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## RESEARCH ARTICLE

### FEASIBILITY AND CONTROL OF NATURE HISTORY: EXAMINING A FANTASY

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#### ABSTRACT

The feasibility and control of nature by mankind should make it possible to deliberately manipulate nature and counteract climate change using highly sophisticated technological means. This integration of nature into the sphere of human action turns it into an immense artefact that humans can heat up and cool down at will. We propose to challenge this environmentalist technocracy by simply rejecting this futurological idea. We then countered this position with the idea that man is mistaken in thinking that nature is totally controllable and predictable, because he is unaware that one of the main lessons of global warming is precisely the unavailability of nature's predictability. It is almost impossible to pinpoint the exact moment when the human project to manipulate the Earth system will turn into a nightmare. It is, moreover, the clear awareness of this danger and of the illusion of man's superpower that fuels all the measures taken to respond to the climate emergency and avoid destroying nature and life. To achieve this result, we used a mixed-method approach combining both observation and qualitative methods.

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## INTRODUCTION

Breaking with any model overhung by the notion of natural history, in order to place nature itself in the scene on which its history is unfolding, man has inflated himself with every illusion with the conviction that he can make and control the history of nature. This idea is the conversion point of geoengineering projects aiming to manipulate climate change through technology. By positioning as a bridge over the great divide of global warming, geoengineering, with its technophile optimism, is suspected of supporting capitalist ideology. This misguided approach poses a problem and forces us to explore the aberration that solutions – even those full of good intentions – to the natural crisis are likely to lead to. This has led us to make the assumption that, the human claim to make the history of nature ignores the limits of human prediction. So, does the desire to control the history of nature and manipulate the climate have the means to put its plan into practice? The answer to this question, which concentrates all the density of this problem, will almost inevitably lead us to observe that the natural crisis is an unexpected reversal of the situation that gives man a privileged place within the planet and elevates him to the rank of biogeological force. In the second part of this study, we will show that this gives man the illusion that he can make and control the history of nature. In the final part of this study, we will criticise the proponents of such an ideology, pointing out the main lesson that global warming teaches us and calling into question all the arguments used to support

their position. In contrast to the rashness and sometimes outrageous speculation often associated with exercises of this kind, we have stuck to the facts. To do this, we have adopted a mixed methodological approach to analysing the diverse data gathered from the relevant literature.

**An Unexpected Reversal of Fortune:** The ecological crisis takes us back to both the past and the future of our era, and reflects our awareness of the influence of our present actions on the future of Earth's history. Humans have become the "sorcerer's apprentices of the climate" (Hamilton, 2013), to the extent that if they continue at this rate, it is possible that, due to their practices which increase the quantity of CO<sub>2</sub> in nature, it will prevent the next ice age expected in 50,000 years' time. Some scientists believe that they can 'manage' the planet, 'manufacture' the climate, influence the history of nature and bring it under their absolute power. Those who have meditated on the depth of geological time have reminded mankind to show a little humility (Quinet, 2013), because *Homo sapiens* only appeared 200,000 years ago, which represents a tiny fraction of the 4.5 billion years of the Earth's history, and an even smaller fraction when we consider the history of the universe. And the ecological crisis is a reminder of our modesty (Latour, 2015) to "keep our feet on the ground", to always bear in mind our condition as "earthlings", not to forget our status as a living species in nature. It is striking to note that some thinkers have a different conception of this re-naturalisation of man.

According to Lewis and Maslin (2015), “Man can no longer be seen as ‘something else’ than nature or ‘outside’ it, but can be seen as one of the most powerful drivers of change ‘within’ and as ‘part’ of the Earth system”. In their view, man, at the same time as becoming natural again, is playing out the history of nature. It is an unexpected reversal that enhances and valorises mankind as I have translated in the following:

‘The Copernican Revolution of the XVI century placed the Sun at the centre of the solar system, thereby downgrading the Earth. Modern cosmology suggests that our Sun is one of 1,024 stars in the universe, each likely to have planets. Darwin’s discoveries in the XIX century and the development of evolutionary science established that humans are just a twig on the tree of life, with no particular origin. In the XXI century, the adoption of the Anthropocene reverses this insignificance: humans are not passive observers of the Earth. *Homo sapiens* is central because the future of the only place where life is known to exist is determined by the actions of humans. In fact, we would say that humanity has become a geological superpower’ (Lewis & Maslin, 2015).

Man, now occupies a privileged position on the planet and has become a geological power. The human trifle referred to by Kant (1990) has become enormous; it is no longer powerless in the face of nature; the situation has been reversed, and it has become super-powerful. Man is capable of shaping the history of nature by modifying the major natural balances, by changing the composition of biodiversity, the atmosphere and the oceans. We are now capable of influencing the course of natural history, to the point of ushering in a new geological epoch. This idea of a fortunate turn of events has also been supported by Steffen, Crutzen and McNeil (2007), who believe that human activities have become so pervasive and profound that they rival the great forces of nature and are pushing the Earth into a planetary *terra incognita*. Archer (2016) also makes a similar analysis assuming that humanity is becoming a climatic force comparable to the orbital variations that drive glacial cycles. In addition, Syvitski (2012) asserts in the same vein that from now on, we are regularly slowing down and speeding up natural processes, achieving extraordinary concentrations of energy and altering, destroying or creating ecosystems.

Without realising it, these reflections put one of the classic problems of the philosophy of history back into circulation, more specifically the question of the feasibility of natural history. They raise the question of whether human beings make the history of nature with full knowledge of the facts. Several scientists answer in the affirmative form, acknowledging that from the beginning of the XXI century, humans have become a self-conscious geological agent: “Humanity is becoming, in one way or another, an active and self-conscious agent in the functioning of its own survival system” (Steffen, Crutzen and McNeil, 2007). They have been further when they assert the following:

‘A new stage of the Anthropocene is unfolding. Humanity is not only influencing the functioning of the Earth system on a global scale, it is, in one way or another, on the verge of becoming an active manager of the planet’s global environments’ (Steffen, Crutzen and McNeil, 2007).

Nature can be managed in the same way as a business. Man has techniques for organising resources, administering and directing nature to satisfy his needs. In this governance of nature, man is neither acquiescing to the natural order nor trampling on it. He is omnipresent in the sense of ‘*natuvorous*’ (which devours the nature), domineering, hypertrophied, massive and invasive. These are the main features of this active manager. Man is valued at the expense of nature, which we seek to control ever more or better, or just as well, cannibalise. For other authors too.

‘The most striking feature of the Anthropocene is certainly that, it is the first geological epoch in which a determining geological force is actively aware of its geological role. The Anthropocene therefore really begins when humans become aware of their overall role in the formation of the Earth and, consequently, when this awareness shapes their relationship with the natural environment’ (Pallson *et al.*, 2013).

Lewis and Maslin (2015), after a rigorous demonstration, arrive at the same idea: “The power that men exercise is unlike any other force in nature, because it is reflexive and can therefore be used, revoked or modified.” We note a variation in the re-characterisation of man’s influence on nature by moving from the naturalistic vocabulary of force to the political vocabulary of power, substituting action determined by decision. Hamilton (2017) also agrees with these thinkers on this point: “The future of the entire planet, including that of many forms of life, now depends on the decisions of a conscious force, even if the signs of its concerted action are only embryonic”. In another text, he announces the totally new nature of this situation as translated below:

‘The transformation of the entire Earth system by a living organism is not unprecedented. The oxygenation of the atmosphere 2.4 billion years ago is attributed to cyanobacteria. Humans, however, have the ability, which cyanobacteria did not have, to decide how and to what extent the Earth system will be transformed; they may even choose to try to regulate the entire system through geoengineering’ (*Ibid.*).

The profound changes brought by man on nature are nothing new in the history of humanity. What is completely new is man’s seizure of power over nature, which refuses to be docile as it once was. This refusal to accept nature’s inertia has resulted in a greater human desire to shape and control it. This feasibility and control of nature will give rise to some utterly disconcerting projects.

**Humanity Makes and Controls the History of Nature:** Much of the vocabulary surrounding the ecological crisis has applied the principle of feasibility to nature. The possibility of “manufacturing one’s environment”, of “managing”, of “making” nature is entirely conceivable for humanity. Some authors have gone very far in the idea that managing nature is a feasible virtuality. These include Lynas with his book: *The Good Species: How the Planet Can Survive the Age of Humans* and Galarraga and Szersynski: “Making Climates: Solar Radiation Management and the Ethics of Fabrication” in Preston (ed.), *Engineering the Climate: The Ethics of Solar Radiation Management*. For these researchers, the ecological problem is a great challenge, an opportunity for humanity.

Humanity has nothing to complain about; it should even proudly display the new face it has given to nature and be satisfied with its determined work on it. This is where the exhibition “Welcome to the Anthropocene: the Earth in our hands”, held at the Deutsches Museum in Berlin from 5 December 2014 to 30 September 2016, comes in. The aim of this exhibition was to show how “humanity as destroyers, but also as creators and designers” has been modified by science. Anthropogenic humanity shaped and modified by humans is said to be in the making, and the Anthropocene is said to be a major factor in the development of their dreams. This discourse takes a variety of forms. For those who call themselves “eco-pragmatists” and “eco-modernists”, economic development and the destruction of nature are “now irreconcilable”. Their founding “Manifesto” of 2015 states:

‘To say that the Earth is a human planet is becoming truer every day. Humans are the product of the Earth, and the Earth in turn is the product of humans. This is what many geoscience experts are saying when they declare that the Earth has entered a new geological era: the Anthropocene, the age of humans.

As academics, scientists, activists and citizens, we write this manifesto driven by the conviction that knowledge and technology, wisely applied, could make for a good, even remarkable, Anthropocene. A good Anthropocene requires humans to use their ever-growing technical, economic and social capacities to improve the human condition, stabilise the climate, and protect nature’ (2015).

Convinced that global warming is a technological “challenge”, they believe that the fight should be directed towards the use of nuclear energy to replace fossil fuels, in a form yet to be defined. For these authors, the acceleration of “innovations” and “technological progress”, with the collaboration of the State, entrepreneurs and civil society, is the appropriate response to the “Great Acceleration”. This is a “techno-utopia” that reminds us of the technophile optimism of the “Accelerationist Manifesto” (Srnicek and Williams, 2016), which shares the idea that acceleration must be remedied by acceleration. The difference between this and the “Eco-modernist Manifesto” is that the latter does not seek to go beyond capitalism, but rather to create conditions for it to continue, by helping it to integrate promising new markets. It could not be otherwise, given that David Keith—one of the academic signatories of the manifesto—spends a third of his time in Calgary, where he runs Carbon Engineering, a company he set up to develop and commercialise a technology for capturing CO<sub>2</sub> from the atmosphere in order to “rapidly accelerate our transition to a net-zero energy world”.

The stated aim of a transition to zero energy consumption should not obscure the eco-modernists’ penchant for geoengineering. If we look closely, we see that the acceleration of technological progress and innovation with which they intend to respond to the Great Acceleration is not only aimed at developing alternative energies, but also at developing certain technologies to directly remedy the causes of global warming. The ambition is to “deliberately manipulate the planetary environment on a large scale in order to counteract anthropogenic climate change” (Federau,

2017). The idea of correcting the environment through technology immediately turns humanity into a ‘*Homo faber*’ who wants to be a ‘*Homo gubernans*’, to use Szerszynski’s expression (2012):

‘But perhaps *Homo faber* could still flourish? Many of the proponents of the coming ‘good’ Anthropocene certainly suggest that scientific and technological progress is such that humanity will soon be able to ‘*engineer*’ the planet, to take control of its key systems in order to optimise them for human habitation and prevent ecological *collapse*. And it is true, for example, that the image of the ‘*maker of climate*’ that currently dominates contemporary climate engineering discourse is an idealised figure who knows in advance the shape he wants the climate to take, who can identify the process by which the climate can be made to take the desired shape, who can implement that process, and for whom all uncertainties are exogenous factors that can in principle be eradicated by future technical improvements’ (Szerszynski’s, 2012).

Geoengineering completes Descartes’s dream of making man “master and possessor of nature”, but with highly sophisticated technological means and large-scale domination. The history of nature is made by mankind, in the sense that mankind can manufacture, model, create and control the evolution of the climate. This *anthropisation* of nature was first officially defended by Paul Crutzen under the name Anthropocene. For him, the Anthropocene is a geological epoch characterised both by man’s negative impact on nature on an ineffable scale and by his power to solve this problem. What man has done wrong; he can do right. To do this, Crutzen (2006) explores the possibility of artificially stimulating the capacity of the atmosphere by sending particles of sulphur into it to allow it to reflect the sun’s rays and thus cool the climate. This manipulation of the climate reflects the integration of nature into the sphere of human action. Nature becomes an immense artefact that humans can heat up and cool down at will: “The barriers that have long existed between nature and culture are breaking down. It’s no longer us against ‘Nature’. Rather, it is we who are deciding what nature is and what it will be” (Crutzen and Schwägerl, 2011).

Crutzen’s proposal, like that of geoengineering, aims to control the causes of global warming, which is a noble intention, but it seems a little fanciful if we consider its means. The idea of increasing the radius of the Earth’s orbit around the sun by sending nuclear rockets into an asteroid belt, or that of whitewashing mountains to increase their ability to reflect light, seems to draw from the imagination rather than the actual practice of putting an end to the phenomenon of global warming. Just thinking about the proposed solutions fills the mind with amazement. For example, sucking carbon dioxide out of the air and storing it elsewhere, by depositing it on the ocean floor using chemical or mechanical manoeuvres, would be a responsible solution to global warming (Hamilton, *Op. Cit.*). Another solution is to reduce the amount of solar radiation reaching the Earth by lightening clouds over the oceans or by injecting sulphur-coated aerosols into the stratosphere. The financial and technical feasibility of these operations remains to be seen, but they are not a whim of geoengineering in search of a sensational experience. They are ideas defended with conviction by scientists such as Crutzen, or Latham and

Slater (2008), who have worked on brightening marine clouds. Businessmen such as Richard Branson and Bill Gates have invested money in this sector because it is seen as 'promising'.

We take on board the common objection raised against certain advocates of geoengineering, who see it as an appropriate means of continuing the capitalist productivity race, of maintaining *business as usual*. Once the climate can be made and remade, there is no need to worry about the future of the planet. The great machine of atmospheric pollution can run at full speed without fear of a single grain of sand likely to jam the system and stop it in its tracks. Palliative solutions are even being considered in case geoengineering proves ineffective. One example is the creation of artificial floating islands that will enable us to adapt to rising sea levels. As we all know, these small private artificial islands that function as climate deceleration devices can only be afforded by a few lucky billionaires<sup>1</sup>. If a general catastrophe were to occur, the solution would be to change planet, or to find a new place for humanity to live. Elon Musk's plan to colonise Mars and Jeff Bezos's dream of conquering the solar system, which is set to become a reality with his company Blue Origin, which is developing space transport technologies, show that this is not just a dream of exalted brains. In the event that the solar system turns out to be very unwelcoming, there is an exoplanet that is potentially habitable. This is *Proxima b*, 4.2 light years from Earth<sup>2</sup>. These scenarios, worthy of science fiction, are indicative of a dilation of the model of a Promethean humanity beyond terrestrial nature.

**Objections to Geoengineering Solutions:** Geoengineering has regularly come under both epistemic and normative attack. Its desire to control the history of nature and manipulate the climate is the ultimate form of arrogance, as Larrère (2015). Normative critics put forward the idea that the ideology of geoengineering places the destiny of the planet entirely in the hands of mankind, whereas in reality man cannot exist without the Earth, but the Earth can continue its rounds without man. The epistemic objection, for its part, takes up the argument of ignorance developed by certain philosophies that postulate that human beings make history, but misunderstand the history they make, because they do not properly anticipate the consequences of their actions, which sometimes end up producing the opposite of their original intention. In other words, this is the thesis of irony or the perverse effects of history. Transposed to the history of nature, it means that geoengineering is mistaken in thinking that nature is totally controllable and predictable, thereby ignoring one of the main lessons of global warming, namely the unavailability of natural predictability:

'The scientific and technical power of modernity was based on the predictability of nature. It is this system of predictability that is disappearing in the Anthropocene

<sup>1</sup> For more on this subject, see Maxime Lerolle's article "Des milliardaires rêvent d'îles artificielles pour échapper au réchauffement", referenced at <https://reporterre.net/Des-milliardaires-revent-d-iles-artificielles-pour-echapper-au-rechauffement>.

<sup>2</sup> Morin provides us with a wealth of information in his article "Proxima b : découverte de l'exoplanète la plus proche de la Terre", which can be found here: [https://www.lemonde.fr/cosmos/article/2016/08/24/une-terre-temperee-autour-de-notre-plus-proche-etoile\\_4987469\\_1650695.html](https://www.lemonde.fr/cosmos/article/2016/08/24/une-terre-temperee-autour-de-notre-plus-proche-etoile_4987469_1650695.html).

[...]. This idea that technology is going to save us from the consequences of technology (the effects of industrialisation) ignores the fact that the ills from which we suffer stem precisely from the limits of prediction: we have not taken into account the unintended consequences of technical developments (*Ibid.*).

Global warming reveals the limits of human predictability, indicating that nature has become as imponderable as human history. We are not saying that climate modelling does not make it possible to anticipate reliable scientific forecasts. The degree of confidence in these forecasts even legitimises talk of a climate emergency, but as Chakrabarty, it is almost impossible to date *tipping points* precisely. The 'tipping points' at which the Earth system will take the path of no return escape our vigilance (Chakrabarty, 2014). Nature's future is thick, and geoengineering seems to be ignoring this fundamental indication by renewing its project to dominate it, even though this ambition has already come up against destructive undesirable effects. If geoengineering is to be put into practice, new and more perverse effects are to be feared, worse than the evil it is supposed to prevent. For example, the spraying of sulphur aerosols into the stratosphere can completely damage the ozone layer. Carbon dioxide deposited at the bottom of the oceans can end up being released and rise massively to the surface of the atmosphere, and the lighting of marine clouds can have a significant impact on rainfall in certain parts of the Earth (Hamilton, 2013). The "good Anthropocene" risks becoming a painful dream, a veritable horror. The proponents of geoengineering want to make nature history, but they don't know the history they are planning to make. These "climate sorcerer's apprentices", to quote Hamilton, have not understood that the Anthropocene has definitively put an end to the contemporary project of making history, and their credo is totally outdated:

'It turns out that the "intelligent animal", which has succeeded in distinguishing itself sufficiently from nature to create its own history, has so transformed the Earth that it now looks anxiously towards a future that promises unpredictable instability and dangers. Contrary to the modernist credo, it is no longer possible to maintain that human beings make their own history, because the stage on which that history unfolds has entered the game as a dynamic and, for the most part, uncontrollable force' (*Ibid.*).

Contemporary man's claim to make the history of nature would have resulted in the loss of his ability to make his own history. It would have made history unpredictable and uncontrollable. Man has unleashed an unstoppable dynamic, the 'Great Acceleration' of decline and threat. These criticisms make geoengineering a dangerous, outdated ideology, but should we abandon it? From our point of view, that would be a mistake. We fear that this concept could "ultimately pave the way for the geoengineering apprentices whose normalisation is worrying for any democratic and/or genuinely ecological approach to ecology" (Sagan, 2019). But this is not inevitable. We do not espouse the ideas of geoengineering, but we must be careful not to confuse the two. Hamilton himself points out that there is such a thing as bio-geoengineering, based on reforestation or the use of biochar, a natural soil fertiliser that captures carbon (Hamilton, *Op. Cit.*). This form of geoengineering seems to

us to be entirely recommendable. It is true that some supporters of chemical geoengineering have reservations about its use. In 2006, when the idea was first mooted by the chemist Crutzen, he saw the injection of sulphur aerosols as the worst possible way of covering up the inaction of political decisionmakers. In his view, “by far the best way to resolve the dilemma facing policy-makers is to reduce greenhouse gas emissions. So far, however, attempts to do so have been largely unsuccessful”(Crutzen, 2006). After a detailed review of all the different geoengineering techniques, in another study published a year later, his conclusion was a strong warning about the risks of side effects:

‘For the time being, however, the mere suggestion of geoengineering options may raise serious ethical questions and intense debate. In addition to fundamental ethical concerns, a critical issue is the possibility of unintended and unforeseen side effects that could have serious consequences. The cure could be worse than the disease. To take the example of the sulphate injection described above, the residence time of sulphate particles in the atmosphere is only a few years, so if serious side effects occur, the injections might have to be stopped and the climate would return to its previous high CO<sub>2</sub> state within a decade’ (Steffen, Crutzen and McNeil, 2007).

Geoengineering is an emergency plan designed to support the planet should it find itself on life support, so it should only be used as a last resort. It is not even the only solution to global warming. Between geoengineering and the inaction or irresponsibility of *business as usual*, there is a third way. The latter, which is widely recommended, aims to promote lifestyles that have no harmful consequences for nature, or to review the way in which technology is used. The policies developed vary according to context and country, and take different, sometimes opposing forms. They take the form of the development of renewable energies, the promotion of non-polluting technologies, energy saving and reduction, green agriculture, recycling and waste sorting, sustainable development with or without capitalism, and so on. Despite their differences, what all these measures have in common is that they put the technophile insouciance of geoengineering and the alarmism of the deluge back-to-back. They express a clear awareness of human responsibility for the destruction of nature.

## CONCLUSION

Man’s desire to manage the planet, to shape the climate, to influence the history of nature so as to bring it entirely under his control has led to an unexpected turnaround. This happy, unexpected situation has elevated man to the privileged position of geological power. The human trifle has become super-powerful, and is now capable of influencing the course of natural history, to the point of ushering in a new geological epoch. Humanity is knowingly shaping the history of nature. This control should make it possible to deliberately manipulate nature and nurture the possibility of thwarting climate change through highly sophisticated technological means. Such a possibility is the translation of the integration of nature into the sphere of human action. Nature becomes an immense artefact that man can manipulate at will. This claim has given rise to some utterly disconcerting solutions that are not the expression of a whim of geoengineering in search of

savagery. They are defended by scientists who extrapolate the model of a Promethean humanity beyond terrestrial nature. Against such a position, we have put forward the idea that man is mistaken in thinking that nature is totally controllable and predictable, because he is unaware that one of the main lessons of global warming is precisely the unavailability of natural predictability. Global warming reveals the limits of human predictability, indicating that nature has become as imponderable as human history. We have not argued that climate modelling does not make it possible to anticipate reliable scientific forecasts. We have said that it is even the degree of confidence in these forecasts that legitimises talk of a climate emergency, but it is almost impossible to determine with any precision the ‘tipping points’ that would send the Earth system into the abyss. The project to make nature feasible and control it has already come up against destructive undesirable effects, and if mankind decides to continue down this path, new and more perverse effects are to be feared. The “good Anthropocene” risks becoming a nightmare. However, we must not forget that the various solutions proposed by geoengineering are an emergency plan to be used only as a last resort. All these measures express the illusion of man’s superpower and a clear awareness of his responsibility for the destruction of nature.

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