

# The Omnipresence of the Technological

## A Project Review

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Since time immemorial, culture has been defined by technologies and techniques which intervene in nature, beginning with techniques for agricultural cultivation and the domestication of non-human beings—plants, animals, and ghosts. Humans build, tend, and destroy, they salvage and bury, they measure and mathematize. Nothing is more tightly bound up with the concept of culture than the epoch-making technologies of media-based writing, imaging, and sound-editing systems. Language, form, mnemonics: culture means coding.

At the same time, we harbor growing suspicions that the relationship between the two has now taken on an entirely new quality. We are noticing a more or less forced departure from the notion of a sublime nature, in whose wake human culture

first develops. According to the modern world view, culture acts against the backdrop of nature, a stable setting which serves as the immutable scenery to human actions. In his reflection on the Anthropocene, Peter Sloterdijk formulated this somewhat pointedly as thinking anchored in “backdrop ontology” where “the human being is the dramatic animal standing onstage before the backdrop of the mountain of nature.”<sup>1</sup> Highly industrialized, geologically impactful humanity now marks the end of this cosmic lack of concern. The simple distinction between the artificial and the natural reveals itself to be an illusion amid today’s interplay of anthropogenic climate change, biotechnological revolution, global infrastructures, environmental sensors, and industrially-managed agricultural ecosystems. What once was considered a conflict between culture and nature is manifesting as immanent interdependence. This unsettles our modern mindset and implies consequences for developing a new one. The Anthropocene is nothing more than a new relationship of effect becoming empirical.

Technology is undoubtedly both a key medium and driver of this effect. Since the beginning of the industrial age, scientists and engineers have developed powerful technologies which have rapidly grown into technological environments of their own. Over the course of the twentieth century, hyperindustrialization, technoscience and technological interconnectivity have massed together a feedback system of the technological, the social and the ecological that formed a space almost entirely saturated with technology. Technology, which has become nature, and nature, which has become technology, together blend and condense objects, events, collectives, material flows, histories, and consequences into a presence in permanence.

But how can we counter the interwoven social, technological, and natural dynamics that shape our contemporary world?

One possible approach to this incalculable multitude of spaces, times, and modes of existence is the concept of the *technosphere*. The technosphere allows us to gain an understanding of how the present composition of the technological, the geological, the human and the non-human manifests, and which scale-spanning operations are at work. It provides us with a way of understanding how we behave and move in the Anthropocene.

The term technosphere represents, first of all, the speculative idea that a technological sphere has been added to the metabolic processes of the Earth. This sphere interacts on a par with the complex processes defining the other Earth spheres, such as the biosphere, the atmosphere, and the hydrosphere. In geological terms, the technosphere is a new player in this elementary game of matter and flows of energy, and is, as such, a driver and catalyst for the transition into the Anthropocene. This will, on the one hand, lead to severe consequences for the global metabolism, reconfiguring the ways in which matter and energy flow, and how future life is evolving. A consequential revision to the Earth system of this kind would forge a direct link between the Earth's history and the history of humankind. On the other hand, however, the concept of the technosphere refers to the present and future situation of humanity itself, and describes that new planetary composite on and in which we will henceforth work, consume, intervene, vegetate, live, and die.

The concept of the technosphere is, therefore, as abstract as it is concrete. It offers a vision of how the natural and technological forces that we currently view as the condition of the present come together on a higher level. The technosphere is now embedded in almost all human-environmental interactions; to a considerable degree, it regulates the situation in which we find ourselves. In the hardware of extractive industries and transport systems, cities and agricultural land-

scapes as much as in the software of global norms and standards, in social regulatory systems and bureaucracies, and in the algorithmic trade of virtual assets, we are witnessing developments which are very tangibly of a technospheric nature. Within these technological alliances, the Earth's diverse human and non-human communities are drawn into an overheated system of mass production and mass consumption. Viewing the technical as technosphere allows us to examine specific infrastructures or socio-technological "apparatuses." The dynamics of these can furthermore be described in the abstract; their emergent systemic behavior can be analyzed. It is these, the technosphere's scalable layers of mediation, which establish a dimension in which we can adequately realize the omnipresent world of the Technological.

The term *technosphere* is not a new one. It has been employed occasionally by geographers and ecologists since the 1970s.<sup>2</sup> Nevertheless, it has acquired new currency and urgency in the recent debate on the Anthropocene. Geoscientists like Peter K. Haff and Jan Zalasiewicz have brought the term back into the conversation in recent years, characterizing the technosphere as a global field of activity in which natural and technological forces are condensed into a more or less autonomous unit, one whose zero point can no longer be named.

In fact, the technosphere acts as a kind of medium, manufacturing inclusion in the "simultaneity" of a singular, temporary situation. The technosphere behaves as if there were no yesterday and no tomorrow; its inner logic is that of the total present. Material and energy flows are designed, or modified, to perpetuate and maintain it. Deposits of chemically-bound energy—oil and coal—which have accrued over millions of years are burned in the here and now with no consideration for the potential geochemical and energetic consequences, i.e. the dramatic warming of our carbon-enriched ocean and atmosphere.

This modern fixation on the present has multiple origins. It was encouraged by the first waves of globalization, namely the colonization of the American continent and the global South at a time when European science, technology, and imperialist economy led to the development of global chains of raw materials, goods, and human exploitation. Four hundred years later, we are increasingly witnessing the effects of a natural world irreversibly deformed by industrial forces.

Ultimately, these destructive effects—holes in the ozone layer, global warming, the acidification of the oceans, toxic residues, and synthetic materials and organisms—are precisely the origin for cultural theory's recent occupation of with concepts that focus on the hybridization of nature and culture. And it is these crises at the border of the natural and social which opened up for political debate a more decentralized and distributed perspective on agency. It is time, then, to develop a cultural framework for this new, technological sphere. The dilemma of omnipresent global technologies and their time-critical presence was the main theme of *Technosphere*, an experimental research project at Haus der Kulturen der Welt (House of World Cultures or HKW), devised and conducted together with our colleagues Nick Houde, Janek Müller, Johanna Schindler, Anna Luhn, and Bernard Geoghegan between 2015 and 2019. It brought together players from the worlds of science, art, and society—and among them the authors of this volume—to examine the original mobilization and current escalation of the technosphere, and stimulated scientific and critical-aesthetic discourse.<sup>3</sup>

Below, we will discuss four concepts and moments which, each in their own way, attest to how human, planetary, and technological forces have merged to create the world's current framework. Questions concerning the operability of the planetary apparatus, the technical nature of knowledge practices and systems, historic moments of technological un-

leashing and their consequent path dependencies, as well as of the reformulation of what life means under technical conditions serve as testimonies exploring the technosphere's existence. They enable us to discover the depths and characteristics of the new gestalt, examine individual cases and phenomena, and test their logic and protocols. These four categories, which structured the annual events at the HKW, attempt to interrogate a sphere which acts in deafening silence.

### **Apparatuses**

The geoscientist and engineer Peter Haff<sup>4</sup> broadly defined the technosphere as the sum of large-scale systems of raw material and energy extraction and transmission, built environments, industrial production and agriculture, and communication and transport—but also financial markets, governments, state bureaucracies, and religious institutions, including their components, such as computers, tractors, office communications, and people. The starting point for our explorative research project were the systems, actors, and structures which participate in this dominant structure as well as the geological, cybernetic, and epistemic fractures and incidents which served to trigger and accelerate its emergence. The local occurrence of a critical element like phosphate, for example, is here seen as a component in a global process, or an “apparatus” as we wish to refer to such a system. Phosphorus is an element which uniquely illustrates the reach of the technosphere far into the fields of nature and culture. This basic substance is essential for all life, and is present in bones, DNA, RNA, and in the energy-regulating molecule adenosine triphosphate. The human diet depends on the industrial circulation of phosphorus used in fertilizers. The history of phosphate mining and the geopolitics that accompany it therefore provide an insight into how corporations and states work together to turn the lithosphere into agricultural profit and reveal the furrows of specific spheres of influence.

The technosphere supports and expands its area of activity, then, by configuring such apparatuses composed of human and non-human, organic and inorganic elements. In this way, genetically modified organisms, for instance, connect biotech laboratories in cities with regionally-structured agricultural economies in far-off countries. This connection is supplemented and rebalanced by other actors, such as patents, laws, stock markets, materials research, and NGO campaigns. Meanwhile, an immense fleet of airplanes and a dense network of airports makes it possible to transport freshly-harvested crops by means of subsidized fossil fuels, themselves released from the depths of the lithosphere. Here, then, processes requiring great periods of geological time—such as those which see energy from the sun chemically stored in the form of crude oil—are connected to the just-in-time procurement logistics of the networked commodity trade, such as greenhouse-grown vegetables in Spain. Above-ground freight companies and the underground microbes which transform the hydrocarbons are connected to a transversal network of activity. In the technosphere, there is no shortage of diverse temporalities and actors.

### **Technospheric knowledge**

But how do we come to know about this transversal network? And what is knowledge, exactly, in the age of the technosphere? Without modern science, there would be no technosphere, and without the technosphere, there would be no contemporary knowledge. The mutual relationship between the two—how they depend on, sustain, and reinforce each other—pervades current knowledge systems and their forms. On the one hand, contemporary knowledge enables a theoretical understanding of and technical control over energy and materials, thereby promoting the existence of a technosphere. On the other, it is the technosphere that organizes, shapes, and drives contemporary knowledge: through the media of data processing, institutionalized evidence produc-

tion, and the anthropotechnics of learning and understanding, among others.

The method of scenario-making, the term truth, and the practice of anthropotechnics capture three modes of knowledge which exemplify what may be termed “technospheric knowledge,” that is, the reciprocal facilitation and stabilization of knowledge production and the technosphere. They highlight the implicit promises, self-fulfilling prophecies, and dead-ends inherent to this liaison: the urgency of becoming aware of it, and the utopian potential it holds. They address technical means of speculating about an unforeseeable future, of scrutinizing measures for establishing juridical truth, and of broaching alternative technologies and practices of experience and being experienced.

Scenarios have been an established and powerful mode of knowledge for imagining and designing future socio-technical constellations since the mid-twentieth century. Unconventional strategies are required when exploring an uncertain future. When designing a scenario, a variety of methods—from computer simulations and game theory to “expert guessing”—are combined to create the basis for decision-making. Scenario development appears to be the *modus operandi* of a present day in which the global interconnectedness of biophysical, social, political, and economic factors has reached unprecedented levels. What is the architecture, effectiveness, and viability of this form of knowledge that treats the unknown as known? Indeed, operating “in scenario mode” appears to be a specific type of contemporary existence, an exploratory practice and tool which exemplifies the nature of understanding and researching the Anthropocene. It reveals how ignorance is prescribed, streamlined, and codified such that stable scenarios may emerge which provide—at least for a time—raw data to fill empirical gaps. And, ultimately, the science of scenario development promotes the formation and

stabilization of the technosphere itself to a certain degree, by upholding and promoting existing technical and mental infrastructures.

Data, evidence, and truth are grades of factuality which represent another interconnected reference system in which social and juridical knowledge is established and maintained. The same applies to the techniques and technologies for obtaining and explaining them. The question as to how factual knowledge develops within and through the technosphere, and what measures exist to identify, construct and prove legitimacy, objectivity, and reason, is one which pervades the systems of order in modernity. The concept of legal truth and truth-finding is connected to the technical production of certainty—particularly in relation to the sophisticated means and practices through which truthfulness is to be displayed. In the present age in which quantification is everywhere, when economic and governmental systems encounter a culture of excessive data keeping, or when governmental interrogation techniques turn the human body into a “body of evidence,” verification seems to be a question of handling data in the right way.

Ultimately, the intertwining of knowledge and the technosphere has a very subtle but crucial dimension: the sum of the collectively, mentally, and physically deep-rooted practices and routines required to perceive, coherently comprehend, and adequately respond to the dynamics of global change. What are the regimes of sense development, the ascetic modes of research, and mental cultivation techniques which lead us to learn and understand, and how do we establish forms of research which shape the interdependence of knowledge and the technosphere, instead of ignoring it? Reflections of this kind on the technospheric conditions of knowledge suggest the need for a new kind of “wisdom,” a constructive approach to the “technologies of the self” and

“anthropotechnics” of knowledge and its distribution.

## **Unleashed**

In order to understand the potential of such knowledge practices in the genesis of technological omnipresence, it is important and elucidating to understand how it came to be. The year 1948 was a catalyst of sorts.<sup>5</sup> It was the year cybernetics experienced its breakthrough moment thanks to Norbert Wiener’s book of the same name, the year in which an attempt was made for a world currency, the year in which the transistor was invented, the year the first photocopier was presented to the public, and the year of Stalin’s Great Plan for the Transformation of Nature. It was the year in which the Universal Declaration of Human Rights, petrochemistry, and information theory would begin to govern the relationship between man, molecule, and machine in an entirely new way. Chronologically situated at the starting point of the *Great Acceleration*—and perhaps the chronostratigraphic beginning of the Anthropocene itself—digital, nuclear, and molecular biological ages reinforced each other to create the comprehensive geo-biophysical-technical phenomenon we now call the technosphere. Technopolitical formations and dreams of new kinds of universalism thrived in the rubble of two world wars. The mobilization and manipulation of the smallest functional elements—bits, molecules, genes—ignited a cascading dynamic of interlinking nature and technology. A new, technologically-unfettered sphere of action emerged, giving rise to a number of political and cultural organizational systems.

Looking back, the year 1948 appears to have been a saddle point for the present day—and with it a fundamental process of unleashing. This unleashing developed by means of a diverse range of technological sciences, through research on an industrial scale, and political and artistic revolutions. And it is clear that these innovations extended across apparatuses, technocracies, and fossil fuel-based economies, which

together drastically changed the make-up of the Earth's ecological zones and simultaneously drove ideas and people, new hopes and new forms of destruction. Only in retrospect is it possible to trace how the crystallization of this technological and cultural framework galvanized the planet to become a technological habitat and a sphere of inherent agency.

### **Life forms. Forms of life.**

Increasingly, technologies shape the conditions which enable and limit our lives. Terms such as Anthropocene and technosphere aim to make the dynamic relationships between humanity, the environment, and technology visible and describable on a planetary level. Yet at the same time, the scale of these two concepts presents another problem: how can a person speak about such enormous, complete systems in their own local articulations? In other words, how do we find indicators for thinking about global relationships stemming from local realities? What standards can we develop for the present situation out of an unstoppable, one-size-fits-all "modernity?" Thus, if we are to understand global processes by connecting local circumstances, appropriate scales of design are required. Interventions in individual processes or local authorities may yield optimal results and practices within a certain context while leaving the global situation unchanged. There is not necessarily an interaction between local and global processes, except for the fact that relational references of this kind are essential to understanding economies of scale. So how can we expose and deal with this kind of complexity?

If we understand the whole technosphere as an accumulation of interventions in the Earth system, a constructive approach emerges, one much like the interventionist approach to the world on a molecular, systematic, and symbolic level which has prevailed since the mid-twentieth century, if in a less intentional and coherent manner. As a hybrid human/non-hu-

man infrastructure, the technosphere is diffuse and difficult to represent in prototypical form. Nevertheless, it shows how the Earth system is transformed, intentionally or unintentionally, rightly or wrongly, into a technical place of action, which organizes and reshapes dynamic processes of the planet and the life upon it into chance, agency, and relationship structures. We now realize that our technologies are intervening in processes on a planetary scale, but in light of this fact, what changes are desirable—what do we want to preserve? If the world is now open to technological changes, nature will become a venue for political agency, a space for negotiating and implementing targets, standards, and possibilities. At the same time, the ways we live and the surroundings we inhabit are increasingly determined by ethical values. Whose values will be reflected in the world of the future?

### **Reading the technosphere**

You hold in your hands a collection of essays, analyses, and reflections by twelve writers. Their texts instruct us about what happens when the technological competes with the natural to shape the world, and how the twentieth century became trapped in an endless loop of world and planetary technologies, where the boundaries between cause and effect, local and global, human and non-human, were perpetually blurred. This increasing interlacing of human culture, natural environments, and global technologies represents a new and highly dynamic component of the Earth system: the technosphere. Amorphous, complex, and contradictory in its design, it influences the actuality of our planet and the conditions of the contemporary human experience. This is a book about the omnipresence of the technological.

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## Endnotes

- 1 Peter Sloterdijk, "The Anthropocene: A Process-State on the Edge of Geohistory" in: Katrin Klingan, Ashkan Sepahvand, Christoph Rosol, Bernd Scherer (Eds.), *Grain Vapor Ray. Textures of the Anthropocene*, Vol. 3: *Ray*, The MIT Press, Cambridge, Massachusetts and London 2015, pp. 257–271, here 265. (Translated from the German by John D. Cochrane.)
- 2 Cf. Friedrich Rapp, *Analytische Technikphilosophie*, Alber, Munich (1978); Zev Naveh, "Landscape Ecology as an Emerging Branch of Human Ecosystem Science," in: A. Macfadyen Ford (Ed.), *Advances in Ecological Research*, Vol. 12, Academic Press, London 1982, pp. 189–237; Christoph Rosol, Sara Nelson, Jürgen Renn "In the machine room of the Anthropocene," *The Anthropocene Review*, 4, 1 (2017) pp. 2–8.
- 3 See also corresponding articles in the two special editions of *The Anthropocene Review* on the technosphere, edited by Sara Nelson, Christoph Rosol and Jürgen Renn: *The Anthropocene Review*, 4, 1 and 4, 2 (2017) as well as numerous entries in the *Technosphere Magazine* (available at <https://www.anthropocene-curriculum.org/project/technosphere-magazine>).
- 4 Peter Haff, "Technology and human purpose: the problem of solids transport on the Earth's surface," *Earth System Dynamics* 3 2 (2012), pp. 149–156; Peter Haff, "Technology as a Geological Phenomenon: Implications for Human Well-Being," Geological Society, London, Special Publications, 395 (2013), pp. 301–309; Jan Zalasiewicz et al., "The Technofossil Record of Humans," *The Anthropocene Review* 1 1 (2014), pp. 34–43, doi:10.1177/2053019613514953; Peter Haff, "Humans and Technology in the Anthropocene: Six Rules", *The Anthropocene Review* 1 2 (2014), pp. 1–11.
- 5 See Christoph Rosol's essay "1948" in the same volume.