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Desperate science fiction: on how Musk, Bezos, Gates and Google plan to escape socio-ecological collapse

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ABSTRACT

With the early 2020s fostering an array of intensified climate-driven catastrophes, a key question is how humanity will respond to its impending transgressions of climatic and ecosystemic tipping points. In this light, this article explores how some of the world's richest entrepreneurs and companies resort to desperate science fiction, that is, to increasingly drastic techno-optimistic ventures. More precisely, the article zooms in on plans put forward and financially supported by Elon Musk, Jeff Bezos, Bill Gates and Google in order to show how these ventures manifest as (1) fanciful plans of leaving Earth and settling on other planets, (2) major geoengineering schemes in which the Earth System becomes the object of terraforming and (3) attempts to manipulate human behaviour via big data. Furthermore, the article argues that these three forms of desperate science fiction are deeply problematic, because they siphon attention away from important democratic conversations about which degrowth-models societies across the planet should pursue and seek to develop. To change this, the article argues, we need to see the three forms of desperate science fiction advanced by Musk, Bezos, Gates and Google for what they are: deceptive attempts to preserve a deeply unjust and destructive economic system.

KEYWORDS

Techno-optimism; climate change; space colonisation; geoengineering; algorithmic governance

Introduction

On 13 October 2021, the actor William Shatner became the oldest person in space at ninety years old. During an event that lasted a mere ten minutes, Shatner was thrust to an altitude of 100km within a capsule belonging to Blue Origin, a company owned by Amazon founder Jeff Bezos. Afterwards, Shatner exclaimed: 'everyone in the world needs to do this' (Davies 2021). But his enthusiasm was not shared in the celebrity world. Besides receiving scorn from fellow actors, Shatner's junket into space was also heavily criticised by the heir to the British throne, Prince William, who stated – presumably more in response to Bezos than to Shatner: 'we need some of the world's greatest brains and minds fixed on trying to repair our planet, not trying to find the next place to go and live' (Boyden 2021). The story does not end there however, as Shatner made

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one final attempt to salvage his honour. In a manoeuvre worthy of a soap opera, he proclaimed that his trip into space was a ‘baby step in getting polluting industries off of Earth’ (Davies 2021).

That said, there is more to be gained from this exchange than a little amusement. The spat between Prince William and Shatner sheds light not only upon a present in which space travel has become the prime ambition of super wealthy entrepreneurs, but also upon a present in which the idea of space travel is becoming increasingly entangled with the fear of a coming socio-ecological collapse. This anticipation is not entirely new, as it is related to the idea of humans terraforming other planets – an idea that has long permeated the imagination of science fiction writers and their readers (Stableford 2005, 131). Yet where this idea originated as a fantasy of exploring extra-terrestrial worlds, today it is galvanised as a response to the growing threat that climate change and the accelerating loss of species and ecosystems pose to human safety and well-being. In fact, this development merely marks a smaller part of a more substantial shift that has occurred within capitalism over the course of the last two decades. Where two decades ago many of the world’s most powerful companies and economic stakeholders were inclined to respond to the concerns of climate scientists and activists with either denial or scepticism, today these companies and stakeholders have generally taken a new position and maintain that it is the advancement of technology that will save humanity from climate change and collapsing ecosystems. For some extremely wealthy entrepreneurs like Elon Musk and Jeff Bezos, this has rekindled the idea of terraforming. Both Musk and Bezos have thus thrown themselves into the race to create programs, aiming to outsource human industries and settlements to space.

This specific response to the fear of a coming socio-ecological collapse is, however, just one of three responses that this article will scrutinise. Hence space programs are not the only reaction to the risks posed by climate change and ecosystemic collapse that is symptomatic of how wealthy and powerful companies and entrepreneurs plan to escape socio-ecological collapse. Rather it is merely one of three techno-optimistic visions gaining traction as the window for averting catastrophic climate change is rapidly closing. In fact, human-induced warming may have already transgressed key tipping points, pushing ‘the Earth System irreversibly onto a Hothouse Earth pathway’ (Steffen et al. 2018, 8254). But while it remains uncertain for now whether this is indeed the case or not, one thing that is certain is that the plans to reduce greenhouse gas emissions put in place by the nations of the world are not ambitious enough to avert the transgression of at least some tipping points (UNEP 2021, xv). The risk that humanity will trigger a domino effect of ecosystemic collapses is, therefore, dramatically increasing, as the nations of the world continue to prioritise modernisation over reductions in greenhouse emissions. This presents the perfect conditions for opportunists to step in and fill the vacuum with visions of techno-optimistic ventures.

To signal that we are here dealing with visions that have been fabricated in order to avert an impending socio-ecological collapse, and as such sketch out increasingly far-fetched, last-ditch efforts, I will throughout this article refer to such techno-optimistic ventures as *desperate science fiction*. In my coinage of this concept, I take inspiration from Istvan Csicsery-Ronay Jr.’s description of the fictive genre of science fiction. Csicsery-Ronay Jr. describes sf as a genre that provides ‘imaginary models of radical transformations of human history initiated by fictive novums’, with novum referring

to a “new thing’ that intervenes in the routine course of social life’ (Csicsery-Ronay Jr. 2008, 5). I will tweak this definition a little, so when I speak of desperate science fiction, I understand science fiction as *imaginary models of radical transformations of human history initiated by technoscientific novums*. Put differently, this means that the examples of desperate science fiction I will scrutinise in this article all present fairly new technoscientific opportunities as their fundamental imaginary model for circumventing the risk of socio-ecological collapse. More precisely, I will use the concept (of desperate science fiction) for criticising three technoscientific ventures that have in recent years been presented with huge optimism, but I take to be symptoms of a deep desperation in contemporary capitalism’s quest to downplay the climate and biodiversity crisis’ imperative of major social, political, economic and cultural changes. I have already placed the spotlight on one of these ventures, as it takes the form of plans to settle human colonies and industries in space. This kind of desperate science fiction in particular seems to fascinate the superrich as an exit strategy, that is, as a potential way to avoid the social havoc an ecological collapse could cause on Earth. As such, it embodies a fantasy of extreme exclusion that is not as readily apparent in the two other forms of desperate science fiction I will touch upon. Major geoengineering schemes – another of these forms – are often framed as having a global purpose. Terraforming is still part of these schemes, but since their object is not other planets, but the entire Earth System, major geoengineering schemes tend to give a false promise of being collective, planetary ventures. The same is true of the third form of desperate science fiction. The explosion in data has thus been accompanied by the vision that major societal problems can be solved via the algorithmic governance of humans and their environments. Yet algorithms are already limiting the imagination of alternative futures. Rather than transforming the status quo, algorithmic governance seems, therefore, much more prone to prompt an optimisation of existing modes of production and consumption.

Like the space programs and the geoengineering schemes, the vision that algorithmic governance will save humanity from socio-ecological collapse is, therefore, inherently desperate. Indeed, all three ventures build on assumptions that may easily prove to be wrong, and thus may have disastrous consequences for the humans they were meant to protect. In this respect, they belong to a whole catalogue of technologies that could be implemented in the Anthropocene, and which have as a common feature that they risk being incarnations of what the late American cultural theorist Lauren Berlant (2011) called ‘cruel optimism’ (24). What is more, the danger lies here not only in the risk that desperation may prove to be a snare for cruel optimism, encouraging humans to place all hope in technologies that will not live up to the expectations invested in them. There is also the much more worrying risk that such expectations may impede necessary societal transformations, and therein foster even more desperate kinds of science fiction, or as American writer, Douglas Rushkoff (2018), puts it:

The longer we ignore the social, economic, and environmental repercussions, the more of a problem they become. This, in turn, motivates even more withdrawal, more isolationism and apocalyptic fantasy – and more desperately concocted technologies and business plans. The cycle feeds itself. (no page number)

Accordingly, it will not suffice to criticise the three forms of desperate science fiction for simply being fabrics of the imagination. Instead, they must be inspected as obstacles to

deeper social transformations, that is, as powerful narratives capable of shaping human understanding and behaviour. In this regard, Rushkoff speaks of the existence of a certain ‘mindset’ in the tech industry that ‘allows for the easy externalization of harm of others, and inspires a corresponding longing for transcendence and separation from the people and places that have been abused’ (2022, 11). It is this mindset that the rest of this article aims to critically dismantle and hold accountable for impeding climate political progress and necessary ecological changes to lifestyles and cultures.

Colonising space

If one were to visualise the vision of the future driving the activities of Jeff Bezos’ company Blue Origin, the two films *Moon* (2009) and *Elysium* (2013) are not the worst places to start. In *Moon*, the company Lunar Industries mines the moon for a new source of clean energy for the Earth. In *Elysium*, a wealthy elite lives in luxury on the space station Elysium, orbiting Earth. The scenarios explored in these two films thus mirror predictions made by Bezos quite closely. For instance, Bezos has said that:

Energy is limited here [on Earth]. Within just a few hundred years, you will have to cover all of the landmass of Earth in solar cells. So, what are you going to do? Well, what I think you are going to do is you are going to move out in space [...] all of our heavy industry will be moved off-planet and Earth will be zoned residential and light-industrial. (Duran 2021)

Indeed, this prediction mirrors, to a certain extent, not only the scenario fictively explored in *Moon*. It seems also to be the origin of Shatner’s former argument (before changing his position radically) that the space tourism facilitated by Blue Origin is a step towards getting polluting industries off of Earth. What is more, Bezos has presented his vision as a fundamental choice between ‘stasis and rationing or dynamism and growth’ (Brown 2019). His claim is, in other words, that outsourcing industries to space is the only possibility if humanity is to continue progressing. Bezos is not alone in this claim. In particular, the key role of rare metals in so called green technologies is fostering prophecies of a point in the near future when space mining will be common (Duran 2021). A more obvious reason for these prophecies is also that there are huge fortunes to be made from space mining. The rare metals from two near-earth asteroids alone might be worth more than ten trillion US dollars (Ravisetti 2021). That said, Bezos’ objective appears not to be limited to harvesting rare metals from space. He also envisions settlements in the solar system, each comprising a million people or more. This has led him to the conclusion that ‘we can have a trillion humans in the solar system, which means we would have 1,000 Mozarts and 1,000 Einsteins’ (Powell 2019).

In *Elysium* there is just one settlement in Earth’s orbit, as the film indirectly questions the assumption that life in space will be available to all. Instead, the movie speculates that human settlements in space will follow the same patterns of inequality that have fostered gated communities on Earth. While life on Elysium is luxurious, life on Earth is plagued by overheating, diseases and hunger. This is notable, as it invites us to critically probe Bezos’ vision – a vision that includes his insistence that human civilisation can only progress by expanding its activities to space, diverting attention from the current suffering of humans and non-humans on Earth. Bezos has recently increased his climate

philanthropy and plans to donate up to one billion US dollars to the conservation of areas important for biodiversity and carbon stocks (Heilweil 2021). But although this will hopefully help decrease the human and non-human suffering inflicted by climate change and other forms of ecological degradation, it by no means annuls the potential dangers of his vision. Even his donations mirror the assumption that human civilisation can only progress by going into space, that is, that Earth will not be large enough to sustain endless economic growth and will therefore need to be transformed into a mixture of a gated community and a wildlife park.

In this, Bezos' vision merely represents the next step in an ideology of modernisation that has, as Bruno Latour (2018) reminds us, always insisted on the possibility of 'advancing toward an infinite horizon [...] pushing outward a limitless frontier' (42). In the US this ideology has enjoyed a long partnership with libertarian ideas, as it is, for example, the case with the so called 'extropians' (Pein 2016, 95). This branch of hardcore libertarians has since the early 1980s been particularly involved in selling the idea of cryonic preservation, that is, the bogus technology of freezing corpses with the intention of revitalising them at some point in the future. But it has also provided inspiration to big tech billionaires like Bezos with its message that 'expansion into space will vastly expand the energy and resources for our civilisation' (More 1992, 5). As early as 1992, one of the chief ideologists of extropianism, Max More, thus proclaimed that 'By the end of the twenty-first century more people may be living off-planet than on Earth' (More 1992). The truth about these ideological constructions is, however, that they have never really cared to look back at those they leave behind. Always focused on moving forward, they have been more concerned with opening opportunities for avantgarde technologies and economic elites than with advancing social equity and sustainability. It seems, therefore, also to be irrelevant to Bezos whether his fellow humans actually want to stay on Earth or not. Instead, his vision is providing an alibi for those who benefit the most economically from global warming and the continued destruction of Earth's ecosystems. For instance, it is hardly a coincidence (as of 14 February 2017, Aljazeera reported on its webpage) that one of the most oil-rich countries on the planet, the United Arab Emirates, is echoing Bezos' vision and wants to build a human settlement on Mars by 2117.

Elon Musk is promoting a similar vision, as he has stated that he is confident that there will be a city of 1 million people on Mars by 2050, transported there by star ships produced by his company SpaceX. The reason? To protect the long-term survival of the human species, or as Musk puts it: 'The future of humanity is fundamentally going to bifurcate along one of two directions: Either we're going to become a multiplanet species and a spacefaring civilization, or we're going to be stuck on one planet until some eventual extinction event' (Drake 2016). Like Bezos, Musk is donating large sums to battle climate change. But similar to Bezos, his vision is steeped in an ideology of modernisation that seems much more focused on pushing the frontiers of the human species than on protecting it. In this regard, saving humanity seems for Musk to imply saving those who will be wealthy enough to buy a one-way ticket to Mars if the acceleration of the Anthropocene turns into an extinction event for humanity. In fact, this problem runs much deeper, as it does not present itself only in Musk's discourse about colonising Mars. It is also present in other parts of his business, as the journalist, Paris Marx (2021), has recently noted:

Just as Musk uses misleading narratives about space to fuel public excitement, he does the same with climate solutions. His portfolio of electric cars, suburban solar installations, and other transport projects are promoted to the public, but they are designed to work best — if not exclusively — for the elite. Billionaires are not leaving the planet, they're insulating themselves from the general public with bulletproof vehicles, battery-powered gated communities, and possibly even exclusive transport tunnels. They have the resources to maintain multiple homes and to have private jets on standby if they need to flee a natural disaster or public outrage. (no page number)

Instead of perceiving Musk and Bezos as pioneers, pushing the frontiers of humanity, it thus makes more sense to see their business ventures as the latest steps in the realisation of 'a climate apartheid, [in which] the wealthy pay to escape overheating, hunger and conflict while the rest of the world is left to suffer' (Alston 2019, 12). Moreover, both Musk and Bezos present space colonisation as the only reasonable option for humanity if it is to survive and continue to progress. In their framing, the only alternatives to space colonisation are decline and death, meaning that there are no real alternatives. In this sense, they present a path forward that has already been determined. And this is the path of perpetual human expansion galvanised by perpetual economic growth.

Geoengineering schemes

Championing perpetual human expansion, the future envisioned by Bezos and Musk is compatible with another vision of human mastery. Geoengineering schemes tend to display the same confidence in human innovation present in Bezos' and Musk's projections of human colonies in space. Yet like Bezos' and Musk's projections, these schemes seem to gain traction only due to a growing desperation. They are, crudely put, only part of scientific and political conversations about the future because they promise to mitigate or solve a situation that is deeply critical. It should therefore come as no surprise that the increasingly obvious failure of international climate politics is creating a growing interest in geoengineering. With the Paris Agreement's goal of limiting global warming to well below 2°C, and preferably to 1.5°C, unlikely to be met (UNEP 2021, xv), the prospect of manipulating the global climate is being presented as an increasingly attractive option.

That said, it is important to note that geoengineering generally refers to two different forms of manipulation. When experts talk about geoengineering, they make a distinction between technologies that can remove carbon dioxide from the atmosphere, and what is called solar geoengineering. Solar geoengineering mainly refers to an intervention at planetary scale to lower global mean temperatures. The term suggests that this could be done by injecting aerosols in the stratosphere to inhibit the influx of solar energy. Solar geoengineering is therefore also seen as the more drastic and dangerous form of geoengineering. So while some nation states are already advanced in the process of implementing carbon capture and storage (CCS) technologies, solar geoengineering has thus far not been granted the same kind of scientific, political and economic attention. But this may be about to change. With the window for averting catastrophic climate change rapidly closing, there is a growing call for more research and investment in solar geoengineering.

For instance, a report released in March 2021 by the National Academies in the United States urges the federal government to fund a research program to assess whether it would be feasible to use solar geoengineering as a stopgap measure to halt global

warming (2). This recommendation has since been endorsed by one of the most prestigious scientific journals in the world. In a recent editorial, *Nature* (2022) encourages ‘Governments and funders [...] to support scientists in efforts to understand the safety and efficacy of various controversial geoengineering technologies [...] such as the addition of particles to the stratosphere to reflect sunlight back into space’ (7). At Harvard University such research is already being conducted. Funded primarily by Microsoft owner Bill Gates, researchers affiliated with Harvard’s Solar Geoengineering Research Program have been working on the Stratospheric Controlled Perturbation Experiment (SCoPEX) for several years (Cohen 2021). The aim of this experiment is to release different aerosol particles across an area one kilometre long and one hundred metres in diameter twenty kilometres above Earth in order to explore the effects.

Yet the progression of SCoPEX has been halted by public opposition. In March 2021 a SCoPEX test with a high-altitude balloon was cancelled by the Swedish Space Corporation due to pressure from environmental groups and the Saami community in Northern Sweden, where the test was to take place. Reuters has since reported that the two Harvard researchers leading SCoPEX, David Keith and Frank Keutsch, instead plan to execute the test at some later point (Goering 2021). Both Keith and Keutsch have in the past defended SCoPEX by referring to the desperation the failures of international climate politics could spark in the coming years. Keith has, for example, warned that:

Some government faced by maybe a huge killing heat wave may make decisions to actually move toward deploying [solar geoengineering] technologies within the next decades. We are more likely to make a reasoned decision as a species, as humanity, about this if we get it out in the open, warts and all. (Mullins and Jolicoeur 2020)

Indeed, Keith and Keutsch are not alone in suggesting that the prospect of irreversible, catastrophic global warming could trigger all kinds of desperate uses of geoengineering in the coming decades. A similar picture is painted by the political theorists Geoff Mann and Joel Wainwright. In their book *Climate Leviathan* (2018), they foreshadow a future in which the failing mitigation of global warming leads to an array of local geoengineering schemes before a planetary sovereign, a climate leviathan, steps in to adjudicate the merits of experimentation. Drawing on Carl Schmitt’s definition of the sovereign as the one who decides on the state of exception, they claim that a future planetary sovereign will be known through its power to declare ‘the experimental exception’ (150). As Mann and Wainwright warn, such sovereignty will not only entail the power to decide when, where and how geoengineering is to be implemented, but even more uncannily, also the power to decide who will endure which risks.

The latter is especially important, as solar geoengineering will have ramifications for all countries, but affect them differently. In other words, the risks of such planetary manipulation would be unevenly spread. One study, for example, has indicated that an attempt at solar geoengineering could cut rainfall in the tropics by thirty percent (McGrath 2014). Indeed, the unevenly distributed risks of solar geoengineering is one of the reasons that in January 2022 a group of more than fifty highly distinguished scientists published an open letter calling for immediate political action from governments, the United Nations and other actors to prevent the normalisation of solar geoengineering as a climate policy option. In their call for an international non-use agreement on solar engineering, they allude to the fact that the ‘global poor are extremely vulnerable to any

change in their environment and threatened the most by any risks or side effects that might result from the deployment of solar geoengineering at planetary scale' (Biermann et al. 2022, 3). Moreover, the open letter states that: 'The looming possibility of future solar geoengineering could become a powerful argument for energy companies and oil-dependent countries to further delay decarbonization policies' (Biermann et al. 2022, 4).

In this regard, Bill Gates' involvement in SCoPEX can be read as an affirmation of a pattern that was already visible in Bezos' and Musk's investments in space travel. Having made incredible fortunes off an economic system that the climate and biodiversity crisis has exposed as blatantly disastrous and unjust, the moguls of contemporary capitalism are trying to turn public attention away from this truth by investing large sums in still more drastic technological ventures. Labelled as altruism and philanthropy, these ventures are framed as being for the good of humanity, but upon closer inspection they serve two less noble functions. The first of these is a desperate self-interest in finding technologies that can protect the moguls and other members of the elite from the brutal effects a socio-ecological collapse could have across the planet, and especially in the global south. The second is an economic interest in maintaining faith in the dying societal and economic model of perpetual economic growth for as long as possible. Gates is here no different from Bezos and Musk. Although he has donated large sums to the fight against climate change, his business remains steeped in fossil capitalism, with the latest example being his purchase of the world's largest private jet services company (Ahlgren 2021).

Fixing unsustainability with big data

In May 2018, the magazine *Verge* published a short film created by Nick Foster, the head of design at X, a development facility owned by Google (Savov 2018). Titled *The Selfish Ledger*, the film starts by introducing its viewers to the theory of the epigenome: an internal code that the author of the theory, French biologist Jean Baptiste Pierre Antoine de Monet Chevalier de Lamarck (1744–1829), believed existed within every living being. Lamarck wrongly thought that the experiences of an organism during its life modified this internal code, and upon reproduction, this modified version was passed down to its young. The film explains this in order to compare Lamarck's idea with the trails of data that most humans today leave behind when they die. In fact, the film equates such trails of data with who we are and asks its viewers to imagine what would happen if these trails were not merely seen as historical references of past online activities, but actively deployed to fight global problems.

More specifically, the film claims that it could have a significant impact on environmental problems if the growing amount of data generated by humans during their lifetimes were treated as a ledger that could be used to optimise human behaviour. According to the film, this will at first require that Google becomes responsible for offering suitable targets to the ledger. At this stage, we should, in other words, imagine that users ask Google to help them nudge their behaviour, so it can become more sustainable. However, this is only the initial phase, as the film moves on to describe a point where the ledger stops presenting suggestions to the users and instead makes choices on their behalf. At this point, the users are imagined to be simply steered by

big data (owned and managed by Google) into ways of living that will be conducive to humanity. What we encounter here is therefore also a kind of ‘capitalist Hegelianism’ in which algorithms are imagined acting as the World spirit that will lift humanity to ever higher stages of smartness (Ramirez, 99).

In this process, unsustainable behaviour is imagined to be transformed into sustainable behaviour. Nevermind the major ecological footprint of green tech. According to the film, it is more, rather than less, digitalisation that will pave humanity’s way out of the climate and biodiversity crisis. In fact, the film can be seen as a call to further accelerate the process that Felix Guattari (2013) termed ‘planetary computerisation’, meaning both the intensified spreading of computers all over the planet and the intensified integration of computers into the human lifeworld (6). Moreover, if the film is indeed representative of how Google envisions the future, it is clear that it is Google’s dream not only to own more data, but also to be able to control and manipulate the behaviour of more humans. The vision ingrained in *The Selfish Ledger* is, in this regard, a perfect example of the algorithmic governmentality that Belgian philosopher Antoinette Rouvroy has repeatedly warned about (Rouvroy and Berns 2013; Rouvroy and Stiegler 2016). According to Rouvroy (2020), algorithmic governmentality ‘generates alerts or stimuli as to obtain reflex responses rather than reflexivity, doubts, hesitations and conscious decisions. It is a relatively subliminal mode of government that consists of directing people’s attention towards certain things, in modifying the informational or physical environment so that behaviours are no longer obligatory but necessary’ (no page number). With this, algorithmic governmentality marks the death of the critical subject, and with it, politics, as Rouvroy (2020) explains:

Machine learning algorithms [are] a way of un-thinking the future. Rather than relating oneself to the future through imagination, precaution, prevention, projection, anticipation [...] the idea is to reduce the wide variety of possible futures to one and only one future, devoid of uncertainty: Replacing uncertainty by necessity. The best way to be assured of the future is indeed to produce it in the present. That is exactly what algorithms used in predictive policing, predictive justice or credit scoring, epitomize. [In this way] it is not only the re-presentation of the past and present that is foreclosed but also the imagination of alternative futures. Optimisation rather than imagination or anticipation is exactly the opposite of politics. Politics is about transcending the current state of affairs. Algorithmic governmentality, on the other hand, is about optimising the current state of affairs. (no page number)

Taking these arguments into consideration, it is thus noteworthy how Google’s presentation of the selfish ledger conveys an image of the future that is in perfect harmony with the ideas of green consumerism and green growth dominating mainstream politics. Within the horizon of these ideas, transforming unsustainable behaviour into sustainable behaviour is strictly a matter of optimising consumption. Rather than prompting a move away from the destructive growth patterns of the last decades, here increasing algorithmic smartness is taken as a promise that such growth patterns can be maintained. In Google’s vision of the selfish ledger we therefore also find a reflection of the ideology of modernisation that is present in Bezos’ and Musk’s space programs. The vision of the selfish ledger embeds a similar eagerness to conserve the idea that the capitalist economy can continue to advance toward an infinite horizon. The fundamental difference is simply that the infinite horizon here is not space, but the promise of big data. In Google’s dream of the future there are thus no physical or psychological limits to

either the integration of computers into the human lifeworld or their planetary proliferation.

Rouvroy suggests that an antidote to this kind of dreaming could be found in the recent corona crisis, when, lost in a techno-immune dream of efficiency, algorithmic governmentality did not see the pandemic coming. To be more precise, Rouvroy (2020) describes the corona crisis 'as a magnifying mirror of the dreadful consequences of denying materiality' and as a call to see digitally created environments as an 'accelerator of ecological entropy' (no page number). There is therefore also a clear link to Latour here, as Latour did in the last years of his life suggests an identical antidote to the eco-modernist dream of an ever-expanding economy. Like Rouvroy, Latour (2018) insisted that the only way forward is to come down to Earth and the material reality that presents itself as collapsing ecosystems, accelerating global warming and dangerous pandemics. Latour made a distinction between those thinking of the Earth System as the Terrestrial and those thinking of it as the Globe, as he accused the latter of grasping all things as if they were completely indifferent to human concerns. What the Terrestrial stands for here is thus a critique of the two intertwined projects of modernisation and globalisation, as they have proven to be 'guilty of [...] errors so massive that it prevents parents from leaving an inhabited world to their children' (Latour 2018, 66).

Google's vision of the selfish ledger is equally illusive, as it feeds on the same promise of perpetual economic and technological improvement that has driven the intertwined projects of modernisation and globalisation off the rails. It is here of lesser importance that the film exposes, once again, the dark desires of Google and other major tech companies who are in the business of surveillance capitalism. From Shoshana Zuboff (2019) we already know that their true 'goal is to automate us' (8). More interesting in this context is instead Google's identification of the climate and biodiversity crisis as a means that can bring them closer to this goal. The timing of Google's vision is thus illustrative of how the stalemate in global climate politics is fuelling opportunism of many kinds. And, more precisely, of how big tech companies are perfectly willing to exploit this stalemate to consolidate the illusive hope that technological innovation can simply make the climate and biodiversity crisis go away, annulling the need for fundamental socio-economic changes. Latour was therefore also right in seeing this opportunism as an interest in maintaining the status quo, that is, in letting the projects of modernisation and globalisation continue undisturbed.

Concluding remarks

The examples of desperate science fiction described above all point towards the same conclusion, namely that techno-optimistic visions are tools of rhetoric deployed to slow down the socio-economic transformations the climate and biodiversity crisis calls for. As such the examples enjoy a close kinship with what Americanist J. Jesse Ramirez (2021) terms business sf. Ramirez writes:

The usual business of genre sf is to entertain, to incite wonder, or to provide critical distance from the present by symbolically transforming it into the past of a hypothetical future. Even the most politically conscious genre sf has a highly mediated relationship to action. In contrast, business sf claims to describe what is the case and starts from the premise of genre sf's transcendence in order to influence future expectations. (18)

The same can be said of desperate science fiction. Prompted by the fear of a coming socio-ecological collapse, it chains the imagination to certain visions of the future in order to foreclose it, that is, to predetermine that the future will not radically break with the past but instead perpetuate the logics enabling contemporary capitalism. It is therefore not surprising that we find the names and brands Bezos, Musk, Gates and Google behind some of the most dominant forms of desperate science fiction. Having made incredible fortunes in an economy that is structured around the principle that wealth must be turned into ever more wealth, with profits yielding ever higher profits, these four major players in the capitalist economy are not only in the business of selling tech products, but also in the business of selling techno-optimistic fantasies. Yet one must tread carefully here. The fact that the products Bezos, Musk, Gates and Google sell feed on narratives accentuating the wonders of technology – and therefore also on narratives about the future in which technology will come to the rescue – should not eclipse the reality of the technologies Bezos, Musk and Gates invest tremendous amounts of money in developing. As I have shown throughout this article, desperate science fiction embodies more than one purpose. It is not only a rhetorical tool deployed to reaffirm faith in the dying societal and economic model of perpetual economic growth for as long as possible. It is also a very real strategy pursued by some of the wealthiest people on the planet in the hope that it will save them from the brutal ramifications of an approaching socio-ecological collapse.

In this sense, desperate science fiction embodies some of the worst features of neoliberal capitalism and its valorisation of private wealth creation. The space programs owned by Musk and Bezos and the geoengineering program funded by Gates are all by-products of a capitalist system generating extreme inequality. This inequality not only reveals itself in the large sums Musk, Bezos and Gates are able to invest in their preferred techno-optimistic venture. It is also highly likely to feature in the potential outputs of these ventures. Very little indicates that the space programs owned by Musk and Bezos will become the major collective project that Musk and Bezos pretend when they sing the praises of settlements in space comprising millions and millions of people. If their space programs do lead to extra-terrestrial settlements, these settlements seem much more likely to be bunkers, where eccentric rich people can wait out the worst consequences of an atomic war or a socio-ecological collapse. In other words, Bezos and Musk seem first and foremost to be working on an exit strategy that can bring them and a few other of the world's richest people to safety in the case of a human extinction event on Earth.

The geoengineering scheme that Gates is throwing millions of dollars after is obviously a little different. Here we are dealing not with an exit strategy that is highly likely to only benefit a limited few, but with a venture capable of producing an output that could potentially benefit large parts of the world's population. That said, the injection of aerosols into the stratosphere would, as previously mentioned, involve several risks, with the most dangerous and destructive of the potential side effects befalling the global south. Alone the study suggesting that solar geoengineering could cut rainfall in the tropics by thirty per cent clearly shows that solar geoengineering would in no way be an unproblematic geopolitical solution, but instead more likely re-enforce already existing patterns of global inequality. Put more crudely, solar geoengineering shows every sign of being a tool that could drive the richest nations on the planet further towards barbarism and climate apartheid, that is, towards a world in which the living

conditions of the poor are sacrificed in order to artificially stabilise the climate in the global north.

After all: morally, there is but a short distance from the ‘slow violence’ currently being exacted upon the global south by the global north to a situation in which a climate leviathan of the global north decides that it is easier to take the risk of solar geoengineering than to continue to reduce emissions (Nixon 2011, 2). If there is a common denominator of climate politics in the global north, it is that politicians have thus far been extremely reluctant to reduce the individual ecological footprints of their citizens by reducing consumption. Instead, these politicians have repeatedly claimed that green growth and green consumerism are the only ways forward. What will happen when this illusion begins to fade, and it becomes obvious to everyone that the politicians in the global north cannot deliver the growth in consumption they promised without accepting runaway global warming and irreversible ecological degradation? A relevant guess is that solar geoengineering will in this situation represent such an attractive alternative that the risks it poses to populations in the global south will not stop politicians in the global north from deploying it. In other words, Mann and Wainwright are right when they point to the danger that geoengineering may quickly become the fascistic answer that governments in the global north will resort to when facing the ramifications of an irreversible climate disaster at home.

In this regard, Google’s vision of the selfish ledger appears less prone to mutate into fascism. But who knows what kind of draconian purposes the ledger could be used for if it were to gain the proportions Google dreams about? In one version of such a nightmare the ledger’s power could be used to unscrupulously manipulate the ecological footprint of populations in the global south and north, while a small minority (controlling the ledger) maintains its excessive way of living. More palpable still is the danger that Google’s desire to access ever more data will culminate in a rise in consumption rather than in a decrease. Despite highlighting the selfish ledger as a possible cure for the world’s environmental problems, Google’s vision of the ledger is a poor disguise for the economic potential tech companies like Google see in big data. For them, big data holds all the promises of their deepest capitalistic desires, as it offers a hitherto unknown level of insight into consumer behaviour that can be exploited to encourage still more consumption in a never-ending circle. The problem with this circle, however, is not only that it automates behaviour, as argued by Rouvroy, but also that it is – in the words of the late French philosopher Bernard Stiegler (2014) – ‘auto-destructive’ in the sense that it automates the destruction of Earth’s ecosystems and stable climate (43).

In fact, what the climate and biodiversity crisis unmasks is that the capitalistic understanding of history as a linear process – in which perpetual economic growth leads to perpetual civilisational progress – is flawed and cannot retain its political power without disastrous consequences. Accordingly, the rapid transformations in ways of living and social designs that the climate and biodiversity crisis calls for depend upon a political implementation of degrowth-models that can bridge justice and well-being. This will not be easy. Over the course of the last three decades, global emissions of greenhouse gasses have increased by around sixty per cent, while it would currently require a reduction in global emissions of around seven per cent or more annually to keep the aims of the Paris Agreement alive (Hickel 2019, 878; UNEP 2019, xx). And even an annual reduction of this magnitude would not guarantee that the global climate would remain

relatively stable and favourable for human civilisation. In this context, one of the major problems with desperate science fiction is that it siphons attention away from important democratic conversations about which degrowth-models societies across the planet should pursue and seek to develop. When desperate science fiction gains traction it therefore further delays and derails these democratic conversations, opening the door to ever more radical techno-optimistic ventures. In order to leave this spiral, it is therefore necessary to abandon the hope that fundamental political, economic and cultural transition processes can be avoided. This requires clearly seeing the three forms of desperate science fiction advanced by Musk, Bezos, Gates and Google for what they are: deceptive attempts to preserve a deeply unjust and destructive economic system.

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