

**The Danger of Modern Technology to the Environment:  
An Analysis from Heidegger's Philosophy**

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**Abstract**

This paper examines the environmental dangers posed by modern technology through analysing Martin Heidegger's philosophy of technology. This great German thinker argues that modern technology should not be comprehended merely as a grouping of instruments or machines. Instead, modern technology represents a mode of revealing that determines how human beings understand the world and relate to nature, which Heidegger conceptualizes as “enframing.” From there, the author analyzes Heidegger’s concept of enframing as the essence of modern technology. Enframing compels human beings to approach the world, in which nature is a significant part, through calculation, efficiency, predictability, and control. Therefore, in the worldview dominated by modern technology, nature is reduced merely to energy suppliers, raw materials, and, above all, a set of objects ready for technological ordering. From there, readers might find his philosophy of technology remains relevant, helping them explain the reason for the global destruction of nature today.

**Keywords:** Martin Heidegger, Philosophy of Technology, Environmental Crisis.

**1. Introduction**

The environmental crisis is connected with the growth of modern technology. Fossil-fuel systems, industrial agriculture, extractive infrastructure, transport networks, and large-scale manufacturing have changed the conditions in which human beings live on Earth. The Intergovernmental Panel on Climate Change (2023) states that human activities using technological devices have caused global warming. They have also produced extensive changes in the atmosphere, oceans, cryosphere, and biosphere. The environmental problem, therefore, should not be understood simply as a conflict between technology and nature. Rather, it is

necessary to examine the way in which modern technology shapes how human beings understand and relate to beings and to nature.

The famous German philosopher Martin Heidegger might offer an important theoretical perspective on this issue. He argues about the way technology discloses the world and gives meaning to technological objects, natural processes, and human activities. At the beginning of *The Question Concerning Technology*, Heidegger (1977) asserts that understanding technology as something neutral can prevent us from recognizing its essence. Technology, thus, is not simply a set of tools but a means by which things become available for human understanding and action.

From there, this paper develops a Heideggerian interpretation of technological danger to the environment. The author claims that the most dangerous effort is the attempt to disclose its nature, thereby making it appear primarily as a resource for human utilization.

## 2. Findings

### 2.1. Heidegger's Concept of Modern Technology

Heidegger (1977, p. 4-5) begins his analysis with what he calls the instrumental and anthropological definitions of technology. In this usage, technology is understood as a means to an end and as a human activity. These definitions are correct because turbines, aircraft, digital systems, and agricultural machines are produced and used for particular purposes. However, if we stop at the instrumentality of technology, we can only seek greater control over it. The main problem then appears to be using technology more effectively. Heidegger, however, argues that the desire for control may already express the technological orientation that needs to be asked.

Heidegger (1977, p. 12-13) then searches for an alternative approach to understanding technology through the Greek concept of “technē.” This concept refers to craft, technical skill, and above all, a manner of comprehending that opens or reveals something. Thus, he moves beyond both anthropological and instrumental definitions of technology, claiming it is a way of revealing. Therefore, the question is no longer only what human beings do with technology, but also how it allows nature to appear in particular ways. Dusek (2006, p. 75-76) explains the Heideggerian definition of technology not as a neutral collection of instruments, but as the force that makes us reveal nature in a particular way.

The difference between “technē” and modern technology in the Heideggerian thinking lies in his concept of “challenging-forth.” These two concepts of technology in the ancient and modern worlds are both ways of revealing. Technē allows us to bring a natural entity into the light

without harming it. Instead, modern technology rejects this technē-sort of revealing by turning nature into a source of energy that can be extracted and stored (Heidegger, 1977, p. 13). Heidegger contrasts the old windmill, which is left to the wind, with the modern extraction of energy from air, land, coal, ore, and uranium. The point is not that every old technology was peaceful or every modern device destructive. The distinctive feature of modern technology concerns an extreme tendency toward systematic availability, storage, acceleration, and command-oriented nature.

Heidegger's (1977, p. 15-16) agricultural example makes the environmental implication clear. The field cultivated through tending and care is transformed under a different ordering when agriculture becomes a mechanized food industry. Challenging-forth means extraction and organizing a chain in which what is unlocked is transformed, stored, distributed, and continuously reordered. Its governing imperatives are regulation and security, with production driven toward maximum yield at minimum expense. This is a logic of availability rather than simply one act of exploitation. Heidegger conceptualizes such a revealing as "standing-reserve". Standing-reserve moves beyond merely stored to depict the condition in which things are ordered to be immediately available for further ordering and in which replaceability and readiness for use become primary. In this sense, a forest can appear as timber inventory, a river as water power, soil as a production substrate, or an ecosystem as a bundle of measurable services. Enframing is the gathering of this ordering disclosure. Heidegger (1977, p. 19-21) defines it as the mode of revealing that challenges human beings to reveal the real as standing-reserve. Through modern technological tools, humans have enframed the nature. Thus, according to Heidegger, the essence of modern technology is enframing.

## **2.2. The Environmental Danger of Modern Technology**

Heidegger's account of modern technology becomes important for the environmental crisis. If a river is understood mainly as a source of energy, a forest as a supply of cellulose or carbon, and land as a deposit of resources, environmental degradation is not simply an accidental result. Rather, it becomes a consequence of a nature understood mainly in terms of exploitation. There are at least four dangers to nature created by modern technology.

The first danger is the challenging-forth, which is a common attitude toward modern technology. Challenging-forth separates natural beings from the relations that make them places, habitats, living processes, and conditions of shared existence. Such abstraction can be useful for scientific purposes. The problem begins when this useful abstraction is treated as a complete account of reality. Suarez (2020) argues that Heidegger's concept of nature is broader

than nature understood only as objectively present physical material. Nature appears in scientific investigation, but it is also experienced through pre-theoretical involvement and through ways of being that a purely physicalist account cannot fully explain.

The second danger is the dominance of calculative rationality, as a typical way of thinking made by modern technology. Heidegger does not reject calculation when calculation is appropriate. The problem arises when calculability becomes the main standard for determining what counts. Harvey (2009) applies a similar concern to environmental governance. He argues that cost-benefit analysis, technical risk frameworks, and efficiency models can push qualitative, cultural, ethical, and distributive concerns to the margins of environmental decision-making. This does not mean that environmental economics, life-cycle assessment, or risk analysis are illegitimate. Heidegger's critique instead asks us to examine the assumptions behind these methods. These assumptions influence what can become visible through them. For example, a wetland can be valued in financial terms for environmental compensation. This may help support a practical decision, but it does not fully express the wetland's ecological, historical, or communal meanings. The more we allow calculative rationality as a dominant way of thinking, the more we permit ourselves to harm nature.

The third danger is the effort to enframe nature. Enframing does not simply reveal nature in one particular way, but also hides the fact that this is only one way of revealing it among others. Heidegger (1977, pp. 26-27) argues that such violence can push other forms of disclosure aside and conceal the process of revealing itself. Thus, the greatest danger does not first come from dangerous machines. Nevertheless, it comes from the possibility that human beings lose access to more original ways of encountering truth. Environmental degradation can therefore involve not only physical damage but also a loss of ways of understanding and experiencing the world. When nature is increasingly treated as something to be managed, it may become more difficult to encounter nature in any other way.

The fourth danger is the illusion of mastery. Heidegger (1977, p. 27) then describes a paradox in which human beings have more power to order the world, while also imagining themselves as its masters, even though they are themselves incorporated into systems of ordering. Environmental politics often displays a similar paradox. Greater predictive capacity and technical intervention can encourage the belief that ecological systems are fully manageable, even though interventions may create new dependencies, uncertainties, and rebound effects.

McWhorter and Stenstad (2009) emphasize that we need to limit the desire for mastery over ourselves and reconsider humanity's place on Earth.

### **2.3. How should we avoid such dangers to the environment?**

According to Heidegger, readers come to conclude from four great dangers to the environment created by modern technology that purely technical solutions may be insufficient. Harvey (2009) argues that technical measures often address immediate symptoms, while leaving unchanged the lifestyles, institutions, habits, and values that continue to generate environmental pressures. Heikkurinen (2018) goes beyond Harvey's argument in the context of degrowth by suggesting that technological practices can sustain increasing material and energy use when nonhuman beings are continually understood as resources for transformation.

The example of Industry 4.0 shows why this argument requires nuance. The "Industrie 4.0" report describes cyber-physical systems in which smart machines, storage systems, and production facilities exchange information, manage processes in real time, and optimize material use across production networks (Kagermann et al., 2013). From a Heideggerian perspective, the autonomous control and continuous optimization still depict the force of "enframing." At the same time, the report explicitly presents resource and energy efficiency as environmental goals and provides examples in which digital technologies reduce energy consumption. The report also recognizes that smart factories require additional resources and therefore calls for balancing new inputs against potential savings.

In contrast, Heidegger can propose a different question: Does efficiency become an end that prevents reflection on what is being optimized? Why does production continue to expand, which forms of life are protected, while environmental costs are transferred? Environmental risk arises when advanced technological tools replace older ones. In this sense, Industry 4.0 neither disproves nor confirms Heidegger's analysis. Instead, this shows that the same technological rationality can produce real environmental benefits while also deepening demands for enframing.

### **3. Conclusion**

From there, Heidegger's philosophy of technology can give readers a deep interpretation of the environmental crisis. For Heidegger, modern technology becomes dangerous when its particular way of revealing reality becomes a dominant and exclusive manner of thinking. Under the force of "enframing," as the essence of modern technology, nature appears as standing-reserve. Nature becomes calculable, available, transformable, storable, replaceable,

and ready for further ordering. When nature is understood mainly in terms of available resources, such practices can become easier to accept as normal ones. At the same time, other ways of thinking about nature can become more difficult to recognize. This interpretation also shows why Heidegger should not be understood as simply opposing technology. Industry 4.0 provides a clear example because the same systems of measurement and optimization that increase technical control can also reduce energy and material consumption. Heidegger's concern, however, is that efficiency should not become the only environmental criterion.

The environmental crisis, therefore, concerns not only what modern technology does to nature but also how it allows nature to appear to us in a seemingly particular way. This is the continuing significance of Heidegger's philosophy of technology to the environmental issue. His analysis does not provide a simple solution to the contemporary crisis, but it challenges human beings to examine the technological assumptions that shape their relationship with the Earth. In a modern technological age whose capacity to transform nature has reached a planetary scale, his reflection remains an important condition for developing a more careful and responsible relationship between human persons and nature.

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