anthropocentric visions to articulate less hubristic and potentially more democratic responses to our current ecological catastrophes.

Keywords:

Gaia; ecology; geoengineering; climate change; Earth Systems

Two scientists, one anthropologist, one philosopher—each of them so-called-human, multispecies organisms.¹ One vast, autopoietic system comprising all four of these humans and much more. These five characters occupy the stage in what follows. One of the two scientists is male (but not only), while one is female (but not only). The anthropologist is male (but not only), while the philosopher is female (but not only). The vast system comprising all four of these humans and much more was named by two of these and by many more after a Goddess and is infinitely more than gendered. This is no happy-ending tale; in fact, it is no tale at all. There will be no love triangle here. Neither should the reader assume a deterministic, dualistic structure easily distributing our more-than-human characters along simple, gendered lines, though sadly, tragically perhaps, what follows may read partly as an exhortation for us not to cave along with the male scientist and his anthropologist admirer, into disappointingly and dangerously gendered tropes and traps. The stakes are high, as they have to do with scientific knowledge, its production, its silences, and its effects on how we humans and other more-or-less humble dwellers may think (with), live with(in), and experience Gaia, that Goddess, that bitch, our home.

Prologue: the (Gaian) Earth is a (High Stakes) Stage

In 2009, Gaia scientist James Lovelock argued that ecological emergency justified limiting democracy in favour of “blood, sweat and tears,” invoking a manly leadership and geoengineering as the only solution to said emergency. However, long before his resort to a language of emergency warnings and this hubristic tone, Lovelock had revolutionised geoscience by demonstrating that the Earth acts physiologically, not unlike a living organism. The “Gaia theory,” which would have remained mostly speculation and computer modelling without his collaborator, Lynn Margulis, took a long time to be taken seriously by the scientific community.² Instead of imagining living beings as passively adapting to a backgrounded environment, Lovelock and Margulis argued that life creates its own conditions for self-perpetuation, a notion that upset both neo-Darwinians and geochemists; the first because this seemed to evoke a telos at a planetary scale that their focus on natural selection forbade, the second because it required the integration of an alien discipline, biology, into their field of expertise. According to Gaia theory, if Earth’s atmosphere isn’t in thermodynamic equilibrium and if planetary temperature has been generally hospitable to the continuation of life, it is because on Earth atmosphere and biosphere dynamically constitute each other. Here I argue that, though Gaia theory originated as a collaboration between Lovelock and Margulis, Lovelock’s emphases are recalled to the detriment of

1 Dorion Sagan, *Cosmic apprentice: Dispatches from the edges of science* (Minneapolis: University of Minnesota Press, 2013).

2 The question of whether Gaia theory makes unanimity among scientists today is not within the scope of this paper: I will focus instead on its rhetorics as well as some of their technopolitical and ethical implications.

Margulis' distinct contribution, and this silencing may become damaging to our global, political and ecological climate. Analysing the distinctly gendered rhetorics of both scientists, as well as ontological, ethical and technopolitical consequences, I advance this critical analysis in agonistic conversation with the Gaia theory commentary of anthropologist Bruno Latour and feminist philosopher of science Isabelle Stengers. In doing so, I aim to show that Gaia theory can, in fact, resist human exceptionalism and hubris rather than reinforcing these.

Act I: Feverish Gaia on Dialysis

Scene 1: Emergency and Dialysis

Enter James Lovelock, scientist, and Gaia, uneasily dressed as a frail old lady

Belonging to “situated knowledges,”³ scientific paradigm shifts, which never are (can be, or arguably should be) neutral, carry significant philosophical and political implications.⁴ Atmospheric chemist Lovelock's and microbiologist Lynn Margulis' Gaia began as an Earth-based planetary science that was deeply anti-anthropocentric. But while Lovelock's Gaia theory offered a vision of the biosphere as a complex and profoundly interdependent system, his onto-political views, situated in imperialist, nationalist pride, taint his conclusions regarding how to “fix” the problem of climate change. In a 2006 essay, he wrote:

As a young man, I was proud to be a subject of a great empire and even now, although it is largely history, I still see it as something that, like the Roman Empire, left behind a beneficial legacy. But I sense that stewardship is an imperial concept that assumes an automatic superiority invested in those in charge. ... We, the United Kingdom, are no longer in charge and stewardship is therefore now the right and duty of the greater powers. Do we trust them to exercise their power justly and sensibly? Do we think that the United States or China or a body like the UN could be trusted to regulate the climate

3 Donna Haraway, “Situated knowledges: The science question in feminism and the privilege of partial perspective,” *Feminist studies* 14, no. 3 (1988): 575–599.

4 Lynn Margulis was keenly aware of this situatedness: in an interview titled “Gaia Is a Tough Bitch” (a title which I echo here), she wrote: “if Science doesn't fit in the cultural milieu, people dismiss science, they never reject their cultural milieu! If we are involved in science of which some aspects are not commensurate with the cultural milieu, then we are told that our science is flawed. I suspect that all people have cultural concepts into which science must fit. Although I try to recognize these biases in myself, I'm sure I cannot entirely avoid them. I try to focus on the direct observational aspects of science.” In: Lynn Margulis, “Gaia Is a Tough Bitch,” *The third culture*, 129–146. She wrote this referring to her partial disagreement with James Lovelock.

or the oxygen level of the atmosphere?⁵

One could imagine that Gaia theory—as it does in some interpretations⁶—would lead one to *reject* the notion of human stewardship altogether, in an anti-anthropocentric positioning inspiring eco-humility rather than hubris. Lovelock himself repeatedly and contradictorily asserted the anti-anthropocentric implications of Gaia. Yet the above passage, with its nostalgia for British rule over an old-world order, proceeds in a lyrical tone about how the biosphere should be respected and apprehended by “us” humans just as physicians would regard their patients. This moment becomes the crucial axis upon which Lovelock’s argument hinges: the failure to specify why we should not trust the U.S. or China as much as one allegedly could have trusted and felt “proud of” the U.K. does not question imperialism, but rather suggests a continued faith in the “beneficial” character of empire per se, only qualified by a nationalist conviction that empire is unlikely to be “just” or “sensible” if such power is left in American or Chinese hands. Ultimately the objection is not at the level of the principle of stewardship or of imperial power but rather patriotically concerns which imperialist nation-state is in charge.

Three years later, in *The Vanishing Face of Gaia*, Lovelock contradicted himself on this point. But rather than retracting his mildly sceptical view of stewardship, he suggests geoengineering as a possible “fix” for the climate crisis:

There are signs that we can treat global heating by engineering or other means. We have proved that our unscheduled and unintended experiment of adding large quantities of carbon dioxide into the air by burning carbon fuel heated the planet, and we know that it was a mistake. Does this mean that we can cure global heating by adding some other gas or material that does the opposite and cools? Scientists, including me, think that we may have little option but to try; but surely it is much better to try as a planned experiment than as a panic response.⁷

Ambiguously (and erroneously) implying that “scientists” (as opposed to “some” scientists) favour geoengineering, Lovelock associates such a technopolitical approach with an inevitable necessity provoked by urgency, a “planned experiment” that emergency forces further as the “only option” in a “panic.” Lovelock thus ignores the possibility that the current catastrophe might in fact prove how much we do not know, and likely will never know.

5 James Lovelock, “The Fallible Concept of Stewardship of the Earth,” in R.J. Berry (ed.), *Environmental Stewardship: Critical Perspectives, Past and Present* (London: T&T Clark, 2006), 106–111.

6 e.g., Lynn Margulis and Dorion Sagan, *Microcosmos: Four Billion Years of Microbial Evolution* (Berkeley: University of California Press, 1997), 22.

7 James Lovelock, *The Vanishing Face of Gaia: A Final Warning* (New York: AZ, Basic Books, 2010), 137.

The apodictic emergency tone of Lovelock's imperialist discourse, gendered and militarized, evinces a militarized masculinity coupled with apocalyptic desire. Thus, he repeatedly insists that a sudden, dramatically catastrophic event would be, to an extent, desirable,⁸ as it would shake "us" into a much-needed, war-like mobilization. *Vanishing Face of Gaia* abounds in bellicose metaphors and comparisons with World War Two.⁹ Here a sudden and devastating event would beneficially justify a strong leader¹⁰ stepping in. Churchill's spectral figure and his "blood, sweat and tears"¹¹ would finally not shy away from circumventing excessively slow and impractical democratic imperatives, which to Lovelock impede upon the necessary expediency given "our" state of emergency. Assuming rather than substantiating the distinct temporality and expedience of authoritarian militarism over democratic inaction, lyrical masculine undertones fuel his rhetoric. Lovelock, originally a medical researcher, stages threatening, anthropomorphizing metaphors where Earth becomes a fragile, vulnerable "old lady," to whose rescue human scientists and bold political leaders must rush, as her benevolent doctors. He assumes, in turn, that these are knowledgeable enough to "save" her:

These technological fixes [i.e., geoengineering] should not be condemned without considering their value as an extender of the time we have to act. In a longer run they are probably no more a cure than is dialysis for kidney failure but who would refuse dialysis if death was the alternative.¹²

Western medicine, with a history of declaring itself capable to act as the ultimate life extender, is taken to exemplify the kind of ethics that shall guide us to the path of potential geoengineering. Life on dialysis is assumed better than death, in a peremptory "who would refuse" turn of phrase. Yet one may pose another "who"-question that shakes the accuracy of the metaphor: whose death is being discussed here? The end of the planet in the Holocene form we are (un)familiar with and have evolved in, may be at stake. Yet leaping from this to the "death" of "the planet" as a whole requires a strong human exceptionalism. Besides, the scale-leap from individual lives and lifesaving dialyses in the

8 Here Lovelock erased, even at the time of his 2010 book, the countless floods, hurricanes, and other disasters that had already claimed, shaken and displaced so many lives in the global South and some of the global north, from hurricanes to floods, and also including slower but equally devastating processes of soil depletion. The "shock doctrine" is Naomi Klein's phrase to describe the violently exploitative predation following these events. See Klein, Naomi. *The Shock Doctrine: The Rise of Disaster Capitalism* (Macmillan, 2007).

9 Lovelock, *Vanishing Face*, 23, 90–93, 131, 135, 155.

10 On the anti-democratic character of geoengineering as "hyper-radical monopoly" and the capitalocentrism of the IPCC reports, see my article, "Feminist imaginations in a heated climate: Parody, idiocy, and climatological possibilities." (*Catalyst: Feminism, Theory, Technoscience* 3, no. 2, 2017): 1–33.

11 Lovelock, *Vanishing Face*, 32.

12 Lovelock, *Vanishing Face*, 142.

human medical realm to the planetary scale gives dubious confidence in our capacity to “cure” ills caused by “us,” forcing a homogeneity upon incredible variegation, difference and inequality, a forced homogeneity from which follows a technocratic and corporate authoritarianism explicitly opposed to democratic approaches.

Lovelock’s reasoning depends on an excess of postulates taken to be incontestable, particularly when it comes to capitalocentric futurism (*i.e.*, the inability to imagine the future as anything but hegemonically capitalist.¹³ Lovelock presumes that “our” present and future goal shall and should (continue to) be “business as usual.” Praising France for its predominantly nuclear energy production,¹⁴ and evoking synthetic food to “solve” world hunger,¹⁵ Lovelock deploys Malthusian diatribes on overpopulation¹⁶ that ignore the feminist debates and critiques thereof.¹⁷ In his later, more explicitly political works, Lovelock appears to assume that as a scientist his expert opinion applies in domains beyond science, and that his opinions are untainted by ideology: scientific authority somehow neutralizes ideological leanings. Thus, he describes himself as an “independent scientist,”¹⁸ by which he means that he rarely if ever was affiliated to a university. The private sources of funding (e.g., Shell, Hewlett Packard) and

13 J.K. Gibson-Graham, *The End of Capitalism (As We Knew It)* (Minneapolis: University of Minnesota Press, 2006).

14 Lovelock praises nuclear energy in his *Vanishing Face of Gaia*, dismissing objections thereof as “irrational” and as “disinformation.” *e.g.*, 25–27, 77. He characterizes nuclear energy as “profitable without state subsidy,” an interesting alternate fact if one considers the long term and the financial and practical difficulty that France is currently experiencing upon updating its many power plants. On p. 81, Lovelock scoffs at “the anecdotal belief that there are clusters of leukemia victims in the populace around nuclear power stations. I know as a scientist that this is nonsense but try convincing a woman who lost a relative who happened to live in the vicinity of a nuclear installation that the likelihood is vanishingly small. This is why it is too easy to persuade the gullible multitude that the harmless mobile phone you use, or the nearby power cable, is a danger.” Gullibility, the mourning woman, the populace, all such naïve characters whose experiences do not weigh much relative to the authority of the scientist and his statistical evidence (which Lovelock does not provide).

15 Lovelock, *Vanishing Face*, 25.

16 Lovelock, *Vanishing Face*, 76.

17 One would be hard-pressed to exhaustively list the enormous amount of scholarship in this area. Perhaps simply mentioning Donna Haraway’s recent attempt to articulate a feminist and decolonial alternative to overpopulation discourse is one example. Donna J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016).

18 Lovelock, *Vanishing Face*, 35.

NASA¹⁹ from which he proudly recounts earning a living²⁰ somehow stand as proof of “independence.” Meanwhile, he never seems to consider the relative academic freedom provided by universities. In Lovelock’s book, *A Rough Ride to the Future*, one of the principal arguments becomes the defence of a figure he calls “the lone scientist,” as allegedly much more capable of leading progress and innovation than may other scientific collaborative arrangements. There he expresses similar contempt about international organizations like the United Nations (indeed quite ineffective at dealing with the ecological catastrophes of our times) as he does regarding academe (which he surely had many legitimate reasons to critique), only to uncritically side in favour of private corporations “fixing” the climate issue. Thus he writes that a “consortium of businessmen” whose interests would be hindered by climate change could consider acting unilaterally, by equipping private cargo ships with aerosol generators producing clouds as the ships would sail.²¹ Though he later admits that this “solution” may be problematic, he does not take back the general logic, but rather provides such admission merely because we could not predict the “side-effects” of such initiatives, which blind spot puts us, in the British scientist’s euphemistic terms, “in an ethical dilemma.” Nonetheless, Lovelock maintains his position in favour of “modest geoengineering” (aerosol pulverization over oceans to create sun-reflexive clouds), and consistently suggests that environmentalists (taken as a lump, and somehow homogenous, monolithic whole) are

19 In her “Gas guzzling Gaia, or: a prehistory of climate change denialism,” *Critical Inquiry* 47, no. 2 (2021): 306–327, Leah Aronowsky documents the ways in which Lovelock regularly obtained funding from Shell for his Gaia research and showed that what she describes as the “malleability” of Gaia theories has enabled some versions of these to subsequently serve a certain strand of climate denialism. She describes Lovelock as “a freelance inventor of sorts [whose] client list came to include Hewlett-Packard, Dupont, Pye Unicam, and, most importantly for our purposes, Shell Research Limited, the research arm of Royal Dutch Shell.” She further writes in reference to Gaia’s “malleability” that “the displacement of human exceptionalism can be leveraged equally for a doctrine of neoliberal environmental governance or for an embrace of radical biological alterity” (emphasis mine). While I find Aronowsky’s critical investigation of the Lovelock’s funding from Shell and of some climate denialists’ capture of Gaia theories very helpful, and while the present essay partly converges with this critique, I do not read Gaia theory as “equally” exploitable by neoliberals and bona fide “embraces of radical biological alterity.” I rather distinguish between interpretations of Gaia (along with their respectively gendered tropes and their distinct consequences ontologically, politically, and ethically). These distinctions have been obscured in part due to a common tendency in the history of sciences to eclipse the contribution of women. Indeed, Aronowsky spends but a few quick sentences and a dismissive footnote acknowledging the role of Lynn Margulis in the development of Gaia theory, as well as her paradigm-shifting work on serial endosymbiosis theory. The notion that recognizing Gaia as a complex system by examining microorganisms amounts to a “naturalization of pollution” is also misleading, relying upon notions of “naturalization” that assume unhelpful nature/culture dualisms. “Naturalizing” seems to hardly be the issue if one understands “nature” (or rather, of naturecultures) as historically contingent and complex.

20 James Lovelock, *A Rough Ride to the Future* (NY: Overlook Press, 2014).

21 Lovelock, *Rough Ride*, 140.

“dogmatic ideologues wholly ignorant of science and engineering.”²² Thus, Lovelock asserts that the “solution” to our “problem” belongs to experts, implemented by corporate, “self-regulating” market forces. Ultimately, Lovelock’s science is primarily an engineering science, and indeed in his last book, *Novacene*, Lovelock concedes that “latterly I have realized that I have never been a pure scientist, I have been an engineer.” The figure of the “lone scientist” morphs into the indeed more accurate description of “engineer,” i.e., someone who wasn’t so much pursuing basic scientific knowledge as he aimed to “fix” the climate in the “practical” interest of “business as usual.”

If Lovelock’s previous book, *The Vanishing Face of Gaia*, was subtitled “A Final Warning,” it and the scientist’s later writings indeed constitute a warning regarding the new forms of hubris late capitalist futurism generates, a window into the “second phase” of political and scientific responses to climate change, which philosopher Isabelle Stengers alerts us about:

Enter Isabelle Stengers, philosopher.

Today, the grand campaign to deny the problem has run out of breath a little, but the second phase is being prepared. New voices are making themselves heard, asserting ... [the] only solution is geo-engineering, which will ensure that it is possible to continue to extract and burn, without the temperature rising... One need not be paranoid in order to ask oneself if the success of [the word “Anthropocene”] as much in the media as in the academic world ... doesn’t signal a transition from the first phase—of denial—to the second phase—that of the new grand narrative in which Man becomes conscious of the fact that his activities transform the earth ... and that he must therefore take responsibility for the future of the planet.²³

Exit Isabelle Stengers (to return in act II)

Lovelock’s recommendations indicate the powerful appeal of capitalocentric futurism, to the point that frenetic “fixing” is deemed preferable to *phronesis* even according to an otherwise inventive scientist. In this emergency context, capitalocentric and futuristic imaginaries which pathologize a feminized Earth, prompt “us” to place the Earth “on dialysis” for the time being, and to figure out later how to perform a more definitive kidney transplant. Paradoxically, it was Lovelock’s rich view of Gaia as a living, self-regulating physiological complex biospheric whole composed in turn of complex ecosystems which informed the scientist’s medicalized, militarized rush to hubristic emergency measures.

22 Lovelock, *Rough Ride*, 144.

23 Isabelle Stengers, *In Catastrophic Times: Resisting the Coming Barbarism* (London: Open Humanities Press and Lüneburg: Meson Press, 2015), 8.

Lovelock's threading of the Gaian metaphor alongside his syllogistic reasoning led him to consider geoengineering as a promising route. From the complex, nuanced, scientifically multidisciplinary and imaginative argument that the Earth is alive, he jumped to the simplification that Earth is comparable to a unified, single organism (a jump that, as we'll see, Lynn Margulis rejects). Lovelock subsequently genders, ages and anthropomorphizes this organism, giving it attributes he paternalistically associates with vulnerability. Then, from the double postulate that old women are vulnerable, and according to which individual organisms' health may be entrusted to medicine's benevolent hands, the image of Earth as a sickly old lady leads him right to geoengineers, standing for incarnations of MD saviours and their dialyses options. An excessively threaded metaphor, a couple of questionable (and implicit) postulates, gendered, pathologizing associations, a few syllogisms, and a massive scale leap, make for a geoengineering advocacy recipe which exemplifies the dangers of analogical thinking. Rhetoric, like the Earth, has its limits.

After *The Vanishing Face of Gaia*, Lovelock went even further in imagining hubristic futures. "Before the end of the century," he prognosticated confidently in a 2016 interview with the *Guardian*, "robots will have taken over."²⁴ As global temperature rise (and the potential extinction of the human species) is unlikely to matter to robots or their artificial intelligence, Lovelock is not concerned anymore. Meant to be reassuring, Lovelock's robotic statement de facto fails to accord value to future more-than-human life, as automated machines, lucky them, will ensure the perpetuation of business as usual. "Business as usual" (now a refrain under his pen), until we die, and beyond. Although usually deploying the phrase as that which demands to be protected, occasionally (and contradictorily) refers to "business as usual" negatively, to signal the continuation of things in blind indifference to the catastrophic situation. But here Lovelock ultimately replaces religious faith's transcendence with a belief in capital such that it may endure beyond life. This transhuman futurism, in which capital stands in for the divine, becomes more explicit in its religious undertones in Lovelock's last book, a year before his death in 2022.

Act I, Scene 2: Gaia In an Accelerationist, Transhumanist Straightjacket

Before turning to this "secular" eschatology, a couple more points are needed regarding Lovelock's *A Rough Ride to the Future*, published just before the robotic *Guardian* interview. Throughout this book Lovelock offers a grand narrative in which the invention of the steam engine marks a new phase of

24 Decca Aitkenhead, "James Lovelock: by the end of the century, robots will have taken over," (*The Guardian*: 2016). Retrieved from: <https://www.theguardian.com/environment/2016/sep/30/james-lovelock-interview-by-end-of-century-robots-will-have-taken-over>

evolution that he calls “accelerated evolution.”²⁵ The bellicose tone presses on, with grand claims regarding “civilization,” “tribalism,” and human nature. “War,” Lovelock’s reader is told, “can be regarded as a way of naturally selecting the right ideas at a time when time is short.” Such emergency selection is read as the mark of progress, and neo-Malthusian assertions contextualize this claim. Lovelock’s association between bellicose masculinity and progress is even more explicit here than in his previous works: “Science and war are closely linked, and maybe this is why more often than not they are male preoccupations.”²⁶ No attempt is made here to critically examine the socio-economic and political reasons for such a connection. A deep essentialism fuels Lovelock’s teleo-industrial evolution: “The human conscious mind was selected for its capacity to tell entertaining stories and reveal to a woman someone lively and fit enough to be the father of her children.”²⁷ Thus “humans” are men, while women are rhetorically excluded from evolution, but kindly invited to “revelations.” The “lone-scientist” wonders: “could men’s skill at ‘chatting up the birds’ have been selected as a measure of fitness?”

Lovelock compares his grand narrative regarding “accelerated evolution,” the period spanning from the steam engine to today, to cosmic inflation following the Big Bang, in an attempt to reassure his readers. He exhorts them to “take comfort also in the thought that the universe survived its inflation; perhaps we will too.”²⁸ The supposed good news is that “accelerated evolution,” turning out new artefacts faster than biodiversity loss, will allegedly compensate mass extinction thanks to “electronic ecosystems.” The cyborg beings populating these, Lovelock claims, will endure higher temperatures than their extinct human creators.

If humans have unapologetically replaced God and robots have replaced humans in this narrative, scientists and inventors stand as a superior “caste” among humans: “I regard it as crucial to think that scientists and inventors are members of the same castes of humans.” But – the reader may catch her breath a little – “neither the scientist nor the inventor is a new species of human.”²⁹ Lovelock distinguishes between science and invention, however, insisting that “necessity and its intuitive answer through invention, [not science], is the explanation of progress.”³⁰ The distinction relegates even science and its rational thinking to the background, unnecessary for progress compared to its sine qua non condition: the inventor’s “intuition.” Again, the “lone scientist” – as hero – will later more accurately

25 Lovelock, J. *Rough Ride*, Lovelock’s notion of “accelerated revolution” is one of the central threads of this book: see 29, 72, 74, 83, 90, 92, 97, 100, 199, 202, 218.

26 Lovelock, *Rough ride*, 24.

27 Lovelock, *Rough ride*, 9.

28 Lovelock, *Rough ride*, 59.

29 Lovelock, *Rough ride*, 62.

30 Lovelock, *Rough ride*, 65.

describe himself as an “engineer.”

When he finally and somewhat movingly mentions Lynn Margulis — the sine qua non of “his” Gaia theory, recounting the news of her death in 2011, Lovelock’s rhetoric takes another militaristic turn: “Like generals who lead their troops from the front, she went into combat against the cronies of the Earth and life sciences firmly established in their turf dugouts.”³¹ The analogy misses the mark for a scientist (Margulis) who turned down any attempt at contact, presumably from the United States Department of Defense, because they demanded secrecy.³² But Lovelock’s militarized tone is coherent with the rest of his discourse. Indeed, while Bruce Clarke rightly describes James Lovelock’s version of Gaia as “neoliberal,” and Lynn Margulis’ as “communistic,”³³ many moments of Lovelock’s prose, increasingly so with each of his later books, are reminiscent of a futurism that characterizes not only certain strands of neo-liberalism but of neo-fascisms.

Lovelock’s imperialist, militaristic, medical and masculine language further confirm their digital futurist orientation in his *Novacene*,³⁴ where he fantasizes further about a future in which Gaia will shed her organic layers in favour of her technological ones, eventually breeding artificial intelligences that would remain in charge of homeostatic self-regulation of the Earth’s atmosphere, thus taking not just an active but a leading part in the Earth system. Here Lovelock offers a monistic worldview that reduces all to informational bits, a view resonating with post-apocalyptic imaginaries from the Silicon Valley and the likes of Elon Musk.³⁵ Where the back cover of the book describes Lovelock as “the greatest

31 Lovelock, *Rough ride*, 65.

32 Personal communication, Dorion Sagan, May 26th, 2018.

33 Bruce Clarke, *Gaian Systems: Lynn Margulis, Neocybernetics, and the End of the Anthropocene* (Minneapolis: University of Minnesota Press, 2020). Clarke’s meticulous investigation of the history of Gaia theories puts less emphasis than the present essay on the very high political stakes in distinguishing between Lovelock and Margulis’ contributions. Much less critical of Lovelock’s politics than I am, Clarke valuably shows that Margulis’ version of Gaia theory particularly stresses autopoiesis (Maturana and Varela’s influence). This indeed is one of the reasons why she is more careful than Lovelock, often underscoring the limits of the term “Gaia” as a metaphor, which misleadingly suggests a unified organism instead of a complex system of systems. Clarke agrees that the distinct approaches of the two scientists prevented Lynn Margulis from caving to the cybernetic fantasies Lovelock indulges in, in his late works. Though Margulis and Sagan do recognize the intimate entanglements of technosphere and biosphere, their ontological and scientific imaginary resists the notion that the latter could do without the former. On autopoiesis see Maturana, Humberto R., and Francisco J. Varela, *Autopoiesis and cognition: The realization of the living*, vol. 42 (Berlin: Springer Science & Business Media, 2012).

34 James Lovelock, *Novacene: The Coming Age of Hyperintelligence* (Cambridge, MA: MIT Press, 2019).

35 For a critique with the entanglements between white supremacy, patriarchy, A.I. and space conquest postapocalyptic discourses, see Joanna Zylinka, *The end of man: A feminist counterapocalypse* (Minneapolis, MN: University of Minnesota Press, 2018).

environmental thinker of our times” (an ironic claim given his own dismissals of “environmentalists” as “ignorant ... dogmatic ideologues”³⁶), it is in this last book that Lovelock describes himself as primarily an “engineer,” dreaming of an earthly technoworld with a subdued biosphere. As the Gaian literary historian Bruce Clarke sums up, “*Novacene* submits both biotic systems – living organisms – and metabiotic ecosystems – of which Gaia is the final iteration – to an AI-fuelled transhumanist imaginary.”³⁷ The commitment of this exceptionalism is further affirmed with Lovelock’s certainty that “we are alone,” that life on Earth was a “one-off.” The Earth’s vital exceptionalism doubles with that of humans, to him unquestionably the only life form endowed with “sentience” (a category whose content the engineer fails to clarify). Armed with fast-moving syllogisms, Lovelock proceeds to declare that “the end of life on Earth would mean the end of all knowing and understanding. The knowing cosmos would die.”³⁸ Lovelock accompanies this concern with more grandiloquent prose: “I now think that the religious view of humanity as chosen may express a deep truth about the cosmos.” While he insists that he does not believe in God, he sees the alleged human uniqueness in sentience as demanding perpetuation – thus the human vocation to craft electronic beings capable of continuing the cosmos’s self-knowledge. The non-life of the mind shall persist in the afterlife of the body.

In our context of ecological catastrophe and, among other things, the concomitant burst of literature referred to as “the nonhuman turn,”³⁹ suggesting that animacy,⁴⁰ agency,⁴¹ vibrancy,⁴² and even sentience⁴³ or intelligence be re-thought in non-anthropocentric terms, Lovelock’s faith in a human monopoly on sentience seems rather dubious, especially on the part of a scientist. Lovelock’s conviction that Earth is the only planet in the cosmos to have developed life is also dubious. A vast literature abounds on this question of whether “we are alone” (the whole scientific discipline of astrobiology spends its vast resources on this matter), a rather anthropocentrically structured question as long as the answers are formed in an “either/or” manner (either yes, in which case we are deemed exceptional, unique, per Lovelock’s position; or no, in which case a sameness is granted to the whole universe, with visions of equivalents for ourselves everywhere; little space in this discourse is left for the recognition of a

36 Lovelock, J. *Rough Ride*, 144.

37 Bruce Clarke, *Gaian Systems*, 273.

38 Lovelock, J. *Novacene*, 30.

39 e.g., Richard Grusin, ed., *The Nonhuman Turn* (Minneapolis, MN: University of Minnesota Press, 2015). The literature on the nonhuman has developed so abundantly over the last decades that one would be hard-pressed to be exhaustive: the following references are just a few key examples.

40 Mel Y. Chen, *Animacies: Biopolitics, Racial Mattering, and Queer Affect* (Durham, NC: Duke University Press, 2012).

41 Karen Barad, *Meeting the Universe Halfway* (Durham, NC: Duke University Press, 2007).

42 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010).

43 Natasha Myers, *Rendering Life Molecular: Models, Modelers, and Excitable Matter* (Durham, NC: Duke University Press, 2015).

possible impossibility to know). Further, the question is anthropocentric insofar as the subject “we,” of the supposed “lone” state, is taken for known. The assumption behind Lovelock’s claim that “we are alone,” a claim which founds his transhumanism, is also that the uniqueness he is so sure of knowing for a fact, is of special value. This fails to consider, at least as a possible question, the Nietzschean suggestion that knowledge might not have mattered at all once those who are assumed to have invented it are gone.⁴⁴ Finally Lovelock assumes that “intelligence” can be merely translated into electronic bits. In this as with his claims regarding earth stewardship or his advocacy of geoengineering, Lovelock’s version of Gaia makes for a neoliberal, transhumanist, technocratic onto-political imaginary.

Act II: Gaia as a Tough Bitch

Scene 1: Staging the Scientist’s Canonization

Enter Bruno Latour, anthropologist; Gaia is still awkwardly dressed

In 2015, Bruno Latour published a book unfortunately titled *Face à Gaïa*.⁴⁵ Unfortunate because Gaia has no face, and neither do her components “face” her – not even us humans – except in a fantasy, dangerously abstract God’s eye view. Latour opens the chapter most directly focused on Gaia theory with quasi-hagiographic praise of James Lovelock, whom he compares and contrasts with Galileo. In fact, Latour’s theatrical-ecological ambitions led him to co-create a play that honoured Lovelock in the same genre with which Brecht had honoured Galileo⁴⁶. There as elsewhere in his late works however, Latour remains conspicuously silent regarding the imperial-transhumanist drama described above.

Latour saw in Lovelock and Galileo’s respective contributions two paradoxically opposite but also

44 In “On Truth and Lies in a Nonmoral sense,” Nietzsche writes: “Once upon a time, in some out of the way corner of that universe which is dispersed into numberless twinkling solar systems, there was a star upon which clever beasts invented knowing. That was the most arrogant and mendacious minute of “world history,” but nevertheless, it was only a minute. After nature had drawn a few breaths, the star cooled and congealed, and the clever beasts had to die. One might invent such a fable, and yet he still would not have adequately illustrated how miserable, how shadowy and transient, how aimless and arbitrary the human intellect looks within nature. There were eternities during which it did not exist. And when it is all over with the human intellect, nothing will have happened. For this intellect has no additional mission which would lead it beyond human life.” Friedrich Nietzsche, *The Birth of Tragedy and Other Writings* (Cambridge: Cambridge University Press, 1999), 139.

45 Bruno Latour, *Face à Gaïa : huit conférences sur le nouveau régime climatique* (Paris: La Découverte, 2015).

46 Latour, Bruno, Aït-Touati Frédérique, Latour Chloé, Global Circus, “Une tragi-comédie climatique”. <https://www.youtube.com/watch?v=8mkNg2nDWmY>. Retrieved July 20th, 2022.

comparable epistemological breaks. Galileo had discovered that the universe was infinite, open, and that all planets shared a commonness making our Earth quite banal. Meanwhile, in Latour's reading, Lovelock's Gaia has allegedly "brought us back" to a finite Earth that can once again be read as unique. While planetary resources available to make the Earth habitable to human and nonhuman life are indeed limited, this would-be uniqueness is misleading. Via Lovelock, Latour deemed Gaia theory as demonstrative of Earth's unique character, because it underscores how living organisms, as integral parts of the Earth system, actively produce the self-regulation of the planet's atmospheric composition and temperature. But, contra Latour, if this self-regulation is indeed Gaia theory's thesis, the theory, rather than assuming a vitalist exceptionalism, actually challenges boundaries between biotic and extra-biotic forces, and adds to a long scientific history that de-centres humans and the Earth. However, this is not as palpable in engaging Gaia theory from the distinct perspective of Lovelock, as it is in the company of Lynn Margulis' Gaia, mostly eclipsed in Bruno Latour's recounting.

Act II, Scene 2: A Gaian Strip Tease

Enter Lynn Margulis, scientist, Dorion Sagan, Margulis' co-author and son.

Gaia strips away her old lady's clothes to reveal her provocative monstrosity, defiant to both humanism and vitalism.

In *Microcosmos*, Lynn Margulis – who co-founded Gaia theory with James Lovelock⁴⁷ – and Dorion Sagan wrote that:

Man is the consummate egotist. Before Copernicus founded modern astronomy our ancestors believed that their home, the Earth, was at the centre of all the universe. Despite Darwin's demonstration that we are only one recent branch on an evolutionary tree, most people still believe that human beings are biologically superior to all other life. ... *Homo Sapiens* does not represent the culmination of progress.⁴⁸

In addition to this questioning of anthropocentric "progress," in an early essay titled "Gaia and Philosophy," Sagan and Margulis explicitly point out how the Gaia hypothesis shatters perceptions of *human uniqueness*:

Perhaps the greatest psychological stumbling block in the way of widespread scholarly

47 James E. Lovelock and Lynn Margulis, "Atmospheric homeostasis by and for the biosphere: the Gaia hypothesis," *Tellus* 26, no. 1-2 (1974): 210.

48 Margulis and Sagan, *Microcosmos*, 194.

acceptance of Gaia is the implicit shadow of doubt it throws over the concept of the uniqueness of humanity in nature. ... Recovering from Copernican insult and Darwinian injury, anthropocentrism has been dealt yet another blow by Gaia.⁴⁹

Furthermore, a thermodynamic understanding of life as an open system efficiently reducing gradients not only prevents claims, *of human uniqueness, but of life's uniqueness* compared to non-life.⁵⁰ Though Latour would likely agree with the critique of anthropocentrism, his Galileo-Lovelock contrast in fact erases part of what makes Gaia theory so rich. Margulis' version of Gaia stresses the limited human understanding of the universe, challenging humans' centring of "their" *oikos*.

Following Margulis and Sagan's take,⁵¹ and stepping away from Latour's Galileo/Lovelock juxtaposition, the epistemo-ontological de-centring of *Anthropos* could be read in terms of (at least) four paradigm shifts within the history of Western science. Copernican heliocentrism showed that *the place of life* was not special.⁵² Darwin's theory of evolution demonstrated that the existence of *humans within life* was not special either, showing them as anecdotal within evolutionary history. Finally, non-equilibrium thermodynamics showed that *the process of life* is not special either, and that contrary to what has been long asserted, life does not "violate the second law of thermodynamics," but participates instead in the reduction of gradients in highly effective ways.⁵³

These events have displaced not only anthropocentrism but also vitalism, troubling the lines between life and non-life. It is in the context of these various scientific provocations disrupting "our" exceptionalism, that Gaia theory must be understood, rather than as "bringing us back" to Earth.

49 Dorion Sagan and Lynn Margulis, "Gaia and philosophy," in *Slanted Truths* (New York, NY: Springer, 1997).

50 Eric D. Schneider and Dorion Sagan, *Into the cool: Energy flow, thermodynamics, and life*, (Chicago: University of Chicago Press, 2005).

51 Margulis and Sagan, "Chapter One," *What Is Life?* (Oakland: Univ of California Press, 2000).

52 In McKittick's conversation with Sylvia Wynter, "Unparalleled Catastrophe for our Species?," Wynter objects to those who may hastily be tempted to equate the Copernican decentering of the human to a form of devalorization, pointing out that this is only the case from a biocentric world vision, which does not recognize that, in the theocentric vision of the times, to see man as the center was to consider him as belonging to "the dregs of the universe." The decentering was thus a form of revalorization of man from *homo religiosus* to *homo politicus*. Thus, the question of anthropocentrism is complex, as its historic amendments not as linear as they may first seem, and as the center does not necessarily signify a superiority. The argument, for our purposes, is specifically about the contested, even collapsing assumptions regarding the uniqueness of humans in relation to what it signifies from the perspective of modern techno-science. See McKittick, Katherine, ed., *Sylvia Wynter: On being human as praxis* (Durham, NC: Duke University Press, 2015).

53 Schneider and Sagan, *Into the Cool*.

If Gaia theory is profoundly pertinent to the current ecological crisis, it is partly because of just this de-centring, in the sense that it encourages the realization that humans and co-evolving species and ecosystems are deeply entangled within a single, far more-than-human autopoietic system, beyond even partial human control, actively making up the biosphere and long fuelling its atmosphere insofar as the latter enables life's persistence.⁵⁴

In an interview provocatively titled "Gaia Is a Tough Bitch," Margulis explicitly asserted the anti-anthropocentric positioning of this new understanding of the Earth, connecting it with Gaia's monstrous bitchiness, which will be the object of our next deanthropos-scene: "The Gaia hypothesis is a biological idea, but it's not human-centred. Those who want Gaia to be an Earth goddess for a cuddly, furry human environment find no solace in it."⁵⁵

Act II, Scene 3: This Bitch That Therefore She Is

Gaia's roar resoundingly claims its meta-organismic character, intruding as a monstrous, bitchy, autopoietic system.⁵⁶

Geoengineering would likely be radically incompatible with such a perspective, which displaces narratives of linear, capitulo-telic progress and any sort of equation between the health of the planet,

54 For some philosophical and political implications of Gaia's thermodynamics as a dissipative system, see Thomas Nail, *Theory of the Earth* (Redwood City: Stanford University Press, 2021).

55 Lynn Margulis, "Tough Bitch."

56 The conception of Earth systems as autopoietic has been critically examined by Myra Hird, who takes it for overemphasizing a oneness that she equates to deep ecology's visions. While Hird's "microbial ethics" (inspired by her immersion in Lynn Margulis' work and at the microbiologist's laboratory) is helpful to overcome some feminist and environmental tendencies to reduce the nonhuman to zoocentric preoccupations, the simple portrayal of Gaian autopoiesis as excessively unifying, or comparable to the flattening produced in deep ecology's accounts (e.g., in Arne Naess or George Sessions' works) is contestable. This point is beyond the specific scope of this paper: in this section I will emphasize how much Margulis' and Stengers' reading of Gaia invites for an anti-hubristic, anti-anthropocentric view. The concern regarding an emphasis on global oneness is warranted in the case of Lovelock's Gaia, but Margulis' conception of autopoiesis along serial symbiogenesis actually makes for a more complex account of Earth History, where multiplicity and what William Connolly calls "bumpy temporalities" hold centre stage. See Hird, Myra, *Origins of Sociable Life: Evolution after Science Studies* (New York: Springer, 2009): chapter 6; William, Connolly, "Bodies, Microbes and the Planetary," *Theory & Event*, 21, no. 4 (October 2018): 962–967. Donna Haraway has similarly advanced the concept of "sympoiesis" in response to Margulis' work (Haraway, *Staying*, chapter 3). Though this notion is arguably needed alongside "autopoiesis" and "symbiosis," if "sympoiesis" was to supplant these altogether, it would perhaps risk flattening an important, productive tension the two concepts aptly describe regarding how more-than-human evolution works in deep time (this again, is made clear by William Connolly's careful reading of Margulis' works in *Facing the planetary: entangled humanism and the politics of swarming*. Durham: Duke University Press, 2017: 47).

that of a single organism or species, and business as usual. Earth's complex dynamism forbids the grand interventionism that geoengineering would-be technofixes mobilize.⁵⁷ Margulis repeatedly insisted on her disagreement with Lovelock on the interpretation of the Gaia hypothesis she supported and enabled to grow into an actual theory: she underscored that the Earth was indeed not an organism, but an animate, autopoietic system. No single organism is capable of recycling almost all its own material wastes (something that Earth's surface does), and the biosphere has yet to reproduce (something that organisms do).⁵⁸ Margulis' Gaia refers to a physiological phenomenon of autopoiesis at the level of the complex system formed by world ecosystems taken together. Indeed, "in [this] symbiotic approach, humility, community and mutuality are as profoundly systemic as are the principles of biological autonomy."⁵⁹ This view interrupts the reasoning upon which Lovelock's pro-geoengineering stance hinges, including its culmination in A.I. control fantasies. Let us remember that foundational to his claims is his positing of the Earth as an organism, one comparable to a – supposedly vulnerable and kidney-failing – "old lady." Margulis, in contrast, carefully underscores the limited scope of organism metaphors, resisting a move from this register to grandiose prescriptive conclusions. Not only her use but the content of her own metaphors differ from Lovelock's: she provocatively described Gaia as "a tough bitch." Among the (counter-)normative connotations of such "bitchiness," is humility, even intimidation. Bitchiness and toughness evoke Gaia's resistance, defiant resilience, and her indifference to humans, who would indeed be well-advised to carefully consider the common roots of "human" (from the Earth), "humus," and "humility."⁶⁰

57 By negatively using the term "technofixing," I do not imply a rejection of technology in general. Rather I am referring to the specific sort of technological approach that consists of imagining a single, capitalocentric solution for a complex system's regulation. The sort of technological changes "Gaia's intrusion" calls for defies the supposed "fixes" by way of atmospheric pulverization of sulfur dioxide, which many geoengineers are advocating. These would create what I call, after Ivan Illich, a "hyper-radical monopoly." See Ivan Illich, *Tools for Conviviality* (New York City: Harper & Row, 1980). Illich called for a general re-tooling of our industrial societies in favour of convivial technologies. While a "monopoly" is exercised by one company over the production of one commodity (e.g., all sodas being made by Pepsi), industrial "radical monopolies" occur when only one kind of commodity is available to satisfy one need (e.g., personal cars become the only possible means of transit due to exclusionary urban planning). Even (somehow) successful geoengineering would condemn humans and many others to depend upon one mode of production (the capitalist mode) for its survival – a "hyper-radical monopoly." (See Claire Brault, "Feminist imaginations in a heated climate: Parody, idiocy, and climatological possibilities," *Catalyst: Feminism, Theory, Technoscience* 3, no. 2 (2017): 1–33).

58 In a speculative, Samuel Butlerian elan, Margulis and Sagan have imagined what something like reproduction could look like for the Earth: humans could be a form of minuscule inadvertent bridge to seeding life into other planets qua contamination of these planets in their space travel. See Margulis and Sagan, *Origins of Sex: Three Billion Years of Genetic Recombination* (New Haven: Yale University Press, 1990) and Margulis and Sagan, "Gaia and philosophy," 145–157.

59 Clarke, 273.

60 Haraway, *Staying*.

Exit Lovelock, with Latour behind him fading into the background.

Act III: The Bitchy Intrusion of Gaia

Scene 1: Gaian Transcendence

Re-enter Isabelle Stengers, philosopher of science.

Contrary to Latour, Isabelle Stengers perspicaciously grasps Lovelock and Margulis' distinct interpretations of Gaia and draws out important philosophical and political implications from the latter scientist's work. She writes:

Lovelock perhaps *went a step too far* in [comparing Gaia to] a living organism ... Gaia thus seemed to be a good, nurturing mother, whose health was to be protected. Today our understanding of the manner in which Gaia holds together is much less reassuring. The question posed by the growing concentration of so-called greenhouse gases is provoking a cascading set of responses that scientists are only just starting to identify.⁶¹

As we can now see from the above reading of Lovelock and Margulis' distinctive contributions (which differences are recapitulated in the table at the end of this essay), one may even go further than Stengers here. Lovelock does indeed oscillate and occasionally portrays Gaia as a protective figure, as well as a vulnerable one in need of human protection. But perhaps this is rather symptomatic of Lovelock's *failure to go far enough* with an anti-anthropocentric view.

The Gaia evoked by Margulis – and subsequently by Stengers – cannot be anthropomorphically reduced. Though both the scientist and the philosopher maintain a provocative rhetorical feminization, the figure of the “tough bitch” is neither hysterical nor nurturing, neither protective nor in need of protection. Thus, Margulis and Sagan write, “Gaia is not the nurturing mother or fertility doll of the human race.”⁶² Rather, she is a monstrous⁶³ autopoietic assemblage of dynamic forces that far transcends the human. As Stengers puts it:

Gaia is the name of an unprecedented or forgotten form of transcendence: a transcendence

61 Stengers, *Catastrophic Times*, 45. Emphasis mine.

62 Margulis and Sagan, *Microcosmos*, 156.

63 Sagan, Dorion, “Coda. Beautiful Monsters: Terra in the Cyanocene,” *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*. (Minneapolis: University of Minnesota Press, 2017).

deprived of the noble qualities that would allow it to be invoked as an arbiter, guarantor, or resource; a ticklish assemblage of forces that are indifferent to our reasons and our projects.⁶⁴

Gaia is, importantly, extra-moral, and merely “tickled” by capitalist telos or human hubris. In her essay *Catastrophic Times*, Stengers outlines two concurrent histories,⁶⁵ coming to a crossroads in today’s crisis. The first narrative tells the story of capitalist triumph, as a system of values and practices transcending those who assembled it. One is reminded here of Steinbeck’s famous dialogue in the *Grapes of Wrath*: perplexed, evicted farmers see the monstrosity of capital: “The bank - the monster has to have profits all the time. It can’t wait. It’ll die. ... When the monster stops growing, it dies. It can’t stay one size.”⁶⁶

But while capitalist monstrous history is an economic assemblage that, as such, transcends the sum of its parts, a second history, in Stengers’ account, is now “intruding.”⁶⁷ This second history includes Gaia’s “ticklishness,” and her threat to evict the industrio-capitalist irritation, potentially harming many in that wake. Gaia, this “tough bitch,” is radically indifferent to humans or any single species, let alone capitalist futurism. Thus, the irony when Stengers writes of the “intrusion” of Gaia: “she” rudely (in terms of capitalist courtesy standards) intrudes upon capitalist delusions of grandeur, importuning the old men’s club whose exclusive members are busy gorging on the resources she’s always already provided, however much they wish to deny their dependence on her and her effective power over them. She may, tragically for humans, cut these resources off if the “tickle” becomes too disrupting of her autopoietic whole. Stengers’ terms, “Gaia’s intrusion,” and her “ticklishness,” ironic and provocative, signal both Gaia’s post-capitalism and its extra-morality, in feminist fashion. The Earth, as the provider we inhabit and which we are but a part of, somehow impertinently “intrudes” upon its parts, who have so far dreamed themselves independent, expelling their tickle with a rash movement barely noticeable to her. Contrary to Lovelock’s drama, there is no righteous “vengeance” at play here: the more-than-human choreography under way is monstrosity extra-moral.

Act IV: Grand Finale: Defense Consulting and Gaia 2.0

Scene 1: Re-enter Latour, Flanked Chummily with Lovelock

This interpretation is barely alluded to in Latour’s reading of Gaia. The anthropologist does purport to offer correctives to some of Lovelock’s rhetorical excess, yet even these fail to address Lovelock’s geoengineering-friendly moments, engendering silence as if the French theorist had missed these

64 Sagan, “Coda.” 47.

65 Stengers, *Catastrophic Times*, chapter one.

66 John Steinbeck, *The Grapes of Wrath* (New York: Viking Press, 1939).

67 Stengers, *Catastrophic Times*, 17–25.

glaringly problematic, repeated passages in Lovelock's prose. In *Facing Gaia*, Latour does cite Margulis, but only in passing – his fleeting mention only credits her “beautiful prose.”⁶⁸ As Lovelock himself readily admits, it was Margulis, after all, who provided the key piece of the mystery – how Earth's atmosphere is chemically regulated – identified by Lovelock: it is regulated by ancient masses of hardy, growing, metabolically diverse microbes. Latour accords very little recognition, if one may even call it this, to Margulis' contribution to Gaia theory, effectively silencing one of the most ground-breaking scientists of the 20th century, one who could bring about the needed corrective with regards to Lovelock's threading of the organism metaphor.⁶⁹

Still, in *Facing Gaia*, Latour even claims to propose this corrective himself (although in rhetorical terms only, rather than supported more specifically by the scientific *and* rhetorical reasoning Margulis

68 Latour mentions Margulis a couple of times in his *Face à Gaïa*. These fleeting, peripheral apparitions are of three kinds: either she appears in a footnote (1), in parentheses (2), or, when mentioned in the body of the text, it is always with Lovelock (3), tagging along rather than treated as his collaborator and a distinct Gaia theorist. On page 134, Latour misspells Margulis' last name. 1) On page 135, in a footnote where he mentions her “argument about symbiogenesis,” Latour fails to attribute it to her and promptly adds that Scott Gilbert also has advanced this argument – this, without specifying that Gilbert has indeed supported her theories: in the Latourian turn of phrase here, one would assume that Margulis followed Gilbert, or that the latter kindly granted credit to the former scientist. On page 139, Latour misspells Margulis' co-author and son Dorion Sagan's name, and admits, again in a footnote, that “without Margulis, Gaia hypothesis would likely not have gone beyond the cybernetic metaphor.” This assertion is left without any further explanation. 2) Latour mentions Margulis in parentheses on page 125: after pointing out how “moving” James Lovelock prose is, he parenthetically underscores that “[Lovelock's] companion (comparse) Margulis” is even more moving. 3) All other mentions of Margulis are lumped together with references to Lovelock: “Lovelock and Margulis...” In contrast, the references to Lovelock on his own abound. No clear distinctions are made regarding possible differences or disagreements. Somehow, Latour does feel the need, in his vagueness regarding Margulis' legacy, to parenthetically indicate her dates of birth and death (confining her life?), which gesture he does not do for any other figure in the rest of the book, dead or alive. While these rhetorical markers may seem anecdotal, and while they are indeed peripheral enough to my main point here, that I relegate them to this endnote, the way that Latour mostly relegates Margulis herself to footnotes, parentheses, and indistinct companionship with the contrastingly hagiographized geoengineering-happy Lovelock, is not simply problematic from a feminist perspective or as a matter of principled recognition, neither is it only about the feminist analysis of citation politics, or simply symptomatic of a rather unsurprising, sadly banal, sexist erasure. It is of course all of this, yet my focus here is on the ontological, political, and technological effects of this erasure.

69 Some of the silences and confusions described in the above note 67, were in part corrected in Latour and scientist Timothy Lenton's essay, “Extending the domain of freedom, or why Gaia is so hard to understand.” In *Critical Inquiry* 45, no. 3 (2019): 659–680. There, in contrast to what occurs in *Face à Gaïa*, though the rhetorical and conceptual divides between Margulis and Lovelock as well as their gendered dimensions or political implications are not disambiguated, the authors do refer to Gaia theory as the collaborative work it always was.

provided). Then, in an interview for the *Los Angeles Review of Books*,⁷⁰ Latour hurries to correct his interviewer when the latter refers to the organism metaphor but does so as if Lovelock himself were precise enough on the matter, *i.e.*, as if the nuance came from the British scientist rather than as a disagreement with his American colleague. As a result, the anthropologist contradicts his own critical moments regarding Lovelock as he expounds them in *Facing Gaia* – granted, the critique regarding the organismic metaphor’s excesses is not exactly his own in the first place. Latour’s silence regarding his male scientist idol’s geoengineering and robotic fantasies, as well as Lovelock’s colonial undertones, effectively erasing or damning with faint praise one of the greatest (female) scientists in the 20th and (so far) the 21st century, seems to come with a commensurate omerta on Lovelock’s anti-democratic hubristic moments.

In the same interview, the STS scholar feels compelled to repeat twice that he has pursued a “close reading” of Lovelock, following him “for many years.”⁷¹ Yet Latour’s rejection of geoengineering as hubristic⁷² sits ambiguously alongside his silence regarding Lovelock’s positions on the matter. A disambiguation would have seemed all the more called for when Latour proudly reported that he had consulted for French president Emmanuel Macron’s ministry of defense.⁷³ This boasting brings to mind the political question of the distinction between state consultant and public intellectual. Where the public intellectual may arguably be characterized by her/his commitment to take open, transparent stances addressed perhaps to power, though importantly, in public and to the public, the state thinker, meanwhile, may provide consulting services to a state’s ministry of defense, without giving any precise or open, public account of said services’ content, though boasting about their occurrence as a proof of his authority, and all this, without even clarifying the reason for which specific state institution has thus been supported. When Latour proudly evokes that he has been consulted by the ministry of defence, he takes the military character of his consultation for granted, deeming it unnecessary to even specify why it was not the ministry of ecology who called for his consultation, let alone to provide any information with regards to the consultation’s content. That the influential anthropologist — whose works famously contributed to the emergence of Science and Technology Studies as a field — took his collaboration with military power for granted calls for all the more critical scrutiny, as here he was assisting a neoliberal government that has notoriously been violent, anti-constitutionally repressed the environmental movement in France (including for instance, in bulldozing “zones à défendre” (ZAD)),

70 See Paulson, Steve. “The Critical Zone of Science and Politics: An Interview with Bruno Latour.” (Los Angeles, CA, *Los Angeles Review of Books*. Retrieved from: <https://lareviewofbooks.org/article/the-critical-zone-of-science-and-politics-an-interview-with-bruno-latour>, 2018)

71 Paulson, “Critical Zone.”

72 On page 111 of his *Face à Gaïa*, Latour takes for granted that such options are irresponsible, and that such judgement sits comfortably with his praise of Lovelock, with no need for qualifications.

73 Paulson, “Critical Zone.”

while covering such repression with marketing slogans such as “make the planet great again.” We have seen earlier that James Lovelock shifted over time from considering himself a “lone scientist” to admitting he was more of an “engineer.” Perhaps the figures of the public intellectual distinct from the state collaborator, offer a helpful parallel to map each of these characters’ respective zones of opacities and responsibilities as well as their convergent and/or divergent politics.

When expressing his enthusiasm about the extent of the unknown that Earth systems sciences open up, Latour exclaimed: “it’s like discovering America. We are at the time of Columbus and all the rest has still to be discovered.”⁷⁴ For an anthropologist to excitedly make this sort of rapprochement between 1492 and the early 21st century, in this rhetorical formulation, marrying universalist Western first-person plural pronouns with the semantics of “discovery,” once again erasing myriad native peoples and their knowledges as part of the great unknown, raises serious questions about the sort of Anthropos-Scene at play. In his later book, *Où atterrir ?*, Latour – who once upon a time had rightly declared that we had never been modern⁷⁵ – now claims that the West once carried the promise of universality, that this promise failed to deliver, but that “we” are now all placed in the same sinking boat, “equally.” But the ground under “our” feet (in which the “us” is universal) has long been robbed as far as colonized people are concerned, and in Latour’s account, “they” are “accustomed to” this situation. But now “the ground collapses under the feet of *all the world at once*.”⁷⁶ The universalist humanism resurrected here is further articulated thus:

This is a question of attachment, of a way of life, that we are being torn away from, a question of ground, of property that recedes under our footsteps, and this concern *nags everyone equally, the former colonizers as much as the formerly colonized*. No! It causes much more panic for the former colonizers, less habituated as they are to this situation, than the formerly colonized. What is for sure, is that *we will find ourselves before a universal lack of the space to be shared and a lack of habitable land*.⁷⁷

While this rhetoric accuses the climate-sceptical camp of denial, it in turn denies what finally has been increasingly but still insufficiently recognized by virtually all climate models, and which a simple reading of even the IPCC reports⁷⁸ would make clear: namely, the impacts of climate change are by no

74 Paulson, “Critical Zone.”

75 Bruno Latour, *Où atterrir?: comment s’orienter en politique* (Paris: La découverte, 2017).

76 Latour, *Où atterrir?*, 17. My translation.

77 Latour, *Où atterrir ?*, 18. My translation.

78 “Even” the IPCC reports: because although the renowned panel was founded back in 1988, receiving the Nobel Peace Prize along with Al Gore in 2007, it was not until the last two rounds of reports (in the 2010s) that the IPCC provided more detail about worldwide inequalities in impacts and vulnerabilities, while in the past, mostly treating global averages as self-explanatorily and homogenously alarming.

means universal, uniform, or self-identical. Instead, they are deeply unequal, according to geographic regions, socio-economic situation, gender, racialized subject position, etc. If, as the characterization of a capitalogenic event as “anthropogenic” attests, mainstream climatological discourse is often founded upon grand universal gestures in spite of blatant differentials, in this passage of Latour’s prose the globalized, deeply unequal injustice is partly flattened under the tears of the “former colonizer.”⁷⁹ The blatant erasures are all the more violent when one considers, even with a quick glimpse, the abundant literature problematizing the universalist pretences of the Anthropocene concept, and the myriad proposal for critical alternatives such as “racial Capitalocene.”⁸⁰

79 Similarly to this moment in his writings, and to his mention of his ministry of defence consulting, the fact that Bruno Latour once exclaimed, when interviewed on the French 8’ o’clock news regarding his theatre play project Gaia Circus, “imagine how I feel as a child of a great wine family,” is far from anecdotal or devoid of political pertinence. Bruno Latour indeed comes from the famous Burgundy family of wine growers “Maison Latour,” in existence since 1797. This class situatedness does not by any means linearly determine his political, scientific or intellectual positioning. However, it does seem to inform some of his declarations alleging that the global North would somehow be worse off than global South and/or poorer populations amidst global ecological catastrophe. The privileged classes may experience some degree of loss in their privilege, or at least the threat thereof, and indeed bemoan this loss, including as expressed by Mr. Latour. The class politics at play, pace Latour’s and Schultz’s claims in their *Mémo sur la nouvelle classe écologique*, maps onto and intersects complexly with new ecological dimensions of the conflicts and catastrophes under way, which the authors claim to be under-mobilized. Latour and Schultz, as with many voices among some segments of the environmental mainstream, lament a supposed lack of mobilization, even an “apathy,” commensurate to the depths and urgency of the ongoing devastation (39). This is due, they claim, mostly to the Left’s lingering attachment to notions of progress that formerly operated as a mobilizing axis but now become one of the needed rebellion targets. This analysis imagines an “inertia” characteristic of “the masses,” while also accusing governments of “inaction,” and positing what they call the “new ecological class” – of which they assume they can be among the spokespeople – as striving to overcome both. But such analysis neglects to account for the many assassinations of environmental activists worldwide, or for states and corporate forces’ violently attacking and bulldozing sites of mobilization such as the Zones à Défendre (ZAD) in France, or the anti-pipelines native movements in North America, to cite but a few. Neither the states and corporations involved, nor the so-called masses prove to be apathetic in such antagonistic confrontations, which scales, and numbers are now rising as sea levels do. Insofar as the movements’ successes might not be commensurate to the urgency, one should likely reconsider the supposed inaction, in fact the active repression of neoliberal and neofascist governments, as well as the devastation wrought by ecological collapse, more than some vague lack of ideological point of reference beyond progress symptomatic of an alleged popular lack of comprehension of what is under way, for an explanation, though the latter factor may play a partial role as well in specific instances. See Latour, Bruno, and Nikolaj Schultz. *Mémo sur la nouvelle classe écologique: Comment faire émerger une classe écologique consciente et fière d’elle-même* (Paris: Empêcheurs de penser rond, 2022).

80 Françoise Vergès, “Racial Capitalocene,” in *Futures of Black Radicalism*, edited by Gaye Theresa Johnson and Alex Lubin (London: Verso Books, 2017); Richard Grusin, ed., *Anthropocene Feminism* (Minneapolis: University of Minnesota Press, 2017); Jason W. Moore, ed., *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism* (Oakland: PM Press, 2016); Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016).

If Latour's question, "where to land?" purports to generously ponder the question of migration in Europe, it is with the same broad-brush strokes with which he had depicted Gaia theories, in both cases ignoring many of the violent political effects at play. Similarly to Lovelock, Latour compared the current geopolitical situation to World War II. His bellicose rapprochement pitched Europe as the good players who have stayed with the (highly insufficient) Paris accords, while Trump's United States are portrayed as having "declared war" on their allies by leaving these agreements. From this comparison, Latour concludes that "we could have solved the problem years ago with something equivalent to the effort put into the Manhattan Project during World War II."⁸¹ In this unfortunate comparison, according to Latour, the techno-scientific initiative that led to some of the most devastating war crimes in history shall serve as inspiration for a "solution" to climate change.⁸²

After his *Facing Gaia*, where he seemed to suggest, albeit vaguely, that he rejected geoengineering as unsound, Bruno Latour was rather ambiguous in this regard. In a formulation strangely antithetical to his own critique of human/nonhuman dualisms tragically constitutive of modernity, in a 2018 essay suggestively titled "Gaia 2.0," Latour wrote with scientist Timothy Lenton that "Gaia has operated without foresight or planning on the part of organisms, but the evolution of humans and their technology are changing that."⁸³ Thus we would have not-yet-human Earth history, replete with aleatory agencies and devoid of anticipation, neatly distinct from a human history, which introduces "foresight" and "planning." The authors evoked these "conscious choices" as opening a new era: "Gaia 2.0."

This explicitly did not rule out possible geoengineering, though some of the reasoning here could also be ambiguously compatible with an eco-humble reading of Gaia: the authors compared humans with others in Gaian history, claiming that the former perform poorly and would benefit from imitating Gaia's waste recycling capacities. Lenton and Latour recognize that: "Gaia was built by adaptive networks of microbial actors that exchanged materials, electrons, and information, the latter through ubiquitous horizontal gene transfer. These microbial networks form the basis of the recycling loops that make up global biogeochemical cycles."⁸⁴ However, this recognition somehow evades any mention of Lynn Margulis's work on microbial life. In spite of this lack of citation, another passage of the essay

81 Paulson, "Critical Zone."

82 As a result, one may even wonder whether Latour was actually starting to align with the ongoing mainstreaming of geoengineering. This, even though in his *Face à Gaïa*, Latour had cited Clive Hamilton appraisively (80), who has compellingly shown how much the Lawrence Livermore National Laboratory is frighteningly reminiscent of the Manhattan Project.

83 Timothy M. Lenton and Bruno Latour, "Gaia 2.0," *Science* 361, no. 6407 (2018): 1066–1068.

84 Lenton and Latour, "Gaia 2.0," 1066–1068.

could suggest that what the authors had in mind may actually be decentralized and democratic, perhaps even postcapitalist, though no such explicit political positioning is allowed by their vague terms:

In Gaia 2.0, horizontal transfer of information, functional diversity with redundancy, and distributed control will likely be important to a successful circular economy. The challenge is to support diverse, autocatalytic networks of human agents that can propel transformations toward goals such as sustainable energy, fuelling the efficient cycling of resources. This is particularly challenging given a social and economic paradigm of short-term localized gain and relatively weak global, unifying, long-term structures to counteract this paradigm.

Latour and Lenton also gesture at a form of eco-humility when they write about the many unknowns in these matters: “Despite a flood of monitoring information, present industrial societies seem less able to track changes in their environment than the life-forms that compose Gaia, because that information is often ignored where it matters by those in power.”⁸⁵ However, this concession is immediately followed by a formulation that somehow reinstates the human/nonhuman dualism which Latour’s earlier works problematized. Lamenting humans’ lack of tracking information, Lenton and Latour wrote: “it is as if purposelessness had shifted from the natural to the social domain.”⁸⁶ A manifold contradiction ensues: tracking of information is assumed a symptom of purposefulness. While this tracking always was present in the nonhuman, somehow, in the last clause of this passage, the human seems to have lost a purposefulness that is assumed to have belonged to its exclusive domain, in contrast to the nonhuman. And, in an echo to Lenton’s relatively critical work on possibilities of geoengineering, Latour and he write:

Implementation of alternative forms of climate control to reduce production of CO₂ or augment existing feedbacks depends on who is in charge of such voluntary activity. The results would clearly be different if the Intergovernmental Panel on Climate Change, President Putin, the California legislature, or President Trump had their finger on the proverbial thermostat. In reality, all these agents and many others have some grip on the thermostat, and their combined effect is not simple to predict.

Though one could hardly contest the fact of the destructive effects left in the wake of Putin and Trump’s fingers – be they on the Earth’s or any other living body, the suggestion that the IPCC or California legislature’s fingers on a would-be thermostat may entice healthy outcomes on a complex system of systems that lacks such “proverbial thermostat” and resists such metaphors begs for interrogation if one indeed espoused a Margulisian Gaia. Albeit in a less imperialist form, we seem ambiguously thrown

85 Lenton and Latour, “Gaia 2.0,” 1066–1068.

86 Lenton and Latour, “Gaia 2.0,” 1066–1068.

back again to the question of *who* shall serve as Earth's steward – per Lovelock's nationalist hesitations which opened this essay, rather than coming to terms with the tough bitch's demand that humans relate and take part in her monstrosity in radical ways defying centralization.

While Latour and Lenton's words do not position them clearly as supporters of the “fixes” Lovelock proposes, on a spectrum staging the ongoing conflicts over dramatically different presents and futures from a radically democratic, decentralised, more-than-human response to an authoritarian robotisation of Earth, Latour's stance is not entirely disambiguated, in spite of his and Lenton's assertions that Gaia is indeed a matter of rethinking the democratic relation between the “domain of necessity” and the “domain of freedom.” What this concretely entails is not clarified. The ambiguity at play keeps Margulis's scientific contributions to Gaia to the backstage, while Lovelock's dangerous right-wing politics is but a side mention or entirely muted.

Finally, in his penultimate book *Où suis-je ?* written during the pandemic, Bruno Latour seems to be willing to finally engage some of the gendered dimensions and distinctions of Gaian scientific discourse. But far from clarifying any of the issues described in the present essay, or from thoroughly reflecting upon the meanings of the feminine and the masculine as categories he mobilized in relation to the nonhuman (reflections which might have benefited from a long and rich philosophical history in feminist philosophy, especially recent iterations thereof in new materialist theories⁸⁷), here the anthropologist provides a flurry of uncritically gendered distinctions capitalizing on old associations loaded with their histories of essentialist implications, which remain unexamined. For example, Latour opposes the term “Earth” – grammatically gendered as feminine in French – to the term “Universe” – grammatically masculine.⁸⁸ From this rhetorical gesture, Latour claims to characterize the matter of the ongoing ecological catastrophes as a conflict of “engendrement” – “engendering” – playing with this

87 Maria Puig de la Bellacasa, “Matters of Care: Speculative Ethics in More Than Human Worlds,” vol. 41 (Minneapolis: U of Minnesota Press, 2017); Val Plumwood, *Feminism and the Mastery of Nature* (London: Routledge, 2002), Astrida Neimanis and Rachel Loewen Walker, “Weathering: Climate Change and the ‘Thick Time’ of Transcorporeality,” *Hypatia* 29, no. 3, (2014): 558–575; Astrida Neimanis, *Bodies of Water: Posthuman Feminist Phenomenology* (London: Bloomsbury Publishing, 2019); Stacy Alaimo and Susan J. Hekman, eds., *Material Feminisms* (Bloomington: Indiana University Press, 2008); Isabelle Stengers and Philippe Pignarre, *Capitalist Sorcery: Breaking the Spell* (New York: Palgrave, 2011); Katherine Behar, ed., *Object-Oriented Feminism* (Minneapolis: University of Minnesota Press, 2016).

88 For instance, under Latour's prose here, the online dimensions of existences forced upon confined millions during the COVID19 pandemic are related to the masculine/universe, while Earth would refer to in-person life (or “présentiel” in French). Whether this somehow implies that the technosphere and more specifically the internet is deemed the domain of men and so-called “real life” embodied interactions the domain of women remains unclear: this likely implication and its heavily essentialist undertones are left uninterrogated. Lack of clarity seems almost a rhetorical strategy to evade accountability. Bruno Latour, *Où suis-je ? : leçons du confinement à l'usage des terrestres* (Paris : Empêcheurs de penser rond, 2021).

term's connotation both as creation at large and as procreation. The STS scholar then ambiguously exclaims: "Gaia and the feminine would not be unrelated!"⁸⁹

Epilogue: Anthropoi, Old Ladies and Tough Bitches

Things indeed seem to fall around rather sadly neat gender lines for our various philosophical and scientific protagonists: Margulis and Stengers, Lovelock and Latour, offer contested figurations of Gaia respectively as "tough bitch" or "old lady." Yet there is no gendered inevitability here. Margulis did not carve out the version of Gaia theory she did, "as a woman," but rather, because she held it as true. Her vision of truth was one adamantly attached to an ethos of multi-disciplinary agonistic debate, synthesis, and historical investigation of science. She was especially attentive to hypotheses that had been too hastily discarded (e.g., symbiogenesis), and empirical observation in the field, especially of microbial communities, both live and fossil, both within and beyond the laboratory. She repeatedly had to defend Gaia theory against attempts at discrediting her vision as "merely" "female science" or "a motherly theory of nature."⁹⁰ Ironically, while regularly asked, the rebellious microbiologist always refused to self-identify as a feminist.

Though the distinctions here do point to the situatedness of knowledges, and though Margulis' gender likely was among the overdetermining factors informing her vision, we should avoid any simple, linear determinism that would, among other issues, reduce Margulis' contribution to science. It would be reductive, evidently not in the sense that her being a woman scientist would shed doubt on her perspicacious scientific vision – in fact it may have enriched it – but in the sense that her situatedness is not only gendered: it is many other things as well. Anne Fausto-Sterling has affirmed that Margulis' immense contribution to evolutionary biology, though recognized to an extent, has not been given its due.⁹¹ The same is true with regards to her contribution to Gaia theory (both her theory of symbiogenesis and Gaia theory now figure in textbooks, but she is not recognized as fully as her male counterparts are, as Latour's silencing exemplifies). Thus, Margulis' gender has arguably had more influence in *silencing* her theories than in "*biasing*" them. Furthermore, a simple, linear deterministic gender analysis risks exempting Lovelock and Latour from responsibility, along the lines of a "boys will be boys" argument. There are, therefore, high feminist stakes in recognizing the anti-heroic bitchiness of Gaia. Lovelock

89 Bruno Latour, *Où suis-je ? : leçons du confinement à l'usage des terrestres*, 50.

90 Margulis and Sagan, "Gaia and Philosophy," in *Slanted truths: Essays on Gaia, Symbiosis and Evolution* (New York, NY: Springer Science & Business Media, 2013), 153.

91 Anne Fausto-Sterling, "Rethinking Evolution" (Boston, MA: *Boston Review*, January 25, 2016), retrieved April 19, 2023, <http://www.annefaustosterling.com/boston-review-rethinking-evolution/>

and Latour's shortcomings are symptomatic of both, to different degrees and in different ways, of a certain masculinist hubris and of a long history of erasures.

But most importantly, Margulis' partial erasure from Gaia theory does not matter simply in terms of a fair recognition, or for the history of the sciences, or for the history of women scientists (though these stakes are certainly important as well). Given the well-deserved attention granted to Gaia theories recently, a clear view of this theatre of more-than-human protagonists has very high stakes. This instance of erasure and this need for clearer distinctions also shows the enormity of the potential technopolitical consequences at play, when major scientific (or intellectual) contributions are eclipsed in this manner. The effects of such silence are political, human, and planetary.

Old lady or tough bitch, dialysis or tickle, robots or autopoiesis, the respective, commensurate scientific and philosophical rigors and nuances, may distinguish between ethical, political and existential outcomes such as climates of hubris, authoritarian and corporate, "emergency" geoengineering on the one hand, and radically democratic postcapitalist, humble, humus-rich, more-than-human earthly climates, on the other. If Earth's a stage and men and women merely some of its players, then certain of their views may allow their animation in the play to endure a bit longer and perhaps less destructively, more democratically, with more solidarity, for them and for other players.

Enter a person who painstakingly pulls a heavy poster out of her clothes, tagging it on a whiteboard with magnets. She gesticulates around each column and each box of the below table featured on the poster, recapitulating the drama described above. Once the gesticulation wears out, out-of-breath, she wipes her forehead.

In a solemn tone: The stakes should not be underestimated. Once upon a history, a crossroad was summed up under the phrase: socialism or barbarism! This Gaian drama could be summed up in an echo: democracy or geoengineers!

She marks a long pause. Then a smile.

Now who will dare to claim control over that old bitch?

	Lovelock	Margulis
Proponent of	Gaia hypothesis (based on speculation about regulation of atmospheric chemistry in spite of thermodynamic imbalance; provided some evidence to substantiate the hypothesis toward a theory, in part by computer model “Daisy world”)	Gaia theory (provided evidence that microbial life collectively regulates the composition of the atmosphere, salinity of oceans, global mean temperature and other variables such that the biosphere creates its own conditions for endurance, substantiating the hypothesis to crucially transform it into theory)
Personification	Old, sickly lady	Tough bitch
Characterization	Comparable to a single organism	Incommensurably autopoietic and complex; system of systems
Resulting need	Needs dialysis	Can and will manage autopoietically, beyond the human
Implications		
Position re: “stewardship of the earth”	Stewardship of the Earth: Contradictory, evolving stance: eventually, not if exercised by the US or China; rejected based on nationalist support for British stewardship of the earth	Stewardship of the earth: thanks but no thanks
Ethical climate	Eco-hubris	human/humus/humility
Techno-political response	Industrial/hyper-industrial/digital; top-down, technocratic, authoritarian; market-based, corporate geoen-gineering, nuclear power, A.I.	Convivial: if mimetically inspired from symbiogenesis, arguably decentralized, radical-democratic, low-tech, economic contraction of consumerism and productivism, etc.

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