



2020

Constructing Reality: An Investigation of Climate Change and the Terraforming Imaginary

K Persinger

University of California, Irvine, kpersing@uci.edu

Follow this and additional works at: <https://www.mackseyjournal.org/publications>



Part of the [Comparative Literature Commons](#), and the [English Language and Literature Commons](#)

Recommended Citation

Persinger, K (2020) "Constructing Reality: An Investigation of Climate Change and the Terraforming Imaginary," *The Macksey Journal*: Vol. 1 , Article 103.

Available at: <https://www.mackseyjournal.org/publications/vol1/iss1/103>

This Article is brought to you for free and open access by The Johns Hopkins University Macksey Journal. It has been accepted for inclusion in The Macksey Journal by an authorized editor of The Johns Hopkins University Macksey Journal.

Constructing Reality: An Investigation of Climate Change and the Terraforming Imaginary

Cover Page Footnote

I cannot begin to express my thanks to Dr. Adriana M. C. Johnson, for her guidance as my advisor. I am so grateful for all of her patience, support, and invaluable insight in developing this paper. I am also grateful to the University of California, Irvine, and especially to the School of Humanities and the Undergraduate Research Opportunities Program for their funding and support which made this research possible.

Constructing Reality: An Investigation of Climate Change and the Terraforming Imaginary

K Persinger

University of California, Irvine

Abstract

Ursula Heise argues in “Martian Ecologies and the Future of Nature,” that Mars in science fiction should be read as “a thought experiment ultimately meant to be bent back onto Earth itself” (2011: 465), but this same perspective is useful in considering the colonization and terraforming of planets and other extraterrestrial bodies more generally. However, as a “thought experiment,” terraforming in science fiction frequently seems to be a biopolitical and technopolitical way of conceptualizing and responding to the anxieties induced by climate change in ways that broadly displace climate anxiety onto other, non-Earth planets and allow for the sense that these anxieties are at once remote and solvable. These logics, which draw from myths of American colonialism and the “western frontier,” respond to an increasing sense of fragility on Earth by imagining that, through technological intervention and expansion, the root causes of climate change do not actually need to be addressed because we can simply offset damage to the Earth through the acquisition and transformation of new planets/moons/asteroids. In my research I will examine space colonization narratives, with an emphasis on terraforming, in order to explore how these logics develop, what underlying cultural logics they speak to, and what impact they have on how climate change is understood and addressed. I will do this by examining primary texts such as Robert Heinlein’s *Farmer in the Sky* and conduct a review of

secondary/theoretical materials in order to analyze these texts and explore the way in which these fictions are informed by and inform material realities.

Keywords: Science Fiction, Terraforming, Climate Change, Space Exploration, Colonization

Introduction

Although dominant discourses frequently position climate change as exclusively a crisis of science, in many ways it is equally (if not more) imperative to investigate it as a crisis of narrative. Narrative is not only the substance of a story, but also the fundamental way through which we organize and articulate realities; in the broadest sense it is the storytelling that curates and creates the material reality in which we exist. As Sturken and Cartwright argue in “Practices of Looking,” “language and systems of representation do not reflect an already existing reality so much as they organize, construct, and mediate our understanding of reality” (13). In essence, in order to unravel climate crisis, we must ask ourselves what stories we have told and been told which have obscured climate crises and normalized the processes through which the crises has come to be entrenched in indivisible from every aspect of our lives. Science fiction in particular is a generative site of investigation, blending in different ways and to different degrees the issue of science and the issue of narrative intrinsic to the larger crises. This is something which Amitav Ghosh interrogates in his book *The Great Derangement*, raising the question “is it the case that science fiction is better equipped to address the Anthropocene than mainstream literary fiction?” before suggesting that “the Anthropocene resists science fiction: it is precisely not an imagined “other” world apart from ours” (72). Ghosh’s argument points to the Anthropocene as a particular climate change narrative, namely conceptualizing climate change as a geological age

of human impact on and destruction of the environment, which discursively functions by centering the immediate responsibility of human action in the creation of the climate crisis. It is because of this that distance produced by the “other worlds” of science fiction renders the fundamental argument of the Anthropocene illegible, undermining the argument implicit in “Anthropocene” by removing the immediacy. Nowhere is this more apparent than in looking at the function of space colonization narratives, especially terraforming, in science fiction.

Even as science fiction is incompatible with a central point of the Anthropocene, insofar as it displaces concerns regarding climate change onto other worlds, science fiction continually embodies other aspects of the Anthropocene narrative, therefore illuminating and embodying the problematics of the “Anthropocene” as a framework. One particular limitation to the Anthropocene narrative which is frequently visible in SF is what Jason Moore has referred to critically in *The Capitocene, Part I* as the “Green Arithmetic” that the Anthropocene narrative relies upon, which allows for the consideration of “nature” as a variable in an equation, and presents the “tale of humans ‘overwhelming the great forces of nature’” (595). This can be especially observed in terraforming narratives, which frequently seem to be a biopolitical and technopolitical way of conceptualizing and responding to the anxieties induced by climate change in ways that broadly displace climate anxiety onto other, non-Earth planets and allow for the sense that these anxieties are at once remote and solvable. The Anthropocene and Green Arithmetic are particularly relevant to the terraforming imaginary; the idea of Earth (specifically the “Nature” of Earth) as overwhelmed by humanity facilitates the imagining of extraterrestrial colonization as a viable solution: if the problem is not the exploitation involved in capitalist and industrialist practices, but instead the sheer power of Humanity/Society to overwhelm Nature (in

its own right imagined as a great force), then humanity also has the power to move elsewhere and preserve the Nature of Earth.

Terraforming as Ideology

In general terms, terraforming can be defined as “the operation consisting of rendering other stellar bodies—mainly planets and eventually asteroids—appropriate for human life” (Neyrat 46), and through the specific lens of the literary imaginary one should also emphasize the way that this imaginary is situated heavily along the Human/Nature divide. As Chris Pak points out in the introduction to his book *Terraforming: Ecopolitical Transformations and Environmentalism in Science Fiction*, the “sense of terraforming as an extension of anthropogenic climate change illustrates a connection between climate change and geoengineering, and by a further conceptual extension geoengineering and terraforming” (2). Human colonization of stellar bodies generally stems from ideologies of technologically intervening into and reordering world(s) in order to extend the lifespan of current systems/relations to environments, rather than challenging the validity of the systems themselves, and this becomes especially clear through the way that terraforming is imagined. The terraforming imaginary largely renders climate crisis illegible, even as it acknowledges the existence of the Anthropocene; it is perhaps because of this that terraforming fiction is so appealing. On one level, terraforming assuages anxieties and assures audiences that through anthropocentric “modern” technology climate change can and will be overcome through expansion. This draws upon a wealth of colonial mythology, especially that of the American “Frontier”—as Carl Abbot points out in “Homesteading on the Extraterrestrial Frontier,” “because the imagery and mythology of the western frontier so pervade American culture,

science fiction repeatedly internalizes the stories that Americans tell about the development of the West and writes them forward for places and times yet unknown” (243).

Terraforming also allows for discussions of environmentalism and climate anxiety without many of the stakes central to the reality: terraforming often involves “empty” lands, a “pure” form of colonization at no risk of being tainted by the genocide of indigenous peoples. This subsequently allows for the idea that (predominantly capitalist, Global North) societies can expand to support current lifestyles in ways removed the stakes of land theft which haunt (even as they are pushed into the margins and erased) the present and historical reality of colonial land grabs as a source of support for such societal structures. This of course ties to a historical-revisionist Manifest Destiny desire, as the rhetoric of colonial land theft often imagines the land empty through a categorical disavowal of certain kinds of life at the moment of the theft, only later to develop some of the “anxieties” which accompany the acknowledgement of the genocide and violence necessary to clear these lands, dominantly locating these anxieties as a past moment, even as the U.S. and other Global North nations continue to be settler colonies. This is also echoed in the way in which terraforming logics frequently recognize only certain kinds of life; the logics which have been used in real life to dehumanize marginalized peoples in order for systems of colonialism, capitalism, and industrialization to function are mapped onto fictional planets which are “lifeless”—meaning generally devoid of significant/sentient life and open to the destruction of the environmental conditions of the planet.

Homesteading, as Abbot defines it, also depends on an intervention into these so-called “lifeless” lands: it “is a particular facet of the complex processes by which agriculturists settle ‘empty’ or undeveloped territories, whether the prairies of North America or the imagined planets of sf, and it is a process with deep resonance in American history and national identity”

(242). What this does in relationship to climate change is imagine a “natural” and “modern” progression in which life on Earth is outdated, as evidenced by the declining health of the planet, and humanity must move forward onto other planets and moons. This can clearly be seen in classic science fiction works such as Robert Heinlein’s *Farmer in the Sky* (1950), which offers an explicitly “homesteading” articulation of the terraforming imaginary, the appeal of terraforming centered heavily in the notion of a dead Earth compared to the offer of a fresh start and “a brand new planet” on Ganymede (Heinlein 8). Ganymede is imagined as a dead land which must be remade from the atmosphere and soil up—as the main character, Billy, reflects “that land was *dead*. Dead as Christopher Columbus...and there had never been any life in it” (Heinlein 125). The emptiness of the land is emphasized at several points, and yet in the last chapter, almost as a footnote, it is discovered that at some unspecified point in the past there was in fact life on Ganymede who “*were* men in the real sense of the word...they controlled their environment” (Heinlein 216). This concept is not explored further and there is no implication that the terraforming project is what destroyed the life already on the planet, yet this is one of the clearest articulations of the Society/Nature binary articulated in the novel, with the concept of “sentience” centered in the ability to intervene in and manipulate “Nature”, and it becomes impossible to accept the previous two-hundred pages’ insistence that human interference is the first and only life-making process to touch the “lifeless” planet. Again, the question must be asked what are “empty” and “lifeless” lands, given the colonial histories of the deployment of these concepts?

Furthermore, the colonization of “empty lands” is frequently couched in biopolitical discourses: as Bill, the narrator, reflects, “[Dad] said that this was the first time in history that some effort was being made to select the best stock for colonization instead of using colonies as

dumping grounds for misfits and criminals and failures” (Heinlein 18). The managing of populations is intimately related to the construction of new and better worlds; if, as Abbot argues, “settlement of new planets repeatedly revisit the problem of the harsh land as pioneers try to cope with ecologies they do not completely understand, and that fight back” (248), then only certain types of people are going to be able to “fight” the land and control it in the way the colonial-homesteading terraforming imaginary demands. Bill’s step-sister Peggy exemplifies the idea that some people aren’t “meant” to leave Earth; despite passing the testing on Earth, she isn’t able to adjust to the lower pressure atmosphere of Ganymede. Bill reflects “she didn’t *belong* here and she wouldn’t *grow* here. Have you ever seen a plant that refused to be happy where you planted it? It was like that. She belonged back on Earth” (157).

In the same way that terraforming imagines certain kinds of people as having a futurity but not others, there is also an imagining of new worlds having a futurity which is not possible for the Earth. Even as extraterrestrial terraforming displaces climate anxieties onto semi-remote planets/moons/asteroids, and despite some discourses on the idea of “terraforming” Earth as a response to climate change, largely the idea is that there will not be (and perhaps cannot be) any direct intervention into climate change on Earth. The best that can be done is to alleviate the damage being done by exporting populations to other stellar bodies, but Earth is frequently represented as inescapably doomed (if it is not literally obliterated) in works centering around extraterrestrial travel and colonization through terraforming. The Earth becomes something outdated and “used up”, which must inevitably be left behind if not by the whole of humanity, then by the protagonists of terraforming narratives. As Neyrat points out, “why protect what we can improve, or reconstruct?” (53).

This is clear in the U.S. television program *Firefly* (2002-2003); each episode opens with a narration that asserts “After the Earth was used up, we found a new solar system and hundreds of new Earths were terraformed and colonized” (“Train Job” 00:00:00-00:00:10). Even though the show is set only about 500 years in the future, Earth is taken for granted as a dead world: “Earth-That-Was” permanently imagines Earth as a past tense and renders the “using up” of a planet as meaningless in the face of the hundreds of “new” Earths which are subsequently able to be produced. The film *Titan A.E.* (2000) follows a similar set of logics, starting with the destruction of Earth by the Drej, a race of aliens made of pure energy who are “afraid” of what humanity “might become” (37:59), and ending with the main characters channeling the energy of the Drej’s technology and bodies to power the battery of the *Titan*, a ship which has the capacity to generate a new planet and a genomic library supposedly containing the DNA of every animal on Earth to fill the new planet with all of the life of Earth. While one might view the Drej as energy made agentic, they have no clear motive and no clear agency and their few lines—spoken in their garbled noise-language—are all simple directions explaining the actions taking place, primarily orders being given to attack. Because of this, on a fundamental level the Drej embody *human* anxieties that humanity will destroy itself through its current practices of energy and technology; by using the Drej in the genesis of the new planet, which is represented as an Edenic and completely “natural” kind of paradise, the audience is assured that Earth is irrelevant and humanity will always be able to produce new (better) worlds, using the same tools and practices which cause the initial destruction.

“Post-Earth Capitalism” and Science Fiction Praxis

Beyond science fiction narratives, we must also consider the way these fictions, imagined as “real” or “potentially real”, continually interweave with interpretations of reality and

engagements with climate change. Processes of understanding and solution-making move backwards and forwards in time; understanding of the present moment shapes the solutions we can project into the future, but it also shapes the way we consider the past and shape the narrative of how time brought us to the predicament which is called the current moment. Furthermore, naming and narrative practices shape not only understanding in the ways these past and present moments are imagined, but also tie into what kinds of futures can be imagined and what kinds of actions might be taken. In application this might be understood through Frédéric Neyrat, for example, who argues in “Terraforming: Reconstructing the Earth, Recreating Life” from his book *The Unconstructable Earth: An Ecology of Separation* that

Little by little desire and the imaginary deserted the deserted space of outer space...the abandonment of the Space Age as a grand narrative led to what we will refer to as the *Reversal of the Frontier*. The psychopolitical investment of the conquest of space during the Space Age was transformed into an investment regarding the conquest of Earth. (49)

This narrative furthers Neyrat’s earlier claim that there *is* a “transfer of imaginary from the Space Age to the Age of Man” (45) and lines up with historical patterns of periodization which ultimately plays into broader narratives of linear progress and modernity, even the intersection of these periodizations and awareness of environmental damage is not new either. Attentiveness to the final paragraph of Rachel Carson’s book *Silent Spring* (1962), which is largely connected with the birth of modern environmentalism, is one way of conducting such investigation. Carson argues that “the ‘control of nature’ is a phrase conceived in arrogance, *born of the Neanderthal age of biology and philosophy*, when it was supposed that nature exists for the convenience of man” (emphasis added). Despite this conception of linear progress which

suggests we have or should have moved beyond such “primitive” notions, belief in the “control of nature” continues to persist on decades later. It is this belief which is perfectly articulated in the terraforming imaginary. A variation of what Fabian identifies as “Mundane Time” seems to be most frequently at work here; according to Fabian, Mundane Time “indulges in grand-scale periodizing,” devising “ages and stages” (23). The chronology of the terraforming imaginary is a kind of linear-cyclical model which constructs a firmly linear progress narrative from a primitive past through an obscured present and into an inevitable civilizing future while simultaneously being deeply engaged with grand-scale periodization which neatly seals the past from the present from the future. Through this model of time one can imagine that “the Anthropocene” is distinct from “manifest destiny” and “the digital age” and “the space age,” despite the way that the narratives of these ages are only coherent through the continuous redeployment of longstanding discourses, frameworks, and institutions of power. What this allows for is the disavowal of the violence which is inherent within them. The effects of this chronology are particularly apparent in the way in which contemporary narratives surrounding space colonization are highly indistinguishable from the “past” rhetoric and myths of terrestrial colonialisms in almost every way except location.

This also connects to Anne McClintock’s discussion of time in *Imperial Leather*, particularly her argument that “in colonial discourse...movement through space becomes analogous to the movement through time” (9). McClintock identifies time as formed through binary oppositions: linear progress “from slouching deprivation to erect, enlightened reason” and backwards towards “anachronistic space” (9). This is the through-line of the terraforming imaginary which carries forward punctuated cyclical time while simultaneously maintaining the anxieties of regression, as one can see in Carson’s condemnation of the “Neanderthal age” of

science. Furthermore, because this chronology is a colonial temporality relies on an assumption of the fundamental necessity of colonization on Earth as the past and present in order to project the futurity constructed through the terraforming imaginary. An example of this is the scientific investment in construction a telescope on Mauna Kea in Hawaii; the colonial chronology at play here imagines the colonization of Hawaii as sectioned off in the past, therefore making it legitimate to build the telescope on stolen lands in the present moment so that the production of astronomical knowledge will be able to facilitate the projected future of colonization in space. As Moore asserts, “the ‘new’ imperialism of early modernity was impossible without a new way of seeing and ordering reality. One could conquer the globe only if one could imagine it” (620); even as terraforming can be most easily located in science fiction, the direction of this imaginary stems from historic imaginaries and subsequent practices with very real stakes. Because of this, in addressing the way that terraforming is applied to “other” stellar bodies, it is important to consider the way the notion of terraforming still affects Earth itself.

Furthermore, even as Neyrat traces a decline in terraforming desires (which he ties to the end of the Space Age and a reduced belief in the tenability of terraforming), these ideas not only out live the boundaries generally given to the Space Age narrative through film and literature and continue to be proposed as very real solutions to climate change, but the very imaginings of the “Space Age” itself persist. In a video titled simply “We Are Going,” released as recently as May 14, 2019, William Shatner’s voice tells a Space Age revitalization narrative:

Fifty years ago we pioneered a path to the moon. The trail we blazed cut through the fictions of science, and showed us all what was possible. Today our calling to explore is even greater...We must use the resources we find at our destinations, we must overcome radiation, isolation, gravity, and extreme environments like

never before. These are the challenges we face to push the bounds of humanity.

(00:00-00:46)

The video also explains that this will be accomplished in part through “commercial sponsorship”; five days prior, Jeff Bezos unveiled his company Blue Moon’s lunar launcher. While the terraforming narrative subscribes predominantly to the Anthropocene narrative, emphasizing ideas of an “Age of Man” and of “human” interventions into the “natural”, one ought to consider the way that capitalist logics also shapes these desires. It is a truism that it is easier to imagine the end of the world than the end of capitalism, and this is certainly true of Jeff Bezos who, according to Caroline Haskins’s *Vice* article, is a “Post-Earth Capitalist.” At the unveiling, Haskins comments that Bezos views space colonies as “a way to expand the human population and offset the impacts of agriculture and industry on Earth. This strategy, according to Bezos, leaves Earth an idyllic paradise: a place to go on vacation, a place to go to college—in other words, a place for the elite” (Haskins). Similarly, a video posted to Youtube by Life Noggin, a science education channel, in 2016 which now has over 2.6 million views titled “How Could We Create a Second Earth?” demonstrates this through its opening statement: “As we blow through the resources on Earth, it’s clear that we’re going to need a new planet soon” (00:03-00:06); one of the top comments, posted by a youtuber called “Creative Writer”, responds with the suggestive question “so we’re causing Global Warming on the wrong planet?” While the video itself ends with the conclusion that it is too difficult to terraform any planets in our solar system and therefore we should focus on protecting Earth, what is especially relevant about this is the way that terraforming is imagined as a possible (even if not plausible), response to “blowing through resources,” as well as the suggestion that *if* we were more technologically capable, we would and should focus on terraforming rather than protecting Earth’s environment.

Conclusion

Timothy Morton suggests in *Hyperobjects* that “the concept *world* is no longer operational” (6); terraforming conceptually performs a similar kind of work. In applying terraforming logics to Earth, “we move onto the *greening* of the Earth, as if the latter, in a certain way, seemed to be *lacking life*, as if the Earth were *already dead*” (Neyrat 52). Terraforming imagines a multiplicity of dead worlds, worlds in need of geo- and bio-constructivist interventions to create life. Ultimately, dominant terraforming imaginaries and the way they operate along a Human/Nature binary tend to obscure anxieties about climate change. Terraforming operates on multiple levels: it displaces climate anxieties onto other worlds, imagines the violence of capitalist/industrialist systems natural, suggests the idea that both these systems and humanity can outlive Earth, presents a notion of “lifelessness” which both regulates what counts as life and carries on the colonial mythos of emptiness as invitation for colonization, suggests that Humanity has the ability to intervene and shape Nature, and represents the problems which might arise in this relationship as being not caused by this relationship, but rather “quirks” of inability to perfectly order world(s) which can perhaps be solved through the perfection of intervening technologies.

While of course the science fictionality is central to an understanding of terraforming and the cultural significance of this imaginary, it is also important to acknowledge the places where the boundaries between “science fiction” and “reality” bleed together; not only does terraforming reflect real dismissals of climate change as a significant threat to certain kinds of (human) life on Earth and active ideologies of how humans should engage with planetary environments and “nature,” but the terraforming imaginary also slips into what might be considered as an actual, viable solution to environmental disaster. While there are ways in which terraforming can be

used to meditate on how slow violence and structural inequalities will project forward in “post-Earth” capitalisms, as well as ways of using terraforming to queer the neatly bounded human/technology/nature divisions so often associated, in this moment with the reactivation of Cold War-Space Age rhetoric now backed by the open presence of corporate interests, the question of what it means to image the ordering and disciplining of stellar bodies in order to make them fit for human life, and what problems become intricately linked with this “possibility,” could not be more relevant.

Works Cited

- Abbott, Carl. "Homesteading on the Extraterrestrial Frontier." *Science Fiction Studies*, vol. 32, no. 2, 2005, pp. 240–264. *JSTOR*, www.jstor.org/stable/4241346.
- Bluth, Don and Gary Goldman, directors. *Titan A.E.* Fox Animation Studios, 2000.
- Ghosh, Amitav. *The Great Derangement: Climate Change and the Unthinkable*. The University of Chicago Press, 2017.
- Heinlein, Robert A. *Farmer in the Sky*. Dell Publishing Co, Inc, (Original work published 1950). 1973.
- Heise, Ursula K. "Martian Ecologies and the Future of Nature." *Twentieth Century Literature*, vol. 57, no. 3/4, 2011, pp. 447–471. *JSTOR*, www.jstor.org/stable/41698761
- Moore, Timothy. "The Capitalocene, Part 1: on the nature and origins of our ecological crisis." *The Journal of Peasant Studies*, 44:3, 2017, pp 594-630.
- Morton, Timothy. *Hyperobjects: Philosophy and Ecology after the End of the World*. University of Minnesota Press, 2014.
- Neyrat, Frederic. "TERRAFORMING: Reconstructing the Earth, Recreating Life." *The Unconstructable Earth: An Ecology of Separation*, by Frederic Neyrat and Drew S. Buck. 1st ed., Fordham University, New York, 2019, pp. 45–55. *JSTOR*. www.jstor.org/stable/j.ctv8jnzp4.7.
- Pak, Chris. (2016). "Introduction: Terraforming: Engineering Imaginary Environments" *Terraforming: Ecopolitical Transformations and Environmentalism in Science Fiction*. Liverpool University Press, 1-17. www.jstor.org/stable/j.ctt1gpcb56.4

Sheetz, Michael. “Jeff Bezos Unveils Lunar Lander to Take Astronauts to the Moon by 2024.”

CNBC, 9 May 2019,

www.cnbc.com/2019/05/09/jeff-bezos-unveils-blue-moon-lunar-lander.html.

Sturken, Marita and Lisa Cartwright. “Practices of Looking: Images, Power, and Politics.”

Practices of Looking: an Introduction to Visual Culture, Oxford Univ. Press, 2007, pp.

10–44.

“The Silent Spring of Rachel Carson.” Performance by Eric Sevareid, *YouTube*, CBS, 1963,

www.youtube.com/watch?v=c6fAP6Fjx-Y&feature=youtu.be.

“The Train Job.” *Firefly*, season 1, episode 2, Fox, 20 Sept. 2002. *Hulu*,

www.hulu.com/watch/61064efe-9ae6-4f8b-9c8d-dd8bcaa5dfa3.