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“Nearly 1,600 operational Starlink satellites are currently in orbit. In the years to come, Musk, currently the richest person in the world, plans to blanket the space around Earth with thousands more. The cult of personality surrounding Musk, coupled with the nature of Starlink’s high-flying operations, cast the SpaceX CEO as an almost godlike figure—our great internet savior, making Wi-Fi rain down from the sky. 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.”¹

The exploits of billionaires in outer space and their plots on Earth concerning outer space, what is sometimes called New Space or Space 2.0, has been very much in the news of late, sufficiently so to make it clear that what Alexander Geppert has called astroculture—the study of the extraterrestrial as it exists in relationship to human culture—is relevant to thinking about the relationship between global capitalism and the Anthropocene today.²

Billionaire Elon Musk has said that he wants to go to Mars, or rather that he wants us to become a “multi-planetary species” for reasons that seem to have much to do with the Anthropocene, namely, he claims that if we stay on Earth “there will be some eventual extinction event.”³ He coyly denies having a specific catastrophe in mind, but it is not hard to recognize that much of the force of his vision of a Martian future comes from the fact that existential risk talk today is almost inseparable from what Jenny Offill has called a “faster than expected” Anthropocene.⁴ Jeff Bezos, for whom “going to space to save the Earth” is an express priority, foregrounds more explicitly the link between space and globalized capital. As he sees it, in the Anthropocene global capital is encountering planetary limits that make further growth seem untenable. The solution to this problem is to extend the economy out into space so that we can enjoy “abundance,” thanks to the “virtually unlimited” resources that exist there, since remaining on Earth can only result in “rationing.”⁵

The most common interpretation of this entanglement of astroculture, globalization and the Anthropocene has been articulated by Bruno Latour—“Exit.”⁶ In other words, it is believed that what the space billionaires in the Anthropocene must be planning is to flee Earth to globalize

¹ Marina Koren, “The War on Ukraine Is Testing the Myth of Elon Musk,” *The Atlantic*, February 28, 2022. <https://www.theatlantic.com/science/archive/2022/02/elon-musk-ukraine-starlink-satellites/622954/>

² Alexander Geppert, “European Astrofuturism, Cosmic Provincialism: Historicizing the Space Age” In *Imagining Outer Space: European Astroculture in the Twentieth Century*, ed. Alexander C.T. Geppert, New York: Palgrave, 2018, 3–24.

³ Elon Musk, “Making Humans a Multi-Planetary Species,” (2017) *New Space*, 46.

⁴ Jenny Offill makes this connection quite explicitly, for example, in her novel *Weather*: “I’m starting to understand why all those people want to go to Mars. The guest today on the show is explaining that many scientists are in a state of barely suppressed panic about the latest data coming in. Their previous models were much too conservative. Everything is happening much faster than expected.” Jenny Offill, *Weather* New York, Knopf, 2020, loc. 639-1667.

⁵ Jeff Bezos, *Invent and Wander*, New York, Harvard Business Review Press, 2020, 247.

⁶ Bruno Latour, *Où suis-je ?* Paris, La découverte, 2021, 135.

again elsewhere. Based on this interpretation of space capitalism critics thus endeavor to resist new space by showing that there “is no planet B,” or by insisting that these capitalists are set to mindlessly repeat the history of settler colonial violence.⁷

I want to suggest that these lines of criticism are in some ways significantly misleading, even that they commit a kind of performative infelicity in arguing for what they ought to be arguing against, and that they do this because they do not really have a grasp on what these billionaires are really doing in space. This fundamental misrecognition of the basics of space capitalism is blatantly in evidence in the text cited in exergue, which is extracted from an article describing how Musk has elected to ship free Space X satellite dishes to the Ukraine. The author, Marina Koren, seeks to say that Musk, as a businessman, has an economical interest in going to Mars. But how this can be so seems somewhat obscure—it is not as if his aim were to trade with Martians, or even to bring back valuable resources from the Red Planet. At best it seems that the highest accomplishment of a Mars colony might be mere survival. On the other hand, what Musk is actually doing, and how it relates to making money is perfectly clear. He is giving free satellite internet to the besieged people of the Ukraine. But this is a kind of advertising for his for-profit satellite internet constellation—it brings him good press, it shows that his internet works, and it illustrates why we would want to transition more completely towards dependence on satellite infrastructure as opposed to terrestrial infrastructure for our data services. This is globalization in action in the sense that we are talking about the extension of Musk’s user base on planet Earth, but it is also not quite globalization that we are talking about: Musk’s satellite constellation is located out beyond the globe. Nor are Musk’s gestures here ones that make sense with respect to an impending emigration to another planet. So what Musk is doing in the Ukraine has nothing to do with going to Mars: it has to do with Musk showing once again his skill at translating existential angst into profit. In other words, after having used our mania for electrifying everything in the name of sustainability to make billions selling electric cars, he has launched himself towards the exploitation of another bug in the sustainability logic of the Anthropocene: namely the exploitation of the fact that economic expansion in orbit does not measurably damage the Earth System (because it occurs outside of the limits to that system), which makes it look as if he is avoiding polluting the Earth and thus adding to the planetary crisis of the Anthropocene, while actually just off-worlding pollution and industry to an unobserved elsewhere.

One of the key objectives of this paper is to discuss how the performative infelicity that might be called the post-planetary bug, can serve to transform critical arguments made by those opposed to the Anthropocene or globalization (or against contemporary astroculture understood in terms of the “Exit” and “repeat” hypotheses) into justifications for Musk and Bezos space expansionist projects. I have elsewhere described the kind of post-global economic growth that they are pursuing as expansive sustainable development, though readers must pay attention precisely to the bugging of this term: expansive sustainable development is not ecological as such, it is rather development of in-space infrastructure that pays for itself, but it is sustainable, or rather

⁷ For the no planet B reaction, see Sylvia Ekström et Javier G. Nombela, *Nous ne vivrons pas sur Mars, ni ailleurs*, Lausanne, Fevre, 2020. For an anti-settler colonialism reading, see Deondre Smiles, “The Settler Logics of (Outer) Space”, *Society + Space*, 2020, October 26. <https://www.societyandspace.org/articles/the-settler-logics-of-outer-space>

ecological from a planetary point of view.⁸ Expansive sustainable development is dangerous because planetary-focused criticisms of globalization and the Anthropocene can easily become arguments for expansive sustainability. But if this is the case, it would only be a worry if extra-terrestrial growth and pollution did matter. Showing why this is the case is also one of the aims of this paper, which is largely dedicated to rethinking space history—and indeed the history of humankind over the last 50 or so years including the information age and the Anthropocene—so that we can better understand what actually is in space, and how that relates to who we are and how we live. The key to this rethinking of space history lies in attending not to the vague idea of space, but rather to what actually is off planet and where, namely satellites and other technological means of gathering and transmitting data scattered throughout a cosmic province that includes not just the Earth but near space, the Moon, Mars, Venus and arguably all of our local planets as well. Having done this work to put space history back on its facts, and having likewise identified the post-planetary bug, we will be in a position to develop effective critical strategies against expansive sustainable development (and those will not be aligned with the performatively infelicitous “exit” and “repeat” hypotheses.)

From the Space 2.0 to the Satellite Age 2.0: Remediating a Categorical Misunderstanding in the History of Astroculture

Understanding how the extraterrestrial relates to cultures on Earth requires rethinking the very idea of the Space Age. In a recent (and at the time of writing as yet unpublished article), Alexander Geppert points out that the notion of the Space Age—of which we are generally considered to be in the version 2.0 (with the first Space Age having (arguably) come to an end when the Challenger crash signaled at least a partial end to the American manned space program, and the 2.0 version signaling a return to manned space set in motion by the so called Rocket Billionaires)—has by and large been uninterrogated by historians and critics.⁹ The Space Age is, as he notes, drawing on a distinction made by Reinhart Koselleck between historical concepts and historiographical categories, is a historical concept that preceded any actual activities in space, and not an ex-post facto historiographical categorization.¹⁰ The significance of this distinction becomes clear when we look at the first use of the term. This occurred in an article by the British aviation journalist Harry Harper in 1946. Harper wrote that following the “age of steam-power, an age of electricity and of the petrol engine and an age of the air, and now with the coming of atomic power” that we would, in due course, find ourselves in “the space age.”¹¹ The thing that stands out here is that every other item on the list is a historiographical categorization based upon a technological innovation (with the exception of the age of the air, which no doubt ought to read the age of the airplane), while the space age is presented in such a way as to omit the technology involved. The importance of this omission is that in the other cases the technological parameters and transformations made possible by these new technologies precisely help us to formulate how each age reconfigured globalization, the pollution of the

⁸ Brad Tabas, “Outer Space, Expansive Sustainable Development, and the Future of the Environmental Humanities,” *Academia Letters*, 2021, Doi: 10.20935/AL120

⁹ Alexander Geppert, “Planetarity, Planetization and the Global Space Age: Critique and Prolegomena,” forthcoming.

¹⁰ Reinhart Koselleck, *Vergangene Zukunft: Zur Semantik geschichtlicher Zeiten*, Frankfurt am Main: Suhrkamp, 1979, 349–50.

¹¹ Harry Harper, 'The Space Age,' *Everybody's Weekly* (19 January 1946), 8–9; idem, *Dawn of the Space Age*, London: Sampson Low, Marston & Co., 1946.

planet, or, alternately, to our self-understanding as human actors. It is not hard to remedy this by saying that instead of talking about the Space Age we should talk about the rocket age, the autonomous space probe and rover age, the space telescope age, the age of the satellite, and perhaps most importantly, the age of extra-terrestrial remote sensing and data transmission.

The history of the extra-terrestrial remote sensor age—and I focus on this because the ability to receive and transmit data is a common feature of rockets, satellites, and rovers—but also because it is this data that has allowed us as a culture to be changed by space, has yet to be written. Which does not mean that it can't be written. Asif Siddiqui has recently published a study of all the deep space probes that have been sent beyond the Earth with precise details regarding the fate and trajectory of each probe as well as the data receiving and transmitting technologies on board.¹² Based on this sort of information, and of course taking into account the actual data that has been returned to Earth from space, we can write a different sort of history of astroculture. This history would in part explore our collective enlightenment relative to places in space—for example the impacts of the definitive discovery that Mars is uninhabited and likely lifeless. But it could also focus on the information from the Earth transmitted back from space, exploring how the ability to observe the planet from afar using technologies often sensitive to aspects of reality hidden to human observers has transformed our cultures. This history—unlike the history of the Space Age—would not focus on understanding cultural history in terms of the ideas expressed by human actors regarding space or their experiences in space, nor would it focus on the technical accomplishments, often linked to putting humans in space, that are the normal focus of space histories. Instead, it would be built upon a data-driving ontology alien to the more-or-less phenomenological or at least linguistic viewpoint taken by most humanistic studies. The fundamental starting point might be what Don Ihde has called a “post-phenomenological” viewpoint derived from technologically mediated ways of relating contacts between humans and prosthetic sensors located in places where no humans can immediately go—namely to Space.¹³ This kind of history would not focus primarily on the destiny of our rather ambiguous claims or dreams of conquering space, but rather track the becoming of our province in the cosmos, by which I mean the historical occupation of those local places within our solar system in which we have sent sensors, and from which we have received enlightening feedback. In such a history novel but distant discoveries such as exoplanets would play a role, but they would be treated differently than well-entangled local objects such as the moon, to mark the significant difference between places we can glimpse on a horizon but not visit, and places in which we are currently building 4G networks.

Astroculture thus becomes less about the human relationship to the vasts of outer space and more about the history and conquest of our cosmic province, even if the two histories are obviously intertwined. From the viewpoint of what might be called the remote sensor age, the history of the Space Age is interpretable as an ultimately failed attempt to impossibly go to space in a kind of transcendental way which permit all technological mediation to be put aside, such that upon arrival we could simply “be” in space. Or, told somewhat differently, they may be interpreted as turning around a collective desire among embodied phenomenological subjects to extend their domain of phenomenal experience beyond the limits of the Earthly ground. Historically I would be tempted to suggest that the hope here is to somehow repair the split between the scientific

¹² Asif Siddiqui, *Beyond the Earth: A Chronicle of Deep Space Exploration*, Washington, NASA Press, 2019.

¹³ Don Ihde, *Technology and lifeworld: From Garden to Earth*, Bloomington, University of Indiana Press, 1990.

view of the world and what Husserl called the phenomenological *Lebenswelt* by going to a place that was once only visible through the alienating mediator of the telescope, and in so doing effectuating a kind return to what Ihde has called a mythic phenomenological “garden” of pure being in the world, with this term possessing all its Edenic, pastoral, and fantastic resonances associated with the healing of the wounds of scientific knowledge.¹⁴ Or, to borrow from but also to somewhat twist Arendt, we might say that the first and (and presumably also the second) space ages were dreams of overcoming “Earth alienation,” by literally alienating ourselves from the Earth by technical means.¹⁵ In any case, the Space Age never actually happened in any of these ways.¹⁶ Seen historically, the Space Age is probably something like what Hans Blumenberg has called a “‘false’ concept,” an erroneous idea that animated real historical and technological developments, rather in the way that the idea that nature was a book animated, and continues to animate, the progress of technoscience.¹⁷ Stated somewhat differently, what we have mostly learned from the Space Age, which is actually the remote sensor age, is that given the very real hostility of space for life, the very real absence of aliens in every site that we can plausibly visit, there is very likely never to be a Space Age, an age in which humans just are in space—say on Mars—without technological mediations all around.

Re-writing space history ex-post facto as a history of the remote transmission age helps us to see the novelty of expansive sustainable development. The new age of extraterrestrial data harvesting and transmission introduces very little that is technologically new. It is, rather an economic shift, a transformation in the politics of astroculture.¹⁸ In the age of expansive

¹⁴ I have—at least in part—explored this point in Brad Tabas, “On Astropastoral in the Anthropocene,” *Ecocene*, 2021, issue 2, volume 2, 192-206, Doi: 10.46863/ecocene.52 On the garden, see: Ihde, *Technology and Lifeworld*, esp. 11-20. The point regarding the desire for reconciliation of the phenomenological subject requires adumbration that cannot be fully given here. The key text is Husserl’s (1937) *Krisis Die Krisis der europäischen Wissenschaften*, a work whose importance of the subsequent history of continental philosophy and methodology in the humanities over the course of the last half century seems to me to have been underestimated. In effect, in this text Husserl lays out a theory whereby the scientific view of the world—and with a particular focus on the mediation provided by Galileo’s usage of the telescope—re-configures the human relationship to cosmic reality and necessarily leads us towards nihilism. The solution proposed by Husserl is phenomenology—the return of philosophy to the immediate givens of lived experience. Science would thus lead to nihilism. Yet going to space, literally seeing with our own eyes what had been looked upon via the telescope, can thus be imagined as healing the nihilistic wound which produced the alienation of science by literally taking us, with our bodies, to the places that initially attracted us when we alienated our gaze. Husserl, *Krisis Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie. Eine Einleitung in die phänomenologische Philosophie*, Leuven, Springer, 1993.

¹⁵ Hannah Arendt, *The Human Condition*, Chicago, University of Chicago Press, 2019. For a reading of Arendt that seems to beckon in this direction, see Eve Seguin, “Political Philosophy of Science: From Cosmos to Power,” in *The Arendt Companion*, eds. Peter Grattan, Yasmin Sari, New York, Bloomsbury, 2020, 612-628.

¹⁶ Which is not to say that there were not those who thought that it did happen in precisely this way. The opening chapters of Jörg Kreienbrock’s *Sich im Weltall orientieren* offer numerous examples of philosophers from the 1950’s to 70’s who precisely seem to have been seduced, and misled, by vague ideas that humankind was now “in space.” Jörg Kreienbrock, *Sich im Weltall orientieren*, Vienna, Turia + Kant, 2020.

¹⁷ Hans Blumenberg, *Schriften zur Technik*, Frankfurt a.M. Suhrkamp, 2015, 208.

¹⁸ It is doubtless misleading to describe this shift as from satellite 1.0 to 2.0—for the process is in fact more historically differentiated, involving a movement from satellites being owned and operated by states with military aims towards a progressive implementation of them as “dual use,” namely being used for military and civilian purposes, with even this term being misleading, since in fact the satellites were used by civilians on the one hand to study the Earth—and so to discover the Anthropocene—and on the other to spread the global economy—to develop the information age phase in globalization. The novelty of the new satellite age lies in the separation of the satellite infrastructure from the hands of public actors. Partial histories of the uses of satellites with respect to both these

sustainable development the infrastructure that informs astroculture is becoming privatized. Space X now has more satellites in orbit than every other country and competitor combined, but there are indeed many other private and national rivals around the globe. The post-planetary economy is expansive insofar as we are already seeing a diversification of profitable industrial endeavors beyond the planet. While the first waves of satellites have been shot up via rockets and left there until they ceased functioning, many companies are looking for ways to prolong the lives of satellites while in orbit, or even to build new ones wholly off-planet. This is because one of the primary costs associated with the space economy is what industry insiders sometimes call Delta-V, namely the price of launching material out of the Earth's gravity well. In space automation brings down costs relative to the primary economy of data-harvesting and diffusion, while opening new sustainable investment opportunities to entrepreneurs. Some examples of this include robots which can accomplish in-space repair on damaged satellites, 3D printers which can manufacture replacement parts in space, as well as innovations aimed at controlling the now increasingly well-known space junk problem. More long-term, and not necessarily realistic innovations include space mines for harvesting propellant on the moon, and in-space factories aimed at totally severing the satellite economy from any dependence on terrestrial material flows. It is this privatization of satellite infrastructure and the emergence of a growing in-space support that makes the new private extraterrestrial data age an inflection point in the history of astroculture.

Thinking Globalization and the Anthropocene as Astroculture

If we understand astroculture as emergent from data transmitted from sensors and transmitters beyond the planet, how does this change the general picture that we have of the history of culture over the last fifty years? Among other things, we are no longer left waiting for the so-called space age, because we are already in the age of extraterrestrial information. In this section I will seek to illustrate how two major historical processes—the emergence of the global information age and the dawn of the Anthropocene—can be understood as astrocultural phenomena.

It is almost a banality to note that the predominant character of the current state of globalization is that we live in an information age, one in which we are globally connected by mediating technologies such as the internet which have changed the way in which we work and live, allowing for a reconfiguration of spatio-temporal relationships across the globe characterized by increasingly rapid exchanges of information, expertise, digital goods and other services.¹⁹ Yet it is less habitual to understand this globalized economy as depending upon something that is not on the globe—which is to say on satellites. However, the importance of satellites to globalization becomes clear when we consider the time of capital. As has often been pointed out, for example by Dipesh Chakrabarty in his brilliant *Provincializing Europe*, a standard notion of universal time has in a certain sense been imposed upon the world by a colonizing Europe, whose provincial but global history is imagined to establish a supposedly universal temporality, one that is in fact violently imposed upon colonized cultures who should, in reaction, pull themselves

projects can be found in Mariel Borowitz, *The Global Effort for Open Access to Environmental Satellite Data*, Cambridge, MIT Press, 2017, also Lisa Parks and James Schwoch, eds., *Down to Earth: Satellite Technologies, Industries, and Cultures*, New Brunswick, Rutgers University Press, 2012.

¹⁹ For example, see Richard Baldwin, *The Great Convergence: Information Technology and the New Globalization*. Cambridge MA, Harvard Belknap, 2016.

away from this time in order to reclaim their historical being.²⁰ Yet if there is a global time that is indeed imposed, we might well ask where the time pieces that keep this time are located. For Chakrabarty and many others, the physical location of this global time seems to be the factory clock, or maybe some clock in Greenwich.²¹ Yet for reasons having to do with spatio-temporal relativity and its effects upon the synchronization of clocks rotating on the surface of the imperfect sphere that is the Earth, there is no global synchronization of clocks located on factory floors.²² Or rather, in order to enable this synchronization the clocks on which most of the global economy currently run are located aboard the same GPS satellites that spatially co-ordinate much of our global logistics. In other words, the real global time, the one that we see on our watches, our computers, and the one which is called upon to time-stamp every digital financial transaction around the globe—whether we are talking about ATMs, credit cards, or market transactions on Wall Street—is located beyond the globe.²³ In this sense, the contemporary information economy is astroculture. A second, more specifically cultural dimension of understanding how recent global culture is astroculture can be derived from Lisa Parks work on the role of satellites in the global diffusion of popular American television shows.²⁴ If there is any such thing that can really be said to be global culture, by which I simply mean a universal set of cultural references which are expected to be shared by everyone everywhere, it is probably not to be found in works of high culture such as Shakespeare, but in works of pop culture like *The Simpsons*. In other words, if we are to take global culture as the one that emerges when American television and radio is shared planet-wide, beamed even into incredibly remote places such as the Australian outback, then we must understand this culture as astroculture, literally impossible without the satellites on which these shows are diffused.

The case for understanding the Anthropocene as astroculture is more obvious. This is particularly true given a recent wave of publications insisting on the “planetarity” of our age.²⁵ As Dipesh Chakrabarty, one of the leading historians of the planetary account of the Anthropocene has made clear, the planetary being of our age ought to be understood in an extra-terrestrially informed way, since, as he notes, in acknowledgment of the role of comparative planetology and astrobiology in the discovery and mapping of the Earth system, that when we talk about the planet we always keep “other planets in view.”²⁶ That said, the way in which the notion of planetarity is here presented precisely occults the role—and the extra-planetary locations—of the

²⁰ This example stems from Marx, but it is particularly clearly laid out Chakrabarty, in *Provincializing Europe*, Princeton, Princeton University Press, 200. p.57, 215.

²¹ This emphasis on the factory clock is probably derived from Marx and perhaps it is inflected by Mumford, though another key location for this idea is no doubt Heidegger’s analyses of the clock within the constitution of what he saw as the nihilistic imposition of vulgar time on individuals who thereby lost their relation to their authentic historicity understood as temporality (in other words, the *Sein* in their *Dasein*). Martin Heidegger, *Sein und Zeit*, Tübingen, Niemeyer, 2006.

²² On the role of the problem of synchronizing clocks located at different places on Earth, and its role in the development of Einstein’s theory of relativity, see Peter Gallison, *Einstein’s Clocks, Poincaré’s Maps: Empires of Time*, New York, Norton, 2004.

²³ Linda Dawson, *War in Space*, Cham, Springer, 2018, 5.

²⁴ Lisa Parks, *Cultures in Orbit*, Durham, Duke University Press, 2005.

²⁵ For example, Nigel Clark and Bronislaw Szerszynski, *Planetary Social Thought. The Anthropocene Challenge to the social sciences*, Cambridge, Polity, 2020.

²⁶ Dipesh Chakrabarty, *The climate of history in a planetary age*, Chicago, University of Chicago Press, 2021, 79.

satellites and remote sensors on which astrobiology and Earth Systems Theory depend.²⁷ One wants to say that for Chakrabarty and other planetary theorists ontological reality seems to only consist in planets in space but does not include the means by which we know about them, point that we will see in the following is a problematic and significant oversight. That said, it is also true that much Anthropocene discourse is guilty of wholly failing to acknowledge any role for the extra-terrestrial in the emergence of our understanding of the Earth system. This is particularly striking among those who, like Jeremy Davies, characterize the Anthropocene in terms of geology and geological time.²⁸ In this case, the evidence for the Anthropocene is not sensor data beamed in from space, but rather lithic strata beneath our feet. To be certain, this is a way of focusing our attention back on the Earth, but it also directs our attention away from attending to the ongoing changes in the large-scale processes by which the lithic strata are being altered (and these are best grasped using satellite data). For example, the changes currently being tracked from space include weather patterns, the loss of the polar ice cap, the shifting of ocean currents, the altering distribution of fire seasons and fires, worldwide non-reported emissions of CO₂ and other gasses such as methane, and even the loss of biodiversity and habitats.²⁹ Moreover, imagining the Anthropocene as only a matter of Earth rocks forgets the important role played by alien rocks and extraterrestrial missions to Mars and Venus in our coming to understand the possible long-term historical trajectories of the Earth's planetary system.³⁰

Once we grasp the Anthropocene as an astrocultural phenomenon we attain a new different perspective on the history of ecological awareness. It becomes transparent why it was James Hansen, a NASA employee, who was the first scientist to publicly testify to the dangers of global warming, and likewise clear why Lovelock was working at JPL when he invented the Gaia hypothesis. Seeing the Anthropocene as astroculture also opens new avenues of criticism into this history. It prompts us to interrogate whether the Bretherton model, the Earth System Model first developed by NASA scientists to study the planet, puts the outer edge of the Earth system at the outer edge of the atmosphere simply because that was the observation threshold for existing satellite observation technologies. We can also see how space man ideas about ecology continue to inform the environmental movement, impeding our understanding of the meaning of a data-driven Anthropocene. Foremost among these misperceptions is the widespread idea that what we learned from the space age was that there was nothing in space of meaning but our one planet (it is this idea, I would suggest, that explains why there are only planets for Chakrabarty and so

²⁷ Chakrabarty, for example, writes that “astrobiology looks at the earth and other planets from an imaginary floating point in space.” This is obviously false: astrobiology looks at these places from a perfectly real, if inhuman, places beyond the Earth, the specific sites where remote sensing technologies and trajectories of the probes, rovers, and satellites have gathered data and transmitted it back to Earth. This point is, in other terms, only properly imaginary in the sense that we, as human observers, cannot with any realism imagine ourselves being situated there as phenomenally experiencing historical subjects un-endowed with post-phenomenological means of technological mediation. Chakrabarty, *climate*, 173.

²⁸ Jeremy Davies, *The Birth of the Anthropocene*, Berkeley, University of California Press, 2016.

²⁹ On this, see Jennifer Gabrys, *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*, Minneapolis, University of Minnesota Press, 2016.

³⁰ David Grinspoon offers a compelling account of how astrobiological research into the deep climate histories of alien planets has helped us to understand our own planet. David Grinspoon, *Earth in Human Hands: Shaping Our Planet's Future*, New York, Grand Central, 2016.

many others).³¹ As Robert Poole has documented, this idea owes much to the testimonials of the astronauts and the photographs that they took in space.³² He also spells out just how critical this idea has for the environmental movement. One might point to the importance of astronaut Bill Anders's iconic *Earthrise* as an iconic emblem of the first Earth day. What these images and testimonials reinforced was collective idea of the Earth as a kind of isolate pastoral garden in a black void, with this garden now being threatened by industrialization. This insight, with its correlative affective implication that the Earth must be defended, has been called the "overview effect," by Frank White.³³ Yet unlike the satellite data on which the picture of the changing planet is based, this humanistic impression of the Earth from space is anything but perceptive. In fact, as Hans Blumenberg once remarked, it was from the first tinged with nostalgia, such that the idea that we lived on a perfect blue marble or a "paradise" to quote astronaut Jim Lovell, was always already an act of forgetting the reality of the wastelands below, above all a function of the relative myopia of all human eyes in orbit—almost totally blind compared to the various forms of satellite sensors.³⁴ Yet this idea of a lost paradise in the void has been inherited by the environmental movement and it has clearly contributed to both the forgetting of space as an environment, and to the incredible pessimism that runs through much Anthropocene discourse.

For example, once we understand the Anthropocene as data-driven astroculture, the much-heralded end of the world of the Anthropocene should not be understood in terms of the catastrophic demise of the planet, but only to signal the end of the privilege of the terrestrial or extra-terrestrial human observer position with respect to understanding our planet.³⁵ In light of this fact, what I would like to describe as astrocultural enlightenment becomes a process whereby we re-discover our phenomenal world in light of data, aligning ourselves and our way of living such that phenomena which have been rendered perceptible from space and using sensors far more powerful than our own senses overlap with our lived experiences, such that data becomes one with what Kim Stanley Robinson, following Raymond Williams, calls our collective "structure of feeling."³⁶ Put otherwise, when we understand the Anthropocene as astroculture we are not tricked into the space age belief that ecology amounts to a return to a sensual or embodied return to the planet, but acknowledge that it consists in fostering a real relation to extra-terrestrial data and our post-planetary historical reality.

³¹ In my mind the clearest (which also means most misguided) narrative account of the human self-understanding as precisely constituted by the discovery that space is culturally meaningless is Peter Sloterdijk, *Im Weltinnenraum des Kapitals: Für eine philosophische Theorie der Globalisierung*, Frankfurt a.M., 2005.

³² On this, see Robert Poole, *Earthrise: How Man First Saw the Earth From Space*, New Haven, Yale University Press, 2010.

³³ Frank White, *The Overview Effect: Space Exploration and Human Evolution*, 4th ed. West Stockbridge, Multiverse, 2021.

³⁴ Hans Blumenberg, *Die Vollzähligkeit der Sterne*, Frankfurt a.M., Suhrkamp, 1997, 440.

³⁵ The idea that the Anthropocene constitutes the end of the world was perhaps first put forward by Timothy Morton. Yet the way in which he articulates this is utterly symptomatic of the absence of space literacy and the bias towards human as opposed to technologically mediated modes of thinking about the fields of sense that constitute what is meaningful in history and society in the contemporary environmental humanities. In effect, rather than talking about satellites and how we actually came to know what we know, Morton invented the concept that he calls the hyper-object, an empty word that moves in the right direction, but also sows confusion insofar as it doesn't clearly have any rigid sense at all—as opposed to, say, a satellite, which to the contrary, has a specific location, a specific materiality, and a factually specifiable range of mediating functions. Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Minneapolis, University of Minnesota Press, 2013.

³⁶ Kim Stanley Robinson, *The Ministry For the Future*, London, Orbit, 2020, p.138.

Post-Globalization and the Extra-terrestrial Anthropocene in the Satellite Age

The primary reason why we must understand the Anthropocene as astroculture has nothing to do avoiding the existential melancholy of the end of history that followed the spaceless space age and everything to do with the need to develop a coherent criticism of expansive sustainable development.

I take to be significant about expansive sustainable development the rightness of one of most key ideas employed by globalization theorists such as Neil Smith—that capital can burst through any boundary.³⁷ Yet I take it also to prompt a revision in their theories: since in my sense the phenomenon that we are now describing is no longer globalization, but rather the expansion of capital into the up until now public domain of our cosmic province. That said, it seems true that the idea that the growth of capitalism leaves uneven development in its wake, but that this notion is once again altered when we are talking about post-planetary capitalism, and lest we be mistaking by assuming that there is in effect no difference between globalization and post-globalization. It has been well documented that on Earth, the spread of economic growth has tended to create both economic inequality and an unjust slow violence in the form of ill-distributed environmental externalities, with most of the suffering falling on the Global South. Indeed, bringing attention to this distributive injustice is precisely why so many have criticized the Anthropocene, suggesting, for example, that it might better be called the Capitolocene or the Plantationocene.³⁸ Yet taking this as a universal truth about development relies on an assumption—totally reasonable in a terrestrial context—that growth always involves a “connection between land/tool and laborers.”³⁹ Yet with respect to the extra-terrestrial data economy, there is that no land is involved, or where there is land—say on the Moon—there are no laborers, and the few people who will be employed will be located in countries that are already among the wealthiest in the world. Nor are there likely to be any laborers in the future, for despite the misleading representations of the future of the space economy in science fiction texts such as Daniel Suarez’ *Delta V*, there is just no economic argument why one should try to put workers in space.⁴⁰ Thus the private space economy to some extent evades critiques of globalization or only effects its damages at a second degree.

What remains true about this capitalism is that it deepens inequalities. In fact, one profound implication of post-global growth relates to the fact that while on Earth the expansion of capital offered people in developing nations at least a small—if unequal share—of global growth, post-global capitalism offers them nothing at all. Or rather more precisely, it does offer them the possibility of growth, but only on a global scale, while the extra-planetary owners of the means

³⁷ Neil Smith, *Uneven Development: Nature, Capital, and the Production of Space*, London, University of Georgia Press, 2008.

³⁸ See, for example, Elaine Gan, Anna Tsing, Heather Swanson, Nils Bubandt, “Haunted Landscapes of the Anthropocene,” in Elaine Gan, Anna Tsing, Heather Swanson, Nils Bubandt eds., *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*, Minneapolis, University of Minnesota Press, 2017.

³⁹ Chakrabarty, Dipesh. *Provincializing Europe*, Princeton, Princeton University Press, 2000, 62-63.

⁴⁰ Daniel Suarez, *Delta-V*, New York, Dutton, 2019. I have discussed this text in “Save the Economy; Go to Space. Delta-V, Space 2.0 and Utopian Mythologies of Post-Planetary Capitalism,” a draft version is available here: https://www.academia.edu/43266099/Save_the_Economy_Go_to_Space_Delta_V_Space_2_0_and_Utopian_Mythologies_of_Post_Planetary_Capitalism

of transmission cosmically increase their capital. Basically, then, the extra-global satellite economy will permit the exponential expansion of the wealth of a small cadre of elite individuals while leaving all the rest behind playing on a merely global economic scale, and it will do so in part because it precisely does not exploit any workers and does not pollute the planetary environment.

If we turn now to environmental questions and the planet, we find a similarly perverse logic. Sustainable growth in space assists in solving the problem of sustainable development on Earth. Except for the well-documented pollution that occurs at rocket launch sites, in-space industry does not directly harm terrestrial environments.⁴¹ Yes, satellites can interfere with traditional ways of relating to the space ways practiced by native sky cultures, by making visible marks in otherwise dark skies, but sadly this is already a minority phenomenon given that much of the world's population already lives in places where light pollution is so extreme that seeing a dark sky is already a challenge.⁴² In other words, a planet-focused critique of the space economy mostly fails, because growth in space does little harm to the vulnerable planetary body that so many environmental critics understand as the only thing in need of protection.⁴³ In other words, the new space economy is a perfect paradigm case to illustrate how one miraculously reconciles economic growth and environmental protection. It is what sustainable development guru John Elkington has called a “green swan.”⁴⁴ Only it isn't when understand the Anthropocene as astroculture, implicitly accepting that we already are in space. The satellite economy does pollute, we just don't see this pollution when we are looking at the Earth through satellites that have been designed to look at the planet. Caring about this pollution may seem heretical to ecologists who think that environmentalism is about life, about the planet, about Gaia. But if we accept that we need to know about what is happening on our planet to protect it, and we recognize that the Kessler syndrome, the possibility that satellites could impact one another in a chain reaction that would destroy all satellites and so deprive us of our ability to monitor and hence to understand our planet is a very real thing, then we should care about the satellites and their environment—living or not. Once we see this, we can also see that from the perspective of expansive sustainable development there is a perverse incentive to produce more space junk. This is because space junk clean-up is just the sort of thing that governments are likely to pay entrepreneurs to do in order to defend the national economic interests that are represented by their private satellite constellations.

Recognizing then the vulnerability of near space, indeed the fact that it is a critical zone for making sense of how to live on our planet, Bruno Latour's insistence that what we need to do in the Anthropocene is “land on Earth,” is revealed to be profoundly misguided, a nostalgic space man symptom of an absent understanding of the Anthropocene is astroculture.⁴⁵ In other words we should not be fooled regarding what Bezos and Musk are doing in space because we were pre-occupied by staring at the mud beneath our feet.

⁴¹ Peter Redfield, *Space in the Tropics: From Convicts to Rockets in West Giana*, Berkeley, University of California Press, 2000.

⁴² Duane W. Hamacher, Krystal De Napoli, Bon Mott, “Whitening the Sky: light pollution as a form of cultural genocide”, *Journal of Dark Skies* Vol. 1.

⁴³ The idea that the Earth is our extended and vulnerable body is put forward, among others, by Wai Chee Dimock, *Weak Planet: Literature and Assisted Survival*, Chicago, University of Chicago Press, 2020.

⁴⁴ John Elkington, *Green Swans: The Coming Boom In Regenerative Capitalism*, New York, Fast Company, 2020.

⁴⁵ Bruno Latour, *Ou atterir?* Paris : La découverte, 2017.

Towards a Cosmopolitan Politics for Our Cosmic Province

The first nations scholar Max Liboiron has recently suggested that there is “no *terra nullius*,” no land that is a “blank slate” devoid of indigenous peoples.⁴⁶ This statement is *strictu sensu* quite obviously false with respect to the visited solar system that has informed astroculture. It is also difficult to apply to the orbital satellite economy. To be sure, and this is speaking wholly speculatively, there may well be occupied planets out there, and so some possibility of extending this of anti-colonial logic of resistance literally to the extra-terrestrial. But this is speculation, based on the assumption that things must repeat identically.

I want to suggest that we should think differently about the question of colonization and even indigenous ownership as it applies to the extra-terrestrial, and to suggest that this should stand at the heart of the cosmopolitics of astroculture. In 1967, no doubt in the spirit of avoiding a massive Cold War-era weaponization of near space and not yet glimpsing the economic potential of extra-terrestrial data, the United States, the United Kingdom, and Russia were the lead signatories of the UN *Outer Space Treaty* which guaranteed that “the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind.”⁴⁷ In this sense, it could be argued that Outer Space has, in a sense, already been settled or colonized by everyone, that is extra-global commons. This statement needs to be nuanced and historicized. There is no meaningful, coherent, and not violent way to extend all humankind’s claim to the cosmos. Yet it seems perfectly coherent to claim that with respect to the cosmic province with which we have become entangled in a meaningful historical relation—all of those places from which we have visited and received back data from our extended robotic sensors—do indeed belong to all Earthlingkind as part of a common cultural history, with two examples of this history being the global information age and the Anthropocene, and happily, they really have been *terra nullius*. So understood, the recent tendency to violate the spirit and the letter of the *Space Treaty* in the name of saving our planet from our economy (or our economy from our planet), which has been given official sanction since the passage of the 2015 “Commercial Space Act,” is a form of violence exercised by a few ultra-rich actors against the rights of all humankind.

Protecting our rights demands becoming aware of them, and this passes through coming to understand ourselves and our form of life as entangled with extra-terrestrial data. The subject of astroculture is one whose being—which is to say their mental topography of information-fueled awareness relative to the factual extent of empirical reality, as well as their way of being with words, their senses of how and why things are thus and so, right and wrong, true and untrue—far exceeds the limits of their terrestrial body and their earthly senses. We could call this excess relative to our terrestrial consciousness our post-planetary extended mind (by which I mean something quite equivalent to what Markus Gabriel, anti-metaphysically tweaking the Hegelian notion calls *Geist*). Our post-planetary *Geist* contains traces, reminders of relations to many

⁴⁶ Max Liboiron, *Pollution is Colonialism*, Durham, Duke University Press, 2021, 21.

⁴⁷ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*,
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

places beyond the Earth where our bodies either have never been, can barely be, or will never be.⁴⁸ Yet it is with this extended mind, or with respect to this extended body that we must learn to adapt our way of being finding symbols and interfaces to make sense of the data, and so at least in part to transform our terrestrial being in the Anthropocene. No doubt scholars trained in transcendental phenomenology, with its emphasis upon being there and its fetishization of the phenomenologically embodied given will want to describe this as a state of alienation, a state in which our being as thinking beings is de-coupled from our immediate environment, with this assertion no doubt being intended to suggest that we are also, and for this reason, anti-ecological subjects, cut off from, to quote Arendt, from “the earth” which “is the very quintessence of the human condition” the only “habitat in which [we] can move and breathe without effort and without artifice.”⁴⁹ Yet there is a perfectly good response to this: on the one hand, we will have not ceased living also on Earth, and thus needing to rely—for instance in the case of political argumentation—on our human senses and ways of feeling. But insofar as we also understand ourselves to be historical subjects of astroculture, called upon to think about and talk to affairs that go one beyond the planet, and that these affairs matter for our continuing existence, we can also be properly alienated: capable of acknowledging that we need to understand that our home, the place in which we actually live, in light of extra-terrestrial places and data beyond planet Earth. Part what this kind of astrocultural enlightenment will teach us is that to live long on this Earth requires artifice and effort, if this artifice need also be balanced against a grateful appreciation that we are also rooted on Earth in our ways of natively being conscious. Indeed, and quite to the contrary, from the viewpoint of ones who have become *homines stellaris*, those who do not embrace the extent to which we are already transformed by space are the ones who are in fact alienated, standing in a state of misunderstanding with respect to the ruptured state of our historical and geographical reality.

To return to the beginning of the paper, I assert that it is from this astroculturally informed and self-consciously extra-terrestrial viewpoint that we can most effectively critique the New Space expansionism of Bezos and Musk. Claiming that there is no Planet B is no such critique: even Musk knows this, which is why he—courting scandal but seeking publicity—claims that we ought to “Nuke Mars” to terraform it, and why he has said that it will be the “light of consciousness”—but not necessarily our bodies—that will spread out into the cosmos.⁵⁰ Being astroculturally self-aware will make us vigilant regarding the confusions that follow from exporting terrestrial categories into space, careful and attentive that our arguments against the Anthropocene do not become arguments for Bezos and Musk’s post-global capitalism. We are already becoming aliens, and that means we now have accepted that space has already begun being colonized, if at least this colonization has been of *terra nullius*, and towards the creation of a technospheric commonwealth extending out beyond the Earth. To be sure, this commonwealth is not perfect: it has also been a site of politics, of militarization, or rivalry. Yet we should not be tricked by the Lockean suggestion that we are somehow not legitimately dwelling in our extended habitat because we are not now using it to maximize capital gains, nor should we feel that we will only live in space when we live on Mars—two ideas that probably amount to the same thing. We must rather retort that we have profited from space to become the beings that we

⁴⁸ Markus Gabriel, *Fiktionen*, Frankfurt a.M., Suhrkamp, 2020.

⁴⁹ Hannah Arendt, *The Human Condition*, Chicago, University of Chicago Press, 1998, 2.

⁵⁰ “I am accumulating resources to help make life multiplanetary & extend the light of consciousness to the stars” March 21, 2021. <https://twitter.com/elonmusk/status/1373507545315172357?lang=en>

are, and to show how expansive sustainable development can harm that being that we have become. We can likewise point out the ways in which we are now—or perhaps have now already dreamed—of using our commons in in the spirit the public good, by which we can understand that we have already inhabited it in our science fictions, or simply understand that we are using it to monitor ourselves, so we can understand the plight of our planet as it fights back against the ravages inflicted by global growth.

This paper is dedicated, in friendship and with deepest gratitude, to Alexander Geppert, whose tireless dedication to the idea of astro-culture, and equally deep tolerance when confronted by my often-excessive intellectual enthusiasm on these matters, have done so much to make this paper possible.