

René Laloux's vision of Ecotopian AI: Exploring the Ecosystemic AI through *Fantastic Planet*

Amar Singh^{1,2}, Shipra Tholia^{3,4}

{amarsnghbhu@gmail.com¹, shipratholia@gmail.com²}

¹Assistant Professor, Department of English, MMV, Banaras Hindu University, India

²Post-Doctoral Researcher at Bergische Universität Wuppertal, Germany

³Assistant Professor, Department of German Studies, Banaras Hindu University, India

⁴Doctoral Researcher at Bergische Universität Wuppertal, Germany

Abstract. Some recent experiments with AI, such as MIT's psychic AI Norman, Microsoft's Nazi Tay, Amazon's 2016 racial fiasco of Prime program subscribers, and many others, have exposed the vulnerability of developing AI solely based on human experiences. Such development shall only serve the anthropogenic causes (that too gendered and racially motivated), neglecting the interests of other species. However, ecosystemic artificial intelligence provides an alternative approach where AI interacts and learns from a broad community of species. Learning as such AI adapts itself, privileging the coherence and unity that an ecosystem demands.

René Laloux's animated film *Fantastic Planet* (1973) focuses on this ecosystemic interaction of AI. The film highlights the positive changes that can be brought in subdued communities when engaged with AI, leading to engendering harmony.

René Laloux's conception of AI comes with the idea of how it can serve in assimilating the marginalized sections within the mainstream by empowering them. This paper delves into examining the situations that the film brings forth, which becomes vital in understanding our relationship to the earth at present, and our role moving forward into the future.

Keywords: Ecosystemic artificial intelligence, future, anthropogenic, harmony

1 Introduction

The article "The Plot against the Future" by Malcolm Quinn questions the significance of time travel. He concurs that it must be the promise of "satisfactions" that a person shall beget while

entertaining to escape her present in which she finds herself unsatisfied. A time machine, however, is only a manifestation of our living time. If one gets to travel via a time machine, the person will end up in a world where she will still be unsatisfied because the time machine has been built “as a new kind of object... from the dissatisfactions that rules the world” (2017, 35). Nevertheless, if one gets to construct a time machine “by a different use of the things of this world” (ibid.), the person will end up in a world where the idea of satisfaction is different from the one she imagined in her past. Hence, there emerges sharp contrast between the two in the form of “not getting what you want” to “not wanting what you get” (ibid.). It turns out that “all the stories of about time travel are really stories about class, gender, capitalism or the commodity or all other things that conspire to rob us of our satisfaction” (ibid. 36).

René Laloux’s *Fantastic Planet* (1973) is one such animated film that transports its viewers to a different timeline, exhibiting a future that forces them to contemplate over the strategies, decisions, and scenarios of satisfactions that they have been devising in their present. The film’s premise follows a dystopian future where a superior alien species Draags, of a distant planet Ygam, have brought humans on their planet to whom they refer as Oms (a pun to the French word *homme* meaning man). Oms are not treated as equals on Ygam; instead, their relationship with Draags exists as domesticated animals. The film comes out as a scathing commentary over humans’ disposition towards other species. It reverses the role of humans being enslaved by a superior race, which treats humans as “companion species” (Haraway 2008). Companion species has always been “emergent entities” (ibid. 136) whose categories (re)formulate in technocultural worlds, requiring “an enquiry into “what is to be done,” ... into what some call ethics or... bioethics” (ibid.).

This paper delves into examining the situations that the film brings forth, which becomes vital in understanding our relationship to the earth at present, and our role moving forward into the future. If humanity continues with its present actions, the future shall be one of dissatisfaction because it will be framed through the objects of dissatisfaction of the present. Again, if we overhaul the system altogether, the future would still be dystopian as the idea of satisfaction shall mitigate human knowledge. How can we then strike a balance to create a metastable structure of the future that can satisfy the needs of humans and ensure the participation of other actants that

have evaded human knowledge? *Fantastic Planet* deals with these questions by showing how AI can aid humanity to overcome its present crises and lead to an ecotopian future.

This paper is divided into two sections. The first introduces the planetary crises we are witnessing in the anthropogenic era. The second proposes artificial intelligence as a third space that can act as a conduit to channel communication between human actors with the other actors of the planet. Examples from *Fantastic Planet* have been drawn in both sections to elucidate the points we are trying to make through this paper.

2 The Planetary Crises

James Lovelock's controversial Gaia hypothesis, of which he had an epiphany at NASA's Jet Propulsion Laboratory in Pasadena, California, while researching the possibilities of life over Mars, could be summarized in brief as: 'life supports life'. Because of the feedback loop that life creates on the earth, it helps to sustain life moving forward (see Lovelock and Lynn Margulis 1974; Latour and Timothy M. Lenton 2018; Onori and Guido Visconti 2012). The "Daisyworld" phenomenon explains that it is "life that has controlled the heat from the Sun. If you wiped out life entirely from the Earth, it would be impossible to inhabit because it would become far too hot" (Lovelock 2019, 11).

Another proposition that Lovelock makes in one of his recent books *Novacene* (2019) that for whatever reason, if the human species would go extinct, it would be bad news not only for the earth but for the whole cosmos. Lovelock assumes that humans might be the only highly developed intelligent species in the universe at this moment. The kind of imagination that science fiction feeds on while showing alien species contacting humans, Lovelock finds them anthropocentric. He believes that such an advanced species that can travel galaxies cannot be organic but electronic (ibid. 9), and if there had been one, they would have had established contacts already. So, the idea of us being alone in the universe comes with baggage upon humans that the cosmos will lose its conscious memory once we are gone. Therefore, the cosmos needs humans probably to "explain itself" (ibid. 26). However, he also insists that humans shouldn't consider themselves as an end to the growth of intelligence but only "parents" or "midwives" to a future race of intelligent species which won't be humans but what he calls "cyborgs" (ibid. 29).

Humans, therefore, have two responsibilities in hand; first, to keep the earth cool by fending off excessive heat because if our planet succumbs to any catastrophe, it is not young enough anymore to cool itself down in the future to restart life. And second, to keep developing an external intelligence, artificial intelligence, machine intelligence, electronic intelligence, whatever moniker suits the purpose, but in essence to create a breed of better intelligence that can sustain itself even after humans are long gone.

René Laloux gives us a glimpse of electronic life in the advanced species with Draags, who possibly are cyborgs. In one of the scenes, mechanical twines work upon a group of Draags who are in mediation. While the cords work, their bodies grow thin while flourishing anew as if new cells are sprouting. It certainly insinuates that Draags are no organic species. Laloux also gives us a hint of what is to become of humanity if we go astray from our responsibilities. In one of the scenes in the film where the council of Draags meet, they play a documentary of the earth that shows pictures of broken walls, damaged railway tracks, wrecked vehicle, fallen sculpture, jaded books displaying the utter devastation caused by the explosion either naturally through meteor collision or triggered by humans as one of the pictures of enormous crater suggests. Human accountability grows with the emergence of newer technologies. One of the Draags mentions that the “animals brought from planet Terra”¹ show a high level of intelligence and have adaptive qualities. “But is that intelligence” questions a Draag? The council accepts that Oms “indicate an advanced evolutionary state” and may have the ability even to surprise Draags. The Oms have a shorter span of life than Draags, but they reproduce rapidly. The film presents Draags struggling with reproduction which they do mechanically using sexbots. Unlike humans who rely on natural selection, Draags have moved on to “intentional selection” (Lovelock 2019, 84), which would be a hallmark of cyborgs as per James Lovelock. Nevertheless, Draags find themselves struggling with similar pitfalls of technology that humans face on the earth, or in the film, Oms might have faced leaving the planet earth (Terra in the film) into shambles.

¹ Noted as given in the English subtitles of the film (René Laloux, *Fantastic Planet* (1973), 9:10 – 10:35)

Martin Heidegger instructs that technology is “no mere means” but a “way of revealing” (1977, 12). There is a twist, though, when it comes to modern technology as that it too reveals but also “puts to nature the unreasonable demand that it supply energy that can be extracted and stored as such” (ibid. 14). Modern technology, therefore, conserves and doesn’t return to the system, hence disrupting the feedback loop of the planet. The philosopher Thomas Nail introduces the concept of “kinetic ethics” (Nail 2021, 260), which calls for reciprocity, meaning “giving as much as we can in expenditure and taking back what nature gives in return” (ibid.). Nail believes that thinking about stable earth is a fiction of Holocene, and the Anthropocene has only exposed that:

We live in an age of movement... huge amounts of materials are now in wide circulation around the globe.... Life is one of the most efficient maximizers of entropy on Earth, and humans have increased their entropic impact by further burning fossil fuels, overproducing nitrogen fertilizers, removing forests, and increasing net carbon dioxide levels in the atmosphere. Portions of the planet are literally moving more quickly and more unevenly – around axes of gender, race, and class... the Anthropocene and the Capitalocene are only subcategories of a much larger kinetic transformation of the Earth currently underway. Humans might have initiated this increase in movement (and capitalism certainly hastened it), but now the whole planet is producing positive feedback cycles (carbon cycles, nitrogen cycles, etc.) that have lives of their own, whose mobility needs to be acknowledged. (Nail 2019, 375)

“Human domination,” thus, says Thomas Nail, is “exposed as the pipe dream that it always was. The future of this planet will not be a return to a stable, static, conquerable earth (that never existed). It will have to be a new metastable formation” (Nail 2021, 228). Through forceful technological intervention to secure geoengineered solutions to the planet’s problems, humans engender crises by overlooking the three rules that any matter is “*pedetic*,” is an “*ongoing iterative process*,” and is “*relational* and immanently self-caused” (Gamble et al. 2019, 125). Therefore, rather than breaking the entropy of the matters, which shall only hasten death, humans should embrace death and help the planet die well. By this, Thomas Nail doesn’t advocate that humans should abandon all their projects and let everything die, but that we should change our perspective from conservation to expenditure: “Life is no longer about accumulation and preservation, but expenditure, and death is no longer an end state, but the process of expenditure itself” (ibid. 257).

To do so, humans must first acknowledge their abusive behaviour over the environment and to other actors of this planet. Unless that is done, humans shall be escaping the first steps needed to create a sustainable ecosystem on the planet. As mentioned earlier, technology manifests human behaviour; it reveals something about them. Modern technology, thus, caters to human corruption, and artificial intelligence cuts no exception to that. As Kate Crawford explains that AI is an “*extractive industry*” (2021, 15):

AI is neither *artificial* nor *intelligent*. Rather, artificial intelligence is both embodied and material, made from natural resources, fuel, human labor, infrastructures, logistics, histories, and classifications. AI systems are not autonomous, rational, or able to discern anything without extensive, computationally intensive training with large datasets or predefined rules and rewards. In fact, artificial intelligence as we know it depends entirely on a much wider set of political and social structures. And due to the capital required to build AI at scale and the ways of seeing that it optimizes AI systems are ultimately designed to serve existing dominant interests. In this sense, artificial intelligence is a registry of power. (ibid. 8)

The *Fantastic Planet* presents a similar disconnect with other species and exploitation via technology that Draags exercise on their planet. In the narration of Ygam’s history in the film, it is revealed that Draags had a violent history where they fought off invaders, eventually settling to peace which they achieved through meditation. Lore has been developed around their meditation which apparently is related to their participation in interspecies orgy achieved through giant sex droids. The myth seems to conceal the real purpose of meditation, which is procreation. The breeding has become a mechanical exercise, a “production target,” as one of the Draags refer to it in the council meeting. When one of the factories did not meet the target, it made Draags worry as they couldn’t figure out the cause behind the malfunction. The anxiousness seems to arise from the reason that they can’t seem to procreate without the technology. A clear contrast is presented by showing Oms, on the other hand, who, like Draags, engage in sexual pleasures and breed rapidly.

Draags’ problems seem to emerge through technology itself, of which they have been enslaved. Although they are superior species to Oms, yet they are incarcerated in their abilities without technology. Consequently, Draags find themselves in a surrogate relationship to technology, something on which capitalism thrives:

Technological futures tied to capitalist development iterate a fantasy that as machines, algorithms, and artificial intelligence take over the dull, dirty, repetitive, and even reproductive labor performed by racialized, gendered, and colonized workers in the past, the full humanity of the (already) human subject will be freed for creative capacities. Even as more valued tasks within capitalist regimes of production and accumulation, such as knowledge work, become automatable, the stated goal of technological innovation is to liberate human potential (its nonalienated essence, or core) that has always been defined in relation to degraded and devalued others – those who were never fully human. (Atanasoski and Kalindi Vora 2019, 4)

For Draags, technology has become a tool of enslavement rather than a means to freedom to exercise their “creative capacities.” Although meditation keeps their and other galactic species’ violent impulses under check, still, that is all they end up primarily engaged in. Thomas Nail’s observation might highlight the problems arising through Draags actions in the film:

Art, culture, and sexuality are also techniques that expend energy. When we restrict freedom and experimentation in those realms, we end up with, again, fewer ways for humans to waste their metabolic energy. Nature is queer and loves to multiply sexes, genders, and sexualities to see if new ways of life might increase the rate of expenditure. If we want to survive, we need to find new and diverse paths to enjoy the expenditure of our energy—as long as these ways do not destroy the conditions for further experimentation and expenditure for others. (Nail 2021, 266)

Draags’ complete orientation is towards meditation, which they are drawn into as soon as one enters into teenage. There are no other activities that they are shown to be occupied with. The other times when they are not meditating, they are hunting for the colonies of wild Oms to kill. An ecological discordant exist on their planet with great disarray in temperature amid geographical features of the planet. It is an uninhabitable planet where every species is out there to kill everything else. There is a complete disregard to Oms from Draags, who even though acknowledge their intelligence and adaptive abilities yet either want to domesticate them or kill them. Just like humans so far have failed to appreciate the roles that other species play in maintaining the ecological harmony within the “critical zone” (Latour 2020) of the earth, Draags too deny recognizing Oms’ worth as an intelligent species that can play a crucial role in preserving the critical zone of their planet.

3 Artificial Intelligence as Third Space

Fantastic Planet places two diverse species in conflict with each other where the dominant one (Draags) wishes to mould and tame the other (Oms) as per their wishes or annihilate them. The premise sounds quite familiar. The anthropogenic history is marred with such conquest of humans on their fellow brethren as well as on other planetary species. The exploits have not been limited to mere animals but have been extended to the other resources of the earth as well. The human hubris has, as Jane Bennett notes, prevented us “from detecting (seeing, hearing, smelling, tasting, feeling) a fuller range of the nonhuman powers circulating around within human bodies. These material powers, which can aid or destroy, enrich or disable, ennoble or degrade us, in any case call for our attentiveness” (Bennett 2010, ix). Humans in the modern era have become antimaterial² as the need for buying new products and “hyperconsumptive necessity of junking them” (ibid. 5) doesn’t make them materialist but antimaterialist. The promise of artificial intelligence as a tool for a better future hides the exploitation that works underneath to put its façade. It hides the mistreatment of human labour and exploitation of natural resources that works behind the mirage of cloud computing. As Kate Crawford explains:

Many aspects of modern life have been moved to “the cloud” with little consideration of these material costs. Our work and personal lives, our medical histories, our leisure time, our entertainment, our political interests – all of this takes place in the world of networked computing architectures that we tap into from devices we hold in one hand, with lithium at their core.

The mining that makes AI is both literal and metaphorical. The new extractivism of data mining also encompasses and propels the old extractivism of traditional mining. The stack required to power artificial intelligence systems goes well beyond the multilayered technical stack of data modeling, hardware, servers, and networks. The full-stack supply chain of AI reaches into capital, labor, and Earth’s resources – and from each, it demands an enormous amount. The cloud is the backbone of the artificial intelligence industry, and it’s made of rocks and lithium brine and crude oil. (2021, 30-31)

² Jane Bennett says this regarding American materialism, but here it has been used in universal terms given the scope of American consumerism dominating the world market.

Fantastic Planet brings forth a literal manifestation of cloud computing in the form of “floating spheres,” each inhabiting the minuscule image of a Draag individual. The spheres indicate the floating data of people that connect them with denizens of other galaxies. Just like our senses today are modified with technology, distracting us with simulated reality, for Draags, meditation becomes a similar escape. This enables a technofascism where every being is occupied in learning the same thing, doing the same thing, thinking the same thing, and consuming the same thing all the time. Draags are completely occupied with cloud computing and artificial intelligence, and they have completely lost control over their lives as they can’t even die. Whenever a thought occurs in a Draag to give up on his life, it is skewed by bringing back the person into meditation. Meditation (i.e., cloud computing and AI) becomes opium for the Draags. Since they don’t die and are wholly occupied in meditation, the mechanical conservation of energy disrupts the feedback loop of their planet. Ygam is slowly dying, as can be seen through its diverse uninhabitable locales. The process of death is accelerated with the actions of Draags disregard for other species, such as Oms, whom they aspire to control or kill.

Thomas Nail’s assertion of the fictionality of a stable planet brings our attention towards correcting our future course of actions rather than seeking solutions into the past. Seeking the past facilitates the narrative of stability through geoengineered solutions but looking into the problems and moving ahead into the future without reconciliation with the past demands newer methods to create a metastable structure. Since AI has been one of the participants in human corruption, disregarding it now won’t resolve the planet’s issues. In *Fantastic Planet*, Oms are empowered by learning through artificial intelligence, with which they connect telepathically via headset. The artificial intelligence here acts as a “third space” that allows Oms to access Draags’ knowledge. Becoming familiar with Draags’ wisdom doesn’t turn Oms like their enslavers. Instead, it becomes a medium of their freedom. As Homi K. Bhabha explains that the importance of the third space doesn’t lie in seeking the trace of “two original moments from which the third emerges, rather hybridity to me is the ‘third space’ which enables other positions to emerge. This third space displaces the histories that constitute it, and sets up new structures of authority, new political initiatives, which are inadequately understood through received wisdom” (Rutherford 1990, 211). This is what happens in the film where with the aid of knowledge gained through AI, Oms force

Draags to negotiate and gain their freedom while creating a relation of reciprocity where they benefit from others' intelligence.

Can artificial intelligence become a third space for the other intelligent species of the earth, bridging them with humans? Cesar & Lois' art installation *Degenerative Cultures* (Cesar and Lois 2018) draw attention to one such effort of creating a “*bhiobrid* (biological and digital hybrid) network in which living microorganism and AI work together” (HG Solomon and Cesar Baio 2020). In this experiment, Cesar & Lois developed a digital fungus modelled on *Physarum polycephalum* by tracking its growth over the text of a book. The purpose of this experiment is to create *ecosystemic connections* in which AI “engages with a broad planetary community and which operates according to broad principles of community well-being” (ibid.). In the installation, the text of a book is destroyed by microbiological growth, the pattern of which is analyzed by AI which further feeds a (de)generative algorithm linked to cellular automata and Natural Language Processing (NLP). This AI, the digital fungus,

searches the Internet for texts that similarly exhibit a predatory approach to living systems. This digital fungus builds a database of texts that advocate human interventions in ecosystems, plots those texts on the screen, and then degrades the text in the way that *Physarum polycephalum* consumes oats. By positing a cooperative model for deconstructing the logic of human superiority over living systems, we anticipate an ecotopian AI, in which computerized logical processing is modulated by the ecosystemic growth logic and values embedded in the decision-making processes of living systems. Thinking of what could emerge as an ecosystemic knowledgebase, we ask, what will be the outcome when these two types of intelligences work together, the prehuman (microbiological) and posthuman (computer-generated)? (ibid.)

Well, if René Laloux's artistic vision of ecotopian artificial intelligence in *Fantastic Planet* provides some clue, it certainly emboldens our hopes for a positive outcome. Using AI to communicate with other intelligent organisms can dismantle the anthropocentric approach by creating an awareness of a novel approach towards our planet that can formulate a stable ecology.

4 Conclusion

Humanity requires a reality check. With the frequency our planet is deteriorating, the future seems to abound with crises. We can no longer deflect our attention from the environmental issues that

are the results of our own making. All the technological innovations curated by humans till now appears to have only catered for misplacing our priorities. The lack of empathy that humans seem to extend upon fellow humans as well as the other actors (living or non-living) seems quite bizarre given that presently we are surrounded with more objects, i.e., the Internet of Things (IoT), than humans on the planet. There emerges the irony as one of the critical tasks of the IoT is to establish connectivity in which it seems to be failing even after accomplishing its task. This disconnectedness in connection might result from modern technology, which has become an 'extension of our sensorium' (McLuhan 1962). Marx's prediction apropos to the modern technology that "the machine does not free the laborer from work, but deprives the work of all interests" (Marx 1890, 548:2) stands correct when we see how technology today effaces the labour that goes behind in its making. Our insensitivity is an outcome of this effacement. The lack of knowledge of human labour as well as ecological disruption that goes behind developing a technology abstains us from encouraging any action, turning us into passive consumers. However, as Dan Fleming and Damion Sturm observe regarding companionship of things that "central to this economy is the realization that people consume meanings that attach to things, that have been drawn into semiosis around things, and that such meanings have to mean something to people before they will consume them as happily as the marketers intend" (Fleming and Damion Sturm 2011, 136). Thus, narrativization, meaning how narratives are attached to things people consume, could be one of the ways people's habits could be tutored to be better. Often, we aren't aware of the consequences of our negative actions, and the awareness of the same may enable us to make better decisions.

René Laloux's classic *Fantastic Planet* is one such narrative that warrants scholarly attention as it deals with issues that we are facing in the modern world. The manner technology affects our senses today, manoeuvring our reality, we are no different from the Draags in the film – we are cyborgs. Postponing the crucial actions required for the ecological stability of the planet, hoping that the future shall embody technology that may cure all our problems, is only an invitation to accelerate humanity's demise. Like any other technology, Artificial intelligence is a powerful tool, but as stated, it is a tool, i.e., an instrument to achieve objectives. It is too much to rely on Moore's chart, waiting for the time when AI shall excel the brains of all humans combined,

that as and when it happens, it shall provide us with our remedies. Stuart Russell correctly says that “faster machines just give you the wrong answer more quickly” (Russell 2019, 78); AI without human competence would thus amount to nothing. The problem with humans so far has been their limitation to interacting with other entities of the planet without posing anthropogenic biases. The degree of empathy stimulated depends upon the knowledge “from a human point of view” (Stroud 2020). We cannot, however, go on plundering the resources of the planet, depriving the other species of their due anymore. Artificial Intelligence could aid in developing an understanding to overcome the shortcoming of anthropogenic projections and help humans comprehend the world beyond the human point of view. This could be observed through Cesar and Lois’s art installation *Degenerative Cultures* as well as through the film *Fantastic Planet* that extends a similar vision of harbouring a biological-technological network, which this paper has attempted to explore by digging into the narrativization offered by the film.

References

- [1] Atanasoski, Neda, and Kalindi Vora. *Surrogate Humanity Race, Robots, and the Politics of Technological Futures*. Durham: Duke University Press, 2019.
- [2] Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press, 2010.
- [3] Cesar, and Lois. “Degenerative Cultures.” *Generative Art Science and Technology hard Journal*, 2018. https://doi.org/http://www.gasathj.com/tiki-read_article.php?articleId=101.
- [4] Crawford, Kate. *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven: Yale University Press, 2021.
- [5] *Fantastic Planet*. DVD. Germany: Anchor Bay Entertainment, 1973.
- [6] Fleming, Dan, and Damion Sturm. *Media, Masculinities, and the Machine: F1, Transformers, and Fantasizing Technology at Its Limits*. New York: Bloomsbury, 2011. 10.5040/9781628928174.
- [7] Gamble, Christopher N., Joshua S. Hanan, and Thomas Nail. “What Is New Materialism?” *Angelaki* 24, no. 6 (2019): 111–34. <https://doi.org/10.1080/0969725x.2019.1684704>.
- [8] Haraway, Donna J. *When Species Meet*. Minneapolis, USA: University of Minnesota Press, 2008.

- [9] Heidegger, Martin. *The Question Concerning Technology, and Other Essays*. New York: Garland Pub., 1977.
- [10] HG Solomon, Lucy, and Cesar Baio. “An Argument for an Ecosystemic Ai: Articulating Connections across Prehuman and Posthuman Intelligences.” *International Journal of Community Well-Being* 3, no. 4 (2020): 559–84. <https://doi.org/10.1007/s42413-020-00092-5>.
- [11] Latour, Bruno, and Timothy M. Lenton. “Extending the Domain of Freedom, or Why Is Gaia so Hard to Understand?” *Critical Inquiry*, 2018, 1–21. <http://www.bruno-latour.fr/sites/default/files/157-CRITICAL-INQUIRY-GAIA-FREEDOM.pdf>.
- [12] Latour, Bruno. “Critical Zones.” Zentrum für Kunst und Medien, 2020. <https://zkm.de/en/exhibition/2020/05/critical-zones>.
- [13] Lovelock, James E., and Lynn Margulis. “Atmospheric Homeostasis by and for the Biosphere: The Gaia Hypothesis.” *Tellus* 26, no. 1-2 (1974): 2–10. <https://doi.org/10.3402/tellusa.v26i1-2.9731>.
- [14] Lovelock, James. *Novacene: The Coming Age of Hyperintelligence*. London: Allen Lane, 2019.
- [15] Marx, Karl. *Das Kapital, Volume I*. 4th ed., 1890. <https://content.csbs.utah.edu/~ehrbar/cap1.pdf>.
- [16] McLuhan, Marshall. *The Gutenberg Galaxy*. Toronto: University of Toronto Press, 1962.
- [17] Nail, Thomas. “Forum 1: Migrant Climate in the Kinocene.” *Mobilities* 14, no. 3 (2019): 375–80. <https://doi.org/10.1080/17450101.2019.1609200>.
- [18] Nail, Thomas. *Theory of the Earth*. Stanford, CA: Stanford University Press, 2021.
- [19] Onori, Luciano, and Guido Visconti. “The Gaia Theory: From Lovelock to Margulis. from a Homeostatic to a Cognitive Autopoietic Worldview.” *Rendiconti Lincei* 23, no. 4 (2012): 375–86. <https://doi.org/10.1007/s12210-012-0187-z>.
- [20] Quinn, Malcolm. “The Plot against the Future.” Essay. In *Memories of the Future: On Countervision*, edited by Stephen Wilson and Deborah Jaffé, 33–48. Berlin, Germany: Peter Lang, 2017.
- [21] Russell, Stuart. *Human Compatible: AI and Problem of Control*. London: Penguin, 2019.
- [22] Rutherford, Jonathan. “The Third Space: Interview with Homi Bhabha.” Essay. In *Identity: Community, Culture, Difference*, 207–21. London: Lawrence and Wishart, 1990.
- [23] Stroud, Barry. “Knowledge from a Human Point of View.” Essay. In *Knowledge from a Human Point of View*, edited by Ana-Maria Crețu and Michela Massimi, 141–48. Cham: Springer, 2020. <https://doi.org/10.1007/978-3-030-27041-4>.