

Is There a New *De Re Aedificatoria* in Our Dystopian Epoch of the Anthropocene?

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The utopian essence of modernity was centred on a triumvirate – built on the congruence between the sovereign state, the techno-science establishment, and the globalized market economy. This triangle of power has commodified nature and created a fragmented, pragmatic, and operative world culture, which has led us to the crossroads we are collectively facing. The Anthropocene, from a philosophical point of view, is thus the time of the emergence of a dystopia that was born, not from any piecemeal feature of modern history, but from the uncritical and disproportionate fulfilment of modern utopian agendas.

- 1 Leon Battista Alberti, *Da Arte Edificatoria* [1585], translation by A. M. do E. Santo, review by M. J. T. Kruger, Lisboa, Fundação Calouste Gulbenkian, 2011.
- 2 Thomas Morus, *Utopia* [1516], bilingual critical edition, translation and commentary notes by Aires A. Nascimento and introductory study by José V. de Pina Martins. Lisboa, Calouste Gulbenkian Foundation, 4th edition, 2016, 516–517.
- 3 “Die Philosophen haben die Welt nur verschieden interpretiert, es kommt drauf an sie zu verändern,” Marx/Engels Gesamtausgabe (MEGA), Berlin, Akademie Verlag, 1998, Vierte Abteilung, Band 3, S. 21.

We know that Thomas More’s seminal text, which initiated the utopian inner trend of modernity, has older roots. Not only those of Platonism and Neoplatonism, but also other sources much closer to him, such the literary blossoms of the Renaissance movement, where the author of *Utopia* (1516) is affiliated as his most important English exponent. In the urban design of the Utopia’s fifty-four cities that the Portuguese Raphael Hythlodaeus — More’s main character — found in that imaginary country, there are clear traces of the foundational book of modern and contemporary architecture, born of the genius of Leon Battista Alberti (1404–1472). Although completed in 1452, the ten books of his *De Re Aedificatoria* only became influential after being the first theoretical work on architecture to be printed (1485).¹ The theme of building and transforming spaces, whether man-made or natural, is a key element to modernity, which still prevails in our 21st-century world view. Thomas More himself had no hesitation in considering that the lack of appropriation of arable land, through technologically supported agricultural work, was “cause” enough for the inhabitants of Utopia to wage “a just war” (*iustissimam belli causam*) of conquest against neighbouring technically indigent indigenous peoples. There could be no clearer and more justifying preface to the coming global tragedy of European colonization and imperialism, of which we are now experiencing the twilight colours.²

We live in an epoch whose conceptual core is paradoxically philosophical, even though this discipline is now residual and seems to be absent from collective life. We live in a philosophical age, because what we call the global environmental and climate crisis not only has a dangerous existential and ontological dimension, but it is also the result of the consistent Hegelian “fulfilment” (*Verwirklichung*) of the project of European modernity, which began with the Portuguese caravels and matured in the self-consciousness of German idealism, including Marx’s powerful eleventh thesis on Feuerbach: “Philosophers have only *interpreted* the world in different ways, but the point is to *transform* it.”³ The paradoxical dimension of our time, which becomes even more poignant if we reflect on the great and accelerated metamorphosis that the planet has undergone in the last sixty to seventy years, lies at the root of this tragedy that involves the whole of humanity. This time, unlike in classical Athenian tragedy, this dark fate that we can already glimpse, but which we are apparently powerless to change, is not the fault of a supernatural external cause. It is not the whim of the Olympian gods that should be blamed for the growing entropy in the equilibrium state of global life-support ecosystems. The threat implies the possibility of profound damage to the biophysical conditions that could allow human history to continue in a regime of civilizational complexity and refinement. This unprecedented situation is not the result of blind indifference to our fate on the part of colossal and overwhelming physical forces. There is no one to blame but us.

- 4 W. Steffen, K. Richardson, J. Rockström, et al. (2020) “The emergence and evolution of Earth System Science,” *Nature Reviews Earth & Environment* 1, 54–63.
<https://doi.org/10.1038/s43017-019-0005-6>.
- 5 W. Steffen, & Jamie Morgan (2021), “From the Paris Agreement to the Anthropocene and Planetary Boundaries Framework: an interview with Will Steffen,” *Globalizations*, 18:7, 1298–1310, DOI: 10.1080/14747731.2021.1940070.

1 The Meaning of the Anthropocene as the Landscape and “Epoch” of Today’s World

The history of modern science unambiguously shows the collective and institutional nature of the scientific enterprise. It requires material and human resources, organized with a long-term perspective. The scientific enterprise must be linked to the education system, supported by public strategies and budgets, in coordination with market players, legitimized by the support of public opinion and civil society organizations. The process of moving from a piecemeal, dysfunctional view of environmental issues — which tends to hide their seriousness and complexity — to a holistic, integrated view, capable of offering representations and models with a solid quantitative basis and rigorous adherence to concrete reality, has been rather slow and painful. It was necessary to bring together disciplines and, above all, people from different academic cultures. It was essential to reshape scientific projects, including difficult interdisciplinary strategies and complex funding models. This path, which deepens the theoretical legacy of systemic thinking and the effort to model complexity that we have already encountered in *The Limits to Growth* report (1972), began to be undertaken, with deliberation and awareness on the part of those involved, during the 1980s (the end of the Cold War freed up the means and will for this highly refined epistemic expansion). The result was what is known today, often without realizing how new this achievement it is, as “Earth system science.” In its maturing process, not only have the natural sciences been brought together, but the social and human sciences have also been engaged.⁴

By overcoming the specialized and fragmented view of “nature” that has prevailed for centuries in modern Western scientific culture, the coordinated study of the Earth system makes it possible to give visibility to complex “emerging” phenomena and processes, objects of knowledge that only become visible through the combination of fields that were previously seen as specialized and tendentially autonomous areas. This is the case with a key indicator for studying climate change, global average surface temperature, as Will Steffen, one of the most important scientists in research into the Anthropocene, explains:

Basically, the “Earth System” refers to the interacting physical, chemical and biological processes that operate across, and link, the atmosphere, cryosphere (ice), land, ocean and lithosphere. These processes create “emergent properties” – that is, properties and features of the Earth System as a whole which arise from the interaction amongst these spheres. Global average surface temperature is a good example – it is a property of the Earth System as a whole.⁵

- 6 Will Steffen et al. (2004), *Global Change and the Earth System: A Planet Under Pressure*, Berlin, Springer, IGBP Series.
- 7 Paul J. Crutzen & E. F. Stoermer (2000). “The ‘Anthropocene’,” *Global Change Newsletter* 41: 17–18.
- 8 Richardson, K. et al. (2023), “Earth beyond six of nine planetary boundaries,” *Science Advances* 9. <https://www.science.org/doi/pdf/10.1126/sciadv.adh2458>

In this transformative movement, Will Steffen (1947–2023) play a double innovative role. Firstly, as executive coordinator of the IGBP (International Geosphere-Biosphere Programme) — which ran from 1987 to 2015 — he helped to consolidate the Earth system science endeavour. Secondly, he was a strong advocate of the Anthropocene, as a new epoch in which the history of humanity is intertwined with the history of the Earth. It was in this spirit that Steffen coordinated the first work in which the Earth system and the Anthropocene are interrelated in a coherent and systemic way.⁶

The concept of the Anthropocene was introduced in 2000 by two researchers involved in the scientific revolution of the Earth system.⁷ It is a proposal that rigorously translates the way in which recent and dynamic historical temporality, which is measured in decades and centuries, has been able to insert itself into the long-term time of geology, which is measured in millions and tens or hundreds of millions of years. The initial proposal in 2000 suggested 1750, the year of the advent of the steam engine in the English Industrial Revolution, as the date on which the Holocene geological epoch (which began roughly 11,700 years ago, at the end of the Würm glaciation) would give way to the Anthropocene epoch. This was defined by humankind’s ability to leave deep, wide, and transformative footprints on the planetary software for many millions of years to come, such as the chemical structure of the atmosphere, the ozone layer, the major cycles of water, nitrogen, carbon, phosphorus, the balance of biodiversity, the average global surface temperature, etc. Subsequently, studies evolved to produce a model of the Earth system and its “planetary boundaries.” The model has been updated, containing from the beginning the study of nine interdependent fields — each with a boundary, parameters, quantitative data referenced to a pre-industrial level — and their respective interaction processes. The Earth system modelled in this way comprised the following fields and their respective limits: 1. climate change; 2. biosphere integrity; 3. biogeochemical flows (phosphorus & nitrogen); 4. stratospheric ozone depletion; 5. ocean acidification; 6. freshwater change; 7. land system change; 8. atmospheric aerosol loading; 9. novel entities.⁸

The research is still open, but what we do know already is enough to understand that we are drifting away from the Holocene conditions, favourable to the human dwelling of the Earth within the realm of a complex culture and society. Not only have we already crossed the red lines of most of the nine “planetary boundaries” that allow us to measure the planet’s state of health, but we are also compelled to rethink what should be the most appropriate chronology for the start of the Anthropocene. If we count from 1860, when the Industrial Revolution was no longer confined to Great Britain, we see that by 2019, 75 percent of all greenhouse gas emissions have been made in just the last 49 years, since 1970. It was only since the second half of the twentieth century that the overwhelming majority of the 45,000 dams over 15 m high were built, capable of storing 6,500 km³ of fresh water,

9 Luke Kemp et al., (2022), "Climate Endgame: Exploring catastrophic climate change scenarios," PNAS 2022 Vol. 119 No. 34 e2108146119 <https://doi.org/10.1073/pnas.2108146119>

which corresponds to 15 percent of the hydrological flow of the world's rivers. The extinction of biodiversity has accelerated, particularly since 1970, to levels that are almost 1000 times higher than pre-anthropogenic levels (many biologists consider that our species will be responsible for the sixth mass extinction since the beginning of life on the planet). The cryosphere is clearly becoming unbalanced, comparable only to periods that occurred several million years ago, in the Pliocene period, when *Homo sapiens* was still far from emerging. The biogeochemical cycles of nitrogen and phosphate have also been exponentially affected by human activity.

The Anthropocene epoch must be viewed, at least initially, with purely descriptive neutrality. It is neither a hymn nor an indictment of humanism or anti-humanism. It simply describes a factual situation: today, humanity is not only the dominant biological species, but also the earthly physical force with the capacity to radically and permanently alter the Earth system. That should not stop us from expressing our deep concern about the course this domination is taking the planet on, with disastrous consequences that are already causing millions of people to suffer every year. The destruction of the carrying capacity of ecosystems which have been devastated and impoverished by intensive agricultural practices, deforestation, extractive activities, or the extreme events resulting from climate change are causing natural tragedies of anthropogenic origin. They are driving hundreds of millions of people into a state of chronic insecurity and poverty, and tens of millions into the helpless condition of environmental refugees. All this erodes social bonds, creates conflicts within and between communities, contributes to the failure of state authority and the rise of public anarchy and disorder. Once again, while states continue to cultivate a culture of military might, completely disconnected from the sheer material reality of the Anthropocene planet, which has erupted at a dizzying pace in recent decades, the community of the Earth system scientists is looking to the future and warning of increasingly likely scenarios, completely out of control, that are being created by the toxic combination of the selfishness, ignorance, arrogance, and irresponsibility of the ruling political and economic elites.⁹

2 What Makes the Ontological Threat of the Anthropocene Invisible?

If we follow the initial vision of the Anthropocene proposal, we know that the emergence of the global environmental crisis overlaps with the beginning of the English Industrial Revolution (1750). It is, however, undeniable that the process of environmental degradation, including the historically unprecedented accumulation of greenhouse gases in the atmosphere, intensified exponentially in the second half of the twentieth century, after the Second World War, in the period that should be referred to as the Great Acceleration phase of the Anthropocene. However, the roots of the main

10 W. Steffen, P. J. Crutzen, J. R. McNeill (2007)
“The Anthropocene: Are humans now
overwhelming the great forces of nature?”
AMBIO 36: 614–621.

driving forces behind the growing impacts of human material culture on the natural environment, as well as the stubborn ignorance or devaluation of these impacts, are much older. Let us try, in a very condensed way, to identify what I call the masking factors, responsible both for concealing the growing symptoms of the global environmental crisis and for the lack of understanding of the shared and common nature of its long-term negative consequences.¹⁰

2.1 The Utopian Soul of the Modern Technoscientific Revolution

The various revolutions of the period of modernity began in the fifteenth century in Europe with the expansion of knowledge and the Western occupation of almost the entire planetary geography. In parallel with this came the emergence of a new understanding of nature and the role of science, and a real metamorphosis in the way humanity began to see itself and to rethink and reframe its relationship with the natural world. Not only has there been a quantitative change in the essence and uses of science, but also a real qualitative change. Science came to be understood as being increasingly linked to technology. Scientific endeavour began to be conceived with the aim of taking theoretical knowledge of natural processes as a lever for the effective transformation of that same natural world through technologies that would limitlessly extend human mastery over nature. Science (*episteme*) seen as the intellectual contemplation of reality, which had pleased the ancient Greeks, shifted, with the moderns, to become a driving force in the process of transforming and mastering the physical world. To serve this purpose, the key ingredient was the intimate unity between science and technology (technoscience). For the ancients, the search for a future that conforms to what is ideal, given by reason, should be the joint work of philosophy, ethics, education and politics. This idealized future (as Plato explains in *The Republic*) is essentially seen as a change in the relationship that human beings have with themselves and with each other collectively in the political realm. Unlike the ancients, the moderns believe that the great leap towards a better future should involve changing human societies’ relationship with nature through technology, seen as the embodiment of human knowledge and inventiveness. The new vision of science was driven by the broader goal of increasing human power over natural forces and processes, implementing practical and useful applications that could be developed through the invention and use of innovative technologies.

In modernity, technology ceases to be a mere secondary, instrumental outcome of scientific primacy and becomes the very vehicle and goal of a designed and desirable future, through our increased ability to alter and mobilize nature to satisfy our needs and even our whims. It is no coincidence, as we saw at the beginning of this essay, that the

11 T. Campanella, (2014) *La città del sole* [1602]. Trans. A. Seroni. Feltrinelli: Milano; F. Bacon, (1989) *New Atlantis* [1624]. In: J. Weinberger (ed) *New Atlantis and the great instauration*. Harlan Davidson Inc., Arlington Heights, IL, 61–159

12 European Environment Agency (2013) *Late lessons from early warnings: Science, precaution, innovation*. EEA report no 1/2013. European Environment Agency, Luxembourg, Europe.

13 K. Polanyi (2001), *The great transformation. The political and economic origins of our time* [1944]. Beacon Press, Boston, MA.

concept of utopia was invented in this period (in Thomas More's *Utopia*, 1516), and that the most influential utopias that followed it, such as those of Tommaso Campanella and Francis Bacon, have the increasingly predominant presence of technoscience as the driving force anticipating a desirable future.¹¹ We have reached the contemporary period with a full technological orientation of the scientific infrastructure and system, as well as its planning and operating procedures, in an atmosphere of uncritical optimism, averse to any prudence. The discourse of unlimited scientific progress marginalized dissenting voices and considered the growing number of negative environmental and social impacts as acceptable collateral damage.¹² The utopian impulse of technoscience is increasingly evolving into the opposite world of a dystopian nightmare.

2.2 The Complete Victory of the Market Society

A second concealing factor of general and fundamental importance is the absorption of technoscience into the economic sphere. Technoscience has become a productive force in a market of variable and cyclical geometry, but always tending towards the maximum possible extension. Technoscience has entered the competitive war for the conquest of market niches. The self-interest of companies with a capacity for technological innovation met with little opposition to the rapid implementation of patents in this field. With little or no regulation of environmental impact assessment, companies were able to circumvent the fragile vigilance of public policy, generally concentrated in the sphere of public health. Governments themselves have often become accomplices of these companies in the unrestricted and unconditional race to conquer markets, also as a way of asserting political and national supremacy. The replacement of society by the market, as a fundamental historical actor, paved the way for a profound shift from the model of a society with a market at its service, to the opposite model of a market that transformed society and nature into its two main satellites.¹³ The lessons of pure industrial capitalism and the tumultuous subsequent events that led to the first liberal globalization and its demise during the violent thirty years of world wars, revolution and depression (1914–1945) were quickly forgotten after three decades of welfare policies and lightly regulated capitalism. In the 1970s, the wheel of history turned, setting the world on the vertiginous path of a second neoliberal globalization, which entailed the intensification of all the environmental and technological risks that are now part of our daily lives.

No-one expressed more elegantly than Aldo Leopold (1887–1948) what was at stake in the surrender of science to the relentless hubris of the market. For Leopold, scientific knowledge had two faces: in its ability to shed light on the unknown and to broaden the horizons of our understanding of natural processes, science was a “searchlight”; but to the extent that knowledge transformed by technology becomes a destructive instrument

fig.1 International shipping, Vancouver.
Photo: Maria Bicker, 2018.



14 A. Leopold, (1977) "The land ethic." In: Leopold A (ed) *A Sand County Almanac* [1949]. Oxford University Press, Oxford, UK, 201–226.

15 M. Friedman, (1970, September 13) "The social responsibility of business is to increase its profits," *The New York Times Magazine*.

of power, science is also a "sword." Between the demands of the market and the imperatives of national security, even in peacetime, the sciences and scientists were driven to maximize efficiency, even at the cost of the wise light that could illuminate the potentially approaching dangers. The role of knowledge as a sentinel against risks and threats was therefore marginalized by an academy also caught up in the feverish desire for exponential growth.¹⁴

2.3 The Triumvirate of Modern Utopia and Its Fragmented Worldview

The third concealing factor strikes directly at the heart of international relations, conceived according to the model inherited from the treaties of Westphalia, which rebuilt the European international system at the end of the Thirty Years' War (1618–1648). Its intrinsic and rigidly mechanical understanding of sovereignty has kept international law, geopolitics and diplomacy under the biased spell of realpolitik, unable to filter out the rapid and dangerous anthropogenic transformation of the planetary software.

There is a strong congruence between these three driving forces of contemporary civilization, born in the same period of European history. These three elements of an authentic triumvirate, unrivalled in the contemporary world, share a very similar internal structure in fundamental aspects. They are united by the quest for increasing effectiveness in transforming the world. Science has been driven by its growing marriage with technology and its marvels. The market economy was fuelled by the fundamental imperative of growing investment and the limitless multiplication of capital. The modern state was driven by the tenacious attempt to affirm the validity of its major myths of sovereignty and autonomy. This triple convergence is densified into a triple fragmentation. Science is divided into disciplinary areas, epistemologically differentiated and even distant, united by an operational agenda dictated by the outside world, be it national security (such as the Manhattan Project that allowed the US to win the race to produce the atomic bomb) or private business objectives. Economics, as a theory and practical activity, is centred solely on its internal models and instrumental objectives, aimed at the unlimited growth of production, consumption and profits. What lies beyond this are externalities that can be set aside in the operation of both economic thought and its practice. The ideal type of company in a "free society" is portrayed by Milton Friedman in his classic 1970 essay, which bluntly states that there should be no such thing as "corporate social responsibility." That task should be assigned to government policies and not to private companies, whose job it is to maximize profits for their "shareholders."¹⁵ Finally, the state looks at the planet through the lens of the territorial projection of power, completely oblivious to the complex ecological functioning of the Earth system, concerned only with what lies within the sphere of its sovereignty, and largely indifferent to everything and everyone beyond its borders.

3 How Utopia Became Dystopia

Dystopia, as a literary genre and philosophical topic, has essentially been portrayed as a negative utopia. This implies considering specific aspects, already present or emerging, in the society in which the literary work arises, picturing a frightening future in which the seeds of risk, already visible, become painfully omnipresent. This is what Aldous Huxley did with his *Brave New World* in 1932. Benefiting from his friendship with futuristic British scientists, he anticipated a society dominated by the empire of biotechnologies transformed into post-human technologies. George Orwell did the same in 1948 with his novel *1984*, in which he imagined an asphyxiating totalitarian society. For this, Orwell drew on his direct knowledge of fascist and Stalinist totalitarianism.

The dystopia into which the Anthropocene epoch society has plunged is different. In our case, the root of today's expanding dystopia, which we all already feel in the anguish of the daily dysphoria between values and realities, is not the hypertrophy of particularly repugnant features. Our dystopia was not born out of any negative utopia, but out of the disproportionate transformation of the world by the totally positive programme of the modern utopian ideology, based on its driving triangle: technoscience, capitalist economics, and the sovereign state. This triangle, as we have seen, combines strength with concealment. Its core values are unassailable in isolation: who can blame the desire for emancipation and an increase in knowledge, or the health and comfort of human life? How can we criticize the human desire not to be a mere plaything of a destiny whose causes are hidden in superstition and ignorance? Our dystopia is born out of the synergy between these desired goals and their disproportionate enforcement, incapable of evaluating their limits and conditions of possibility. Erasmus of Rotterdam, in his *In Praise of Folly* (1511), identified the stamp of a universal and unrestricted foolishness at the heart of all human endeavours. We also have to be able, before daring to change the world we have already changed, to realize that this foolishness, in other guises, will always dwell at the heart of the best human ideas and intentions, if we are unable to fight relentless the drive towards the abyss contained in human arrogance disguised as enthusiasm and optimism for the future. As a matter of fact, the new *De Re Aedificatoria* which, like Ariana's thread, can help us out of the deadly labyrinth of the Minotaur, is still waiting for the author who can reveal it to the world.