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# On cosmic injustices: Critical thinking, outer space, green values, and capitalist ideologies in a planetary age



**Brad Tabas** 

ENSTA Bretagne, France

## Abstract

It may seem obvious that the interests of social justice should always align with environmental justice on a limited planet Earth. Unfortunately, this is far from the case in practice, even in the Anthropocene. This essay provides a new cognitive mapping of how ideologically charged discourse splits the interests of people and planet. It offers a pragmatic, semantic, and spatial analysis of how arguments for planetary protection can infelicitously turn into justifications for broadening social inequalities (and the inverse). As such, it presents an implicit critique of holist theories. In striving to demonstrate the fundamental unity of society and the environment risk, holistic thinking leaves critics with an impoverished critical toolbox incapable of differentiating between transparently fraudulent greenwashing and scientifically supportable, but ideologically charged, claims. This text is focused on the spatial dimension of Anthropocene ideology. It places a particular focus on the growing place and rhetorical function of outer space within the Anthropocene economy. It illustrates that the promise of extraterrestrial growth, at least when this growth is contextualized against a zoned extraterrestrial space, has emerged as a potent means of justifying inequality in the name of planetary well-being, and so also of justifying the gospel of growth despite our increasing awareness of the limits of our planet.

## Keywords

Critical theory, Anthropocene, astroculture, eco-criticism, existential risk, social studies of outer space

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## Corresponding author:

Brad Tabas, ENSTA Bretagne, 2 Rue Francois Verny, Brest, Finistère 29806, France.

Email: [brad.tabas@ensta-bretagne.fr](mailto:brad.tabas@ensta-bretagne.fr)

## Pre-launch

My financial model predicts that on its present course this unsustainable debt bubble will pop within the next decade, collapsing the entire global economy—with the potential for world conflict, mass starvation, and possibly the end of modern civilization as we know it... However, there is a place where near-infinite expansion can occur—is, in fact, already occurring. Where our current debt-based financial system can expand for millions of years uninterrupted. Korrapati pointed upward. “Space.” (Suarez, 2019: 249)

Earth will end up zoned residential and light industry. It’ll be a beautiful place to live. It’ll be a beautiful place to visit. It’ll be a beautiful place to go to college and to do some light industry. But heavy industry and all the polluting industry—all the things that are damaging our planet—will be done off Earth. (Bezos, 2020: 249)

*History is going to bifurcate along two directions. One path is we stay on Earth forever, and then there will be some eventual extinction event. I do not have an immediate doomsday prophecy, but eventually, history suggests, there will be some doomsday event. The alternative is to become a space-bearing civilization and a multi-planetary species, which I hope you would agree is the right way to go.* (Musk, 2017: 46)

## The Anthropocene and the extraterrestrial

The Anthropocene is an era in which anthropogenically driven changes are degrading prospects for the continuing habitability of planet Earth. It is also a space age in which humans are affecting environments beyond the planet, leading Klinger (2021) as well as Olson and Messeri (2015) to argue that the Anthropocene is now extraterrestrial. Nevertheless, in no coherent way can we claim that human activity is degrading the *entire cosmos*. Our pollution affects our cosmic province. Orbital space and the moon are being junked. And with an acceleration of economic activity in near space underway, these problems are primed to get worse. They should be the concern of scholars interested in capitalism and the environment, even if they are not, by and large, on most critical geographers’ maps. This is so even if our primary concern lies not with protecting space environments, but with understanding better what is currently happening here on Earth, for much of the technology which links places on Earth to one another and provides information about the Earth to earthlings is located in orbital space.

This essay explores the extraterrestrial Anthropocene as a question of cultural geography—more properly, astrography—with an eye to informing the critique of discourse: the analysis of capitalist ideologies. The guiding thesis is that our “planetary age” (Chakrabarty, 2021) is also a post-planetary age, so its ideologies are no longer informed only by the spatiality of the terrestrial globe but are now also supplemented by zones beyond it. That is another way of saying that in the present, if we want to think critically about discourse, if we want to examine the justifications that lead to the perpetuation of inequalities and the ravaging of environments, we need also to learn to think beyond the Earth, beyond the local and the global. The critique of the discourses of globalization needs an astrographic supplement. Thus, even if Earth should remain foremost in our minds, outer space should no longer be treated as an empty and homogenous outside. We need to zone extraterrestrial space to find critical traction off planet. This friction will allow us to critically differentiate astrofuturist discourses which merely throw words out into the void of extraterrestrial fantasy from those that serve to justify very real appropriations of the orbital commons, and in

so doing, generate very real ecological and social consequences both on Earth, and off. While some critics argue that our primary objective in the Anthropocene is the return to Earth, caring for the planet should in no way justify ignoring the very significant recent advances that have been made by those seeking to expand and sustain capitalism out beyond the globe.

To fill what can seem a conceptual void with a spatial and relational topography, this essay proposes a new “cognitive mapping” (Jameson, 2019). It does so by introducing four zones: satellite space, near space, outer space, and alien space. A zone can be understood as a spatial unit that is isolated and submitted to a particular normative regime, in this particular case a different intensity of relation in terms of the harvesting and profitability of information, with the constitution of these zones being an implicit function of practice (Etelain, 2017). In our still developing space age, the horizons of the zones are historically flexible, but each is differentiated by a decreasing degree of epistemic and practical relatedness between embodied Earthlings and locations beyond the planet, such that our everyday connections to the satellite zone are as close as our 5G- and GPS-equipped smartphones, while our connection to the alien zone consists merely in the inference that there is more out beyond the cosmic horizon. To some extent, these zones graft onto the physical categorizations introduced by Daniel Deudney (2020): Earth-Orbital Space, Solar Orbital Space, Galactic Space, and Intergalactic Space. They differ to the extent that Deudney’s zoning does not reflect a dynamic and historical process of spatialization but rather a pre-established and ahistorical background. The difference between these two approaches matters when we attempt to think historically about changes in the human relationship to space, and so also attempt to historicize discourses and ideologies that support space expansionism. There is a massive difference between the political implications of an Earth-orbital space that merely surrounds the Earth (as it presumably always has), and one that is filled with satellites constantly sending back and forth data, just as there is a massive difference between a merely existing Solar Orbital Space, glimpsed only through telescopes or with the naked eye, and a near space to which we are connected via information circuits to rovers on Mars. Zoning space as I propose here, establishing its astrographic relationship to cultural politics as a product of historically constructed informational relations between humans and places extraterrestrial, and understanding these constructions to involve negotiations with social consequences for human society, allows for a far greater degree of precision and clarity when reflecting critically on the meaning of what we say when we talk about realities beyond the planet. Moreover, and insofar as outer space is connected to the Earth, and satellites offer a valuable view on the Earth, outer space politics are always also about the Earth, even if they cannot, and should not, merely be reduced to the terrestrial spatiality of global politics.

Zoning space particularly matters for thinking about capital in our age of planetary crisis. For if it remains true that human beings live on planet Earth, and so a concern with space should remain supplemental to a concern for the planet, it is not true that capitalism only exists on the critical zone (Latour and Weibel, 2020) that is the habitable surface of planet Earth. A great deal of valuable data is harvested in the satellite zone, and some is likewise harvested in near space and even beyond. The value of this data often derives from its usefulness for protecting or understanding our home planet. More to the point, what we know about space inflects how we act towards our critically threatened planet. Our awareness regarding the chemical composition of Martian regolith, our inferences regarding the possible habitability of exoplanets, all of this inflects how we judge the feasibility of the promises made by space capitalists, our concerns regarding the urgency of regulating orbital space, as well as our interpretations of how strongly we ought to resist changes to our

home planet. Treating the Earth as the only environment not only forgets that extraterrestrial zones are also capable of being degraded by our actions, but also overlooks the sometimes culturally ambiguous significance of harvesting data from space for terrestrial societies as they strive towards sustainability.

### **Locating ideology in an extraplanetary technosphere**

Ideology functions dialectically across thresholds, scales, and perspectives. It is the parallax induced by frontiers that is responsible for the tensions and complementarities that exist between the local and global. But the global need not be taken as referring to the globe: the geographical planet. The globe itself can be taken, semantically, as local with respect to the solar system. Moreover, there is nothing that can keep global reference coherently fixed on the Earth, at least in an age in which remote sensor-equipped technologies can travel well beyond the planet. When data permit the global to become local, new ideological logics arise and seemingly solid arguments melt into air. Semantically speaking, language is, as Charles Travis (2011) has argued, occasion sensitive, with the performative meaningfulness of terms varying widely with the time and place of their utterance. Reflections on the pragmatics of meaning making suggest that all explicitly assertable claims implicitly depend on inferential constellations constituted out of contextualized past speech acts (Brandom, 1994). That implies that when we leave our past world behind, at times our critical terms lose their grip. Seemingly commonsense claims occasionally misfire when we accept the extraterrestrial into our ontology. If economic growth on Earth is wrong in a terrestrial context, economic growth beyond the Earth might be good, if our reference for environmental consequences remains terrestrial. If this growth was enabled by capitalism, capital would not only be preserved but protected by environmental critique. Monetary inequality thus recontextualized might look like environmental justice. In this way, the actions taken by capitalists driving extraterrestrial growth can be interpreted as saving the planet—which is exactly what they claim to be doing in the citations placed in *exergue*.

From the point of view of the genesis of cultural norms and values, the words and gestures of the space billionaires are a planetary gift, a non-reciprocal donation of a sustainable, or at least more sustainable, Earth system to the Earthlings. This bequest would, if we were to lean on the cultural logic of the gift first theorized by Marcel Mauss and recently revalorized within a developmental theory of world historical consciousness by Kojin Karatani (2014), establish a pathetic relation of debt between Earthlings and capital. It would validate the radical injustice of the system which permits the existence of billionaire ultracapitalists, those manifestations of the ever-more acute differentiation between the ultra-rich and the rest that Thomas Piketty (2013) has suggested is characteristic of only the most recent phases in capitalism's history. This difference in means is unjustifiable even according to the principles of a liberal, hence capitalist, theory of justice as fairness such as is defended by Rawls (2005). One symptom of the radicality of the injustice of the current system is the fact no means of counter-gifting seem imaginable. In sum, offworlding terrestrial problems, even if only partially, offers a strong affective stimulus to those who would seek to justify even the most radically inegalitarian aspects of our planetary social order.

A way of resisting this line of thought is to puncture the illusion that helping the planet transparently equates with helping society. This can in part be done by zoning space, since treating space as zoned and not as an undifferentiated other makes evident that if the space billionaires are contributing in the short term to our adaption to a changing planet, they are also generating long-term problems beyond the Earth. Unfortunately much of the critical energy in the Anthropocene has been devoted to accomplishing exactly the opposite

objective: it has aimed to convince us that we must think about the planet, that there is no environment in outer space, that there is no planet B, no outside, no supplement to our globe. But that rhetoric is aimed at the belief that extraterrestrial space is a habitat for human beings, rather than—as it already is—a space which is being used to supplement and support our primary planetary habitat. In an Anthropocene that understands itself as a Space Age, outer space as we usually understand it ought to be taken as an archaic, pre-Space Age concept, one dependent on a cosmological imagination that predates the historical reality of the Space Age. In that archaic imaginary, all outer space was one, it was all inaccessible, all indifferent, all equally belonging to the domain of “extraterrestrial literature” (Theisohn, 2022) . . . or the gods. But in the Space Age, a wedge can be driven between space history and space opera. Yet this difference and its consequences for the environmental imagination remain underthought. If many books on the history of environmental consciousness begin with an evocation of the cultural importance of seeing the Earth from space, and a few go on to think about Earth as a spaceship, few go on to include the role of space in the making of our understanding of the global environment, and even fewer dare to reflect on the fact that there is an environment beyond the globe.

Yet that is all oversight. The emergence of the Anthropocene cannot be thought without also thinking the Space Age.

Aligning the Anthropocene with the Space Age may seem shocking. But to those who study the effects of space technology on everyday existence there should be no astonishment. James H. Dickinson of the U.S. Space Command has claimed that “the American way of life is fueled by space” (2021). This is disturbing, but it is not false: our everyday lives on planet Earth are structured by space data, by GPS signals, by communication transmitted by satellites, by LANDSAT images and other meteorological information about the Earth beamed down from orbit. Some of this dependence on space merely fuels consumerism. But much of it also fuels our current understanding of the evolution of the earth system. As the geologist and Mars researcher Robert Sharp (1980) argued, studying alien planets has always been a “two-way street” with Earth revealing Mars and Mars revealing Earth. Information coming from other planets has played a major role in helping us to understand our own climate’s history (Conway, 2008; Frank, 2018; Grinspoon, 2016; Lorenz, 2019). But it is not just other planets that have revealed the Earth to us through comparative planetology. It is also the satellites and satellite data which have played such a key role in producing planetary system models. Lynn Margulis (1998: 2) states this nicely: “Gaia is just symbiosis as seen from space.” A more precise account of the relation between space data and the dawning of the Anthropocene cultural climate is given by historian Paul Edwards. His *A Vast Machine* (2010) documents the key role of satellites in the discovery of “how we know what we know” about the changing climate. To live in the Anthropocene is to live on a planet with an extraterrestrial technosphere.

## Learning to think astrographically

Critical theorists have something to learn from the Space Force: astrographic orientation. The term astrographic was coined by Shaw et al. (2022) (all members of the Space Force) in a paper discussing the Area of Operations (AORs) of this new branch of the military. The idea of astrography arose out of an interrogation regarding how to think the proper scale and orientation of extraterrestrial activities as set against the background concern that surveilling an infinite domain is in no way operationally feasible. In the same way, cultural critics need to accept that space is now a critical AOR, and to do this they need to renounce the idea that it is an infinite domain, and instead find ways of creating differences that



matter for their critical operations. Of course, unlike the Space Force, critical thinkers do not have billions of dollars available to send up tailor-made prostheses into space. They have only representations and mediations, ingenuity, organization, communication, and curiosity. With these tools in hand, astrocritics must build a new astrographic map to supplement geographic orientation.

Doing this will imply renouncing many of the assumptions underwriting theories of globalization. This may be hard. The globe, as a concept, has always, if often unavowedly, been a spatialized way of sneaking teleology, or more seductively, a revolutionary horizon, into secular historical thinking. To posit globalization as the end of the historical progress is to claim that there is no outside, but it is also to claim that the coming of globalization either ushers in the verdict that the secular liberal state makes manifest the end of history (Fukuyama, 1992), or confirms the immanence of a Marxist revolution to right global liberalism's terminal contradictions (Harvey, 2019; Smith, 1991). Yet reassuring as believing that we live at the end of history might be, the era of globalization—which is to say the era in which globalization functioned as a dominant within the languages of critical theory (approximately the post-modern era beginning in the late 1960's, and arguing beginning with the Apollo moon landing)—radically underestimated the historical significance of the Space Age. Yet this significance can no longer be dismissed once we accept that birth of the Anthropocene is cannot be disentangled from the birth of space-based Earth observation. With the space of history having thus been reframed, the global logic of the non-event, the post-modern condition in which every event is interpreted as analogous a new commodity, and thus to an existentially meaningless same, in the form of an eternal return of capital, finds its semantical economy broken from the outside (Jameson, 1991). In the new historical regime that is the post-global Anthropocene, what confronts us is not the eternal return of capital, but an infinity of signs attesting to the fragility of our grasp on a rapidly foreclosing future.

Yet if the coming of the Anthropocene has jolted us out of the libidinal economy post-modernity, it has not yet fully pulled us out of its global cognitive mapping. To do this we must fully acknowledge the importance of space for what Alexander Geppert and I (2023) have called the planetization of Earth, the historical emergence of our understanding of the Earth as a living planet located in a spatialized space and not just as a geometrical globe floating in the void. The thinker most sensitive to this difference has without doubt been Dipesh Chakrabarty, who has precisely insisted that the planet on which the Anthropocene hypothesis is based, as opposed to “the globe of globalization,” “necessarily has other planets in view” (2021: 75). That said, and herein lies the importance of zoning extraterrestrial space at the same time as we historicize our planet, there are not *only* planets in the universe, and, as a point of fact, almost all of the locations in space on which our current culture is entangled lie neither within the domain that we would traditionally have classified as our terrestrial globe, nor on alien planets, but precisely in between, in spaces that our ordinary language and our inherited cultural imaginary would have us imagine (to quote Levinas on Gagarin) as existing “beyond any horizon” in an “absolute of homogenous space” (1984: 350). Before there was history in space, outer space was, in short, being that was nothingness. But in the age of New Space we can no longer allow the satellite and even near space zones to be space in which nothing incarnate is manifest.

Since Sputnik, space has entered history. The planet depends to an ever-greater degree on space, with these dependencies structuring our astrographic zoning of the extraterrestrial. The zone of highest dependency is the *satellite zone*. This zone should not be defined in terms of distance but in terms of relations. It is characterized by its intimate inclusion within the everyday lives of the inhabitants of planet Earth, even to the point that space

infrastructure is mission critical for supporting the contemporary social order (Dawson, 2018). *Near space* includes those parts of space such as Mars which humans have visited prosthetically (or in reality), and with which certain micro-communities of researchers may even have established long-term entanglements (Mirmalek, 2020), but with respect to which we as yet have no significant, which is to say utterly critical, dependencies. I call the third zone *outer space*, because the structural relationship to this ‘new’ outer space resembles that of the relationship to the old, pre-space age outer space. As was the case for all extraterrestrial space before the space age, the new outer space is merely ‘visible’, if not necessarily to the naked eye or within the light as opposed to the radio spectrum. Increasingly, our relationship to this outer space is mediated through the satellite zone and thanks to space telescopes. I call the fourth zone the *alien zone*. By this I do not necessarily mean to suggest that this is where aliens live, nor do I mean to suggest that aliens do not live there, concealed from us. This zoning is making no astrobiological claim, but rather a statement regarding the epistemic situation of the astrobiologist, for whom alien life, and particularly intelligent alien life, may seem to hang (at least for now) just over the horizon of the known. In short, the alien zone is alien to us, we know that we do not know what is there. It is outside of the outer space that we have glimpsed, but not outside of the cognitive economy of our imaginations.

### Global infelicities

I have already suggested that the cognitive map of our planetary age cannot be identical with that of globalization, and that this difference plays out in terms of how we interpret ideologies, but also in terms of how we as critics stand with respect to the teleological assumptions implicit within our own critical discourse, and how these assumptions might become a new source of bias, even a form of astrofuturist ideology. As context-sensitive empirical theses, the globe and globalization are perfectly fine descriptive categories. Yet when the notion of the globe becomes transcendentalized, transformed into a historical absolute such that the global becomes synonymous with the universal, we often say what we do not mean. To illustrate how this transcendentalization of the global happened within the critical discourse, Peter Sloterdijk’s cultural theory of global capitalism *Im Weltinnenraum des Kapitals* (2005) is a good starting point.

I cite the title in German because the English translation—*In the World Interior of Capital*—obscures an allusion to outer space that is perfectly explicit in the German, where *Weltinnenraum*—inner space—stands in dialectical opposition to the *Weltraum*—outer space. In this way, and even from the title alone, Sloterdijk’s book echoes a claim (arguably) first made by J.G. Ballard in his essay “Which Way to Inner Space”, essentially the idea that in the wake of the moon missions, and in light of the stark contrast between the exciting futures imagined in SF and the dull reality of space itself, the reality that needs to be explored, and which is primed for bringing about real revolutions and future changes, is “inner space, not outer” (1996: loc. 3009). For Sloterdijk, it is clear the way towards inner space and the revolutions that it might promise passes through a sustained attack on the idea that there is any significant reality in outer space. This leads him to align the very concept of globalization with the “devitalization of the previously numinous spheres,” with the loss not only of the traditional vision of the cosmos but also of the loss of any belief in Astrofuturism as a historically relevant possibility. Thus, to employ Sloterdijk’s own words, the global theorists find themselves caught within the inner space of a global imagination with respect to which “planet Terra” is “the single and real globe, the one that underwrites all life contexts (*Lebenszusammenhängen*), while nearly everything that up until then had



counted as partnership, as meaningful (*sinnerfüllter*) heaven, collapsed into emptiness” (15). Now such a collapse, a loss of the partnership between heavens and the Earth to the profit of a future in which for all eternity there would only be the Earth surrounded by nothingness, would be fine and unproblematic if we really had just gone to the moon and returned, if our society had not become deeply dependent on satellites floating up there in those spaces that we still imagine, and depict on the covers of our ecology textbooks, as empty.

“The Earth alone” as Robert Poole (2008: 195) has shown, has been the consensus interpretation of what is shown in Anders’ “Earthrise” photo within the environmental movement. But accepting this interpretation is to self-incur an ignorance of the outside as well as a tendency to absolutize the global and the local. This has affected the critics working on the environment just as much as it has affected those focusing on capitalism. Almost every scholar within the environmental humanities who has written about scale has looked no further than the limits of the globe (Clark, 2015; Heise, 2008), while the few who have looked done so have nevertheless treated the outside as homogenous cosmic absolute (Gormley, 2021; Horton, 2021). As a result, even very good scholars reveal a remarkable lack of context-sensitivity when attending to the differences between the global and the environment affected by our technosphere. Anna Tsing, for example, in *Friction*, asserts that “global connections are everywhere” (Tsing, 2005: 1). This seems to suggest either that the globe is everywhere, even on Alpha Centauri, or that which is off the globe is nowhere (which is just as problematic given the accumulation of space junk). This sort of misfire is lamentable, particularly given that Tsing’s book, with its focus on friction and the local aspects of environmental action, would precisely seem to take to heart Wittgenstein’s core teaching on the importance of context sensitivity, his claim that we ought to avoid high flying theoretical terms like the global preferring always the friction of ordinary language:

We have got on to slippery ice where there is no friction and so in a certain sense the conditions are ideal, but also, just because of that, we are unable to walk. We want to walk: so we need friction. Back to the rough ground! (2003: 107)

But then again, the task of finding friction in orbital space requires specific efforts that are anything but obvious to Earthlings, whose everyday speech precisely has no words for things beyond the scope of normal terrestrial experience.

A similar problem affects the writing of Jason Moore, one of the thinkers who has contributed the most to attempting to bring environmental issues together with the critique of global capital. Yet in doing this, has also imported a certain number of global assumptions within the Anthropocene discourse. The simplest way of making this point is to focus on the inferential semantics when Moore (2015) explains that in the Anthropocene “capital, power, and nature” form an “organic whole” or a “world-ecology” (2). This statement cannot make sense if it is taken to refer to Pluto; yet it ends up being reductive when, as is the case with Moore, the world is identified with the planet understood as globe minus the inorganic expanse of the technosphere. Now Moore obviously has strong reasons to do this: it is the ontological closure provided by identifying the world with the globe that allows him to claim, following Foster et al. (2010) that Anthropocene capitalism is ecocidal because it depends on infinite growth within an ontologically finite system. Without questioning the rightness of the inference that capitalist growth poses a danger to the planet, he is remiss to overlook the fact that the dynamics of capital accumulation are animated by something akin to a Hegelian “*List der Vernunft*” (Hegel, 1975: 49), a cleverness of capitalist reason, a diabolical trickiness that allows capital, when confronted by apparent limits, seeks ways to spiritualize itself and to justify its persistence, in this particular case by finding means of

earning money by transmitting information, and not material goods, of meaning to Earthlings from space. Locating the sources of these transmissions traces out a terrain beyond the material and biological limits of the planet understood as globe, in which sustainable, meaning non-ecocidal growth, seems possible and even—from the point of view of the environment as globally considered—desirable.

## **X-values**

The brilliance of space capitalism is to be found in its capacity to justify its existence in the name of saving the planet. To make this point somewhat clearer, I want to introduce the notion of the x-value. This term expresses the exchange value attributed to a good or service which diminishes existential risk. For example, if we all agree that extractive activities which take place on the surface of the globe pose an existential risk to all inhabitants of the planet, then we can also agree that human beings may be willing to pay to have these same activities performed, to such an extent as is possible, off planet, if it can be so arranged that this significantly decouples economic growth from the risks unleashed by that growth.<sup>1</sup> The subjective value attributed to that decoupling is an x-value. We can attribute x-values to qualified as well as quantified environmental services as they impact exchange values.

The x-value brings together two distinct strands in recent thought: the work of green economists, such as Nobel laureate William Nordhaus (2021), on negative environmental externalities and the work of existential risk theorists, such as Toby Ord (2020), Vaclav Smil (2008), and Nick Bostrom and Cirkovic (2011). From the viewpoint of economists, the negative externalities generated by things like coal-fueled power plants can be said to increase existential risk, in other words, the odds of losing in what Nordhaus (2013) call the “climate casino”. Meanwhile, alternative commodities such as electric cars are attributed positive x-values because they lower the collective probability of suffering near-term climate catastrophe. This positive x-valuation makes products and services both desirable to consumers and attractive to investors (as a case in point, consider Tesla’s P/E ratio as compared to a traditional automaker such as Ford). In other words, rather than dismissing the efforts of environmentally engaged professors at leading business and engineering schools (Henderson, 2020; McAfee, 2019) and the efforts of the advocates of green capitalism (Elkington, 2000; Raworth, 2017) as empty greenwashing, critics in the Anthropocene need to learn to think with these environmental actors to understand more clearly the forces shaping the market, and so also the Anthropocene cultural discourse. While it may be tempting for extremists to decry all this as pro-market ideologizing or greenwashing, doing so is dangerous, at least if our aim is to keep social inequality, as well as environmental degradation, in mind.

Yet if I have introduced x-values here, it is also for their explanatory power, since attending to x-values can help us see precisely how the capitalist economy is adapting to the Anthropocene by scaling itself to the planet, as well as by seeing out ways to establish itself in satellite space and beyond. Consider the following statements from a recent investor guide published by Morgan Stanley (2020):

as the new space economy develops, it increasingly overlaps with sustainability in areas such as Earth observation, energy and communications. These developing technologies from both public and private companies may soon become a new avenue for investors interested in pursuing the twin goals of sustainability and investor returns.

As Audrey Choi explains in the same document: data from space gives a “powerful global view of climate data and environmental science” which in turn allows for

a “deeper integration of sustainability considerations into investment decisions.” Some of this is just a sales pitch, but assuming we accept the thesis that different economic activities produce different quantities of existential risk for the future habitability of the planet, then we see that real x-values are in play in the space economy. More to the point, if it is true that all industrial and extractive activities pollute, it is not true that all these activities, at all phases of their existence, pollute the planet, and this is because space activities, insofar as they take place in space, are not producing measurably dangerous externalities if (*and only if*) our frame of reference is the Earth system.

X-values are not only a way of thinking about ideology. They themselves are ideological. We must believe that a good or service has x-value without final proof; the only form that proof could take would be our own extinction. Thus, x-values are a speculative or even an aesthetic category since they derive their value from attempts to probabilistically determine catastrophic developmental trends. They can, and consistently are, generated narratively or dramatically by playing on the intuitions of what observers count as realistic, *vraisemblable* as this term was used by the dramatists of the French classical age (Campe, 2002), as opposed to statistically likely in a quantified Bayesian sense (Tetlock and Gardner, 2016). In all cases, x-values reflect anticipatory biases. That said, claims about x-values can be grounded in our best scientific data, and they are the products of our best science (to doubt x-values is to doubt “the science” which underpins climate science). The desire to avoid increasing extinction risks can be justified by prudential rationality, including the principle of precaution and the ethics of responsibility (Jonas, 1979; Whiteside, 2006). In fact, we cannot be in the Anthropocene if we do not accept x-values into our ontology. X-values function for cultural critics in the Anthropocene rather like what Derrida, following Plato, calls a *pharmakon*, “a remedy and/or a poison” (1972: 87). They enable critical thinking at the cost of certain compromises within the free functioning of critical rationality. But these compromises are required if we wish to acknowledge a real concern for the planetary boundaries (themselves reflections of x-value calculations) sketched out by the Stockholm Resilience center (Rockström and Klum, 2015) or any other of the disaster scenarios which inspire environmental activism in the Anthropocene. As *pharmaka*, x-values are not without risks. As Schuster and Woods (2021) have pointed out, existential risk thinking is not always planet-friendly, since while it remains true that concern for existential risk can promote resistance to the extractivist and productivist elements in the capitalist economy, it can also foster belief in the need to work towards becoming a multi-planetary civilization, given that even the most effective taming of our emissions will do nothing to palliate the long-term existential risks associated with volcanic eruptions, incoming meteorites, or a dying sun (MacAskill, 2022; Musk, 2017). Thus, given these dangers, it is unsurprising if some might feel tempted to join more classically post-modern ideology critics such as Žižek (2011) in throwing out all environmental criticism as mere ideology. Yet the cost of doing this is to place cultural critics on the side of the climate skeptics, or, and arguably as damagingly, on the side of what Bellamy Foster (2023) has called the “New Irrationalism” and its belief that the planet will be saved by cultivating belief in an aesthetico-providential deity (Latour, 2015).

Thomas Piketty defined the ideological as that without which “the entire social and political edifice of society would collapse” (Piketty, 2019: 13). Within the Anthropocene economy, x-values precisely name the ideological essence of ideology. We know that the capitalist economy presents catastrophic risks, we are willing to pay more to reduce those catastrophic risks, and in so doing we provide justification for the perpetuation of that catastrophe machine and all it implies. Attending to x-values does not free us from climate catastrophe or liberate us from ideology. It makes it impossible for us to believe that

a revolution amounts to a solution. But what it does do, more felicitously, is draw attention to the fact that ecology and equality are not analytically identical concepts. Saving the planet can become a pretext for perpetuating and deepening economic inequality, just as fostering economic equality can come at a cost to the planet. Any cultural theory that fails to acknowledge this will have substituted wishful thinking and a desire for holism for a careful analysis of the contradictions of Anthropocene capitalism.

## Zoning x-values

Theorists who have focused on the relationship between ideology and globalization have long stressed the importance of developmental difference within the globalized dialectical logic of unequal exchange (Jameson and Miyoshi, 1998). A similar logic, supplemented by a zoned extraterrestrial space, can be employed to reflect on the relationship between ideology and the circulation of extraterrestrial capital in the Anthropocene. With respect to the production of x-values, each zone plays a different role in the justification of capitalist activity and stands in a different logic of supplementation relative to an Earth that ought not to be imagined as homogenous, as well as to the other extraterrestrial zones. As we move out from zone to zone towards the alien, or as we reflect on the relationship between zoned space and advanced space nations and less advanced nations on Earth, we see a kaleidoscope of ideological frames, each with a specific topography of tensions, and all offering possibilities for ideologists to justify space activities in the name of planetary well-being. A slightly reconfigured version of Jason Moore's (2015) notion of "cheap nature", nature that can be sacrificed without consequence to feed the needs of capital, is helpful here.<sup>2</sup> Once we look beyond the Earth, every more alienated zone promises a new and cheaper form of future nature as well as an ever-greater degree of ambiguity with respect to its real and life serving potentialities. Thus, each more distant zone signifies a greater promise for saving capitalism from its internal contradictions and humankind from its existential risks. In other words, even now, as critics are starting to raise alarm bells regarding the proliferation and risks associated with orbital space junk, deeper space ventures are evoked as a justification for these near-term disorders. Alongside these deep space ventures are evoked deep space futures in which the immediate and short-term inequalities generated by the unfair distribution of access to the satellite zone become justified in the name of more distant futures in which all humankind will live on utopian space colonies.

Unfortunately, and despite the alarms being raised by those who were concerned about the condition of orbital space, many environmental critics refuse to zone the extraterrestrial, even to the point of appearing to regard attending to outer space environments as a form of heresy against the gospel of Gaia. Bruno Latour, for one, insisted that we must construct a new "*Summa divisio*":

I propose to call the inside (*l'en-deçà*) Ground (*Terre*) and the beyond, why not, Universe. And those who dwell inside, or rather those who accept to live inside, we can call them grounded (*terrestres*). These are provisory denominations; I have only begun to take inventory. But we feel already that the ground is experienced from close, even if we know it poorly, while the universe is often much better known, even if we do not have direct experience of it. It would be good that we others, the grounded, that we prepare to redress (*revêtir*) the tools which were otherwise conceived depending on whether we are planning to voyage to one side or the other of this frontier, this unbridgeable *limes*. Without doing this, we will not be able to grasp what allows living beings to make the ground inhabitable; we will make life impossible. (Latour, 2021: 26)

I would argue that this critique only makes sense in the context of a global imaginary, one which assumes that we are not always already in outer space, always already prosthetically living in a world informed by data that come from beyond the limits of the planet as Latour imagines it, in such a way that the quantifiable benefits of disentangling from space do not necessarily outweigh the collective benefits of “landing on Earth” (as if we ever physically left). For it is a purely empirical question whether the diminished emissions due to cancelling satellite launches really outweigh the positive benefits of being able to monitor terrestrial pollution and emissions from orbit and so to police polluters, poachers, and other pillagers of the planet, and while simultaneously obtaining data necessary for adapting ourselves and our activities to sustainable forms of life within the planetary boundaries.<sup>3</sup> One way of putting that is to say if returning to Earth can offer political orientation in the Anthropocene, it is not clear that this orientation brings more benefits than it costs, both in terms of measurable emissions, but also in terms of critical language, for following Latour’s lead, we would be unable to analyze with any nuance the promises and perils linked to a very real and expanding space economy. Indeed, there may be no more effective way of justifying space capitalism than the path taken by Latour: for placing space beyond the limits of our territory turns it precisely into the apotheosis of cheap nature, marking it as a *terra nullius*, a space that belongs to no one, or no one who is not an enemy, and so as a space that is available to any and all for despoliation if not for habitation.

In addition to refusing to think space historically, far too many critics in the Anthropocene embrace an utterly ahistorical imaginary regarding the habitability of near space. Take, for example, Elon Musk’s well-publicized claim that he wishes to colonize Mars, a statement that has raised the ire of several prominent ecologists (Berners-Lee, 2021). According to most scientists, this is a dream that is either impossible, or in the near-term largely undesirable in light of what we already know about the hostility of the red planet’s environment (Ekstrom and Javier, 2020; Morden, 2021). Arguably, even Musk recognizes this. He often speaks of “Nuking Mars” or of exporting the “light of consciousness” (Musk, 2018) (and not embodied humans) to the red planet. Yet if Musk does sometimes seem to speak frankly about colonizing Mars, it is doubtless because he would rather that we not attend critically to his industrial activities in satellite space, or rather that we see the one as supporting the other, as Maria Koren does in the following article from *The Atlantic*:

But Musk is a businessman, not a philanthropist. And SpaceX doesn’t exist to beam internet down from the heavens; the company was founded with the express purpose of putting people on Mars and, as Musk’s tagline goes, “making life multiplanetary.” Musk wants to save humanity by colonizing Mars, not by giving everyone internet, and Starlink is supposed to help finance that deep-space effort. (2022)

Here Koren offers a perfect illustration of how unzoned extraterrestrial space disorients critical discourse. In the article, Koren argues that Musk should not get mixed up in politics, that he should not have given free Starlink service to the Ukraine, since doing this does not help him to make money, nor does it help him to achieve his real economic objectives of setting up a commercial colony on Mars. Yet Koren gets just about everything backward here. Eyes fixed on near space, she overlooks that his economic activity is nothing other than making money on Earth by beaming internet down from satellite space, an endeavor that is served by giving away internet to the Ukraine in a well-publicized demonstration of the effectiveness of his technology, that exploits the global developmental differences relative to both economics and space access here on Earth. With respect to all of that, the talk of



Mars is part of an aspirational discourse meant to distract us away from the quite disturbing economic and political implications that some members of the billionaire class now have enough money to rival with nations for control over the satellite zone, and to make money in a zone that is both not apt to be criticized for polluting the Earth, and is off-limits to but the richest of the rich. As economist Paul Krugman (2022) has pointed out in an expansive analysis, there just isn't a strong business case for colonizing Mars (or anywhere else in near space).<sup>4</sup> But there is—keeping the ideological potency of trading in x-values in mind—a strong business case for *talking* about saving humankind by colonizing near space, and even a strong business case for 'greening' internet infrastructure by putting it out into satellite space, and indeed a strongest case for talking about the one while doing the other, since inequality in the satellite zone is a means of rendering more realistic dreams of future equality in more distant zones.

### **Cosmo-interplanetary-intergalactic eternal-rights**

Inspired by Carl Schmitt, Bruno Latour has argued that we ought to see those who violate the *summa divisio* between the globe and the beyond as enemies of the planet. While it feels fair to say (as I have elsewhere said) that Musk, Robert Zubrin, and some others truly do hate the Earth (Tabas, 2020), most space entrepreneurs and Astrofuturists cannot so neatly be classified as enemies of the planet. Thus, we ought to resist such calls to war on the grounds that all blanket friend–enemy distinctions are insufficiently context sensitive. The costs of Latour's warrior fantasies become painfully clear if we look at the intersections Afrofuturism and Astrofuturism such as have been highlighted by Kilgore (2003). By and large the Afrofuturists stand in a diametrically opposite position within the social hierarchy to the rocket billionaires. Their limited sphere of real political and economic agency keeps them far from being able to send rockets to the Mars, but with their hopes and dreams they still reach out towards the alien in such a way that makes it seem unjust to brand them as enemies of the planet, even if it would be false to claim that they do not, to some degree, dream of leaving this Earth behind.

Consider, for example, the words of the Afrofuturist poet Adrian Matejka:

& the ship  
 Is the only way any of us  
 down-&-out blacks are  
 going to ease on down  
 those future & celestial  
 roads. (2017: 50)

Matejka wants to go to space, or at least sees it as a way, even the only way. But that hardly seems a pretext for condemning him, better to condemn the social order that made such hopeless hope seem a form of realism. Like many Afrofuturists before him, he imagines going to space as a middle passage on an inverted slaveship, one not back to the motherland, but to an otherland, a land that would be a true home as opposed to the now alien one that was left behind, and the equally alien one that is his America (Lavender, 2019; Womack, 2013). Perhaps no one has ever brought this this kinship between the Afrofuturist and the outside more clearly down to Earth than Ta-Nehisi Coates:

I knew that West Baltimore, where I lived; that the north side of Philadelphia, where my cousins lived; that the South Side of Chicago, where friends of my father lived, comprised a world apart.



Somewhere out there beyond the firmament, past the asteroid belt, there were other worlds where children did not regularly fear for their bodies. I knew this because there was a large television resting in my living room. In the evenings I would sit before this television bearing witness to the dispatches from this other world. There were little white boys with complete collections of football cards, and their only want was a popular girlfriend and their only worry was poison oak. That other world was suburban and endless, organized around pot roasts, blueberry pies, fireworks, ice cream sundaes, immaculate bathrooms, and small toy trucks that were loosed in wooded backyards with streams and glens. Comparing these dispatches with the facts of my native world, I came to understand that my country was a galaxy, and this galaxy stretched from the pandemonium of West Baltimore to the happy hunting grounds of Mr. Belvedere. I obsessed over the distance between that other sector of space and my own. I knew that my portion of the American galaxy, where bodies were enslaved by a tenacious gravity, was black and that the other, liberated portion was not. I knew that some inscrutable energy preserved the breach. I felt, but did not yet understand, the relation between that other world and me. And I felt in this a cosmic injustice, a profound cruelty, which infused an abiding, irrepressible desire to unshackle my body and achieve the velocity of escape. (Coates, 2015: 20–21)

It is nearly criminal for critics to brand those who are already on the ground and who out of misery dream of escape velocity as enemies. It seems a foolish gesture rooted in puritanical desire for ideological homogeneity rather than a pragmatical gesture acknowledging the value of “coalition politics”—a failure to grasp a lesson in politics as a practice that was perfectly well understood by the Black Panthers and other members of the black radical tradition (Shames and Bobby, 2016). Such ecological puritanism disserves political ecology precisely by confirming a critique that was directed at ecologists by Marxists before the urgency of the Anthropocene: namely, the reproach that environmental concerns were something that mattered only to the white middle class, a group wholly out of touch with the day-to-day realities of the West Baltimores of the world. But puritanism also, and perhaps more importantly, can cut us off from past cultural investments that can easily be turned into arguments against the space billionaires, and so cashed in as part of a cosmopolitical struggle to collectively control the orbital means of harvesting and diffusing data, a struggle that will be critical to adapting space infrastructure to our real needs, and so learning to live sustainably within (or who knows, beyond) planetary limits.

Let me spell that point out somewhat more precisely. If we are to take dreams of space futures as a kind of claim on space, as a way of dwelling off planet established even before we physically arrived there, then we might also claim that the very real process of appropriating the nearest reaches of the space commons is a violation of the pre-existing rights of alienated terrestrial dreamers, insofar as the concrete forms the space infrastructure being constructed by Bezos et al. aim to materialize astropastoral suburban dreams (Tabas, 2021) utterly alien and alienating to these Afrofuturist dreamers such as Coates. But more to the point, the present constructions in satellite and near space can only imply that any futures imaginable for these terrestrial aliens will need to be constructed yet further out into alien space. As such, we can perfectly well claim that if the space billionaires are offering us the gift of a future on planet Earth, they are simultaneously engaged in stealing futures off planet from those who most richly deserve them. This may not allow us much power over them, but it at least breaks some ideological spells.

If our concern is the future in space and not merely the future of the Earth, we ought not be asking whether humankind should ever attempt to expand out beyond the Earth, but

rather how, not so much by which means, but under which conditions, in which spirit. The great astrofuturist jazzman Sun Ra, seemed to have an answer in mind when he wrote:

You've lost your right  
To walk on Jupiter and Mars.  
And even other worlds unknown among the stars  
Among the stars.  
You've lost your rights to the pleasant  
To the pleasant things of being.  
You've lost your rights,  
Your cosmo-interplanetary-intergalactic  
Eternal-rights of Celestial being. (Ra, 2005: 50)

It seems clear enough that Musk, Bezos and co. could have no right to walk the space ways until they learn to walk in righteousness. Moreover, even if Musk were to get human-kind to Mars by capitalism, and thus to ensure the long-term existence of the human species, even if Bezos' investments beyond the Earth will have contributed to saving our planet and its ecosystems by decorrelating economic growth from ecological destruction, the costs to equality will have been high. Well beyond justification by any Rawlsian difference theorem. With Musk's Starship, some may get to Mars. But it will not have been the right way to go.

## Conclusion

If critics remain with eyes riven to the Earth, we not only risk ceding satellite space and near space to the billionaires, but we also risk avoiding avoiding a confrontation with one of the real challenges facing criticism in the Anthropocene, namely holding together the ecological and the economic dimensions of our critical thinking.

If thinking with respect to a zoned space teaches us anything, it is that ideology is relentless in seeking out ruses to split our concern with justice and equity from our concern with sustainability and environmental well-being. Zoning space will not solve these problems. It will keep us from ignoring them.

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## ORCID iD

Brad Tabas  <https://orcid.org/0000-0003-0156-8389>

## Notes

1. I am not here alleging that there is a total decorrelation between space activities and terrestrial existential risks, nor am I suggesting that there are infinite limits in outer space that imply that off-worlding allows for a total decorrelation from limits. Yet I am alleging that being able to off world activities does make a difference.

2. Moore's own account of this concept is trapped in a global imaginary, as he claims that cheap nature no longer exists in the Anthropocene.
3. At present, more than half of the key indexes of planetary health (26 out of 50) are currently only capable of being monitored from space (Eyres, 2017).
4. If this interpretation seems doubtful, consider the details of the supposed business case for Martian colonization more closely. Musk is selling internet to consumers on the globe, and there are few better ways to illustrate that his system works and to get positive publicity for his system than to orchestrate an extremely well-publicized demo of its capacities in a war zone. After all, if Starlink works there, one presumes that it ought to work everywhere else as well, and the attractiveness of satellite infrastructure for internet, of course, depends on the fact that it can deliver service everywhere, even in areas where there is not, and likely will not soon be, land infrastructure. From a business point of view, demonstrations like this are critical, since the success and failure of Musk's significant investments in LEO infrastructure ultimately depend upon individuals opting into the system, which of course they are unlikely to do unless they believe that it confers some advantages in terms of availability, speed, reliability, or cost. Put another way, there is a loud and clear business case for giving free internet to the Ukraine. On the other hand, the only clear business case for colonizing Mars comes down to it being a way of marketing Musk's activities to mask their economic and ecological consequences by focusing attention not on near space but in a yet more alien zone where those consequences are harder to discern. But that said, even from here it is hard to mount a business case for Mars colonization. Selling tickets to Mars only seems as if it could be a good deal if the Earth were about to be doomed, Mars was able to be colonized, and people were willing to give everything for a ride, since in this case a ticket would doubtless have near-infinite exchange value (and absolute x-value). Yet what would Musk gain in the exchange? Sure, selling such tickets to Mars would make Musk the richest person in the world. But Musk is *already the richest person in the world*. Moreover, he is the richest person on a rich world. On Mars there is nothing but poisonous soil, ice, and radiation.

## References

- Ballard JG (1996) *A User's Guide to the Millennium: Essays and Reviews*. New York: Picador USA.
- Berners-Lee M (2021) *There is No Planet B: A Handbook for the Make or Break Years – Updated Edition*. Cambridge: Cambridge University Press.
- Bezos J (2020) *Invent and Wander*. New York: Harvard Business Review.
- Bostrom N and Cirkovic MM (2011) *Global Catastrophic Risks*. Oxford: OUP.
- Brandom R (1994) *Making It Explicit: Reasoning, Representing, and Discursive Commitment*. Cambridge, MA: Harvard University Press.
- Campe R (2002) *Spiel der Wahrscheinlichkeit: Literatur und Berechnung zwischen Pascal und Kleist*. Göttingen: Wallstein.
- Chakrabarty D (2021) *The Climate of History in a Planetary Age*. Chicago: The University of Chicago Press.
- Clark T (2015) *Ecocriticism on the Edge: The Anthropocene as a Threshold Concept*. London/ New York: Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc.
- Coates T-N (2015) *Between the World and Me*. New York: Spiegel & Grau.
- Conway EM (2008) *Atmospheric Science at NASA: A History*. Baltimore: Johns Hopkins University Press.
- Dawson L (2018) *War in Space: The Science and Technology behind Our Next Theater of Conflict. Space Exploration*. Cham: Springer.
- Derrida J (1972) *La Dissémination*. Paris: Éditions du Seuil.
- Deudney D (2020) *Dark skies: space expansionism, planetary geopolitics, and the ends of humanity*. New York, NY: Oxford University Press.
- Dickinson J (2021) *Never a Day Without Space: Commander's Strategic Vision*. Washington D.C.: United States Space Force.

- Edwards PN (2010) *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, MA: MIT Press.
- Ekstrom SN and Javier (2020) *Nous ne Vivrons Pas Sur Mars, ni Ailleus*. Lausanne: Editions Favre.
- Elkington J (2000) Cannibals with forks: The triple bottom line of 21st century business. *Journal of Business Ethics* 23(2): 229–231.
- Etelain J (2017) Qu'appelle-t-on Zone? À la recherche d'un concept manqué. *Les Temps Modernes* 692(1): 113–135.
- Eyres H (2017) *Seeing Our Planet Whole: A Cultural and Ethical View of Earth Observation*. Cham, Switzerland: Springer International Publishing.
- Foster JB (2023) The new irrationalism. *Monthly Review* 74(9).
- Foster JB, Clark B and York R (2010) *The Ecological Rift: Capitalism's War on the Earth*. New York: Monthly Review Press.
- Frank A (2018) *Light of the Stars: Alien Worlds and the Fate of the Earth*. New York: W.W. Norton & Company.
- Fukuyama F (1992) *The End of History and the Last Man*. New York: Free Press.
- Geppert ACT and Tabas B (2023) "Planetizing History." NYU Space Talks, 11 May.
- Gormley M (2021) *The End of the Anthropocene: Ecocriticism, the Universal Ecosystem, and the Astropocene*. Lanham: Lexington Books.
- Grinspoon DH (2016) *Earth in Human Hands: Shaping Our Planet's Future*. New York: Grand Central Publishing.
- Harvey D (2019) *Spaces of Global Capitalism*. London/New York: Verso.
- Hegel GWF (1975) *Vorlesungen über Die Philosophie Der Geschichte*. Stuttgart: Reclam.
- Heise UK (2008) *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. Oxford/New York: Oxford University Press.
- Henderson R (2020) *Reimagining Capitalism in a World on Fire*. New York: PublicAffairs.
- Horton ZK (2021) *The Cosmic Zoom: Scale, Knowledge, and Mediation*. Chicago/London: The University of Chicago Press.
- Jameson F (1991) *Postmodernism, or, the Cultural Logic of Late Capitalism*. Durham: Duke University Press.
- Jameson F (2019) *Allegory and Ideology*. London/New York: Verso.
- Jameson F and Miyoshi M (1998) *The Cultures of Globalization*. Durham: Duke University Press.
- Jonas H (1979) *Das Prinzip Verantwortung: Versuch einer Ethik für die technologische Zivilisation*. Frankfurt am Main: Suhrkamp.
- Karatani K (2014) *The Structure of World History: From Modes of Production to Modes of Exchange*. Trans. Bourdagh MK/Durham/London: Duke University Press.
- Kilgore DWD (2003) *Astrofuturism: Science, Race, and Visions of Utopia in Space*. Philadelphia: University of Pennsylvania Press.
- Klinger J (2021) Environmental geopolitics and outer space. *Geopolitics* 26(3): 666–703.
- Koren M (2022) The war on Ukraine is testing the myth of Elon Musk. *The Atlantic*, 28 February.
- Krugman P (2022) Elon Musk, Mars and the modern economy. *New York Times*, 7 June, 2022.
- Latour B (2015) *Face à Gaïa: huit conférences sur le nouveau régime climatique*. Paris: La Découverte: Les Empêcheurs de penser en rond.
- Latour B (2021) *Ou suis-je?* Paris: La découverte.
- Latour B and Weibel P (2020) *Critical Zones: The Science and Politics of Landing on Earth*. Cambridge, MA: MIT Press.
- Lavender I (2019) *Afrofuturism Rising: The Literary Prehistory of a Movement*. Columbus: Ohio State University Press.
- Levinas E (1984) *Liberté difficile*. Paris: Livre de poche.
- Lorenz R (2019) *Exploring Planetary Climate: A History of Scientific Discovery on Earth, Mars, Venus, and Titan*. Cambridge/New York: Cambridge University Press.
- MacAskill W (2022) *What we Owe the Future*. New York: Hachette.

- Margulis L (1998) *Symbiotic Planet: A New Look at Evolution*. New York: Basic Books.
- Matejka A (2017) *Map to the Stars*. New York: Penguin Books.
- McAfee A (2019) *More from Less: The Surprising Story of How we Learned to Prosper Using Fewer Resources – And What Happens Next*. New York: Scribner.
- Mirmalek Z (2020) *Making Time on Mars*. Cambridge, MA: MIT Press.
- Moore JW (2015) *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso.
- Morden S (2021) *The Red Planet: A Natural History of Mars*. London: Eliot and Thompson.
- Musk E (2017) Making humans a multi-planetary species. *New Space* 5(2): 46–61.
- Musk E (2018) Available at: [twitter.com](https://twitter.com) (last accessed 12 June 2023).
- Nordhaus WD (2021) *The Spirit of Green: The Economics of Collisions and Contagions in a Crowded World*. Princeton: Princeton University Press.
- Nordhaus WD (2013) *The climate casino: Risk, uncertainty, and economics for a warming world*. New Haven: Yale University Press.
- Olson V and Messeri L (2015) Beyond the Anthropocene: Un-earthing and epoch. *Environment and Society* 6(1): 28–47.
- Ord T (2020) *The Precipice: Existential Risk and the Future of Humanity*. New York: Hachette Books.
- Piketty T (2013) *Le capital au XXI<sup>e</sup> siècle*. Paris: Éditions du Seuil.
- Piketty T (2019) *Capital et idéologie*. Paris: Éditions du Seuil.
- Poole R (2008) *Earthrise: How Man First Saw the Earth*. New Haven: Yale University Press.
- Ra S (2005) *Immeasurable Equation*. Chandler: Paelos.
- Rawls J (2005) *A Theory of Justice*. Cambridge, MA: Belknap Press.
- Raworth K (2017) *Doughnut Economics: Seven Ways to Think like a 21st Century Economist*. White River Junction, Vermont: Chelsea Green Publishing.
- Rockström J and Klum M (2015) *Big World, Small Planet: Abundance within Planetary Boundaries*. New Haven/London: Yale University Press.
- Schuster J and Woods D (2021) *Calamity Theory: Three Critiques of Existential Risk*. Minneapolis: University of Minnesota Press.
- Shames S and Bobby S (2016) *Power to the People: The World of the Black Panthers*. New York: ABRAMS, Incorporated (Ignition).
- Sharp R (1980) Geomorphological processes on terrestrial planetary surfaces. *Annual Review of Earth and Planetary Sciences* 8: 231–261.
- Shaw JP, Purgason J and Soileau A (2022) Sailing the Wine-Dark Sea: Space as a Military Area of Responsibility. *Aether: A Journal of Strategic Airpower & Spacepower* 1(1): 35–45.
- Sloterdijk P (2005) *Im Weltraum des Kapitals: für eine philosophische Theorie der Globalisierung*. Frankfurt am Main: Suhrkamp.
- Smil V (2008) *Global Catastrophes and Trends: The Next 50 Years*. Cambridge, MA: MIT Press.
- Smith N (1991) *Uneven Development: Nature, Capital, and the Production of Space*. Oxford, UK/ Cambridge, MA: B. Blackwell.
- Stanley M (2020) *Does Earth's Future Depend on Space?* Available at: [www.morganstanley.com/ideas/space-earth-sustainability](http://www.morganstanley.com/ideas/space-earth-sustainability) (accessed 1 July 2023).
- Suarez D (2019) *Delta-V*. New York: Penguin.
- Tabas B (2020) *Ecozon@ [Ecozona]: European Journal of Literature, Culture and Environment* 11(1): 63–79.
- Tabas B (2021) On astropastoral in the Anthropocene. *Ecocene: Cappadocia Journal of Environmental Humanities, Cappadocia University* 2(2): 192–206.
- Tetlock PE and Gardner D (2016) *Superforecasting: The Art and Science of Prediction*. New York: Crown.
- Theisoeh P (2022) *Einführung in die Außerirdische Literatur*. Berlin: Matthes & Seitz.
- Travis C (2011) *Objectivity and the Parochial*. Oxford: Oxford University Press.
- Tsing AL (2005) *Friction: An Ethnography of Global Connection*. Princeton, NJ: Princeton University Press.

- Whiteside KH (2006) *Precautionary Politics: Principle and Practice in Confronting Environmental Risk*. Cambridge, MA: MIT Press.
- Wittgenstein L (2003) *Philosophical Investigations*. Malden, MA: Blackwell.
- Womack Y (2013) *Afrofuturism: The World of Black Sci-Fi and Fantasy Culture*. Chicago: Chicago Review Press.
- Zizek S (2011) *Living in the End Times*. London/New York: Verso.

**Brad Tabas** teaches in the Department of Social and Human Sciences at the ENSTA Bretagne, where he also pilots a working group on the study of Curriculum and Identity Dynamics (EA7529). He earned a B.A. from the University of Pennsylvania and an M.A. and Ph.D. in Comparative Literature from New York University. His research interests are wide ranging, though most turn around exploring the political, social, ethical, and ecological concerns raised by new technologies, and in particular, space technologies. His recent work has appeared in *Cosmos and History*, *Conversations: The Journal of Cavellian Studies*, *Resilience*, *Terrain*, *The Journal of Responsible Innovation*, and elsewhere.