TECHNOLOGY - THE ENGINEER OF OUR DESTRUCTION OR A TOOL FOR SALVATION

Exploring the role of technology in the environmental crisis

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Abstract: This master's thesis explores the role of technology in our environmental crisis. It does so through the exploration of a range of theories within the field of philosophy of technology, starting from its roots in Europe and continuing through to contemporary theories aligned with the social science studies of technology. In this exploration, different views of the nature of technology, how it acts, and who controls it are presented and compared to create a deeper understanding of how such differing views affect the everyday debate on technology and the natural environment.

To get deeper into the latter, parallels are drawn between the philosophy of technology and environmental philosophy. Through this comparison, the potential roles of technology in the environmental crisis are explored and subsequently the effect of those roles in the notion of sustainable development is discussed. A deep incoherence is discovered between the understanding of technology on which the concept of sustainability is based and the one at the base of the theories presented. This incoherence is, however, challenged and it is argued that the philosophy of technology may need to submit to a technological mindset to truly enter the field.

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Content:

1 A DAY IN THE LIFE OF A COG

Technique is the complex and complete milieu in which human beings must live, and in relation to which they must define themselves. (Jacques Ellul, 1983)

I wake up by the gentle song of birds and open my eyes to see the room lit up in a golden sunlight, both originating from the white, oval-shaped sunrise alarm sitting on the drawer across from my bed. Next to me is my daughter, still sleeping. She is just 14 months old, but it is almost three years since she originated in a petri-dish in the white-walled fertility clinic of Aalborg hospital. The first many months of her embryonic life, she spent in a hospital freezer, as tiny little cells. Now she opens her eyes, sits up and reaches her arms up for me to lift her out of her crib. We pull up the black blinds and look out, it's grey and windy, but the building is new, the windows draft proof, and the room warm and bright. We are in our technological cocoon.

A few minutes later, with the help of the coffee machine, induction stove, microwave oven, and electric kettle, I produce our breakfast. While eating, I check the weather forecast on my phone and send a picture of my daughter to my husband. Afterwards, I have a glance at the news from my favourite newspaper, there is a war, a natural catastrophe, and a local political scandal – without think I quickly lock the screen and it away again. The phone is at one and the same time part of me and something I read, an embodied and hermeneutic technical relation.

After breakfast, we play with some of my daughter's toys. She loves her walking and singing dog, and the book with animal sounds and pictures. None of us have any idea how they work, we just push the buttons and imitate the sounds. We do not aim at mastery but accept the technology's order. When it is time for her nap, I walk her pram through the industrial area outside our flat; it is all tarmac and concrete and undeniably grim, but at the end of it, we enter the path along the fjord. On the other side of the fjord, I can see the snow-covered mountains. It is winter and freezing, but my coat and boots are designed with "innovative techniques and materials", and I feel warm and snug. While enjoying the views, I put my earbuds in and listen to a Psychology article on Taoism as the antidote to the stress of modern life. Even in nature life is textured by technology.

At home again, we have lunch. As dessert, we have bananas and grapes, the grapes are from Morocco and the bananas from Brazil. As I stack all the dishes from breakfast and lunch into the dishwasher, I ask my daughter if se wants to feed the vacuum cleaner; she gives an excited little gasp and runs to the corner where the robot vacuum is sitting. Muah, she says loudly while bowing down

to give it a wake-up kiss. It gets one when she goes to bed too. Cleaning the area under her high chair, the little round machine has a plentiful lunch, and afterwards returns to it corner for a rest.

In the afternoon, while my daughter is with a babysitter, I work on a feature for my magazine. It is a declared technologically optimist publication, and each month I write an editorial note on how the world is booming with cleantech innovations aiming to make our world a better and greener place. For this feature I interview, Mark Z. Jacobson, a prominent professor of civil and environmental engineering at Stanford University and the author of the book *No Miracles Needed*. During the interview he stresses how all the technologies needed to transform the energy system already exist and how governments are wasting time and money investing in new miracle technologies, in other words, as the headline says, no miracles needed. Inside the book, he specifies the headline to no *technological* miracles needed, and I press him on the matter – surely I would still take a miracle. He seems a little annoyed – "Whether it occurs is up to each country. If governments want to continue wasting money on useless technologies […] then the country is intentionally saying – we are not going to solve the problem but continue to waste money and damage people."[1]

Is it really that simple? I wonder flicking over to a different folder, the one containing this paper. With a click and scroll, I browse through PDF files of articles written by philosophers from different decades and parts of the world. I land on a book by philosopher and tech critic David Skrbina. There is a highlight in the PDF - it continues a section describing the global community's unimpressive progress on tackling the climate crisis and presents a slightly less technologically optimist view of the situation.

"Technology, then, is a compound danger. It is the cause of the problem - global carbon emissions, in this case—and it has produced a society that is functionally irrational and thus incapable of solving the very problem it has created. Technology creates the danger and then makes us unable to collectively respond to it. It virtually guarantees that we and the planet will feel the full impact of climate change and global warming. With the present state of industrial society, we will not take serious action until it becomes an obvious threat. But when that time comes, it will be far too late. The disaster will be upon us, and upon all life on Earth. At that point, our only action will be a scramble for survival, under the most brutal and cutthroat conditions imaginable. Future generations will not forgive us, but perhaps they will understand our functional impotence in the face of a dominating technological system." (Skrbina, 2015, p. 109)

[1] The interview with Mark Z. Jacobson will be published in the June publication of Discover Cleantech. This is transcript from my interview with him, conducted on Zoom, February, 2023.

I look back at my day. I start to type – “am I the cog that keeps the machinery going on a path towards planetary destruction or does technology serve me, and my fellow humans, on a path of boundless growth and opportunities?” And as I type, I wonder, if a cog, whether machine or woman, would be able to stop to question its place in the system at all, then, as my wireless keyboard lights up, I wonder whether I did, as a matter of fact, stop, or of my wondering is just part of what keeps the wheels turning on the machinery’s path towards humanitarian, environmental and planetary destruction and technological domination.

1.1 The worries of a cog (introduction)

That the technological era has brough with it a myriad of unforeseen consequences is indisputable, even in the realm of philosophical discussion. At the beginning of the technological era - by some defined as the invention of the mechanical clock (1200) by others as invention of the steam engine (1700) - no one could have predicted the impact that technology would come to have on the human race, nature, and the planetary eco-system. (Skrbina, 87, 207)

There is, however, intense disagreement on whether the impact on the former of the three, the human race, has been overwhelmingly good or overwhelmingly bad. Depending on who you ask, technologization might be a path towards liberation and unlimited possibilities or domination and destruction. In *The Metaphysics of Technology* (2015), David Skrbina for one, argues ardently that technology has deteriorated almost all aspects of human life, that it has limited freedom, increased physical and mental illness and decreased cognitive abilities. He is not the only one, in recent years classic technology critics like Jacques Ellul (1912-1994), have been revived and attributed increased attention in the philosophy of technology. The 2022 republication – and the positive reviews - of *Technological Slavery* by Theodore Kaczynski (better known as the unibomber) indicate a similar shift in popular culture.

Meanwhile, others, like Steven Pinker, a Professor of Psychology at Harvard and the author of *Enlightenment Now* (2019), argue that overall, technology has vastly improved multiple vital aspects of human wellbeing and happiness such as health, prosperity, safety and knowledge all over the world. The continuous development and success of new, innovative and - at least at the surface - liberating technologies such as e-scooters, robot vacuum cleaners, and online philosophy libraries, similarly indicate that many consider, develop and use technology as a positive force in their life (similarly negative examples could, of course, be conjured – online porn, biological weapons, and AI monitoring of employee keystrokes.)

Likewise, views differ on the moral significance of the destruction and resourcification of natural environments caused by the progress of technology (whether technology is actually the root cause of this, will be explored in Chapter 3).

When it comes to the destruction of the planetary eco-system, more specifically the harmful increase of greenhouse gasses in the atmosphere and the consequent destructive global warming effect, however, most agree – both that it is harmful and morally unjustifiable. Global warming is a problem created by a process which has predominantly benefitted the rich countries, it will predominantly affect low-income countries, it will capsize the planetary ecosystem and eradicate millions of species. The effects will be felt for multiple generations; if unmitigated, the planet could possibly become incapable of providing for human civilisation as we know it today. Trillions of potential future beings may not come to live. (IPCC, 2022). In other words, from whatever viewpoint you look at it - it is bad, not even philosophers dare argue otherwise. The disagreement arises upon the question of what caused it and how to solve it.

First, however, before addressing any problem containing within it the element(s) of technology we need to attempt an understanding of what technology is, how it acts and who controls it. Thus that will be the first step of this thesis after these introductory notes.

Next, we will need to look at the role technology has played in the climate crisis – is it the evil mastermind, a victim of religion or capitalism, or perhaps a lens that corrupts our view of nature? Based upon the answers presented, the following chapter will explore what role, if any, technology or technologies can play in providing a sustainable solution to the planetary crisis. In doing so, we need to explore both the values embedded in the goal of sustainability, the environmentalist arguments against it, and the risks of trusting technology to be (part of) the solution.

Finally, based on the above, we move on to explore if technological optimism is indeed sustainable and if so, where we reach the moral limitations of such a viewpoint - can we technologically alter nature, human nature, or the planet's atmosphere in the name of sustainability?

1.2 Notes on method, thesis question and sub-theses

In order to avoid an overtly technical approach to this paper, that of efficiency and order, I have allowed myself to interrupt the academic presentations with a few interludes of more creative thought-flows of a distinctly non-technical character. If I were to justify this style by some lofty philosophical argument, I would say it could be a Heideggerian attempt at approaching the essence

of technology through that of art, revealing without determining what is revealed; more down to earth, I might say it aims at lightening the reading (or, in a more honest take, writing) process.

Apart from this, I think it is fair to say that this thesis contains a fairly traditional academic structure, relying on establishes writers and peer-reviewed books and papers, within the field of the philosophy of technology and environmental philosophy.

The main research question I attempt to answer through this is that of the role of technology in the environmental crisis, somewhat creatively phrased at the end of the first section of this chapter.

Presented in a more traditional manner the following is my main thesis question:

Can technology be used as a tool to help us solve the climate crisis, or is there inherent to technology, a drive towards effectivization and order (of humans and nature), which not only prohibit this, but make our attempt at it, a part of its trajectory towards technological domination and natural destruction.

For each chapter I explore the following sub-theses:

Chapter 2: People have fundamentally differing understanding of technology, and this view is consciously or unconsciously reflected in their arguments and thoughts about possible solutions to the environmental crisis.

Chapter 3: The relationship between the natural environment and technology is central to both the philosophy of technology and environmental philosophy. Exploring how the two fields overlap and contrast, can bring greater clarity to this relationship.

Chapter 4: The focus on sustainability as the main concern in our relation to the environment has shifted our relationship to both technology and the environment. But taken to its furthest extent, the shift brings with it a number of, perhaps undesirable, consequences.

Throughout the paper I use the term technology and technological to refer to modern technology as a system, dominated by a specific way of thinking and relating to the world. I also use the word resourcification, which is my attempt at translating Heideggers enframing, the mental and cultural transformation of the world into a standing reserve for technology.

2 T FOR TECHNOLOGY

[T]he essence of technology is nothing technological.

—Martin Heidegger, 1954

"Vada" says my daughter and looks inquisitively at me. It is one of her favourite sounds and is always accompanied by an eager, at times almost aggressive pointing; it means "what is that." The answer is always fairly straightforward; since she does not have a language yet, she is only capable of asking about the things that are in front of her, a toy cat, a dog, a car. I know of course that soon I will not get off as easily. Soon, I will have to explain what a cat is, what defines a cat. Imagine then, that what defined catness was not features of the cat but features of the force with which the cat was created. Furthermore, imagine that the force might have come not from the entities who thought they created the cat, but from the cat itself. This would mean that its creators, who thought the cat was a means for them to achieve entertainment, were in fact means for the cat to achieve more catness, maybe even cat domination. To explain that will be what I face the day my daughter asks me what technology means.

2.1 Establishing a shared understanding

For decades (some might say millennia), philosophers have been exploring the nature of technology. However, despite the philosophy of technology becoming a n established field several decades ago, and several anthologies and a recently published *Oxford Handbook of Technology of Philosophy (2022)* cementing its position as such, it is still not straightforward to determine what philosophy of technology is actually about. Perhaps because a broadly recognised definition of technology is missing at large, not to speak of an agreed ontological categorisation of technology or even more farfetched an accepted metaphysics of the fundamental the principles and structures that underlie our technological reality (Franssen, 2022, p.55-58).

Shannon Vallor, Editor of the *Oxford Handbook of Technology of Philosophy,* begins her introduction to the comprehensive and tellingly eclectic collection of essays on technology with a seemingly straightforward definition.

"Technology has profoundly shaped human thought and action for as long as humans have existed. Our prehistorical forays in practices of hunting, gathering, trading, defending and sheltering were enabled only by our ability to deploy the power of imagination in the service of *technique: The*

creative manipulation and reconfiguration of objects in our physical and social environment to serve new practical ends." (technique, original italics, last sentence, my italics) (Ibid. p. 1)

This introduction provides a perfect illustration of how even a simple statement about technology relies on a specific view of its nature (or in other cases its lack thereof). With the use of the word "*technique*" *in italics*, one must assume that Vallor, is referring to Ellul Jacque's understanding of technology. As we will see in the next section, the emphasis on the influence of technology on human thought (and not the other way round) as well as the notion that human imagination is deployed "in service" of technique also indicate this. My thesis is that most people have such fundamentally differing views of technology, but, unfortunately, not the French vocabulary or philosophical insight to consciously and accurately convey (or perhaps even understand) that it is what they base their arguments on in e.g. cleantech debates. According to some philosophers in the field of philosophy of technology, this is not just a problem in public debates. Dutch philosopher Maarteen Franssen writes:

"[I]t is difficult to see how a philosophical field can sustain itself without a shared understanding of the meaning of the term that defines it, or minimally, a shared understanding of the main controversies surrounding the meaning of that term….[P]hilosophers of technology fail to appreciate the extent to which different authors build upon different conceptions of technology and the extent to which this makes their claims and views and assessments incomparable." (Franssen, 2022, P.57)

Indeed, without such as shared understanding asking any question about technology becomes a seemingly impossible task. Before even asking, first one must answer what the term "technology" refers to or what we mean when using it. This is what this chapter will attempt to answer. This will not be an attempt at landing at a final or better definition of technology than any previously presented, but rather at a clarification of how the fundamentally differing understandings of the nature of technology or - depending on the viewpoint – the relations that constitute its existence affect our view of its possible function in creating a sustainable human civilisation.

2.2 What we refer to when we talk about technology

To answer the question of what we refer to when we talk about technology, we need to start out by recognising that just by doing so, by assuming that there is a "something" beyond the shifting shapes of technologic artifacts and the – at least to some degree shared - human understanding of what we mean when we say "technology, we have already taken a solid leap down the road of essentialism, the view that there is a technological nature to which we, in theory at least, refer when we say the

word technology. This is a view that has, in recent years, often implicitly been rejected in the philosophy of technology as the field has broadly focused on the empirical manifestations of technology and their effects on humans, society and, to some degree, nature.(Vallor, 2022, p. 6) However, some of the strongest – but not all - anti-tech sentiments originate in a conscious or unconscious fear of the uncontrollable essence of technology. [2]

In other words, to examine the roots of such sentiments, we start by examining the roots of the belief that there is an underlying technological essence from which all technological instantiations originate.

Without any attempt at an original approach, the first stop in such a foray inevitably leads us to a hydroelectric plant on the Rhine, eternally condemned to play the role of the villain in the modernisation of technology. It is the hydro dam with which Martin Heidegger (1889-1976) seeks to illustrate the deceiving and demanding nature of what he calls “modern” technology. (Heidegger, 1977, p. 8)

In his paper *The Question Concerning Technology,* originally published in German in 1954*,* Heidegger initiates his exploration of the technological phenomenon by rejecting what he says is the “current conception of technology, according to which it is a means and a human activity.” This instrumental and anthropological definition of technology, he says, may be correct, but it does not touch upon the truth of technology. (Heidegger, 1977, p. 5)

He thus begins his venture towards the truth by reaching back to the ancient Greeks, in particular Aristoteles, to explain the nature of technology. Considering that Aristoteles lived in a time which can hardly, in the today commonly accepted definition of technologic, be considered technologic, this may seem surprising. The explanation lies, however, in the fact that to Heidegger the hydroelectric plant on the Rhine is not Technology, it is a manifestation of, or a creation by Technology. Technology on the other hand is what the Greeks called Technê Logos, the process (Technê) by which order (Logos) is created. The order referred to being the underlying order of the cosmos. (Skrbina, 2015, 22-30). The nature of Logos was the subject of several of the ancient Greek philosophers, but according to Skrbina, Aristoteles was the first to merge the two words offering the following definitions. “Technê reveals into being that which was hidden within the logos of the creator. Technê is the process of coming-to-be, guided by the logos. (Skrbina, 2015, 25)).

[2] See for instance David Skrbina’s antitech movement or the well-known anti-tech manifesto by Theodore Kaczynski. https://www.antitechcollective.com/

It is this process of “revealing” which Heidegger explores in his essay, and it is the process, or rather the power behind the process which he defines as the essence (wesen) of Technology. By capitalising the word "technology," Heidegger seeks to emphasise that he is not referring to technology as simply a tool or a means to an end, but as a pervasive and all-encompassing force that shapes modern society and our understanding of the world. In his words:

“Technology is therefore no mere means. Technology is a way of revealing. If we give heed to this, then another whole realm for the essence of technology will open itself up to us. It is the realm of revealing, i.e., of truth,” (Heidegger, 1977, p 12)

With this he intends to say that the essence of technology though, evidentially essentially technological, is not what we - the common people - in general think of when we think of technology. He famously sums up his idea with the phrase “[T]he essence of technology is by no means anything technological.” (The Question Concerning Technology, P 4, Martin Heidegger)

Rather than at tool, technology is thus a way of viewing the world, of revealing the world. Revealing, however comes in two forms: bringing forth and ordering. Bringing forth is the original form of revealing, the one that has been taking place since the dawn of day as things that were not yet came into existence. It takes place in three forms, simple technology (such as carpentry), art, and nature. Heidegger illustrates the first with a silver chalice created by a Greek craftsman who gathers the elements of form or shape of the work, matter or material, and finality or purpose; and thereby brings out the "truth" of his materials. (Heidegger p. 6, 10) Ordering, however, is according to Heidegger a different form of revealing, the form that takes place in modern technology, and it entails both a commanding or challenging aspect and an organising aspect, nature is challenged out of its context to be organised after their utility.

“What kind of unconcealment is it, then, that is peculiar to that which comes to stand forth through this setting-upon that challenges? Everywhere everything is ordered to stand by, to be immediately at hand, indeed to stand there just so that it may be on call for a further ordering. Whatever is ordered about in this way has its own standing. We call it the standing-reserve.” (Ibid. p. 17)

Modern technology is, in other words, that which orders or challenges its elements to reveal their true order, and “which puts to nature the unreasonable demand that it supply energy that can be extracted and stored.” (Ibid. 14) Heidegger refers to this challenge of modern technology as

“enframing”, a term he uses to describe the way it creates a specific frame or perspective that shapes our understanding of the world in which it is reduced it to mere resources to be exploited for human purposes.

“Enframing means the gathering together of that setting-upon which sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing-reserve. Enframing means that way of revealing which holds sway in the essence of modern technology and which is itself nothing technological.” (Ibid. 20)

Another defining feature od modern technology is its interconnectedness with science, the nature of which Heidegger questions saying that modern technology is not (just) a product of science but also the producer of modern science. Consequently, technology and modern science are not in Heidegger’s view neutral, they have an end, namely to command or challenge humans to see and use the world in certain ways and to structure everything into a standing reserve, a resource. (Heidegger, 1977, p. 19) It is in other words a primal cause in what looks like a deterministic system. Maybe that is why Heidegger, later in his life, in an interview with Da Spiegel on the matter of the continued progress of technology, said “Only a god can save us.” (Skrbina,2015, p. 90, the interview was published in Der Spiegel in 1976, 10 years after Heidegger’s death per his stipulation).

One might find a tiny glimpse of hope, however, in the fact that Heidegger only sees *modern* technology as manifestations of enframing. The hydropower plant on the Reine is used to exemplify this because it, unlike examples of traditional technologies like a bridge that crosses the river, changes the nature of the Rhine. It is no longer (just) a river, it no longer is in itself; it is in its role of water and power supplier in the power plant which it is dammed up into. (Heidegger, 1977, p 16, Martin Heidegger). It thus manifests the technological way of understanding the world, perceiving in its elements only opportunities for increased efficiency, productivity, and control over nature. In other words it manifests the ordering nature of Technology.

“[T]hat expediting [the ordering/challenging] is always itself directed from the beginning toward furthering something else, i.e., toward driving on to the maximum yield at the minimum expense”. (Ibid. 15)

It is obvious how this view of technology might be at the foundation of a belief that the promotion of technological solutions to environmental problems is counter intuitive. Indeed, how can a force that is essentially defined by its transformation of nature into a resource, be used to protect nature. It is, however, not obvious which elements of technology we have to stay clear of to avoid this, how

to differentiate between the “traditional technologies” that brings forth” the truth, and the “modern technologies” that order the world into a structure that serves its own ends. (Skrbina, 2015, p8-9) We might believe that we are using the former kind of technology but, in reality, be blinded by technologization.

While Heidegger does not address the indefinite nature of the division between modern and traditional technologies, he does state that the danger of technologization lies in the fact that the nature of technology will blind its “orderers” into believing that they control it.

“As soon as what is disclosed no longer concerns man even as object, but does so, rather, exclusively as standing-reserve, and man in the midst of objectlessness is nothing but the orderer of the standing-reserve, then he comes to the very brink of a precipitous fall; that is, he comes to the point where he himself will have to be taken as standing-reserve. Meanwhile man, precisely as the one so threatened, exalts himself to the posture of lord of the earth. (Heidegger, 1977, p. 27).

With that uplifting definition of technology as the process which turns everything, including man, into a resource, it may not be surprising that a competing view has taken over the majority of the philosophical investigation during the last decades. The view of Heidegger is, however, not just a historical curiosity. The idea of a technological force that demeans and subjugates nature – and man – into a standing reserve for technological process, still seem to form the foundation for many tech-avert theories.

One of them is the pantechnikon theory of David Skrbina who carries forward Heidegger’s notion of a technological essence inherently driven towards a view of both of nature and man as a resource. In 2015, Skrbina published *The Metaphysics of Technology*, calling it the “first monograph ever written on the metaphysics of technology.” In doing so he dismisses other major works such as Dessauer’s *Philosophie der Technik* (1927), Ihde’s *Technology and the Lifeworld* (1990) and Borgmann’s *Technology and the Character of Contemporary Life* (1984), as “not truly metaphysical”. (Skrbina, 2015, p. 1)

While Skrbina agrees with Heidegger’s essentialist view of technology, he believes the nature of technological ordering saturates all levels of technological development. In other words, he perceives no separation between modern and traditional technology but sees the same techê, process of creation, in all energetic substances to create logos, which he describes as a higher level of complexity and order throughout the universe. This theory he names the metaphysics of the

Pantechnicon and in it, man-made technology is the latest and most complex phase of this process here on Earth.

"We do not, however, control such a process; rather, we are the means by which it is manifest. As long as abundant free energy is available, technology will advance—regardless of our wishes. Or more precisely, regardless of the circumstances; our wishes are not relevant, largely being a product of technological thinking. No matter the situation, we will always wish for more technology. (Skrbina, 2015, p. 129)

We clearly see that Skrbina shares Heidegger's concern for the impact of technologization on the world, he does not, however, like Heidegger, leave any room for any other acts of human creation in "traditional technologies"; in his view, technologization is a universal force. It is, however, not the only such force, he is in his own words a "soft determinist", as he leaves room for other forces such as gravity and free will to affect the world. The pantechnikon force is, however, the dominant force of the universe. (Ibid. p. 213) Referencing Harvard astrophysicist Eric Chaisson's theory that when energy is available, all physical systems in the universe will grow in complexity as the foundation for his metaphysical framework.

"There is an unseen energetic force at work in the cosmos (dark energy) that is the cause of order (Logos). This energy brings a "sort of life" to all things, driving them upward toward order, toward "the better."… The accelerating cosmic expansion demonstrates that the universe is in fact biased toward order; the cosmic system is running 'downhill,' at an ever-faster rate, toward complexity, order, and increasing energy densities." (Ibid. 64)

As such, while we have individual free will, it is continually eroded by the pressure from the expanding technological system. (Ibid. 178) While Skrbina may have been among the few to have moved beyond Heidegger's metaphysical framework, many of the theories of technology presented by continental philosophers in the mid to late 20th century were inspired by the idea of Technology with a capital T as a dominating force in human history. Merging a philosophical perspective with societal analysis inspired by Karl Marx and his writings on the role of technology in the social evolution, the French sociologist and theologist Jacques Ellul extends Heidegger's ideas and with numerous lengthy works on the subject provided much greater detail. His focus on the socially oppressive force of technology leads to an increased emphasis on the need for individuals to resist technology's continuous pull towards greater efficiency and thus control over human life. To retain their unique human subjectivity, humans have to master technology. (Mitcham, 2022, p. 24,25)

Whereas Heidegger uses the capitalised Technology to refer to the essence and force of technology, Ellul uses the term Technique which he defines as something that should not be understood as machine or "a collection of machines, methods and products."

"No longer a secondary factor integrated into a nontechnical society and civilisation, Technique has become the dominant factor in the Western world, so that the best name for our society is the "technicist society". It is on technique that all other factors depend….. Technique is the complex and complete milieu in which human beings must live, and in relation to which they must define themselves. It is a universal mediator, producing a generalised mediation, totalizing and aspiring to totality." (Ellul, 1983, p. 1)

As a theologist, one of Ellul's reoccurring grievances is the replacement of religion with technology. In his words technology has become the sacred centre of modern-day life. As a consequence, its values - efficiency, success and technological rationality - forcefully take over every aspect of our lives and relationship, including that with nature, dehumanising the former and destroying the latter. I his paper *The Technological Order*, *(*1963/2000*)* Ellul defines technology as an artificial and autonomous force, formed by an accumulation of means that have primacy over ends, and with its part mutually implicated in a way that makes separation impossible. Furthermore he writes:

"It is self-determining in a closed circle. Like nature, it is a closed organization which permits it to be self-determinative independently of all human intervention." (Ibid. p. 21)

In Ellul's emphasis on the development of technology as a production method, to technique, the all-encompassing dominating factor in Western society, his inspiration by Karl Marx (1818-1889) becomes evident. Writing in the midst of the 19th century, Marx is generally considered to be the first to present a theory (albeit a political and not technological one) with an element of technological determinism. In his critique of the capitalist system of mass production, he describes a society that is driven by conditions of production, which in turn are driven by technological forces. (Skrbina, 2015, p. 195-197)

The positions of Heidegger, Skrbina, and Ellul may all be described as strongly substantivist, meaning that they ascribe technology deterministic and autonomous nature. In other words, technology plays a determining role in society and its development cannot be controlled by humanity. (Verbeek, 2022, p. 37)

Marx, however, presented a dual view of the role of technology in the capitalist system. On the one hand, he saw it as a means of increasing productivity and efficiency, which can lead to economic growth and material progress. On the other hand, as a source of exploitation, as capitalist owners use technology to increase profits and maintain control over workers. Notedly, however, according to Marx's central theory, social evolution is primarily propelled by class conflict, with technology playing a secondary role at most. Furthermore, in the concept of the proletarian revolution, the working class would seize ownership of the means of production, including technological resources, thereby placing themselves in charge rather than subordinate to technology. (Skrbina, 195-197)

Also critical of the deterministic nature of Heidegger, Marx and Ellul's ideas, American philosopher Albert Borgmann (born 1937), nonetheless, continued their critique of the harmful essence of technology, stating that the root of the problem of technological societies is something intrinsic to advanced technological life; that there is a "is a characteristic and constraining pattern to the entire fabric of our lives" (Borgmann, 1984, p. 3.) (Skrbina, 2015, p. 97)

Unlike Heidegger and Ellul, Borgmann, however, dedicated a significant effort to describing and exemplifying the contrasting characteristic of modern technologies - in his terminology "devices" - and traditional technologies - in his terminology "focal things". In *Technology and the Character of Contemporary Life,* published in 1984, eight years after the death of Heidegger, he laments the development of a modern worldview dominated by the device paradigm. Under this paradigm, technical objects provide commodified products in a standardised manner, which is not visible to, or understood by, the consumer. This paradigm contrasts with a state of technologization where focal things, such as a fireplace, provide their products directly through effort and communal involvement.

According to Borgmann, the problem with the device paradigm is that it creates detachment from the products we consume and hides the process by which we get them, while focal things promote interaction and responsibility. His solution is thus, put very simply, to create a boundary around the device paradigm to limit our focus on devices as means to ends and instead shift our attention towards focal things and activities that allow us to engage with the world around us. Thus the nuance provided in his theory by his division between focal things and devices, allow some wiggle room for humanity to challenge the constraining and erosive effect of the device paradigm without ending up with what Heidegger calls helplessly rebelling against it and cursing it as the work of the devil. (Heidegger, 1977, p. 26) (Borgmann, 1984, p. 157-250)

Despite, the more nuanced view of technology in Borgmann's essentialism, the philosophy of technology and, arguably, society has increasingly moved even further away from an understanding of technology as a singular essence. Thus while continental Europe saw several essentialist theories of technology being developed in mid to late 20th century, at the end of the century, the field saw a turn towards a scientifically aligned analytic approach. (Acterhuis 2001) (Vallor, 2022, p. 6)

Arguably, the seemingly impossible task of developing any academically viable theories on technology in the wake of the gloomy perspective of the deterministic essentialism, played a significant role in what became known as the empirical turn. (Mitcham, 2022, p. 31, 39)

2.2 What we talk about when we talk about technology

Political philosopher Andrew Feenberg has been one of the voices arguing that leaving the essentialist viewpoint behind is necessary to approach the increasingly significant differences in the role of technology in different social, cultural, and political contexts. (Feenberg, 2000, p. 300)

In his paper, *From essentialism to constructivism,* Feenberg highlights what is perceived as one of the essential problems with essentialism - it's inability to say anything, in particular anything "useful", about actual technologies, modern technological cultures, and the social effects of technologies. (Ibid 304)

His approach is one of a number of approaches that appeared after the empirical turn, most of them closely aligned with the field of (Social) Science and Technology Studies. Part of the turn was inspired by research within this field which "showed that technology does not *determine* society, but is itself socially *constructed and appropriated."* (Verbeek, 2022, p. 39). The sociocultural embeddedness of technology became the turning point of the theory of social constructivism.

According to Feenberg, the turn which allowed for "significant difference in the reception and appropriation of modernity", did however not lead to led to "quite the flowering of research in philosophy of technology one might hope for." (Feenberg, 2000, p. 294) Furthermore, the new field had its own distinct shortcomings as new social-scientific theories failed to approach the field's original problem, modernity. (Ibid. p. 304)

"[T]o dissolve the technical realm into the variety of its manifestations, as constructivists sometimes demand, would effectively block philosophical reflection on modernity… The solution to this

problem is a radical redefinition of technology that crosses the usual line between artifacts and social relations assumed by common sense and philosophers alike." (Ibid. p. 304)

To this end, Feenberg presents a phenomenologically inspired approach, referred to as "critical theory", highlighting not just how technologies are shaped by their use and context but also on how technologies and technological systems (such as management and PR) can be carriers of politics and power relations. (Feenberg, 2005, p. 47)

Within this approach it does not make sense to ask about the neutrality or determinism of technology. Technology may have within it the driving forces of efficiency and rationality, but without its integration into real world systems and contexts it never comes into existence, therefore:

"There is no such thing as technology as such. Today we employ this specific technology with limitations that are due not only to the state of our knowledge but also to the power structures that bias this knowledge and its applications. This really existing contemporary technology favors specific ends and obstructs others." (Feenberg, 2005, p. 54)

Consequently, Feenberg presents a framework for analysing technologies and technological systems at a primary "instrumentalization" level which corresponds to the reifying "functionalization" characteristics of technology discussed in essentialist accounts, and a secondary instrumentalization, the "integration" level, which constitutes the realization of the constituted objects and subjects in actual technical networks and devices. (Ibid. p. 306).

The framework comprises four primary reifying moments: 1, the decontextualization and fragmentation of natural elements to reveal their usefulness and reconstitute them as technical objects; 2, the reductionism with which things, now out of their original context, are stripped of all qualities superfluous to their technical function, all qualities essential to the technical function are referred to as primary qualities; 3, Autonomization, the isolation of the subject of technical action from the feedback effect from the action's impact. 4, positioning, technological subjects are positioned to enable distance control in technical actions in accordance with technological functions, programs and laws. (Ibid p. 306-7)

At the secondary level, the dimensions of reality from which the primary level abstracts, four moments establish how the reified objects and subjects (components of technological systems) are realised in actual technical networks and devices. (Ibid. p. 306).

“Here technical action turns back on itself and its actors as it is realized concretely. In the process, it reappropriates some of the dimensions of contextual relatedness and self-development from which abstraction was originally made in establishing the technical relation. The underdetermination of technological development leaves room for social interests and values to participate in the process of realization. As decontextualized elements are combined, these interests and values assign functions, orient choices, and ensure congruence between technology and society at the technical level itself.” (Ibid. p. 308)

The moments actualise the technology in an entity that is integrated with the natural, technical, and social environments that support its functioning. The moments are: 1, systematization, the incorporation of the technical object into its place in a technological system and its adaption into the natural and social environment; 2, mediation, ethical and aesthetic mediations supply the technical object with secondary qualities which can be consciously incorporated or, as Feenberg argues they often are in modern society, ignored. 3, vocation, the effect by which the human subject using the technology is defined by its use, the shooter of the rifle becomes a hunter and so on; 4, initiative, “the strategic control of the worker and consumer through positioning is to some extent compensated by various forms of tactical initiative on the part of the individuals submitted to technical control.”
Together with the primary level, these moments constitute the technological character of systems or artifacts. (Ibid. p. 304-310)

“The sharpness of a knife is indeed a measurable physical property, but sharpness is only a function rather than a hazard or a matter of pure indifference, through a social construction. All the properties of technologies are relational insofar as we recognize their technological character. As mere physical objects abstracted from all relations, these artifacts have no function and hence no properly technological character at all.” (Ibid. p. 305)

Consequently, argues Feenberg, a conscious focus on how to include the different moments in the process of technological development may help consciously incorporate their contexts into the very structure, and thus produce technology more in line with the original mode of revealing, the artistic bringing forth. (Ibid. 319)

According to postphenomenologist Peter-Paul Verbeek, the founding insight of critical theory - that technology both shapes and is shaped by society - is also reflected in the postphenomenological approach to technology initiated by American philosopher Don Ihde. (Verbeek, 2022, p. 39) With an extensive number of papers published on the subject of technology and phenomenology, Ihde

continues the phenomenological approach to technology initiated by Heidegger (and Husserl (1859-1938)). However, he maintains a "materiality to technology" that Heidegger denied relevance to the study of Technology. In Heidegger's view, though the material parts of technology belong to the technological, it is not the cause of any difference in humans' attitude towards nature; the technological activity "always merely responds to the challenge of Enframing, but it never comprises Enframing itself or brings it about." (Heidegger, 1977, p. 21)

Ihde, on the other hand, maintains that the concreteness of technological hardware connects with bodily materiality - that is the experience we have of being our bodies - to create different technological relations, and that relation is what constitutes their being. Consequently, with what Ihde calls the existential development in phenomenology - an increasing focus on perceptual bodily experience - the materiality of technology has become a natural object of phenomenology. Thus, Ihde leaves Heidegger's strict abstraction from the perceptually experienced and allows for a more nuanced view on technology. This however does not mean that Idhe sees technologies as just objects, or in Heidegger's words "mere means" (Heidegger, 1977, p. 12). While he retains the need to classify technologies as objects, he stresses that they are never "just object"; they are what they are through human technology relations, relations which are consequently most purposedly illustrated in relativistic accounts, that is in an account of relations. (Ihde, 1990, p. 26)

Ihde is also critical of Ellul's use of the word technique to "absorb" technology into *technique,* in what he reviews as a concept of a generalised way of thinking and acting, which allows no room for particular human-technology relations. Technique, he stresses, can exist with or without technology. (Ihde, 1990, p. 26).
The relativist account of technology thus escapes the dangers of both total abstraction (the inability to address differences in different technologies) and empirical objectification (the presumed neutrality of technological objects). Illustrating the problem with the latter, Ihde points to the discussion relating guns in America. Questioning the popular pro-gun campaign slogan "guns don't kill people, people kill people", he writes.

"[I]n a relativistic account where the primitive unit is the human technology relation, it becomes immediately obvious that the relation of human gun (a human with a gun) to another object or another human is very different from the human without a gun. The human gun relation transforms the situation from any similar situation of a human without a gun. At the levels of mega technologies, it can be seen that the transformational effects will be similarly magnified." (Ibid. 27)

Thus, in Ihde's approach, technology is never neutral as it never "just is"; neither when looking at it from a phenomenological perspective, which explores human-technology relations, nor from a cultural hermeneutic level, which explores the cultural embeddedness of technology. He calls the idea that there is a neutral object outside of the context or relation of human-technology-world a "disembodied abstraction" maintaining that technology only is what it is through its use, in other words through its relation to a human and/or its context in a (human) culture. (Ibid. 128, 69)

Looking at human-technology relations, the non-neutrality is rooted in that fact that technology always changes or transforms the basic situation. (Ibid. p. 73) This is true even with embodied technologies, technologies which extends the human body image in a way that leads the human to consider the technology as part of itself. But this embodiment also leads, says Ihde, to an ambiguous desire for the technology to become truly invisible, for it to actually become part of the human. Explaining why this embodied technology is never truly neutral, Ihde writes:

"In extending bodily capacities, the technology also transforms them. In that sense, all technologies in use are non-neutral. They change the basic situation, however subtly, however minimally; but this is the other side of the desire. The desire is simultaneously a desire for a change in situation–to inhabit the earth, or even to go beyond the earth–while sometimes inconsistently and secretly wishing that this movement could be without the mediation of the technology." (ibid, p 75)

The embodied relation is the first of three human-technology relations classified as clearly distinguishable by Ihde. The relations present a gradually increasing level of "objectness" in the experience of technology, which define the human-technology relation. At the one end, we find the embodied relations. These technologies, such as glasses, give the human the experience of changing its bodily experience and capacity, becoming part of the human, and not the world. Though the relations also include tools, such as Heidegger's hammer which extends the arm, they all in some way mediate the world. The world is experienced (in a different way) through them. The more invisible the technology becomes, the more powerful the embodiment experience, hence the wish for total invisibility. Ihde formalises the relations: (Human-technology) → World.

At the next level are the hermeneutic relationship which, at one and the same time mediates the world and becomes part of the human's perception and experience of the world. In this category we find a range of read technologies such as a thermometer, a speed dial etc, which give a depiction of the world but in a way that needs to be read by the human. In this way, the technology becomes

placed in a different position in relation to human and world. Though it still mediates the world, it is no longer perceived as embodied. It is part of the world and only gets its meaning through the world, but, at another level, it is also an entity which the human perceives the world through. Ihde formalises this relation: Human → (technology-World)

At the furthest end of the continuum, we find alterity relations "in which the technology becomes quasi-other, or technology "as" other to which I relate." In this category, we find objects that humans relate to as an other, a technological object experienced as an object we feel and relate to in a manner that is not aimed at anything beyond the artifact. We are not seeing or seeking to interact with the world through the technology, the technology is the world we interact with. (Ibid. p. 72-111). The robot vacuum cleaner is not one of Ihde's example, but if he had seen my daughter giving it, its goodnight kiss, it would be. It is, I believe, what Ihde calls anthropomorphism, in this case a trivial and harmless affection for artifacts. Ihde formalises the relation: I → technology-(-world)

Had my daughter not thrown her love at it, the robot cleaner might have been categorised as what Ihde calls "background relations." A still expanding variety of automatic or semi-automatic background appliances, such as lighting and fridges, falls within this category of technologies which become part of the environment rather than an individual human-technology relation. (Ibid 109-111) Ihde does not formalise this relation, though he says that despite their absent presence they still transform the human experience and may exert a more subtle and indirect effect upon the experience of the world. Ihde does not formalise this relation but I imagine that it would require the word "the word" "world to be merged placed on top of a faded "technology." This would also neatly illustrate what Ihde calls technological texturing.

It Is clear to see how this approach enables a move away from Heidegger's nostalgic preference for old technics and monolithic demonising of modern technology to a more nuanced exploration of how different technologies mediate and shape our relation to the world. This becomes even clearer, when it comes to the cultural hermeneutics of technology, the branch of his theory, which Ihde applies to account for the culture-technology mechanisms. Notedly, Idhe, concludes that neither phenomenologically nor hermeneutically are technologies controlled by humans or cultures. On a phenomenological level they are not so due to various factors, creating ambiguity in the human-technology relation. Firstly, as in the vacuum example, any artifact may be entered into different uses and relations and a likewise an intention may be fulfilled by various different technologies. (Ibid. p. 139) Since the technology never just is, but is created by various different relations, some of which are shaped by the technology and others which are shaped by the human, it escapes control.

On a hermeneutic level, since technologies prove to be culturally embedded, the question of control in Ihde's view becomes inappropriate; the opposing viewpoints normally assumed as one of the answers -determinism, no control, or instrumentalism, full control - does not allow for the relativities that would reconstitute the debate. To reframe the question, in the context of the embeddedness of technologies within cultures, "is to see that the question of the control of technology amounts to a question of whether cultures can be "controlled"?

"This reformulation reveals the degree of complexity needed for its answer. Few—except for megalomaniacs historically associated with disastrous results—would quickly answer positively to this reformulation. There is even good reason to see the twentieth century concern for the "control" of technology as the contemporary equivalent of the nineteenth century obsession with the "control" of nature. Neither question, in my estimation, is posed properly." (Ibid p. 140)

While moving away from the determinism of their predecessors, neither the critical constructivist nor the postphenomenological view has thus led to an understanding of technology as something entirely controlled by humans. But it did mean an end to the attempt to define some transcendental dimension of technology, an essence abstractable not from the artifacts manifesting it but from a historic development. This was instead replaced by a focus on the individual technologies and their relations to the world. (Verbeek, 2022, p. 37-40).

At large, the wide-reaching conceptual theories originated by continental philosophers, were thus replaced by what some saw as more academically viable worldly applicable small scale thinking about individual technologies and particulars such as climate change and nuclear energy. (Verbeek, 2022, p. 31).). However, this shift also led to a loss of emphasis on defining technology. Instead, the field redirected its attention towards analysing empirical observations of the relationships between humans and technology, as well as the processes of design and innovation, and the societal implications of individual technologies. ((Verbeek, 2022, p. 39).)

However, as stated in the introduction to this chapter, the purpose was never to land on a final or better definition of technology but rather to create an understanding of the many different starting points a discussion on technology may take. Neither has this been an exhaustive exploration, many approaches, have not been included, but hopefully it has provided some sort of understanding of the way the fundamental conception of technology has been seeded and sprouted in different directions and shapes since it first became a subject of philosophical contemplation.

2.3 Why it matters to the discussion on sustainability

One might argue that the fact that philosophers do not agree on whether to spell technology with a capital T, does not affect the real world much at all. However, when looking at the public debate regarding climate change measures, it seems that the promotion of conflicting measures often relies on conflicting definitions or understandings of what technology means, how it can be understood and how and if it should be promoted or reformed.

To illustrate this we can start by looking at the interview with Mark Z. Jacobson referred to in the introduction to this paper. In his conviction that since the technologies necessary to transit to a renewable energy system already exists, we don't need any miracles to transform the harmful nature of the current system we see a strong instrumentalist view of technology. Jacobson has no need for Heidegger's god, just for people to listen to the engineers.

Indeed, it seems, Jacobson sees no inherent hindrances for a change towards a reformation of the technological system to shift to a system less exploitative of nature, less centralised and with the roles of consumers and producers blurred (Jacobson suggests that the problem of storing electricity in an all-renewable system may be solved in part by enabling consumers to resell the electricity stored in car and house batteries back to the grid at night when renewable sources typically falter). In short, technology can be redesigned to achieve the desired outcome, which is in his eyes two-sided - the aversion of climate change and a healthier climate free of human-made air pollution.

Looking at arguments from large established providers of what is widely considered harmful technologies such as electricity from fossil fuels etc, we see a greater focus on the governmental, social, and legal structures shaping the use of technologies. Whether it is the continued need for natural gas plants or fracking, arguments proclaiming the inability of organisations to stop these polluting technologies (even if cleaner alternatives are available) often focus on the social and political framework in which they operate. Demand from users, lacking political incentives and security of workplaces are among the economic, societal and political concerns that are often listed as factors shaping and determining the form of technological products developed. "Right now, we are accelerating our investments into renewables and low-carbon businesses. But it is also worth noting that we can only go as fast as society goes – if we shut down our petrol stations tomorrow, it would be a problem for society. But we do try to push it. We try to push our customers to demand

more green solutions, then we can also transition our company faster. Otherwise, it is very hard for us to do that."[3]

In other words, one might argue that such organisations, broadly speaking, rely on an understanding, or at least indicate an understanding, of technology which is socially constructed and appropriated and which can be shaped or reformed by changing the social factors that propel them. The same theory might be seen as the foundation for arguments of investors referring to analyses of not just the technological potential of new technologies but also the likelihood of its social acceptance and economic viability as justification for their choices when investing in sustainable technologies.[4]

Likewise politically, technological developments might be delayed based on arguments of the inequal politics inherent in, for instance, the placement of what may be considered large, unsightly and noisy wind turbines in less prosperous regions. In a similar manner, developments, such as super trains or biogas plants may be delayed due to the belief that they will provide unequal economic or social benefit or harm to specific groups or regions in society. Likewise, reactions to proposed or completed technological developments may be expressed within this framework.

Meanwhile, environmental organisations and young climate activists on social media often express arguments that are heavily based on an understanding of technology as a means of the rich elite to maintain control and increase profit. Writing on the climate crisis, Friends of the Earth International writes: "What drives these crises? Unsustainable economic and development models based on fossil fuels and other destructive energy sources, and the concentration of power over energy goods and services in the hands of the wealthy few."[5]

On Instagram many green or environmental accounts often include quotes, like the following attributed to the Dalai Lama "The planet does not need more successful people. The planet desperately needs more peacemakers, healers, restorers, storytellers and lovers of all kinds."

[3] https://discovercleantech.com/thomas-brostrom-evp-global-renewable-generation-shell-we-can-only-go-as-fast-as-society-goes/
[4] https://discovercleantech.com/a-net-zero-leader-on-how-investment-and-innovation-might-save-us/
[5] https://www.foei.org/what-we-do/climate-justice-and-energy/

With an emphasis on the need for the individual to break free from the efficiency norms of society at large rather than engage in a consumer orientated race, this rhetoric seems to draw on the ideas of Marx and Ellul.[6]

The quote which is widely attributed to and circulated with an image of the Dalai Lama, however, seems to originate from a book on ecological literacy for children, and it continues:

“It needs people who live well in their places. It needs people of moral courage willing to join the fight to make the world habitable and humane. And these qualities have little to do with success as we have defined it." (Stone, 1991)

Few mainstream voices in the public debate express an explicit fear of the nature of technology as a destructive force in the history of humankind, but it seems fair to say that a fear of Technology or Technique could be one of the factors behind the movement to escape urban life, get off the grid, and back to nature. Indeed, as we will see later the strategy or fleeing urban society and get off the grid to get closer to nature and “act locally while thinking globally” can be seen as direct consequences of the deterministic view of technology presented by the classical essentialist definitions of technologies.

when it comes to the way technology mediate and shape our relation to the world, how it becomes our relation, to the world, one needs only have a recent newspaper to know that this understanding of technology is widespread in our part of the world. Particularly, at the moment, we see the fear of how phones, computers and i-pads, are texturing all unmediated relations to the world, especially when it comes to children and young people. However, this understanding is most often reflected in discussions of the damage on the life of individuals and, to some extent, society, but not often when it comes to the environment and nature. We will, however, explore the latter further in the following chapter.

6 https://www.facebook.com/ClimateSaveMovement/photos/a.1610276715895648/2858886971034610/?type=3 a simple google search will demonstrate the love for this quote by environmental organisations all over the world.

3 SO WHAT ABOUT NATURE?

"*We end, I think, at what might be called the standard paradox of the twentieth century: our tools are better than we are, and grow better faster than we do. They suffice to crack the atom, to command the tides. But they do not suffice for the oldest task in human history: to live on a piece of land without spoiling it."*

- *Aldo Leopold (1938)*

After dinner, my husband puts our daughter to bed, and I go to turn on my computer. As I press the "on" button, the keyboard lights up, but nothing else happens. As the computer turns to a mere artifact, sitting on my desk, I feel irritation. I have no idea what to do, so I close the top down and try again. I may not control it, but I can turn it off. Luckily, it works, and I feel a little serotonin buzz as my altar lights up.

As it is getting dark outside, I turn on the light in the office. All of my technical actions contribute to the environmental crisis, but I have no other way of being. Like everyone else around me, I am helplessly dependent on the technological environment in which I live, some parts of it I have purchased out of necessity, others, like the electric keyboard standing next to my desk, are among my most precious possession, most, I hardly notice - all of them consume natural resources and emit harmful greenhouse gasses.

I look out the window to the see the mountainside dotted with little squares of light, sip my tea, take a deep breath and then release out a lungful of carbon dioxide; it slowly makes its way towards the atmosphere. I can't see it, of course, but through technology I know. We all do. Thanks to technology we know, thanks to technology it is now, at least in the lives of privileged people like me, the predominant worry of our life.

3.1 The role of technology in the environmental crisis

Nature, trees, the ocean, and the soil, produce resources and absorb carbon dioxide, humans and technology consume natural resources and emit carbon dioxide. It is that simple. Or rather it would be if it was not because humans and technology are, not one and the same, at least so we would like to think. Hence, we have the cause for the disagreement as to which entity, humanity - technology or a third entity created by the two - we are to turn to if we are to reverse the environmental devastation caused by increasing technologization and human expansion of the last decades.

While it is hopefully evident that the headers below presents an attempt at a humorous simplification of some of the views, this chapter will endeavour to investigate what role, if any, technology plays in the environmental crisis, depending on the philosophical viewpoint taken. As with the understanding of technology, this should hopefully lead to a deeper understanding of the incongruity often encountered between different sides in the debate on technology and natural environment when it comes to both cause and solutions.

To explore this aspect of the debate, this chapter will draw on the theories presented above as well as theories within environmental philosophy, aiming to highlight overlaps and contradictions. The hope is to be able to not just show divisions and shared beliefs between the work of environmental ethics and the field of philosophy of technology, but also to demonstrate a use of the latter to deepen the technological aspect of environmental ethics and to explore what role the natural environment plays in technological evolution. (It goes without saying, that the reverse movement would be equally interesting and rewarding).

3.2 The Evil Mastermind

The eroding effect of technology on the relationship between human and nature, has been one of the key subjects of environmentalism, a philosophical paradigm that, broadly speaking, challenges the moral defensibility of human actions that change or eradicate natural environments, since its establishment as a philosophical theory. (Hansen, 2021)

Within the philosophy of technology, the classical deterministic position represented by Heidegger and Ellul, and given a "pan-twist" by Skrbina, largely aligns with the viewpoint of American forester Aldo Leopold (1887-1948), one of the key writers behind the establishment of environmentalism as an ethical theory. It is the view that modern technology and science are insidious in the way that they erode the relationship between human and nature; consequently they can be considered the main cause of the environmental crisis we are currently facing. Moreover, because humanity has come to rely on technological systems for food, heating and almost all of life's essentials, the erosion is self-propelling. (Whyte, Gunderson, Clark, 2017 p. 41)

This insidious effect of technology is popularly summarised by Leopold in a quote describing "the two spiritual dangers of not owning a farm." One of which is to believe that groceries come from the store and the other that heat comes from the furnace. (Leopold, 1949, p. 12).

We see a direct parallel from this conception of the eroding and damaging effect of modern agricultural practices to many of the previously discussed understandings of technology. Most obviously perhaps, the statement by Leopold echoes Borgmann's focus on the wood stove as an example of the focal things which are now predominantly replaced by devices such as central heating and heatpumps. The shift is, in his words, not just erosive for our relation to nature but also for our relation to our community because not only does it hide the process and source by which we get our heating, it also separates us from the community that brings it forth. Describing a world in which heat is still produced from a woodstove, he writes:

"[The woodstove's] coldness marked the morning, and the spreading of its warmth the beginning of the day. It assigned to the different family members tasks that defined their place in the household. The mother built the fire, the children kept the firebox filled, and the father cut the firewood. It provided for the entire family a regular and bodily engagement with the rhythm of the seasons that was woven together of the threat of cold and the solace of warmth, the smell of wood smoke, the exertion of sawing and of carrying, the teaching of skills, and the fidelity to daily tasks. These features of physical engagement and of family relations are only first indications of the full dimensions of a thing's world." (Borgmann, 1984, p. 41)

Leaving aside the patriarchal (their place in the household), exhaustive (the exertion of carrying and sawing wood) and unhealthy (the smell of smoke) aspects of what is in Borgmann's eyes a depiction of the wholesomeness of focal things, we see how nature and community are at the heart of the world of focal things. The shifting of the seasons and the threat of cold signals a force of nature uncontrollable by humans, the filling of the firebox, the reliance on nature, and the cutting of the wood, the direct engagement between the human nature/body and nature. Moreover, in his opening remarks on where the problem of technology originates, Borgmann stresses, in a way characteristic to the essentialist approach, that the problem does not lie with factors extrinsic to technology, such as environmental restrains (or political indecision or social injustice), but within the pattern of technology itself. (Borgmann, 1984, p. 3)

Equally, we may conceive a parallel to Leopold's point in Heidegger's description of the traditional peasant's work to "take care of and maintain the soil" versus the "modern mechanised food production" (Heidegger, 1977 p. 15), as an example of how modern technology's "enframing" changes the nature of our relationship to the Earth. However, as we noted earlier the erosion in Heidegger's view does not originate in the distance or detachment technology creates between human and nature. Instead it originates in the technologic mindset, Technology, which perceives everything, including nature and, increasingly humans, as a standing-reserve, a resource. To the

possible objection that the root cause of this way of perceiving nature is not technology but human nature, Heidegger's answer is clear - human is the very first object of the ordering of technology, he is its original standing reserve.

"Only to the extent that man for his part is already challenged to exploit the energies of nature can this ordering revealing happen. If man is challenged, ordered, to do this, then does not man himself belong even more originally than nature within the standing-reserve." (Heidegger, 1977, p. 18)

It seems fair to say that this presents a sinisterism in technology, which leaves little room for escape (we will briefly return to Heidegger's suggested "solution" in the lasts section of this chapter).

Considering the above, the destructive nature of technology may not seem reflected in all its severity in Leopold's somewhat light-hearted depiction of the "dangers or not owing a farm". But while the quote presents a lightly humorous and easily digestible point, Leopold was not always as poetic and light-hearted. In an unpublished manuscript prepared at the end of 1944, he wrote:

"What will happen to wild values after the war when the fruits of military strategy and military engineering fall into the eager lap of modern man? DDT, capable of eradicating everything from mosquitoes up and down? Family airplanes, ready to eradicate solitude from the face of the map? Power machinery capable of rebuilding the earth on a scale almost comparable to the ice-age? If such tools are to fall short of achieving our ecological suicide, it is the time for us to learn caution and restraint in our power to eradicate wild things." (Leopold, 1944)

In this wording, Leopold seems to attribute a driving force inherent to technology, of technology ("tools" in his wording) working towards "achieving" something, this something, unfortunately, being the ecological suicide of humankind. Of course this level of caution against the destructive power of technology is not absent in today's philosophy of technology either. Having the advantage of having experienced the further environmental destruction and societal change caused during the nearly 70 years passed since Leopold's warning, Skrbina's pessimistic portrayal of technology's uncontrollable force (published in 2015), today, seems like an almost welcome explanation of how, despite all the warnings, we have now indisputably ended at the brink of environmental disaster. However, as we discovered in Chapter 2, in contrast to Heidegger, Skrbina sees the same ordering principle as the driving force throughout nature, all of human history, and the universe, not just in modern technology. As such he criticises both Heidegger's metaphysical distinction between modern technology and what came before and Borgmann's "technological dichotomy". Regarding the latter he states:

“There is no sharp breakpoint but only a smooth progression along certain lines of development. Even so, we can understand his motivation. If one is concerned about aspects of present-day technology, and yet everyone realizes that humans cannot do without some technology, then there is strong pressure to declare modern technology bad and traditional technology good—and thus to make fundamental distinctions”. (Skrbina, 2015, p 101)

There is, however, no such distinction, stresses Skrbina. Rather there is a continuous, evolutionary progression towards greater “control and manipulation of energy” and technology is the pinnacle of this process; nature and humans may thus just be steps on the way. (Ibid. p. 64,101)

Most likely, according to Skrbina, this means we face the choice between de-technologization and self-eradication. Skrbina bases this conclusion on the lack of superior technological civilisations outside of Earth. Since it is unlikely that such civilisations would not have developed, he says, their absence in space, must mean they either de-technologized or self-eradicated. Climate change is just one of the ways this may happen. (Ibid. 50-65) One may question whether this makes sense in what he calls “a natural evolutionary progression of complexity”. (Ibid. p. 60) Surely, if technological civilisations tend to self-eradicate, they are not evolutionarily apt.

On the question of whether man or technology is the root cause of this destructive process, Skrbina, unsurprisingly agrees with Heidegger and to prove his point presents an array of empirical examples of technologically caused problems that humans have not been able to prevent. One of them is the fact that despite the overwhelming scientific consensus on the cause of the climate change, the action needed to mitigate its effects is still missing.

“[E]ven in the face of a global catastrophe, the prospect for rational reform is slim…. The orthodox philosopher of technology may reply: “This is not a problem of technology, but one of political will, or social tradeoffs, or ethics— environmental or otherwise.” And yet: The problem has a known and explicit cause— advanced technological society. The root cause is modern industrial technology.” (Ibid. 108)

To anyone trying to point the finger of blame at other causes such as overpopulation or overconsumption, Skrbina, swiftly rejects such arguments with the retort that “It is technology itself that has created the conditions by which there are too many people on the planet.” (Ibid. 108)

By doing so, technology has also created a self-enforcing trajectory towards total technologization and environmental destruction as greater consumption, bigger populations and less physically and

mentally able humans (also a consequence of technologization in Skrbina's pantechnikon universe) only increase the necessity of, and reliance on, technological systems.

In recent years, the American environmental philosopher Baird Callicott has widely carried forth and given a theoretical framework to Leopold's ideas (which widely lacked this). In this work, Callicott too has expressed an explicit support for the belief that environmental destruction is caused not by what we think but that "what we think depends on the technologies with which with we do what we do". (Callicot, 2017, p. 22).

However, while Callicott explicitly expresses the idea that technological determinism is the driving force in the environmental crisis, he presents this view with some wiggle room for humans (in specific philosophers) to stop the negative technological development, to rethink the axioms of modern technology and steer what he calls a positive feedback loop in the right direction.

"I am inclined to think that a positive feedback loop – a kind of mutually reinforcing historical dialectic – goes on between what we think and what we do, that is, between natural philosophy and technology." (Ibid. 23)

Historically, he claims, we have first had paradigm shifts in natural philosophy followed by reenforcing paradigm shifts in technology and so on in a continuous circle of reinforcement. The conclusion he draws is that if the technological deterministsare correct, environmental philosophers who can rethink the axioms of our relations to nature is not the resource we need to intersect in the root cause of our environmental crisis, it will be engineers. Presenting this paper in a collection of papers supposedly aiming to "'green' philosophy of technology and to technologize environmental philosophy" it is, one might say, odd that Callicott does not mention the role of the former in shaping the practices and approaches of the latter. In the fourth section of this chapter, we will go on to explore one aspect of his own work, which can be more comprehensively analysed with a little help from the philosophy of technology.

3.3 A victim of religion, culture, and capitalism

While Leopold's fear of technology seemed to find several theoretical counterparts in the determinism presented by essentialists such as Heidegger and Skrbina, other environmental

philosophers[7] draw a different conclusion. Widely believed to have spurred the creation of an academic field of environmental philosophy, Lynn White Jr. has a notoriously different interpretation (Callicott, 2017, p. 17). In his lecture and subsequent paper, *The Historical Root of Our Ecologic Crisis*, (1967), he argues that while technology and modern science has indisputably given us the ability to impact and degrade the environment at previously inconceivable levels, the root cause of the destructive form of technologization is Christianity, or in other words the Christian belief that man was created to dominate Earth. As such what he suggests as the solution to the crisis, has nothing to do with technology but rather with the "presuppositions that underlie modern technology and science" (Ibid. p. 1204)

In another, better-known phrasing of this idea, White states that "what people do about their ecology depends on what they think (about themselves in relation to things around them)". (my brackets) (White 1967, 1203-1207). For this reason, White also stresses that more technology and science will never solve the problem if the root cause is not challenged. What is needed is to "rethink our axioms." (ibid1204) Still, White concedes that the proximate cause of the environmental crisis is technology, or rather *modern* technology, which, he agrees with the rest, sets itself apart from other human and animal relations to the world by nature of being informed by science.

Evidently, this sharply contrasts with the view of the classic theories of technology, in particular with that of Ellul, who states that one of the main problems of technologization is that we have - due to it, not as a cause for it - lost our view of the real sacred which has now been replaced by technology. Technology, he says, takes the place of the divine, out of bounds of critique and revered by the masses as a means of liberation and salvation.

"Whenever anyone suggests that technology presents certain disadvantages, people rush to its defence . . .This good is set forth as a thing not to be challenged…One can call everything in our society into question (including God), but not technology" (Ellul, To Will & To Do, quoted in Gill, 2012)

Indeed, not only does Ellull not consider religion the cause of technologization, he sees it as a potential remedy, a way to resist its malevolent influence, writes David W. Gill, professor of religion and social ethics, and founding President of the International Jacques Ellul Society:

[7] It should be noted here that neither Leopold nor White had academic backgrounds in philosophy, Leopold studied forestry at Yale and White a historian, specialised in the history of technology.

“To his sociological critique of technology, Ellul counter-poses a biblical, theological account of radical discipleship in the world. The dialectic Ellul establishes between the two is one of life and freedom. These two meet not in an intellectual resolution but in an existential resolution. In other words, it is in our daily life that the sobering insight of the technological critique and the bold call to radical faith and hope can be lived out in a life of freedom and relationship.” (Gill, 2012)

As we saw in the previous chapter, Ellul is, however, not just inspired by Heidegger who, like him sees technology as the root cause of the problem of modern society, but also by Marx, who has a more ambiguous interpretation of the situation. While Marx sees technology as a driving force of oppression and exploitation, he also believes that the main driving force of society, class struggle, could transform it to a tool for growth and prosperity for the working class. In other words, technology’s inherent drive toward the domination of efficiency might be shaped in the hands of the dominating group of society. This thought is clearly reflected in Feenberg’s critical theory, in which the moments constituting the secondary instrumentalization, integration, open op for an inclusion of the features of technology that are shaped by, and further the interest of, the dominating group in society (Feenberg, 2005, p. 51.) A prime example of this, is, Feenberg writes, “the imperative requirement to deskill labor in the course of industrialization rather than preserving or enhancing skills.” (Ibid52)

While the derivative role of Christianity is not one of the examples presented by Feenberg in the articles cited in this paper, we might stipulate that White’s approach to technology reflects a similar understanding. That Christianity is, not just one of, but the major force that pushes the primary characteristics of the technological realm (Feenberg’s wording) into conflict with the natural environment. Furthermore, Feenberg does include mediation by ethical and aesthetic factors as one of the “moments of secondary instrumentalization” that integrate the technique with the natural, technical, and social environments that support its functioning. (Feenberg, 2020, p. 308)

“Technologies have distinctive features as such while also exhibiting biases derived from their place in society. The technical code is the rule under which technologies are realized in a social context with biases reflecting the unequal distribution of social power.” (Feenberg, 2005, p. 47.)

Focusing on the effect of individual technologies and their place in society rather than a monolithic dominating force and way of thinking, however, allows for a theory that permits subordinate groups to demand or take influence in the evolvement of technologies. As I read it, it is thus not the call for the upheaval of a foundational view that directs all of modernity but rather for an awareness of the

different moments of technological realisation and through this the possible reform of the destructive patterns of individual technologies.

3.4 The glasses which diminish or redeem nature

While many environmentalists subscribe to the idea that technology is insidious, the idea that the erosion of human relations with the environment is a distinctive feature of technology is not unilaterally accepted.

As we saw in the first section of this chapter, environmental philosopher Baird Callicott carried forth a soft version of technological determinism. In his 1989 paper, *American Indian land wisdom*, Callicott explores the lifeways of a number of native Ojibwe communities. Through their language and history, he studies their relation to non-natural physical objects, nature, and environmental systems. In the paper, he notes how the understanding and language of the communities reflect Leopold's understanding of a biotic community, a community of which humans are members but not masters. In line with this though, the tribal communities view their land as a living entity, intricately interconnected with all other living beings. The land is not simply a resource to be used, but a sacred and integral part of a larger spiritual and cultural system. (Ibid. 42) Evidently, in this we clearly see the source of conflict with technology as understood in the classic essentialist approaches.

However, in his work, Callicott also notes how the integration of colonial technologies have impacted the tribal communities. For some researchers, the tribes' ready acceptance of modern hunting tools and consequent change in behavioural attitude toward nature serve as proof that their success in living in harmony with the land and avoiding the environmental destruction of Western societies is not based on their respect for nature, but rather on a lack of tools. Callicott, however, argues that the tribes changed their ways due to the impact caused by the ideology embedded in technology. In this, he sees proof that "technologies are never cognitively and axiologically neutral; they are embedded in an engendering and sustaining system of ideas." (Ibid. 39-40)

While Callicott explores the relations of the native American tribes with nature through their language and history, Don Ihde explores the relation of Australia's aboriginals with nature through the dream of technological totalization (when everything is included in our technological system, no nature untouched). Noting how the aboriginal dream of totalization carries none of the controlling or dominating features of the western dream of totalisation, he uses this "anomaly" to demonstrate the possibility that the texturing, the concealing transformation inherent in all human-technology-world relations, and the drive toward totalization is not a feature intrinsic to technology.

“[T]here is both a sameness to our trajectories in dreaming of totality and a deep difference. The dream of taking nature into culture technologically is shown to belong to a history, to our history. The enigma that appears at this junction is that our very distinctive history seems a currently dominant one. Aboriginal culture today is vestigial in the sense that, with isolated exceptions, the old ways are no longer being transmitted, at least not in their original forms.” (Ibid. 123)

The aboriginal community is one of many indigenous groups, Ihde uses to exemplify the various ways technologies introduced to native groups are adapted and embedded. While paying less focus on the original relationship of the native communities with nature than Callicott, he instead focuses on the various, sometimes highly peculiar, ways western technology has been adapted. As a matter of fact, in this, he sees proof that adaption of technology depends, at least in its first instance, on its utility in an existing practice of the receiving group. But even if adapted, the praxis in which it becomes part may provide it with a significantly different existence than in its original relation.

Exploring this line of thought, he presents several examples of Eastern technologies used for religious and aesthetic purposes by their creators, but turned into tools of efficiency and resource exploitation when adapted by the West. However, he stresses, though the artifact may in these examples, in some sense, have been transferred, its context, its culture and immediate use may not have been transferred, and thus the technological phenomena, that exists in order of its relation to that context, may not be what is transferred. Of course, some use contexts may overlap broadly in all cultures, which may, explain for instance the quick acceptance and adaptation of steel traps and hunting rifles of American native tribes in Callicott’s example. Others may be more complex and involve a culture-specific learned hermeneutic process, such as reading. However, when it comes to the second level of technological contextual involvement, the cultural one, there is very likely to be no overlap at all. This may, says Ihde, explain, the different levels of adaption and the different impacts that this adaption has on the recipient group.

“Between the extremities of successful resistance to culturetechnology and its counterpart quick acceptance there lie the approximate adaptations in which selected ("appropriate") technologies are adapted without total or major disfigurations of indigenous cultures (Southeast Asian examples). I am here reading the situation to be empirically a mixed one and not, as some interpreters would have it, the unimpeded march of Western high technology culture over and in spite of all cultural resistance.” (Ibid. 131)

Also interesting, in relation to the discussed technologic trajectory to take nature into culture, is the fact, that as in the case of the aboriginals, it needs not, says Ihde, entail a negative movement

towards detachment. In fact, whereas areas of nature and the animal world were previously feared, due to a lack of understanding, technologization brought a feeling of security and thus awareness of the beauty of e.g. previously considered ominous mountain peaks. The experience of the mountains was transformed, technologically textured, but not in a negative exploitive manner. Ihde, gives a more concrete example of this process in his discussion of the effect of television education and mass media, which has, he says, eliminated negative stereotypes in the animal kingdom and created greater ecologic awareness in young people. Hence, he says, even though there is no clear path yet, the possibility of networking the entire globe through existing technologies and well as the effect of the pluriculturality created through image technologies, gives hope that:

The concept [The Gaia Hypothesis] that sees an interlinkage between biological and non-biological dimensions of earth seems both likely and plausible for the future of the understanding of the earth. At the very least, to see technological civilization as a kind of biologically activated "geological" force should by now be clear. With or without the metaphor of "Nature telling us something," the self reverberation of negative environmental actions are more widely known." (Ihde, 1990, p. 202]

With that, the notion that nature and technology may be interlinked, that technological civilization may come to be understood, one day, not as something opposite to the natural environment but as a part of it driving, and driven by changes, in the Earth System (including atmosphere, ocean salinity, temperature and more) we enter the final stage of the discussion. One that explores the possibility, that our natural environment may, not through its limitations but through the understanding it provides, might hold the key to redefining our relation to technology.

3.5 The role of the natural environment in theories of technology

Just as technology has played a central role in environmental ethics since the inception of the field, nature, in some form or shape, is included in most theories of technology. Increasingly so, as the environmental crisis has accentuated the fact that technologization has so far produced no more than a quasi-independence from of the natural environment in which it functions - and that this environment might very soon pull the plug on humanity's grand disillusion of mastery. In the early theories of technology, the degradation of nature was, however, seen as just one of several symptoms of the cause for worry, not, in other words, as a cause for worry in itself.

Returning to our hydropower plant on the Rhine, one might find it particularly odd, that despite his stark warnings against the reductive resourcification of nature inherent to modern technology, Heidegger shows no concerns that might be classified as environmental. To him both man and

nature are natural resources. And though man is never just "mere standing reserve" since he drives technology forward and takes part in ordering, both man and nature are within the domain of domination of technology. (Heidegger,1977, p. 18) It is, however, with the freedom of the latter that Heidegger is mainly concerned. His loving descriptions of "traditional" technologies in harmony with nature such as the "sawmill in a secluded valley of the Black Forest" (Heidegger,1977, p. 5) arguably demonstrate more of an aesthetic than environmental concern. The fact that Heidegger, during his lifetime from 1889 to 1976, experienced sweeping and devastating technologically dominated events, including two world wars[8], but only the dawn of critical environmental concerns, might explain why he does not consider environmental destruction as the problem but rather, if we consider the resorucification or nature as such, as an indicator of the problem.

Though he addresses environmental problems in a way that Heidegger does not, Ellul similarly considers issues such as pollution "fake" problems, problems that will be solved with more technology. The real problem is, accordingly, that the fake problems will cause the domination and control of technique to continue to grow in strength as more "fake" problems are created, creating the need for more technological solutions and so on. In other words, the complete replacement of "the natural milieu" is both a consequence of, and reinforcing reason for, "technique" to become all-encompassing. (Mitcham, 2022, p. 25)

"Technique is no longer some uncertain and incomplete intermediary between humanity and the natural milieu. The latter is totally dominated and utilized (in Western society). Technique now constitutes a fabric of its own, replacing nature." (Jacques Ellul, 1983, P 1)

Maybe this belief, that nature is completely dominated, (or a variation of it) is the reason, neither Ellul nor Heidegger attribute nature nor the environment great significance neither as problem nor as solution. When it comes to a possible solution, Heidegger suggests a "reflection" on art where man can, due to the, at one and the same time, "akin" and "fundamentally different" essence of art and technology, see the truth of technology's form of revealing without encountering the danger of enframing. (Heidegger, 1966, p. 35) However, later in life Heidegger seemed to have given up this idea as well (the freeing claim never seemed a convincing solution to his dystopian depiction of technology, in the first place, which is why it is not dedicated more space or time in this paper) Leading up to his famous statement that "only a god can save us", he says: "Technology in its

[8] Heidegger's membership of the Nazi party and his early (though possibly disrupted) support of its politics and its possible influence on his writings have been widely explored and with several papers and books written on the subject, I will leave it at this note.

essence is something that humanity, of its own accord, cannot master." Technology continually presses upon us; "[it] increasingly dislodges man and uproots him from the earth."

Ellul, on the other hand, presents a slightly more optimistic stance and poses four steps for man to extricate himself from the domination of technique: correct diagnosis, the destruction of the "myth" of Technique, practising detachment and independence, and dialogue and engagement with technicians. (Ellul, 1963, p. 27-28)

When it is noteworthy to point out that neither considers nature a part of the solution to the proposed problem of technological domination, it is because this is the role nature, in particular wilderness, plays in many of the other theories of technology explored. Skrbina for his part, is explicitly critical of Heidegger's disregard for nature.

"The impact of technology on nature must be a component of our ethical outlook, both for instrumental reasons and because an enlightened ethic will see intrinsic value in the nonhuman world. Empirically speaking, advanced technological societies inevitably damage their local environments and disrupt the global ecosystem." (Skrbina, 2015, p. 89)

Worth remembering before moving on, is that fact that unlike Ellul, Skrbina does not contrast technology with nature; he perceives both as part of the same world, obeying the same imperative and directives, the drive towards greater order and complexity. The difference is a matter of degree not an ontological divide. (Skrbina, 2015, 192) When the destruction of nature is, nonetheless, possible in a pantechnikal progression (which is a natural process and part of nature) it is because the drive towards greater complexity may necessitate the ordering and possibly the destruction of lower orders of structure to the benefit of higher orders of structure. How and why technological civilization, which is in Skrbina's theory very likely to self-eradicate before reaching other planetary systems, can be this higher order, still escapes my understanding. It seems to be based on the fact that technology carries a greater energy density than nature, thereby making it the pinnacle of an evolutionary process that works towards higher energy density. (Skrbina 2015, 81)

Nonetheless, as we have seen, the inability of society to deal with the environmental destruction and, in particular the climate crisis, serves as a frequent example to prove that humans do not control technology in Skrbina's pantechnikon universe.

“Even if we disregard all value in nature itself, the fact that we may well be destroying our own basis for life is comparable to the drug addict or alcoholic who continues in his self-destructive behavior, precisely because he is not in control. Our very devaluing of nature in favor of our own technological lifestyle is potent evidence that technological values surpass all others. […] And if technological values reign supreme—even though they are not our only values—then we are predominantly controlled by the technological phenomenon.” (Skrbina, 2015, p215)

However, as mentioned, nature, or rather wilderness is also one of the measures suggested by Skrbina to escape the destruction of complete technologization and restore society to the bliss of what is referred to as the “human era”, the time from the late Neolithic through the early agricultural period and into the era of the first true civilizations. During this time, humanity deployed benign technologies and the foragers, farmers and small-scale urbanites thrived in a lifestyle to which it had been adapted for through two million years of human evolution. However, during the following period, as humanity moved into the Middle Age the third wave of technological determinism began, bringing with it the host of vices of modern day. Hence, our era is the Technological Era, and due to the self-propelling force of the pantechnikon this means everything we do (with technology) leaves us - and nature - further behind. Morally, however, we cannot blame technology.

“This is no one’s fault. There is no one to blame. Technology is not evil. It acts not out of malevolence but out of necessity. It is an inevitable consequence of life on a planet of superabundant energy.” (Skrbina, 2015, p. 272)

However, Skrbina, does offer a way out (maybe, the cynic might say, because his theory would otherwise be too bleak to be publishable in a technologically controlled academic system which increasingly requires everything to serve a purpose); fortunately, we are only living in the first phase of technological determinism, a state where technology is still dependent on humanity for its continued expansion. And, in Skrbina’s words, “though we cannot control its progress, we may control its regress.” To do so, we ned to restore our world to the Human Era. This will include at a minimum, three things: “a partial dismantling of the technological layer, a substantial global population reduction, and the restoration of a majority of the Earth’s land area to true wilderness.” (Skrbina, 2015, p. 277)

In this context, the suggestions are provided with uncharacteristically little detail, but in an earlier refutation of an opponent’s case for the benefits of urban life (which Skrbina sees as the epitome of

technologization), Skrbina lists the numerous scientifically proven benefits of nature and wilderness on human mental health. He links this to the claim that humans are still evolutionary both physically and mentally adapted to the life of hunter gatherers "roaming amid vast openness".

"Our success as a species is adapted to this precise mode of existence. Our abilities to solve problems and to anticipate dangers all evolved under such conditions. We are most at home in open and pristine wilderness, and therefore the further removed we are from this experience, the greater the likelihood of psychological disorder. And conversely, the greater the degree to which we are able to return to such a condition, the better for our psyches. The true 'wilderness requirement' for the human species is so vast that we cannot hope to attain it in the present age. But obviously we can move in that direction." (Skrbina, 2015, p. 219)

Borgmann too prescribes nature as a remedy to the vices of technologization, in his terms "the device paradigm". But he comes from a vastly different starting point, describing nature and the relationship between nature and human as sacred, and technology as the unholy element ruining the connection. Accordingly, nature also plays the role of more than a remedy, we might say that it is the very antithesis to the device paradigm. Hence it is perhaps fair to say that when Borgmann suggests nature as a tool in the fight against devices, it appears as more of a coherent line of thought than in the case of Skrbina. Inspired as he was with his predecessors, one might speculate that Borgmann has replaced Heidegger's art with wilderness, "nature in a pristine state," as the ideal through which we can begin to conceive the patterns of technology. Through wilderness we can begin to comprehend that meaning is derived by engaging with things that we "recognize and respect in their own right." As such wilderness can be drawn on to limit the reign of the device paradigm and help focal things regain their role in connecting human and nature as well as human and community. *(*Borgmann, 1984*, p. 193).*

Unlike Skrbina, Borgmann, however, realises that we cannot reject our technological existence, not even in embracing wilderness (Skrbina recognises that we cannot completely dismantle the technological system, but maintains that it would be desirable to do so). We can no longer rely on nature to sustain us, but need technology, warm boots, flashlight etc, to ensure our safety, comfort, and even and survival in the wild. As such we need to take care not to damage nature in our ventures and so our relationship to it is redefined. As the relationship between nature and culture has been reversed, we no longer respect wilderness out of fear for its wildness but out of care for its fragility. Borgmann compares this reversion of roles with that of parent and child. While the parent sustains and nurtures the child in the first part of life, later in life, the roles must reverse as the

parent becomes old and frail. Consequently, he also sees in technology the opportunity for humans to learn a new relationship to nature.

“Just like nature teaches us to accept technology, so through technology, we learn to respect the wilderness, not for its power but for its beauty.” (Borgmann, p. 194)

Furthermore, Borgmann believes that by reconnecting with nature, we also realise the limits of technology. We see that technology cannot produce, cannot give us nature. Only by limiting technology can we have wilderness. Thus technology becomes the ideal, outside the device paradigm, which can help reduce its reign and allow us the insight to see the value the focal things and reengage in their world in a mature and engaging manner. (Ibid. 195)

It is indeed a more uplifting and poetic depicturing than that of Skribina who, paradoxically, suggests a more systematic reordering of the world. In other words, in Skrbina’s suggestions for resistance to technology seems to the epitome of technological thinking, recommending control – of the population – and increased efficiency – of the human psyche – through rewilding. But then again, since Skrbina maintains that everything is directed by the same technological force, he has no where else to argue from.

Borgmann’s and Skrbina’s focus on nature and wilderness as essential to the betterment of technological civilization is somewhat reflected in Don Ihde’s post-phenomenological analysis, noting that the lack of a conservational ethics is one of the greatest concerns of technological civilisation.

“Combined with what remains a dominantly expansionist ethic towards nature, my first recommendation must be a worldwide conservational ethic. This is, to my mind, the most sweeping and urgent need in response to the currently often negative relation that high technological civilization has placed upon the environment.” (Ihde, 1990, p.197)

However, in giving this recommendation, Ihde takes great care not to define environmental destruction as something exclusively caused by high-tech western societies. Environmental destruction, he says, has happened for millennia and has been caused by cultures with minimal technologization as well. For this he gives a number of examples, accompanied, by a number of examples of small- and large-scale environmental successes in high-tech cultures. However, he stresses, the distribution of blame does not mean that Western high-tech cultures should not revisit its relationship with nature. In this he aligns himself with, among many others, Lynn White, in attributing some responsibility to “dominant cultural and religious beliefs”. Those beliefs include (1) the belief that Earth is primarily a resource well for privileged human use; and (2), closely linked, the

belief that there is a large and valuable significant gap between humans and the rest of the animal kingdom such that our precedence.

Notedly, these believes do not originate from human-technology relations though, of course, their effect can be exacerbated by them (though as we saw in the previous section, sometimes technology can also reverse the effect of past prejudice). The catch is, of course, that any change in attitude towards nature has to originate within the technologically textured society. As we saw, in the past section, Idhe is hopeful, that the interlinkage between the natural environment and our technological civilization, may ensure that this happens.

Feenberg too shares a belief that it may be as the awareness of the impact of our technical actions is almost being forced upon us by the environmental crisis, which is changing the criteria for the primary moment of instrumentalization, “Autonomization”. In technical action, we remember, the subject is "autonomized" as the feedback between the object and the actor is interrupted and the subject is isolated from the effect of their technical action. We do not feel the speed of the car or the emission from the tailpipe and, by now, even the mosquitos splattering the front screen are gone. The latter is, however, in Feeberg one of the ways in which the loops of feedback (which are instant with untechnical, finite action) are growing shorter. With technologies, we are diffusing and deferring the feedback, creating an illusion of infinite liberty. This illusion, however, “will become increasingly obvious as we disturb nature more violently in attempting to control it.” (Feenber,2005, p. 48,55)

To face this challenge, Feenberg, shares an uplifting vison for the philosophy of technology, drawing lines to both its past and future.

“When modern technical processes are brought into compliance with the requirements of nature or human health, they incorporate their contexts into their very structure, as truly as the […] chalice, or bridge that Heidegger holds out as models of authenticity. Our models should be such things as reskilled work, medical practices that respect the person, architectural and urban designs that create humane living spaces, computer designs that mediate new social forms. These promising innovations all suggest the possibility of a general reconstruction of modern technology so that it gathers a world to itself rather than reducing its natural, human, and social environment to mere resources. It is now the task of philosophy of technology to recognize that possibility and to criticize the present in the light of it. (Feenberg, 2000, 313)

4 THE TECHNOLOGY VIEW IMPLICIT IN THE GOAL OF SUSTAINABLE DEVELOPMENT

> *The idea that increased consumption will inevitably lead to depletion and scarcity, as often as it is repeated, is mistaken in both principle and in fact […] Modern economics depend more on the progress of technology than on the exploitation of nature.*
>
> - Mark Sagoff, 2017

Next morning, I look at the forecast, a little red triangle flashes in the corner, extreme weather it reads when I click on it, and the rain outside the window looks like a wall. But the wind has quietened down, and inside the city it will be safe to venture out; mainly the warnings are of avalanches and road collapses in the mountains north of here, caused by quickly melting snow, sudden temperature spikes and heavy rain. We go to the huge indoor playland next door. It is full of lifelike animals, zebras, monkeys and lions. My daughter loves it. She has never seen any of the animals live, but she watches them on TV with her dad, a biologist, and he cannot wait to take her to the zoo.

Someday, maybe we will do a safari too; if we make it in time before the Savannahs of Africa are all destroyed by drought and increasing storms. I imagine how amazed she would be, and hope they manage to save it all. But if they don't, we have Leo's Legeland. It is built in concrete and with ample state funds (collected through oil exploitation), Norway has the means to enact every thinkable green technology and measure to prepare for the impact of climate change. In the midst of our building complex is a green park, with build-in waterways, in the summer they create a serene atmosphere, but right now they are serving their function – making sure the abnormal waterfall is drained away to prevent flooding. In the basement, almost all parking spaces have e-chargers. Norway is the country with the highest market saturation of electric vehicles and the lowest amount of air pollution in the world. Wind and solar energy have become the cheapest sources of energy in many parts of the world, but the old oil giants are not worried, they have the means to invest and are slowly turning their ship around.

4.1 The role of technology in the definition of sustainability

"What is needed now is a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable," those were among the opening words of the

Brundtland report published by the World Commission on Environment and Development in 1987. Since, the concept of sustainable growth has become, at least in intention, a key component of global, national, and local policies all over the world (WCED, 1987) (Arler, 2017).

Historically, however, the concept of sustainability originates all the way back to 1713 where it was initially introduced by the German mining administrator Carl von Carlowitz, who presented it in a work published on Wild Tree Cultivation. Later, the concept was promoted by the American forester and politician Gifford Pinchot, who used the term distinctly in relation to the work to preserve woodland to safeguard a continued exploitation of resources from forestry (Arler, 2015, p. 18). In terms of environmental ethics, it thus presented a conservation ethics, but based not on any intrinsic value of the forest, but on the value of the utilities - heat, building material, and so on - it provided and could provide for present and future generations of humanity. It was a utilitarian viewpoint of optimising well-being.

However, the concept of sustainability did not become part of the common vocabulary until the 1987 report, *Our Common Future (*the report became better known as the Brundtland report, a name it was given in recognition of the work of the former Norwegian Prime Minister, Gro Harlem Brundtland, who served as Chair of the World Commission on Environment and Development during the report's creation). Reusing a definition of sustainable development used in a report published by several environmental organisations in 1980, the 1987 report includes the aim of "sustainable development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

However, in our exploration of the relationship between human, technology, and the natural environment, it is the Brundtland report's addition to the above which, hopefully, make the above explorations relevant. The report goes on to state that:

"The concept of sustainable development does imply limits - *not absolute* limits *but limitations imposed by the present state of technology and social organization on environmental resources* and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth." WCED) (My italics)

Within this additional concept defining sustainable development, we find the cue to the increasing relevance of the discussion on the role of technology in relation to the degradation and devastation of our natural environment.

Historically, the concept signals a move away from an earlier stronger focus on environmental concerns. At the 1972 conference, *The Human Environment* - the very first of the UN's conferences to make environmental concerns a major issue - economic growth, ill-fated technology, and population growth were considered the main causes of environmental problems. However, the conference created significant political tensions between developing and developed countries, with many of the poorer countries expressing fears that the focus on environmental problems would reduce the attention on global inequality and poverty. Consequently, the Brundtland report also included the concept of need into its definition of sustainability writing that:

"The Commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes."

Fifteen-20 years on, both the 1987 report and 1992 conference (now named Environment and Development*)*, signalled an unwavering belief that economic growth was a requirement for sustainable development and that increased economic growth would lead to more efficient and cleaner technologies. (Arler, 2017)

In this redefined approach, concisely conveyed in the extract cited above, we can clearly perceive an ideal of sustainable development that retains within it a concept of no "absolute limits"; the limitations of sustainable development cannot be found in, or defined by, the natural environment, it is not deductible from the size of our planet or the amount of accessible water or oil; the limit is defined by technology's shifting, continuously expanding, capacity for effectivization. Accordingly, we might stipulate that if we believe that technology can continue to increase in efficiency, regardless of the state of our natural environment, we have achieved infinite sustainable growtht. This furthermore, entails an unambiguous belief that "technology and social organization can be both managed and improved to make way for a new era of economic growth."

We have already explored the theories of technology and environmental ethics, that make the notion of sustainable development seem - well, complicated at best, but before we move on, let us just examine a couple of the points made in the preceding chapters. 1: Despite their very varying approaches, the discussed theories of technology all agree that nature is, not just to some degree, but utterly and completely dominated by technology. 2: Most theories agree that humans do not control technology, which is propelled by a drive towards greater order and efficiency and fuelled by

devouring and demeaning nature (and to varying extents human freedom), but they vary on the degrees to which humanity can resist, shape, or nudge the force of technology in the right direction. We might cautiously say, a slight dissonance, with the concept of sustainable development is detected. 3: The more recent theories, all see the protection, restoration of - and/or connection with – nature, in specific wilderness, as not just a remedy against the effects of technology but as an ideal or cure to draw strength or inspiration from in the transformation of technology.

However, before concluding that the concept of sustainable development challenges most theories that work with technology as more than a collection on isolated tools, we have one more stop to make. In the last chapter, we discussed three roles that technology could be attributed in the environmental crisis. Arguably, there is a fourth possible role, that of the saviour.

4.2 The saviour of our planet

Before exploring the idea that technology could play the role of saviour in the environmental crisis, let us first remember the instrumental view of technology which Heidegger in the beginning of our explorations, rejected as correct, but not related to the truth of Technology (see chapter 2). The conception of technology as a mere tool is at the core of what is known as the neutrality view, the view that the technological realm is nothing more than a collection of neutral tools with which humans may fulfil their intentions. As such, technology is viewed purely as a variety of neutral objects, not as manifestations of any sort of underlying or overriding force, essence or relation or a combination of any of those. Of course, a tool may be designed for a specific purpose by its creator, who might be specifically interested in having its user engage in a specific action, but this intention is neutralised by the user who can use it towards any end regardless of the creator's intentions. In other words, if I feel compelled to use my laptop to write my thesis on technology and not to watch seven episodes of *Breaking Bad*, it has nothing to do with computer. The computer has no preference, not even if I choose to use it as a dinner tray or doorstop. Feenberg explains this view the following way:

"[Technology] does not respond to inherent purposes, but is merely a means serving subjective goals we choose as we wish. For modern common sense, means and ends are independent of each other. Here is s crude example. In America we say "Guns don't kill people, people kill people." Guns are a means which is independent of the ends brough to them by the user, whether it be to rob a bank or to enforce the law." (Feenberg, 2003) (Whyte, Gunderson, Clark, 2017, p. 43)

Thus the approach not only signifies that there is no unifying force at work, no capital T, in technology, but also that individual technologies do not alter or shape human action beyond their original intentions. This view is, says Feenberg, "a kind of spontaneous product of our civilization, assumed unreflectively by most people." (Feenberg, 2003) (Whyte, Gunderson, Clark, 2017, p. 42)

A variation of this approach is the disinterestedness of technology, which holds that while the users of technologies may have their ability to carry out specific actions enhanced by the availability of technological means, their original desires are not changed. Thus, when the use of certain technologies lead to negative side effects such as described by Skrbina, it has, fundamentally, nothing to do with the technology but rather with the inclinations and propensities of the user (Whyte, Gunderson, Clark, 2017, p. 43). Most of the preceding chapters have served to demonstrate that the majority of theories within both environmental philosophy and the philosophy of technology provide significant challenges to this point of view, arguably to a point where it seems fair to say that even if the way we relate to technology can shape how it shapes our individual live and culture, it will shape it; it is not neutral; it cannot simply be controlled.

There is, however, another option – that technology is not here to doom us, but to save us. That the force that drives technology's continuous expansion towards efficiency and order will not end in destruction but in greater freedom, prosperity, and subjectivity[9] for the human race. So, let us look at the idea that technology could play the role of the saviour in the environmental crisis. In the everyday public debate, the belief that technological innovation can overcome environmental challenges is at the core of the conception of circular economy, the idea that we can, through technology, recirculate materials (in the fullest extent, indefinitely) to achieve the greatest possible benefit and efficiency in resource use and production. This belief is also at the core of the theory of ecological modernization. Developed within environmental sociology, this theory argues that though ecological degradation is likely to be a consequence of the first stages of modernization, "modern capitalist society has reflexive capacities that allow the social system to self-correct and to pursue environmental sustainability." (Ibid, p. 52). According to this theory, technology will be propelled by market factors to create greener products and practices. Accordingly, one of the theory's proponent's Athur P.J. Mol argues that "environmental improvement can go together with economic development via a process of delinking economic growth from natural resources input and outputs of emissions and waste." (Mol, 1997, 141). As technological innovations and social environmental reforms is believed to result in both a decline in the use of natural resources and an increase in

[9] I use subjectivity as an attempt to reflect what Ellul means when he says that technology threatens human's ability to remain "sujet", which I will take to mean an individual subject aware of his subjectivity.

economic growth, the outlook of this theory is decidedly rosy. The view is, in other words, markedly in line with the view of sustainable development expressed in the Brundtland report – there are no absolute limits to growth, only the limits set by our technological capacities, and these capacities continue to grow under our management. Notedly, the view means that we can transform our technology without having to transform our institutions or culture (of capitalism and consumption).

While the views of ecological modernization have not, as we have seen, been widely embraced by philosophers of technology or environmental ethics, they are not entirely unrepresented. In the field of environmental and economic philosophy, Mark Sagoff is equally critical of the idea that overconsumption (through technological means) will inevitably lead to disaster. In rejecting the idea that overconsumption will lead to scarcity and depletion, he presents a number of empirically based arguments to reject the "misconceptions" that we are running out of both renewable (food) and non-renewable (minerals) resources as well as the fear that energy resources will run out or that population growth will run amok (Sagoff, 2017, 175).

In shorth his theory is as follows: As has happened throughout history, as specific resources run low, market mechanisms will ensure the development of new technologies that rely on less scarce raw materials; when it comes to food, it is not a matter of whether we can produce enough but of distribution and moderation. The world cannot, he stresses, feed 9 billion obese Americans on a diet based on fast food and meat, but it can feed 9 billion people on a healthy vegetarian diet. When it comes to energy technologies, they need to be reformed not because of scarcity but because of geopolitical risks and climate change. Finally, when it comes to population growth, Sagoff points to the fact that population growth is not happening due to increasing birth rates but due to lower mortality rates, and that with the continuing decrease in global birth rates, population growth will soon halt and begin to slowly decline. Particularly, his three last points seem to have ben proven by recent developments and movements.

"Modern economics depend more on the progress of technology than on the exploitation of nature. Technological advance, which seems to be exponential insofar as each discovery prompts another, promises to improve standards of living while lightening the human footprint on the natural world." (Ibid, p. 177)

This does, however, not mean that we should not act to preserve or protect nature, but rather than arguing to do so because of the risk of depleting its resources, we should argue in moral and social terms, says Sagoff. We should protect nature because of its aesthetic and social value, not because of its economic value. In doing so, we would have valid goal and the means to achieve it, says Sagoff.

“Of course no one believes that economic development will automatically lead to environmental improvement. It only provides the means; we must gather the moral, cultural and political will to pursue the end.”

Some have argued that an equivalent notion of environmental conservation could be entailed in the concept of sustainability if the wellbeing created by nature is taken into account to make the beauty of nature a value to be sustained. (Poel, 2017, p. 127)

4.3 Is it a sustainable view?

While the above is an intentionally absurdly broad question, the following section will aim at an introduction to some of the points of contention in this debate. The main one being, of course, that the technologically (and economically, but as economy is a technical system, this is implicit) optimist view of sustainable development is the epitome of technological thinking, that it is the type of thinking that technology promotes, and in which we get further and further entangled, the more desperately we need to believe it. It is easy to find support for this view in the classic theories of technology. Despite the rise of popular awareness of the sustainability concept happening after his death, it seems safe to say that Heidegger would not have been impressed. In his discussion of the instrumental view of technology, he writes:

“But this much remains correct: modern technology too is a means to an end. That is why the instrumental conception of technology conditions every attempt to bring man into the right relation to technology. Everything depends on our manipulating technology in the proper manner as a means. We will, as we say, get" technology "spiritually in hand." We will master it. The will to mastery becomes all the more urgent the more technology threatens to slip from human control.” (Heidegger, 1977, p. 5)

Of course, Skrbinia agrees with Heidegger - in pressing on with technological solutions, we are acting from within a technological thinking which has one goal only, increased complexity and order. Furthermore, with the thesis that all current technological thinking comes from within a technological mindset, and that we are too close to it to grasp the nature of the phenomenon, arguments to the contrary automatically become void. Every retribute describing technology as a neutral or positive phenomenon, can be attributed to the dominating force of technology.

However, we will allow ourselves to succumb to technological thinking for a moment (knowing of course that it can produce nothing, it effectively becomes purposeless, it will add nothing and order nothing – it is, in other words, the opposite of technological).

When looking at the concept of sustainable development in the last section, we neglected an investigation into the impact of the concept of need, the notion that the needs of the world's poor should be given overriding priority, not just to eradicate poverty but also to avert environmental catastrophes. It is an issue that brings up several issues in regard to the promise of technology. One is what Don Ihde calls cultural transfer, namely the theory that even if technological artifacts might be transferred, at a cultural level, the technology will almost definitely not be transferred.

"The sheer power and concentration of technological and scientific power in the mainly Northern Hemisphere hightechnology nations is, of course, an indisputable fact. But it is also an ambiguous fact. It points to a much deeper relation between technology and culture and the embeddedness of the former in the latter. What is not successfully being transferred is precisely the infrastructure necessary for autonomous development". (Ihde, 1990, p. 131)

Ihde goes on to listing the number of countries that by the time of his writing had the infrastructure for such transfer, a list which, at the time excluded some 150 countries. The remaining countries, including Europe, Northern America, and Australia, Israel, South Africa and Japan accounted for , 97.1 percent of world research and development dollars and 87.4 percent of the scientists and engineers associated with such development. Concluding that "I read this as a massive failure to transfer precisely these aspects of a culture that would support furtherance of high technology." (Ihde, 1990, p. 132)

And although some of the countries lacking such infrastructure, have to an astonishing degree caught up with the west (China is now among the leaders in the cleantech race), it has not lessened the poignancy of his point. Just in the last year, the governments of the developed world have ramped up their funding and research infrastructure to attract cleantech ventures.[10]

Another argument, often levied against ecological modernization and thus the technology conception implicit to the concept of sustainability is that of a continuous drive towards greater consumption. If we create more efficient, greener methods of producing more, we just consumer more. (Brey, 2017, p. 200) It is another version of the classic argument that more technology will just

[10] https://www.greenbiz.com/article/heres-glimpse-eu-response-inflation-reduction-act

create the desire for more technology, and looking at past trends, it is one that is difficult to deny. The fact that we will, however, if recent predictions turn true soon be “saved” by sharply dropping birth rates, however, only raises further the concern of global inequality and technologization. As the share of elderly people increase, particularly in Western countries, the consequence seems clear. Either borders will open to allow for an immigration of young workers from the less developed parts of the world to stabilise the generational pyramid and ensure continued economic growth, or we will replace or reshape the diminishing workforce with more technology. This means, either moving the problem of an eldering population to the less developed part of the world, or increasing technologization, neither which would do anything towards the aim of prioritising the needs of the poorer countries.

The inability to democratically persuade people to consume less or reduce carbon dioxide, are two of the problems often fostering the most controversial solutions. Geoengineering, bioengineering and behaviour steering, or even altering, technologies are some of the solutions often referred to as high-risk technologies. But slowly, more radical solutions are making their way into broader acceptance. Lab-grown meat, for one, is one of the technologies that while not considered high-risk, blurs the border between nature and technology in a way that have previously tended to attract arguments against the “hubris” of engineers. Another argument against this type of solutions is the psychological effect of perceiving such solutions as easy solutions. (Savulescu, 2017, p. 105,6) In general this kind of solution, call for a wide extent of risk and cost comparative analysis, something which is, due to the inherent subjectivity unavoidable in benefit and risk assessment, virtually impossible, until that is, the most desired and feared of all technologies take over, an all-encompassing AI surpassing human intelligence. (Thompson, 2017, 73-7)

5 A DAY IN THE LIFE OF THE MACHINE

"In the final extension of the paradigm, the globe itself must be seen and treated as one technical device"

- Borgmann, 1984

I wake up to the gentle song of birds and open my eyes to see the room lit up in a golden sunlight, both originating from the wall-sized window by the end of my bed. The outside windowfilm has, activated by my watch, cleared the glass and a number of small air dents have opened up to allow for the sound of birds and the gentle rustle of leaves to reach the rooms. Next to me, my daughter, now 60 years old opens her eyes and looks at me. She is staying with me. I am not well, but thanks to an implant in my brain I have no pain, and when I get overwhelmed by fear or anxiety, I can gently tap a wristband on my arm to activate the control of another implant. It stimulates the centre in my brain producing serotine and endorphins, and instead of the fear of death, the memories of my life with her and her dad fill me with warmth and joy. Her dad is now part of the cyber universe, we talk to him daily, but it is not the same. We are not allowed to ask what it is like, if it feels real, if he is real; it will make it collapse. But soon I will find out as I join him.

My daughter looks serenely at the window too, we are on the fourth floor and just at the level of the leafy crowns of the trees. They were planted ten years ago, but have, thanks to the work of bioengineers and the science of dendrology, grown at ten times the speed of natural trees. Most likely, most of the birds are artificial too. As natural species struggled to survive the increasingly extreme weather and the changes in their food chain, they were slowly replaced by genetically modified species. Today, of course, the weather is under our control, billions of little mirrors at the edge of our our atmosphere, alongside a number of weather applications on earth, all controlled by an AI system, create the perfect combination of sun and rain for our technological system to thrive.

The fast-growing trees and a large underground storage of carbon dioxide, along with an energy system run on 100 percent solar, wind, and water energy helped us get on top of the environmental woes of my daughter's childhood. It was not without some mishaps though. As businesses scrambled to proliferate on the crisis, high-tech, centralised solutions such as small nuclear power plants were exported to the less developed part of the world, that had not gotten started on the expansion of wind, water and solar in time. Not all such ventures proved a success, and today, some of the areas serve as natural attractions, where visitors can enjoy the undisturbed wildlife while

protected by antiradiation medication. My daughter got to see her zebras, and today we have them here too. In the l indoor parks of the city in which we can walk for miles, listen to the sounds of insects and nature buzzing, and watch the tomatoes grow, literally as they too grow with ten times the speed of the traditional ones.

My daughter looks at me, she looks slightly sad, and I can tell from her light tapping on her wristband, that she is adjusting her mood. I stand up, and for a moment feel confused, I don't know where I am. Then it all comes back, the first brain implants approved for medical distribution were those electrically stimulating the neurological pathways between the short and long-term memory, it eradicated dementia – and the moral arguments against enhancing mental and cognitive capacities with implants. Today, my daughter has several too, not for dementia, but for mood control and better concentration. It made her, she says, a better person.

As we have breakfast, fresh fruit and plant-made yoghurt from the fast-growing plants of the conservatory of my balcony and the communal roof garden, we link our mind-controlled network access up, so we can commonly browse through the news while eating and chatting. My daughter stops at an image of a large forest that has grown out of control of the system. A group of young people who resist the mediation of implants and network connections, have interfered with the growth of the forest. The news feature discusses the different effects that the rapid forest growth may have on other parts of the nearby system, and globally, if the group as it threatens too will continues their sabotage on a wider scale. My daughter looks at me, a slight worry in her eyes. I know the fear. It was the one I felt during most of her childhood, the fear that nature would collapse and humanity with it. I know, however, that her fear is different. That her fear is that of the collapse of the technological system and with it, technological civilization.

5.1 The worries of a machine (conclusion)

In the novelistic venture above, I have aimed at conveying the view, which I, after 50 pages of exploring what I will call the "nature of technology" end up with. If this wording seems an unnecessary confusion of things, I need to add that I choose this expression "the nature of technology" exactly because of that confusion. Because it, I believe, demonstrates, how nature is in technology and technology is in nature. I believe this understanding will only grow stronger in our conception of our world, until it seems odd that it was ever any different. The same, might I add for humans; nature and technology (technological thinking), convene in humanity, as it convenes in our bioengineered creations and indeed, in all of nature. In this, I suppose, I agree with Skrbina; where I depart from his view is that I do not believe it to be necessarily a bad things. I do not understand the

need to end in destruction. And as Ihde states, “as long as humans are seen as superior to other beings, there can be no change” (Ihde, 1990, 2007). I believe this goes for both technological and natural beings.

To explain let me return to the understanding that my foray through the ideas of the philosophy of technology and environmental philosophy has created - it is that there is indeed a drive, a force inherent to technology. That this force is, like David Skrbina describes it, something alike a natural law, like that of gravity, that provides a decidedly one-way pull, towards a world of greater efficiency and a greater degree of what I call resourcification, we could also call it order; it is a force in itself, but one which we can in the words of Ihde “significantly nudge in a specific direction.” (Ihde, 1990, p. 163). Skrbina too maintains this - despite the pull of technology, technology does not eradicate free will in humans, it just works towards its own end, just as we might say nature does. Moreover, despite what many of the explored theories seem to indicate, I do not believe that we control nature; like with technology we can “turn it off”, destroy its balance, yes, but, like technology, we cannot do so without destroying our own existence. We cannot do so, because we, nature and technology are all part of Borgmann’s “globe device”.

Several of the theories I explored suggest a focus outside of the technological system, a focus on nature or wilderness, as a remedy, an antithesis you might say, to the technological way of thinking. To retain the idea that nature is outside of technology, is as I mentioned earlier, no longer possible. Furthermore, to argue for a sacredness in nature, an intrinsic value, independent of its value to humans and technology, is beside the point. Nature has immense value as part of our global device. It is arguably the most complex and mysterious of its parts and in that is has value too. I agree with Sagoff that we can place an aesthetic value on nature, but it has this the value as part of the global system. Arguing otherwise is a hypothetical and pointless exercise. The ideal of sustainability is making us increasingly aware of this. No one is any longer surprised to hear a like phrase “you cannot put a price on the survival of the honeybee, it is of incommensurable value to our ecological system.” I hear this in my work on a regular basics, from engineers and investors alike. We all know, or should know, that nature is the greatest system of order, efficiency and complexity there is. Everything has a role, everything has purpose.

Skrbinia and Borgmann also discuss the notion of technological abstinence, with Skrbina comparing it to that of a heroin addict. Total abstinence, he says is necessary, to break the addiction. On a cultural level, of course, he admits, it is a measure highly implausible to be carried through, barely, as a matter of fact, possible on an individual level. I find with the comparison with an addiction

unhelpful, partly because heroin is itself technological. If found inspiration for another, I believe more fitting, metaphor in Ihde's brief mentioning that "sexual techniques" are techniques with no element of technology (Ihde, 1990). Our sexual drive is, I find a better metaphor, as it is rooted in - and satisfied by - what we might call the natural part of our human existence. Furthermore, while abstinence may be the cure towards addiction, in this case, it will be a partial or temporary addiction. In treating nymphomaniacs, it is not suggested to supress the natural drive completely, eternally, just as we should not aim to supress our technological drive. Furthermore, what is required to truly master the drive, I would argue, is more than abstinence, which will arguably attain the opposite, once the abstinence stops. What is required is empathy, skill, and knowledge, and I believe this goes for technology as well. To build the foundation for safe, beneficial and fun technological relations, we should teach our children the basics in school, and since the relationship is, I would argue more complicated than its sexual metaphor, it should not be a one-off class at the beginning of puberty; it should be a returning subject throughout our educational system. As pupils dissected frogs in the past, they should dissect phones (and frogs), both literally and metaphorically learning about the physical components of the artifacts as well as the politics, economic and aesthetics values that form their relationship with them.

When it come to the concept of sustainability, there are indeed significant hindrances in the nature and technology of humanity. Greatest of which is the drive towards inequality inherent in the power structure embedded in our current technological system. For this, I am tempted to suggest an ideal outside of technology, but I will attempt not to succumb to the idea - I don't believe glaring at the stars, art or nature is it. However, an aspect the theories of technology that I have not attributed much space in thesis paper is that of its relation with science. Partly, I have neglected thus because I have explored this in a previous paper on the necessity of interdisciplinarity in the creation of sustainable technologies. (Hansen, 2021) The beginning concept of interdisciplinarity is also touched upon at the very early stages of philosophy of technology by Ellul, who suggests that "dialogue and engagement with technicians" is one of the steps towards resisting the pull of technology, and later by Ihde. Both discuss the importance of demystifying the natural sciences and increasing the focus on other sciences. In his paper Phil-tech Meets Eco-Phil, Idhe furthermore discusses the importance of getting philosophers at the ground level and into interdisciplinary research teams. It is a notion, he admits "to despairing of for a while", and this despair is, I will argue not uncommon on the world of philosophy. In Feenberg's critical theory, of course, we already see the result of, and further foundation, for such interdisciplinary collaborations involving the philosophy of technology. Another example of this is the engineering branch of the field, one which is not discussed in this paper, but

which works to intersect moral considerations at the design phase of technology (Verbeek, 2022, 41).

During my work on the beforementioned paper on interdisciplinarity, I joined a group of some 600 scientists at NTNU, working in interdisciplinary teams to solve the problems of the sustainable energy transition. I was the only philosopher. During this paper, and the discussion of the last decades' shifting views of technology, one thing seems clear to me – philosophers are decidedly anti-technological, not in the obvious sense that they resist technologization in society, but that they resist it in their field. I think this is, to put it mildly, a challenging starting point if we, as a discipline, want to avoid becoming in the words of Baird Callicott "the cheerleaders – not the world-savers of our megalomaniacal fantasies – narcissistically nattering on the sidelines of a technology-driven ecology of mind." (Callicott, 2017, p. 24-25) Based on the preceding explorations and the urgency of gathering all the forces available, including the philosophical ones, in the hope of nudging or shaping technology to direct its drive towards a sustainable system, my recommendation would be to get within the system, in other words, if you can't beat it (and by this point it should be clear that receding to a wooden cabin in Vermont will not do it), join it.

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