

## Geoengineering in the Context of the Technological Age

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### 1. A Blasphemous Transgression by Homo Faber?

A number of years ago, Peter Sloterdijk already encouraged philosophers to make the conditions of atmosphere management explicit:

With the transition from the 20th century to the 21st, the subject of the cultural sciences thus becomes: *making the air conditions explicit*. These sciences practice pneumatology with an empirical disposition. For the now, this program can only be carried out by reconstruction and accumulation, because the “thing itself”, the universe of influenced climata, of designed atmospheres, of modified airs and of adjusted, measured, legalized environments, has – with the very far-reaching advances in the explication of natural scientific, technical, military, legislative legal, architectonic and artistic spheres – gained an almost unbeatable head start over the attempt to formulate concepts in cultural theory.<sup>1</sup>

But even before we modified the air, we manipulated the Earth. For at least 12,000 years, humans have been making nature. With industrialization, dropping atom bombs, perpetually increasing urbanization, and the climate change, this powerful influence is only becoming more explicit – the reason why geologists are also having heated debates about Paul Crutzen’s concept of the “Anthropocene” in the meanwhile.<sup>2</sup>

The critical estimation of this technology, which is there to serve an intended purpose in restructuring and extending “*natural* conditions”, has a long tradition in the history of philosophy and theology. This became apparent in mining, in designer babies, and we will also follow this path in the debate around geoengineering and brain transplantations. The corresponding theses usually revolve around concepts such as risk, law, and danger, and often lead to the hybris argument – exemplified by the Tower of Babel – about human fantasies of omnipotence. The pinnacle of the philosophical critique of technology is most definitely Martin Heidegger’s philosophy of *Gestell*, or “enframing”, with which he attempts to address the essence of modern technology. Modern technology reveals the extent to which humans are challenged to challenge nature and to use it up. Firstly, Heidegger sees the danger for humans that reality would become a resource to be “ordered”, since humans themselves, as part of the real, are thus also at the mercy of total technicization.<sup>3</sup> Secondly, alternative perceptions of reality – artistic and genuinely philosophical – would be at stake when only the so-called precise sciences could say what the situation is.<sup>4</sup> A third, when not entirely explicit thesis suggests that with technologies like climate manipulation processes, we would demonstrate a power that was once considered god-like.<sup>5</sup>

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<sup>1</sup> Peter Sloterdijk, *Terror from the Air*, trans. Amy Patton and Steve Corcoran (Los Angeles: Semiotext(e), 2009), 85.

<sup>2</sup> Cf. Paul J. Crutzen, “The Geology of Mankind,” *Nature* 415 (2002): 23; cf. Christian Schwägerl, *Menschenzeit: Zerstören oder Gestalten? Die entscheidende Epoche unseres Planeten* (Munich: Riemann Verlag, 2010).

<sup>3</sup> Martin Heidegger, “The Question Concerning Technology,” in *Basic Writings*, ed. David Farrell Krell (New York: HarperCollins Publishers, 1993), 321.

<sup>4</sup> Cf. Heidegger 1993.

<sup>5</sup> Cf. Heidegger 1993. This thesis is now firmly anchored in the collective intuition. It is again explained in Bill McKibben, *The End of Nature* (London: Bloomsbury, 2003).

That means, a proud God in a whirlwind could once rhetorically ask his servant Hiob:

Where wast thou when I laid the foundations of the earth? Declare, if thou hast understanding. Who hath laid the measures thereof, if thou knowest? Or who hath stretched the line upon it? [...] Who hath divided a watercourse for the overflowing of waters, or a way for the lightning of thunder; To cause it to rain on the earth, *where* no man *is*; *on* the wilderness, wherein *there is* no man; To satisfy the desolate and waste *ground*; and to cause the bud of the tender herb to spring forth? Hath the rain a father? Or who hath begotten the drops of dew? Out of whose womb came the ice? And the hoary frost of heaven, who hath generated it? The waters are hid as *with* a stone, and the face of the deep is frozen.<sup>6</sup>

And formerly, God could still checkmate Hiob with this argument, but nowadays it seems that we humans can be comparatively laconic about it: We did it, and yes, we can!

This raises the question: Does the strategic rationality of humans arrogate the function of the creator's ordering hand? What's the problem, one could reply, isn't this ultimately God's own will?

And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. [...] And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion [...].<sup>7</sup>

Hence, the "Man-plays-God" argument can only be read: The technological age appropriates the mythological-religious mission of Jewish accounts but abandons the transcendental reference at the same time. As a result, the "climate protection techniques" would control the Earth simply because of the possibility to control; or more carefully formulated: because one believes that control is *beneficial*. In scientific lectures and popular discourse about geoengineering, terms such as "emergency solution", "rescue", "cure", and "remediation" are often used. One can come to the conclusion: The modern *homo faber* is actually of the firm opinion that his ingenious activity is in the interest of humans. But which humans? The human of industrialized nations or that of the southern hemisphere; the human of the present or that of the future; the human in the sense of the single individual or – in the spirit of the utilitarians – the "largest number"?

If the global average temperature can be set at will, then the question is what the "ideal" average temperature *is* – not to mention, it is only local-regional temperatures that really exist and they vary. For example, Africans could come to the conclusion that it was generally always too warm, while Scandinavians could find a few more warmer days per year highly desirable.

At this point, the thesis reads: The assumption of being perfectly informed about what is "beneficial" or what happens "in the interest of humans" becomes highly problematic upon closer observation. Stylized arguments like we fight fire with fire or that humans arrogate the right to play God, however, further our understanding equally so little. This will be substantiated in the following.

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<sup>6</sup> Job 38:4–30 (King James Version; Swindon: The Bible Societies, 1994), 470.

<sup>7</sup> Ibid., Gen. 1:26–28.

## 2. The Autonomy of Technology

“Mankind” hasn’t been – for better or for worse – the sole ruling power for quite some time now. Also the atmosphere is not (yet) an air conditioner built independently from scratch by human hand, which delivers the desired “room climate” with the turn of a knob in one direction or the other, and it will likely not become this because it is not a closed but an open system in which coincidences and emergences cannot be excluded. The argument of the extensive “anthropogenity” of climate change justified by natural science cannot, from a philosophical perspective, be equated with intentional decision-making.

Perhaps the two decisive features that distinguish technical-historical development since the nineteenth century from antique wood clearings are first the global intensity of the effects of local events *only made possible by technology* and second the *momentum of a technology* that produces technology. Technology is since long not just a “tool” to satisfy established human needs. No human hand can manufacture microchips – but what would modern information societies be without microchips? For example, climate research would not be possible without computer models. Without the vast computing power and complex future simulations, no one would be able to anticipate the potential global climate situation in 100 years. Hence, we would continue to burn fossil fuels until they were depleted and nobody would research into emergency climate measures. Above all, nobody would be preoccupied today with geoengineering if the technical advances of the last 150 years hadn’t triggered a climate change that no one maliciously plotted in the first place.

To reflect upon the autonomy of technology means to reflect upon the fact that the causal processes installed somewhere along the line by craftsmen, artists, and engineers potentially cause not only what their good intentions should achieve. Instead, technical products adhere, not entirely but also, to their own and contingent social codes and could thereby necessitate successor technologies or safety systems. This is why they are able to challenge the world in a way that the human initiator of the technology couldn’t have imagined. If this is the case, then the question is: Do we actually have a plan C for the unfavorable situation when the necessary plan B (the use of fast-acting geoengineering) doesn’t “work” after a while due to natural scientific, economic, or political reasons, and good intentions “suddenly” turn into adverse effects?

Naturally, we do not have this plan because every plan requires specific knowledge about that which is to be planned. The development of complex systems is, however, characterized by a great number of indeterminacies since coincidental reciprocities are a feature of such systems. In short: Eventualities are not a matter of knowledge but of speculation. And if there really was a plan C, then, in turn, plan D would be missing.

Geoengineering technologies, when they are then applied, are insofar later-installed *secondary technologies* that should reverse the unwanted side effects of the fossil fuel driven civilization technologies of the twentieth century. Or put simply: Problems of technology should be solved with technical means – and maybe they can only still be solved with technical means.<sup>8</sup> Thus, geoengineering can also be seen as a technocentric *reverse engineering*. But when global warming should be reversed solely with a system parallel global cooling, one reproduces the principle of “anthropogenic climate change”. It can thereby lead to principally similar ecological feedback loops and the same unequal distribution of winners and losers, only in another guise. And so the old truth turns up here as well: In the worst case, one potentializes the threat with precisely the instruments for combating it.

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<sup>8</sup> Cf. Niklas Luhmann, *Risk: A Sociological Theory*, trans. Rhodes Barrett (New Brunswick, NJ: Aldine Transactions, 2008).

### 3. The Dialectic of the Technocene

The theory of modernity that informs the argumentative context of the present essay can be apostrophized – in this framework of technical corrections and repairs that always become effective only after the fact but are nevertheless necessary – as a “*dialectic of the technocene*”. This implies that in the minds of the responsible engineers geoengineering in the stricter sense is *de facto* an anthropogenic future technology for the good of most people; in essence, however, it is far more a reproduction of precisely that “technological” logic whose environmental consequences we are coming to feel in the twenty-first century. In the history of ideas, this form of technical-financial gigantomania stems from the past century: a century of total annihilation systems, of total financial speculation, and of total genome sequencing. One assumes that it is possible to master a crisis situation with copious technical stealth in order to go on as always. That only in the rarest cases is it wise to react to a new challenge with an old strategy proves itself time and again anew, even in everyday life.

The classical thesis to which this train of thought leads – the one that locates the driving force of history not in the individual decision-makers but in the momentum of technical processes – should be quite clear. It has been repeatedly addressed by Friedrich Nietzsche, Sigmund Freud, Norbert Elias, and Theodor W. Adorno, but only now in our age of “atmosphere management”<sup>9</sup> does it possibly reveal in a modified form its full evidence. It states that the efforts in the self-empowering domination of nature that have been directed against its constraints since the early modern period breed a new self-constraint or alternatively a new technology constraint. A *circulus vitiosus* which, according to Adorno, can be understood as a “dialectic of enlightenment” or the dialectic of liberalistic thought.

For a concrete illustration, let us assume that solar reflection processes will be implemented in the future to control climate change effects, which as mentioned before result from a resource-based form of dominating nature. Let us further assume that in the course of time these would prove to be failures on a grand scale; and to such an extent that the climate system has been irreversibly destroyed with clear disadvantages for humans and the biosphere. We would then find ourselves in a situation where even the last progress apologists would be substantially irritated as human life on Earth is everything else but independent from global climatic environments. But what is decisive is that not only philosophers no longer need these intellectual games to realize that the dialectic of the age of technology is inexorably stumbling through history in its characteristic tripartite waltz. Ultimately, the argument is also applicable independent from the possibility of a large-scale accident. Because the revocation of technology’s promise of relief reveals itself in the “success” of technology:<sup>10</sup> Precisely when one would employ the cooling methods of “Solar Radiation Management” in order to protect oneself from the undesired effects of climate change and to avoid cost-intensive reductions of CO<sub>2</sub> emissions, the uncertainties and constraints increase exponentially. If one puts all their money on the apparently unbeatable technology joker and leaves the climate-impacting greenhouse gases in the air, one would be committed for centuries to reflect incoming solar radiation in order to avoid exposure to the accelerated threat of a thawing nature. This dilemma of a sudden halt in the use of climate technology is usually referred to as the *termination* problem.<sup>11</sup>

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<sup>9</sup> Peter Sloterdijk, “Wie groß ist ‘groß’?” in *Das Raumschiff Erde hat keinen Notausgang*, eds. Paul J. Crutzen et al. (Berlin: edition unseld, 2011), 94.

<sup>10</sup> Cf. Luhmann 2008.

<sup>11</sup> Victor Brovkin et al., “Geoengineering climate by stratospheric sulfur injections: Earth system vulnerability to technological failure,” *Climatic Change* 92 (2009), 243–259; Konrad Ott, “Kartierung der Argumente zum Geoengineering,” in: *Die Klima-Manipulateure – Rettet uns Politik oder Geo-Engineering?* Jahrbuch Ökologie 2011, eds. Günter Altner et al. (Stuttgart: Hirzel Verlag, 2010), 20–32.

This makes it clear to what extent we find ourselves in a historical process in which the old dependencies on nature are being replaced by dependencies on technology. If we continue as in the past, then in 50 to 100 years the global climate will only be bearable for the majority of mankind with a geotechnical climate management system. In this sense, the dialectic of the “technocenes” would exist in the fact that precisely the clearing felled by scientific-technical rationality, with its tendencies to exploit and prohibit nature, one day leads to the startling realization that we are trapped in this clearing. Just as Adorno and Horkheimer repeatedly explicated: “Every attempt to break the natural thralldom, because nature is broken, enters all the more deeply into that natural enslavement. Hence the course of European civilization.”<sup>12</sup> There is much to suggest that things are not going to change any time soon. Moreover, the technical potential of geoengineering represents the tentative pinnacle of the enlightened ideal of technical control, scientific calculation, and economic utility. The punch line, of course, is that it has become obvious in the meantime that the last stealth of emancipatory, Apollonian thinking and planning should be to turn around and drive Apollo the sun driver himself. The journey of technology in which we find ourselves is not a fate leading us to disaster. It is a challenge. Even geoengineering hides within it the possibility to better understand the world and to preserve it for mankind. However, one should be aware that this challenge for people alive today is neither chosen nor can it be renounced. The vehicle is driving too fast to consider possible disembarkment. Mankind will increasingly and more extensively shape the planet with technology. But also the means and the objective of this shaping must be shaped as well.

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<sup>12</sup> Cf. Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment*, trans. John Cumming (New York: Herder and Herder, 1972).