Eksistenz

Philosophical Hermeneutics

and Intercultural Philosophy

Vol. 3, No. 1 (Sept. 2024)

Hermeneutik und Technik

Freya Häberlein

Tragedy and the Bipolarity of Value in the Hermeneutics of Technology

Abstract: When considering tragedy for the hermeneutics of technology, one is pointed toward investigating the value systems and cosmologies that underpin concepts such as progress or invention. Tragedy defines an ambiguity of the values, reflected in the definition of technology being pharmacological, that is, both remedy and poison at the same time – according to the original ambiguity of the translation of the term "pharmacology." Philosophers of technology like Gilbert Simondon, and more recently Bernard Stiegler, give tragedy noteworthy attention in their understanding of the complex and mutual relationship of culture, nature, and technology – ideas that in the course of Western philosophy had been viewed as separate and distinguishable. This article follows a genealogy of tragedy in the hermeneutics of philosophy of technology, starting with its Ancient Greek origin, followed by the account of tragedy in the early works of Friedrich Nietzsche (who is influential to both Simondon and Stiegler), before moving to the implications of tragedy in philosophy of technology that emerged in the twentieth century with the rise of modern technological inventions. Additionally, this article emphasizes the question of tragedy in the hermeneutics of technology outside the European context of its origin by including Yuk Hui's comparison of tragedy with Chinese value systems.

Zusammenfassung: Bei Überlegungen zur Bedeutung der Tragödie für die Hermeneutik der Technik ist es notwendig, die Wertesysteme und Kosmologien zu untersuchen, die Konzepte wie „progress" oder „invention" untermauern. Die Tragödie definiert eine Ambiguität der Werte, die sich in der Definition der Technologie als pharmakologisch widerspiegelt, das heißt, sowohl Heilmittel als auch Gift zur gleichen Zeit – gemäß der ursprünglichen Ambiguität der Übersetzung des Begriffs „Pharmakologie". Technikphilosophen wie Gilbert Simondon und in jüngerer Zeit Bernard Stiegler schenken der Tragödie bemerkenswerte Aufmerksamkeit in ihrem Verständnis der komplexen und wechselseitigen Beziehung von Kultur, Natur und Technologie – Ideen, die im Verlauf der westlichen Philosophie als getrennt und unterscheidbar betrachtet wurden. Dieser Artikel verfolgt eine Genealogie der Tragödie in der Hermeneutik der Philosophie der Technik, beginnend mit ihrem Ursprung im antiken Griechenland, gefolgt von der Darstellung der Tragödie in den frühen Werken von Friedrich Nietzsche (der sowohl Simondon als auch Stiegler beeinflusst hat), bevor er zu den Implikationen der Tragödie in der Philosophie der Technik übergeht, die im 20. Jahrhun-

dert mit dem Aufkommen moderner technologischer Erfindungen entstanden sind. Darüber hinaus betont dieser Artikel die Frage der Tragödie in der Hermeneutik der Technik außerhalb des europäischen Kontexts ihres Ursprungs, indem er Yuk Huis Vergleich der Tragödie mit chinesischen Wertesystemen einbezieht.

摘要：在考虑悲剧对技术诠释学的意义时，有必要探究支撑“进步”或“发明”等概念的价值体系和宇宙观。悲剧定义了价值的模糊性，这体现在技术的药理学定义上，即技术同时是解药和毒药——根据“药理学”一词翻译的原始模糊性。技术哲学家如吉尔伯特·西蒙东和近期的伯纳德·斯蒂格勒在他们对文化、自然和技术——这些观念在西方哲学的发展进程中被视为独立和泾渭分明的——的复杂的交互关系的理解中，对悲剧给予了显著的关注。本文追溯了技术哲学之诠释学中悲剧的谱系，从其古希腊起源开始，接着是弗里德里希·尼采早期作品中的悲剧描述（他对西蒙东和斯蒂格勒都有影响），然后转向20世纪随着现代技术发明的兴起而出现的技术哲学中的悲剧内涵。此外，本文还强调了在其起源的欧洲背景之外技术诠释学中的悲剧问题，并引入了许煜（Yuk HUI）对悲剧与中国价值体系的对照。

Keywords: Tragedy, Pre-Socratics, Nietzsche, Hermeneutics, Technology, Bipolarity, Dualism, Value

1. Introduction

When considering tragedy for the hermeneutics of modern and contemporary philosophy of technology, the underlying question is that of the value systems and cosmologies that define such concepts as progress, invention, or design. Philosophers of technology like Gilbert Simondon, and more recently Bernard Stiegler, give the Ancient Greek concept of tragedy noteworthy attention in their understanding of the complex and mutual relationship of culture, nature, and technology – ideas that in the course of Western philosophy had been viewed as separate and distinguishable. Tragedy defines in this regard first and foremost an ambiguity of values, reflected in the definition of technology being pharmacological, that is, both remedy and poison at the same time. The Ancient Greek term “*pharmakon*” (*φάρμακον*) has gained popularity in recent ethical discourses around algorithmic technology and AI, and is in its translation ambiguous. This means that it can be translated both as remedy and as poison, as point-

ed out by Derrida,[1] who makes this important remark on Socrates' definition of writing as a *pharmakon* in Plato's *Phaedrus*. Stiegler continues in extending the concept of the *pharmakon*, beyond writing, to other domains of technology, but also problematizes it, since pharmacology can attain an ethical indifference, echoing Nietzsche's warning against the romanticization of uncertainty.

A potential hermeneutics of technology seeks to outline the complex relationship between thought, practice, and the ontology of the technical object. The legacy of French thought on technology following Simondon emphasizes such hermeneutics in a reciprocal sense, as it explores both the importance of technology for the production of knowledge as well as social and cultural epistemologies that have influenced and shaped the invention of technical objects. Georges Canguilhem,[2] a teacher to Michel Foucault and Simondon, writes in his article "Machine and Organism" that a veritable theory of the organic would be required to define the physiological qualities of the organism that had hitherto been described with mechanist principles. Developing such a theory became the project of Stiegler, who employed the concept of "general organology." By that, he understands that technical objects should be understood *via* their organic extensions, for example through the bodies and concepts that mobilize them as prostheses. While, at the same time, recognizing that technology itself co-constitutes the becoming of collective and individual consciousness. As society builds on technics of memorization, they become the products of "exosomatization" by being stored anterior to the body. As such, they become part of the process of *hypomnesis*, which Stiegler relates to Plato's idea of *anamnesis* as the process of knowledge production of the soul *via* remembrance. General organology for Stiegler encompasses the idea that there are reciprocal effects between psychological, social, and technical becoming so that exosomatized knowledge informs such becoming in shaping perceptions, emotions, or ideas.[3]

1 Jacques Derrida (1981). "Plato's Pharmacy". In: *Dissemination*. Chicago, IL: Chicago University Press.

2 Georges Canguilhem. (1992). „Machine and Organism". In: *Incorporations* (eds. J. Crary and S. Kwinter. New York: Zone Books.

3 Bernard Stiegler (2017). "General Ecology, Economy and Organology". In:

Philosophy of technology as a discipline makes explicit the special role that technology has in Western epistemology. With his notion of "cosmotechnics," Yuk Hui aims to diversify the complex relationship between culture, nature, and technology from a global perspective: if technics are hermeneutically situated in their cultures, this implies that the meaning of a technical object would be different in China than it is in the West. However, such an understanding of hermeneutics may also call into question the very notion of technics itself. Given a post-Eurocentric perspective of the complex implications of technics and technology that are both local and unique as well as a globalizing force in their own right, Hui differentiates between the following categories:

> "technics refers to the general category of all forms of making and practice, tékhnē refers to the Greek conception of it, which Heidegger understands as *poiesis* or bringing forth; and technology refers to a radical turn which took place during European modernity, and developed in the direction of ever-increasing automation, leading consequently to what Heidegger calls the *Gestell*."[4]

As such, "technology" as a concept holds truth even in a global perspective, and the notion of "cosmotechnics" that Hui will introduce in his work, aims to counterbalance this globalizing tendency in the organological relation of thought and technics. As this article wants to demonstrate as its main argument, this is also true when considering tragedy for the hermeneutics of technology as bearing particular value judgments attributed to technical objects and their position in a globalized world. Effectively, and following Hui, I will differentiate between these three terms: "technics," "technology," and "cosmotechnics."

This article suggests a genealogy of the question of tragedy for the hermeneutics of technology, by, in the second to fourth section, reconstructing the interest shared by Nietzsche and Simondon in pre-Socratic philosophy and its accounts on the relation between the individual, the collective, and the indefinite. Such a relation

General Ecology: The New Ecological Paradigm (eds. E. Hörl & J. Burton). London: Bloomsbury.

4 Yuk Hui (2016). *The Question Concerning Technology in China,* London and Falmouth: Urbanomic, p. 4.

is also reflected in the axiological ambiguity of tragedy; as presented in the fourth section, Simondon considers tragedy explicitly for the question of value in technology. From this perspective, developed in the fifth section, Stiegler will renew this framing from Simondon in the context of today's technologies, invoking ethical imperatives in light of the disruptive powers of technology today. Hui draws on general organology in a post-Eurocentric context, broadly opening the question of technology in its distinct relation to a Chinese cosmology, and in particular discussing the question of a Western dualism of value co-emerging from and with tragedy. However, the final section aims to highlight the special place that Nietzsche occupies in reflecting on tragedy, aiming just to overcome such a dualism.

2. Technology and the Indefinite

The origins of the Greek tragedy are to be found in storytelling. The authors of such tragedies, which are written interpretations of Ancient Greek mythology (for example by Sophocles or Aeschylus) were celebrated in the ancient culture as their narratives depicted the complex role-reversal of the hero into a fool or scapegoat, showing that the concept of value is intricate and ambiguous – what is good fortune can quickly turn bad, and that everything has both a positive and a negative side at the same time. Tragedy was, alongside the epic, a dominant form of storytelling in Ancient Greece, and its narrative structure can even be found in the philosophical writings of Plato, such as in the *Apologia* of Socrates.[5] There, Socrates is both the hero and the scapegoat, and his hemlock drinking both kills him and makes him immortal as the founding figure of Western philosophy. But first and foremost, this article aims to follow Nietzsche's suggestion to situate the origin of tragedy in the intellectual and mythological milieu of the pre-Socratic philosophers, that is, the early Greek philosophers that came before Socrates and the written recreation of his thought through philosophers such as Plato (hence Nietzsche calls the pre-Socratics the pre-Platonics).[6]

5 See, e.g., Jacob Howland (2008). "Plato's 'Apology' as Tragedy", The Review of Politics 70(4).

6 Friedrich Nietzsche (1998). *Philosophy in the Tragic Age of the Greeks*.

Following Nietzsche, Simondon also shows a keen interest in pre-Socratic philosophy, especially with regard to Anaximander of Miletus. Like Nietzsche, Simondon spends a considerable amount of time with the reconstruction of Anaximander's concept of the *apeiron* (*ἄπειρον*) –translated as "the indefinite" or "boundless," as the term stems from the Greek *peirar* (*πεῖραρ*), meaning "end" or "limited";[7] for Nietzsche, the *apeiron* is also the undefined ("*das Unbestimmte*"). He considers Anaximander a pessimist, as, in the light of everything returning to the undefined, becoming has no meaning in its temporary emancipation from dissipation. For Nietzsche, Anaximander is a truly tragic thinker as he addresses the question of ethics amidst the dying of all things:

> " […] Anaximander was no longer dealing with the question of the origin of this world in a purely physical way. Rather, when he saw in the multiplicity of things that have come-to-be a sum of injustices that must be expiated, he grasped with bold fingers the tangle of the profoundest problem in ethics. […] How can anything pass away which has a right to be? Whence that restless, ceaseless coming-into-being and giving birth, whence that grimace of painful disfiguration on the countenance of nature, whence the never-ending dirge in all the realms of existence? […] At last, after long pensive silence, he puts a question to all creatures: 'What is your existence worth? And if it is worthless, why are you here? Your guilt, I see, causes you to tarry in your existence. With your death, you have to expiate it. Look how your earth is withering, how your seas are diminishing and drying up; the seashell on the mountain top can show you how much has dried up already. Even now, fire is destroying your world; some day it will go up in fumes and smoke. But ever and anew, another such world of ephemerality will construct itself. Who is there that could redeem you from the curse of coming-to-be?"[8]

According to Nietzsche, at the heart of Anaximander's philosophy lies the fundamental ethical struggle against the meaninglessness of existence. Such is the tragedy of fate coming and going in the flux of what he will define as the eternal

Washington, DC: Regnery Publishing

7 Lidell and Scott (2024) "πεῖρας", *A Greek-English Lexicon.* www.perseus.tufts.edu/hopper/text? doc=Perseus:text:1999.04.0057:entry=pei=rar (accessed 30 August 2024).

8 Nietzsche, *Philosophy in the Tragic Age of the Greeks*, p. 48.

return. It could be said of modern technology (especially in its affinity with transhumanism) that it attempts to halt this flux by creating linear progress in a world that is indefinite. In this sense, it functions as compensation for the profound abyss that opens up once such boundlessness is revealed.

Simondon too turns to Anaximander and reconfigures the concept of the *apeiron* in light of thermodynamics as what he calls the "preindividual,"[9] that is, the potentiality that enables the coming-into-existence of the individual and the social. It appears that, especially for Simondon, the pre-Socratics provide an understanding of values that helps recontextualize important questions of today, that is, the psychic and collective relation and with it the status of technology. According to Simondon, philosophy hitherto had little regard for the technical object, treating it as alien and anterior to culture, instead of perceiving culture and technics as mutually influential.[10] That is, culture ought to be an active response to the integral becoming of the individual and the social – very similar to Nietzsche in the reading of Pierre Klossowski[11] whose interest in Nietzsche marks the beginning of a renewed reception of the philosopher in France – emerging from a preindividual moment, epochally reflecting and producing value judgments instead of referring to static cultural laws.

Simondon's philosophy is particularly compelled with individuation, that is, the possibilities and circumstances of the individual ('individual' meaning, of course, that which cannot be divided). Nietzsche too reflects on individuation, or what he refers to as the *principium individuationis*, and its relation to tragedy. In *The Birth of Tragedy*, he defines two tendencies that tragedy encompasses as a scope of both axiological and aesthetic qualities, the Apollonian and the Dionysian. The Apollonian, named after the Greek deity Apollo, who is the god of truth, light, prophecy, and healing, is considered to correspond to such principle

9 Elizabeth Grosz (2017). *The Incorporeal: Ontology, Ethics and the Limits of Materialism*. New York: Columbia University Press, p. 204.

10 See, e.g., Gilbert Simondon (2015). "Culture and Technics (1965, tr. O. L. Fraser)", *Radical Philosophy* 189.

11 See Pierre Klossowski (1997). *Nietzsche and the Vicious Circle*, London: The Athlone Press.

of individuation and is also associated with art forms such as sculpture (an Ancient Greek sculpture is associated with harmony, strict form, and perfection).[12] For Nietzsche, Apollo is also an elusive figure, since the individual is in itself an impossibility – but, as Stiegler will highlight, an impossibility nonetheless worth attempting in a world that is paradoxically inhabited both by chaos and an increasing isolation of individuals (as will be discussed in the fifth section of this article). The individual is impossible in the sense that it is merely a grasping of an object or thought out of a primordial chaotic whole, that in turn, via transindividuation, is always more than just the individual (see also Section 4). Thus, the individual is tragic in the sense that it *is* and *is not*, as it is defined by its limitations; recall Nietzsche's reference to Anaximander: "How can anything pass away which has a right to be?"[13] To accept tragedy is to accept change;[14] from Nietzsche's perspective, it was therefore important to introduce the Dionysian as a concept into Western, predominantly Apollonian, society to counter-balance the totalizing tendencies manifesting social hierarchies romanticizing all such uncertainties that would have made axiological contradictions unbearable.

Dionysus is the Greek god of excess, inebriants, and fertility, and he is associated, as Nietzsche points out, with music; music bears a certain immediacy, a detachment from words and conceptualizations, which makes it unique as an art form. According to Aristotle, the dithyramb was the predecessor of tragedy, a choral hymn sung in celebration of the Greek god Dionysus.[15] In these choral pieces, a soloist is paired in a call-and-response pattern with a choir, aesthetically corresponding to the fundamental and necessary instability of psychic and collective relations that, according to such thinkers as Nietzsche or Simondon, lies at the heart of pre-Socratic thought. The Dionysian in Nietzsche's philosophy is

12 Friedrich Nietzsche (2007). *The Birth of Tragedy* (tr. R. Speirs). Cambridge: Cambridge University Press.

13 Nietzsche, *Philosophy in the Tragic Age of the Greeks*, p. 48.

14 And to accept the cyclicity of life and death, of which certain concepts of transhumanism appear to be in denial when proclaiming eternal life through technological enhancement.

15 Aristotle (1987). *Poetics* (tr. R. Janko). Cambridge: Hackett, p. 6.

invoked as a figure that stands for the affirmation of excess that withdraws from any attempt to systematize individuation. An important difference that should be noted between Nietzsche and Simondon is that the latter does not speak of the individuation as being a principle, which contributes to the argument developed in the fourth section of this article, that tragedy will become a problematic term in philosophy of technology. Despite this absence of coherence, tragedy is still capable of complementarity and hence points towards a systemic notion of cosmology, which becomes relevant precisely at the point when technology disrupts the milieu and the relation between the individual and the collective.

Especially in the Western philosophical context, technology poses an obstacle for any suggested natural order which separates being from becoming or *techne* from *logos*.[16] That is, the technical object is traditionally considered anterior to nature, and, upon reflection by Simondon and his successors, transvalues cosmological paradigms. It is in that sense that it is often constructed to imitate natural systems with increasingly greater efficiency and resemblance. Erich Hörl's observation that the concept of ecology has gone through a semantic shift from being identified with the natural to the unnatural (as today there are "ecologies of sensation, perception, cognition, desire, attention, power, values, information, participation, media, the mind, relations, practices, behavior, belonging, the social, the political" etc.),[17] is in itself a tragic revaluation of the concept of ecology. Tragedy points toward the cyclicity of life and death (since the *apeiron* is the potential that makes new life possible, emerging out of disorder) and is nested within a cultural milieu that has influenced and shaped an understanding of the values of technology and technics. Hence, tragedy should be considered regarding the development of the hermeneutics of technology.

16 Ars Industrialis (2024). "Anamnesis and Hypomnesis". https://arsindustrialis.org/anamnesis-and-hypomnesis (accessed 30 August 2024).

17 Erich Hörl (2017). "The Ecologization of Thinking" (tr. N. F. Scott). In: *General Ecology: The New Ecological Paradigm* (eds. E. Hörl & J. Burton). London: Bloomsbury, p. 1–2.

3. Nihilism, Value, and Modernity

Simondon points out the continuities of the pre-Socratic tradition of axiology and the philosophy of Nietzsche in his claims about the values of technology today. Both are defending claims about the relativity of values that differ, as Simondon (and Nietzsche for that matter) argues, from the Christian understanding of values which served as a ground for modern rationalism, in the sense that all value judgments are subjugated to a "divine finality."[18] Simondon however also points out that Nietzsche, with his notion of the eternal return of the same, creates a "pantheism" that diverts from the pre-Socratic tradition:

> "But we should note that the pre-Socratics conceived complementarity differently as a pair of contraries: birth and death, ascent and descent, paths leading upward and downward. For the pre-Socratics, the death of one being is the condition for the birth of another; what Nietzsche rediscovered as an essential myth in the pre-Socratics and integrated into his pantheism is the complementarity of the sum of becoming expressed by the notion of the eternal return."[19]

Nietzsche himself is barely explicitly concerned with the ontology of the technical object, although he experiences the epochal turn of industrialization and modernization. In this regard, as Stiegler writes, he is however significant for considering the role of technics in a historicity (or genealogy) of techno-scientific rationalism that had been until then ignored in Western philosophy.[20] Nietzsche's work emerged during a time when Western society changed immensely, and scientism informed by Enlightenment began to replace Christian belief. The problems that accommodated modern rationalism at the time are diverse (as it, for example, coincided with the rise of fascism), and certainly

18 Gilbert Simondon (2020). "Values and the Search for Objectivity". In: *Individuation in Light of Notions of Form and Information Volume II: Supplemental Texts* (tr. T. Adkins). Minneapolis, MN: University of Minnesota Press, p. 403.

19 Ibid.

20 Bernard Stiegler (1998) Technics and Time, 1: The Fault of Epimetheus. Stanford, CA: Stanford University Press, p. 252.

shaped the way in which modern technology came into existence.[21] And yet, especially in his earlier philosophy, it is also Christianity that is rigorously criticized by Nietzsche with regard to the constraints that it poses for ethics. Hence, in *The Birth of Tragedy*, Nietzsche identifies Christianity with the Apollonian; the overexpression of Apollonian tendencies in Western society is what Nietzsche figures to be problematic in the light of a metaphysical crisis that he describes as nihilism. In his early work, Nietzsche invokes Dionysus who was worshipped in Ancient Greece as a counter-figure to the Apollonian tendencies in society, to address the problem of nihilism. One of Nietzsche's major contributions to Western thought is the notion of the "transvaluation of all values"[22] which means that values, and the ethical decisions that are based on them, change over time, as their corresponding perceptions and perspectives do too, rather than being dependent on a moral law. This discovery leads Nietzsche to address further concerns: If there is no principle of goodness, on what basis should our actions be based? And even further, how to do so without falling into nihilism, that is, into believing that there is no value to anything at all. It is important to acknowledge that these questions arise at a point when society becomes secularized, and science and discourse demystify religious doctrine. For Nietzsche, the emergence of modern science does not replace Christianity in a sufficient way that would improve the individual's ability to act ethically in any given circumstance – hence his famous outcry that 'God is dead,' which Nietzsche did not mean to express triumphantly, as he was aware that society has found nothing with which to replace religion and therefore suffers from an ethical void. On the contrary, the absence of God leads to an increase in nihilism, that has, according to Stiegler, not seized to spread in the digital age – his notion of "automatic nihilism" will be addressed in the fifth section of this article.

21 See, e.g., Hans Blumenberg (1963) „Lebenswelt und Technisierung unter Aspekten der Phänomenologie", *Filosofia* 14(4).

22 See Friedrich Nietzsche (2009). *Beyond Good and Evil* (tr. M. Faber). Oxford: Oxford University Press.

The young Nietzsche in his debut work and *The Birth of Tragedy* seeks to offer a path to affirm the excess that comes from the acceptance that values are not fixed. But Nietzsche also critically reflects on various aspects of his own early work in a late preface, that is included in *Ecce Homo*; the ornamentalism of the text – that means the poetic and flamboyant language of the text, as well as the strong recourse of dialectics when defining the Dionysian and Apollonian are subjects of such criticism. Gilles Deleuze, who is an important influence for Stiegler and himself influenced to a large degree by Simondon, points out that Nietzsche even shifts the tragic antinomy of Dionysus and Apollon to that of Dionysus and Socrates, so that the tragic relation is no longer between disorder and order, but between excess and reason, in an attempt to further concretize the problem of dialectics.[23]

4. The Early Reception of Nietzsche in French Philosophy of Technology

The question of tragedy is of noteworthy importance in the hermeneutics of technology emerging with Simondon in the course of the twentieth century. But the validity of the concept is also at stake at the very moment when technology is introduced into the tragic relation of the individual and the collective, since tragedy merely considers the dialogical exchange between the psychic and collective, but not the technological. As such, tragedy supposes the problem of value in philosophy of technology; or rather, technology offers the possibility of an axiology beyond tragedy, as Simondon suggests. The contemporary relevance of this topic becomes apparent as the Simondonian legacy in philosophy on technology has today gained ethical grounds in problematizing the legitimacy of large-scale cybernetic interventions that act on an ecological level.[24]

For Simondon, psychic and collective individuation is mainly described through three categories: the preindividual, the transindividual, and the individ-

23 Gilles Deleuze (1983). *Nietzsche and Philosophy* (tr. Hugh Tomlinson). New York: Columbia University Press, p. 11.

24 See Yuk Hui (2021). "Über Kosmotechnik", *Dritte Natur* 4(3).

ual. The transindividual supposes that every relation between two objects is in itself a signification; hence, relation does not mean a simple rapport between two entities, but rather is in itself of value. Therefore, Simondon differentiates between transindividual relations and interindividual connections; whereas the latter marks a static field of identifications, the transindividual marks the individual both in its potential and its incompleteness as complete, taking into consideration that the "reality of the subject […] is 'vaster than the individual'". Therefore, the transindividual is the process of becoming-individual that is dynamic in order to "carry a charge of preindividual reality". Additionally, the transindividual already considers the individual in relation to the technical object, as the technical object marks an encroachment of both the psychic and the collective sphere.[25] The individual in itself is, so to speak, fictitious and not a singularity that depends upon the moment. As will be further explained through Stiegler in the following section, the individual may be impossible (as also already Nietzsche remarks) but nonetheless requires to be attempted. Such an attempt, however, is only possible in the encounter with the collective. Hence, Simondon refers to Nietzsche's *Thus Spoke Zarathustra* to explain the concept of "transindividuation" when Zarathustra realizes that he should seek fellow creators instead of followers.[26]

To a certain degree, Simondon's concept of psychic and collective individuation bears continuity with Nietzsche's *principium individuationis*, through which the latter expresses that individuation is an illusion inasmuch that what is individual – identity, objects, or concepts – lies in the eye of the beholder who creates the idea of the individual through a particular, Apollonian, perception of a chaotic and primordial whole. Another difference between these two philos-

25 See Jean-Hugues Barthélémy (2012). „Fifty Key Terms in the Works of Gilbert Simondon". In: *Gilbert Simondon: Being and Technology* (eds. A. De Boever, A. Murray, J. Roffe and A. Woodward). Edinburgh: Edinburgh University Press, p. 230–231.

26 Gilbert Simondon (2020). *Individuation in Light of Notions of Form and Information* (tr. T. Adkins). Minneapolis, MN: University of Minnesota Press, p. 314.

ophies is that Simondon's work harbours a realism that exceeds the noumenal sphere; hence, he finds processes of individuation in the living world, for example in the coming-into-existence of a crystal.[27] The technical object is for Simondon another example of an individual that comes into existence, but one that is unable to individuate itself and thus tied to an organic and creative impulse by the inventor. A suitable metaphor to depict this process may be that of a termite mount, as suggested by Lynn Margulis and Dorian Sagan in their essay on the evolution of technical objects.[28] The technical object thus poses an obstacle to individuation and hence its relation to value, as it is static, "holds" truth and stores memory (see also the sixth section). It therefore also poses an obstacle to the fluxes of anamnesis.[29] Stiegler refers to the Platonic division of anamnesis and hypomnesis to explain this difference, but also critically adds that such division supposes a problem which lies in the distinct division of body and soul in anamnesis. Tragedy marks the initial moment of departure in which the excess created by the technical object becomes reincorporated into value.[30]

Again, what Simondon shares with the pre-Socratics and with Nietzsche is the idea of indeterminacy. Such indeterminacy however must differentiate between coherence and complementarity. Unlike the Christian value system (in which there are clear doctrines on what is good and bad), the *apeiron* harbours incoherence, but nonetheless evokes complementarity.[31] This enables us to read Simondon's understanding of the tragedy of choice (a decision that is both *for* something or someone and *against* another something or someone) in the con-

27 Simondon, *Individuation in Light of Notions of Form and Information*.

28 Lynn Margulis and Dorian Sagan (1987). "Gaia and the Evolution of Machines", *The Whole Earth Catalog* 55.

29 Plato develops the concept of anamnesis as part of his cosmology in several of his dialogues; anamnesis is the process of the remembering of the soul that is reborn into the world from immortality. The soul that has forgotten reality (also 'truth' in the sense of aletheia, which contains the Greek word lethe which means 'oblivion') and has to remember it during lifetime through culture, education, etc.

30 Ars Industrialis, "Anamnesis and Hypomnesis".

31 Simondon, "Values and the Search for Objectivity", p. 403.

text of technology: "What is tragic about choice is no longer fundamental if choice is no longer what establishes communication between an independent city and an independent individual as substances."[32] The proposition here is to read this passage with an emphasis on 'as substances': As neither the individual nor the collective are sufficiently defined as substances, as being consistent and exhausted in themselves, since they in-form one another (with and through the technical object), normativity must present itself in a different manner. And indeed, Simondon continues to argue that the concept of choice is merely "a recourse to schemas of already performed actions."[33] Hence, if, on the one hand, substances are dissolved, psychic and collective individuation is at risk of losing its productive relation (as for example in the context of algorithmic automatization). On the other hand, if instead the individual is "grasped as the singular point of an open infinity of relations," "there is no longer any opposition between the desire for eternity and the necessity of collective life,"[34] then this proposes a co-constitutional understanding of anamnesis and hypomnesis as suggested by Stiegler (see next section). The absence of choice does not necessarily encompass a problem; on the contrary, it makes veritable normative action possible, enabling a contingency of ethics, which ought to be a necessary condition for the subject in the context of organological relations. This is also pointed out by Hui, who writes that, in renegotiating the relation between nature, culture and technics, technology presents a potential moment of veritable contingency (that might be defined as ethico-organological becoming) in which nature is not fixed in its ontology but affiliated to the categories and exceptions attributed to it.[35]

As the next section wants to show, the cosmologies presented in this article are also relying on different interpretations of thermodynamics. Tragedy supposes a cosmological order that does not seem to align with today's reality in which technology has become a major ecological force that impacts the stability

32 Ibid., p. 407.

33 Ibid., p. 408.

34 Ibid., p. 407.

35 Hui, „Über Kosmotechnik", p. 36.

of the global ecosystem disrupted by human impact. This is also reflected in the axiological implications of thermodynamics, where connections to tragedy have been made with regard to the values associated with entropy and negentropy, in which energy is dissipated and temporarily accumulated. Again, the question at hand is that of a system, and of the boundaries of a system. Nietzsche, for example, writes that "philosophical systems are wholly true for their founders only."[36] As Joel White points out, for Nietzsche, the articulation of the hypothesis of heat death (the eventual death of the universe) in thermodynamics poses an obstacle to his concept of the eternal return, which derives from a critique of finalism, whereas heat death ultimately points towards an end. White also explains however that Nietzsche is mainly focussing on the first law of thermodynamics in his notes that came to be part of the *Will to Power* and may have been aware of the potential implications of heat death on the eternal return.[37] Stiegler too investigates the concept of thermodynamics in his later works extensively and, while incorporating the idea of an end, maintains the possibility of temporal order or metastability.

5. Disruption, Disindividuation, and "Automatic Nihilism"

Tragedy, thermodynamics, and pharmacology play a crucial role in the values attributed to technology today, and even more so in the relation of technology to current crises such as the climate catastrophe or the mental health crisis. Stiegler links these disruptive issues to an overall and structural loss of individuation (also called "disindividuation" by both Simondon and Stiegler), brought by a proletarianization of the exteriorized memory faculties. Hypomnesis, the exteriorization of memory via the technical object, in its current shape has evoked a feeling of detachment from the world, a perception of others as those "with whom I feel nothing."[38] Many of the social reactions to current crises are defined

36 Nietzsche, *Philosophy in the Tragic Age of the Greeks*, p. 23.

37 J. White (2024) "Philosophy of Thermodynamics". Seminar held at The New Centre for Research and Practice. www.youtube.com/watch?v=KALQtI4P-mUs (accessed 30 August 2024).

38 Bernard Stiegler (2014). *Symbolic Misery, Vol I: The Hyperindustrial Epoch*

by Stiegler as madness or *affolement*.[39] Such madness is also a phenomenon of disruption, which encompasses an end and a break, and has also been defined by Stiegler as "automatic nihilism."[40] "Disruption" is the term that Stiegler uses to link a variety of contemporary crises to the problems of the organological relation of the psychic, the social, and the technological in the digital age. For Stiegler, this is primarily expressed through the absence of reason that is attributed to what he calls "careful thinking" (*panser*). Processes of automation deprive us of the sense of making value judgments in the moment, based on individual situations. In this regard, Stiegler warns against an overly expressed ambiguity of the pharmakon, that is, of the tragic value of technological objects being both remedy and poison. The "misuse of the pharmakon of the literal attentional technique"[41] is therefore opposed to what he calls the "the constant need to neganthropologically take care of the pharmakon,"[42] so as to individually reflect on the values of technology instead of merely giving in to mass media that, via marketing strategies that harness attention and desire, corrodes the ability to create transindividual relations.

Stiegler also claims that, in order to transvalue these issues and the nihilism that is part of it, Nietzsche himself would have to be transvaluated, since, given the special status of the technical object, there is no possibility of surrendering to a higher cosmological cause but simple normative action.[43] In this sense, he echoes Simondon's opting for a contingency of value that is marked by the open infinity of relations which individuals finds themselves in. Such a contingency however stands in for an affirmation that does not affirm the absence of a final

(tr. B. Norman). Cambridge & Malden, MA: Polity Press, p. 3.

39 Bernard Stiegler (2019). *The Age of Disruption* (tr. D. Ross). Cambridge: Polity.

40 Ibid., p. 7.

41 Bernard Stiegler (2012). "Relational Ecology and the Digital Pharmakon", *Culture Machine* 13, p. 6.

42 Stiegler*, The Age of Disruption*, p. 303.

43 Ibid., p. 304.

cause but in fact "the cooling of the solar system"[44] as implicated by thermodynamics. Hence, Stiegler aims to argue for a normativity that does not orientate itself within the traditional Western cosmology. He rather considers the "tragedy of disruption" to be merely the first step of the transvaluation of all values.[45] Those who take such measures in this direction of normativity despite an eventual end, such as Swedish climate activist Greta Thunberg, are for Stiegler "tragic voices" ("*Greta Thunberg est une parole, et cette parole est une force. Portée par son image tout à fait impressionnante, à l'écart de tout stéréotype, de toute pose, cette parole et la voix qui la dit sont celles d'une tragédienne*"),[46] echoing what Nietzsche pre-empted when he defined the problem of nihilism. Such a problematization, as he will write in his late preface to *The Birth of Tragedy*, encompasses the rule or even romanticization of *Unklarheit* ("uncertainty") that goes hand in hand with fascism,[47] and it is those who take action amidst such uncertainty that are working towards what Stiegler calls "the Neganthropocene." In *Qu'appelle-t-on panser ? 2. La leçon de Greta Thunberg*, where Stiegler draws a connection between Thunberg and Antigone, it is unclear whether he had Nietzsche's association with Sophocles' Antigone as being Apollonian in mind. Nietzsche himself associates Cassandra with the Dionysian tendencies in tragedy. It should be noted here, however, that both Antigone and Cassandra are tragic figures for Nietzsche that complement one another; nonetheless, they represent different tendencies.[48]

Aeschylus' Cassandra foresees the terrors of the world that no one believes. Apollon, who is captivated by Cassandra's beauty, gives her the power of prophecy. But when she refuses his courtship, Apollon casts her with the fate that no one would believe her true prophecies. In Sophocles' *Antigone*, the heroine fol-

44 Ibid.

45 Ibid., p. 301.

46 Bernard Stiegler (2020). *Qu'appelle-t-on panser? 2. La leçon de Greta Thunberg*. Paris: Les Liens qui Libèrent, p. 14–16.

47 Friedrich Nietzsche (1999). *Die Geburt der Tragödie*. Berlin and New York: De Gruyter.

48 Nietzsche, *The Birth of Tragedy*, p. 27–28.

lows her own ethical consciousness as she buries her brother despite the issued ban against such a burial that would be punished by death, as she responds to the moral guidance of the gods and not of the law. Although there could be an obvious connection drawn between Thunberg and Cassandra, which is that Thunberg too warns people about the end of the world, and those who should listen do not, Stiegler refrains from drawing this connection. Instead, Thunberg, and those who call themselves the last generation, choose, like Antigone, to stand up against the disruption of what Sophocles' called the "divine order," an order that encompasses piety, decency, and caring for one's descendants.[49] The story of Antigone, who commits suicide after being convicted to being buried alive, is that of normative action amidst existing morality. The reason why Stiegler compares Thunberg to her is because she acts to do what she feels is right, and not what is applied by culture. As this all shows, however, despite Nietzsche declaring decidedly that his work does not aim to be dialectic, there are certain aspects that remain bipolar, in the sense that the Apollonian and Dionysian are not oppositional contradictory essences but varying complementary degrees. Therefore, as the following section aims to show, the question of tragedy and its relation to the hermeneutics of technology is related to the application of bipolar value systems that are common in Western thought. Going beyond this bipolarity may provide further insights to address the question of automatic nihilism and disruption in today's times.

6. Tragedy and the Hermeneutics of Technology from a Global Perspective

This last section of the article aims to take a brief look at the hermeneutics of tragedy in the philosophy of technology from a non-Western perspective. Hui has taken on the task of searching for a possibility of a philosophy of technology that both incorporates onto-epistemological elements of Simondon's and Stiegler's philosophy and a post-colonial and post-Eurocentric perspective, in which the philosophy of technology means to understand technics "as an onto-

49 Stiegler, *Qu'appelle-t-on panser?*, p. 14.

logical category [which] must be interrogated in relation to a larger configuration, a 'cosmology' proper to the culture from which it emerged."[50] His concept of "cosmotechnics" addresses the following: If we consider Simondon's trajectory that technology is co-emergent with and through a psychic and social milieu, and if such a milieu, as Stiegler suggests, creates the organological relation of thought, culture, and technics, then there should be overlapping yet different conceptualizations of cosmologies *qua* technics. Hence, "cosmotechnics" expresses the ethico-organological axis of cosomology and technics situated within a (non-Western) culture. A culture such as the Chinese has a different relationship to technics than, for example, India, to the extent that even the Greek category of *techne* becomes questionable as a philosophical category; although, as Hui argues, the concept of *techne* persists when considering technics to be the extension of human organs, such as hands, as Andre Leroi-Gourhan suggests,[51] usually discussed under the guise of prosthesis in philosophy and media theory. That is, the Greek concept of *techne* persists for Hui as an anthropological category instead of a philosophical one. Hui also discusses the relevance of Heidegger's notion of "technics" as *Gestell* in the context of cosmotechnics, and gives credit to it to a certain degree, which is that, in a globalized world in which technology is predominantly defined through Western modernity, *Gestell* still holds truth to China's relationship with technics, which is perhaps one of the reasons why Heidegger is popular among Eastern Asian thinkers. However, Heidegger's claim that technology is international is profoundly criticized by Hui.[52]

Hui figures that tragedy is related to the values appointed to technology in the West and that China emerged from a different value system. This observation is one of the basic grounds for his project of "[sketching] out a possible way to construct a properly *Chinese* philosophy of technology." Unlike the Ancient Greek myth of Promethianism (which is also mentioned by Nietzsche as being tragic), which counts as the Western myth of the origin of humanity as a being

50 Hui, *The Question Concerning Technology in China*, p. 10.

51 Ibid., p. 7.

52 Ibid., p. 3–4.

of default, Hui writes that, in Chinese culture, there does not exist a myth of Prometheus and that "the radical separation between the world of the gods and the world of man that was necessary for the development of Greek rationality didn't happen in China. Thought of the Greek type arrived too late to exercise any formative influence – the Chinese had already 'naturalised the divine'."[53] In a later passage, Hui also writes that China, in his history of thought, did not develop a problematization of the value of technology in nature in comparison to the West, and that, with reference to Japanese philosopher Keji Nishitani, Asian thought had already found the means to "transcend nihility" by refraining from the abstraction of science from lived practice in the first place. Buddhism and Zen-Buddhism, which are deeply rooted in Eastern Asian cultures, also do not invoke the concept of the individual in the same way as Western philosophy, as "being" as a concept is undermined by the practice of self-negation.[54]

According to Hui, the opposition between the divine and the rational that was essential for Western thought and the hermeneutics of technology is not predominant in the cosmotechnical history of China. Tragedy emerges in Europe with

> "philosophy's attempt to separate itself from mythology, meaning that mythology reveals the germinal form of such a mode of philosophising. Every demythologisation is accompanied by a remythologisation, since philosophy is conditioned by an origin from which it can never fully detach itself. Accordingly, in order to interrogate what is at stake with the question of technology, we should turn to the predominant myths of the origins of technology that have been handed down to us, and at once rejected and extended by Western philosophy" (Hui 2016: 11–12).

Hui will address this bipolarity emerging from the differentiation between science and mythology when he traces the origins of systems thinking, that is, cybernetics, back to German idealism, a time in which the interest in tragedy was regained through Hölderlin, Hegel, and Schelling.[55] In *Recursivity and Contin-*

53 Ibid., p. 14–16.

54 Ibid., p. 242–249.

55 Ibid., p. 11, and also Hui, (2019). *Recursivity and Contingency*. London and

gency, he also writes with reference to Jean-Luc Nancy that tragedy as a concept does not hold in times of ecological destruction that emerged with and trough technology, in which humans are no longer, like in Ancient Greece – and neither in Confucianism, Taoism or Buddhism for that matter – subjects of larger cosmic forces. Rather, the modern world and the humans who inhabit it, are themselves responsible for the cosmological shift that the contemporary world is faced with: "The end arrives as an event and discloses the monstrosity of metaphysics."[56] Compared to Simondon and Stiegler, the references to Nietzsche remain marginal in Hui's work. Nonetheless, in all cases, tragedy appears to be marked by a certain bipolarity that persists even though Nietzsche's reading of tragedy came after German Idealism and sought a renewal of the interest in the topic under different conditions, some of which have undoubtedly paved the ground for the axiologies developed in French philosophy of technology in the twentieth century. Nietzsche explicitly attempts to avoid Hegelian dialectics, as he for example writes in his late preface of the *The Birth of Tragedy*, and also criticised German Idealism at large for its creation of purely noetic systems.[57] Nietzsche's anti-systematic thinking that is marked by the excess that bears a resemblance with Simondon in the regard that the latter critiques Norbert Wiener, one of the founders of cybernetics proper, for not considering the outside-perspective of the observer of the system to already pose an obstacle to any conceptualisation of a closed system. [58]

7. Conclusion

This article provided an overview of the significance of tragedy in the philosophy of technology by developing a genealogy of thinkers that have elaborated on the

New York: Rowman and Littlefield.

56 Hui, *Recursivity and Contingency*, p. 233.

57 M. J. M. Branco (2015). "The Song of the Sirens: Nietzsche and Hegel on Music and Freedom". In: *Nietzsche, German Idealism and its Critics* (eds. K. Hay and L. Ribeiro dos Santos). Nietzsche Today, Vol. 4. Berlin and Boston: De Gruyter, p. 100.

58 Gilbert Simondon (2017). *On the Mode of Existence of Technical Objects* (tr. C. Malaspina). Minneapolis, MN: Univocal Publishing, p. 51.

special role that tragedy plays in the hermeneutics of technology, as expressed in Stiegler's concept of "general organology." Tragedy brings forth the question of an axiology that goes beyond a simple dualism of values and as such traces the origins of the question of the technical object beyond its division from epistemology in the philosophy that preceded Plato. Nonetheless, tragedy remains bipolar to a certain degree and bound to a larger cosmological framework that differentiates between being and becoming. But the differentiation of degrees of value, rather than of essences, is certainly of noteworthy importance, and pinpoints towards current questions connected to the hermeneutics of technology, by calling into existence the problem of nihilism. Stiegler's project, in particular, as he often writes, is politically charged with his motivation to reconcile the concepts of hypomnesis and anamnesis in order to understand technologies' effects on emotion, attention and imagination, and to create awareness for a normativity that actively engages with the pharmacology of the technical object.

Hui follows this trajectory by reposing the question of technics and technology from a global and non-Eurocentric perspective. He finds that, by looking especially into Chinese culture, Eastern Asian thought does not have the same dualistic principles in its history of knowledge, and that, hence, the question of tragedy for the hermeneutics of technology only holds limited capacity, since Western technology as deriving from modernity and industrialization is already globalized and affecting non-Western cultures. Nonetheless, a thorough investigation of the continuities of Nietzsche's philosophy and Eastern Asian philosophy would be required to adequately measure Nietzsche's account of tragedy against Chinese philosophy, since Nietzsche distances himself decidedly from German Idealism and the dialectics that emerged from it. "Nietzsche's" tragedy maintains a bipolarity of value, but the differentiation between Apollo and Dionysus is one of degree, allowing him to address the possibility of overcoming nihilism. Both Simondon and Stiegler however call into question the systematic framework that Nietzsche attached to his work, which is that of the eternal return.

As Hui's work shows, there is a continuity between cosmologies, values and invention. The bipolarity of values in Western philosophy is thus reflected in

multiple applications of binaries and divisions. To deem technical objects only either remedy or poison has led to several ethical problems – on the one hand, the enthusiasm of technical invention as a solution to current problems lacks care with regard to social and ecological diversity, and on the other hand, the pessimism directed against technology in relation to culture has turned culture into a sterile und inflexible (and irreflexible) social superstructure. What both techno-optimists and techno-pessimist try to resolve can never be resolved in one way or the other, or kept in permanent balance. To constantly take care of the pharmakon is, according to Stiegler, the main task for approaching ethical problems emerging with and through technology. This article aimed to highlight tragedy and tragic thinking as a way of enduring ambiguity of values in Western philosophy, which therefore deserves special attention as a point of departure for Stiegler's pactice of caretaking of the pharmakon.

Freya Häberlein, M.A.

PhD Candidate at Leuphana University, Lüneburg,
Fellow at the Research Centre for Philosophy in Hannover
(beginning October 2024)
Freya.Haeberlein@stud.leuphana.de

References:

Aristotle (1987). *Poetics* (tr. R. Janko). Cambridge: Hackett.

Ars Industrialis (2024). "Anamnesis and Hypomnesis". https://arsindustrialis.org/anamnesis-and-hypomnesis (accessed 30 August 2024).

Barthélémy, J.-H. (2012). „Fifty Key Terms in the Works of Gilbert Simondon". In: *Gilbert Simondon: Being and Technology* (eds. A. De Boever, A. Murray, J. Roffe, and A. Woodward). Edinburgh: Edinburgh University Press.

Blumenberg, H. (1963) „Lebenswelt und Technisierung unter Aspekten der Phänomenologie", *Filosofia* 14(4).

Branco, M. J. M. (2015). "The Song of the Sirens: Nietzsche and Hegel on Music and Freedom". In: *Nietzsche, German Idealism and its Critics* (eds. K. Hay and L. Ribeiro dos Santos). Nietzsche Today, Vol. 4. Berlin and Boston: De Gruyter.

Canguilhem, G. (1992). „Machine and Organism". In: *Incorporations* (eds. J. Crary and S. Kwinter. New York: Zone Books.

Deleuze, G. (1983). *Nietzsche and Philosophy* (tr. Hugh Tomlinson). New York: Columbia University Press.

Derrida, J. (1981). "Plato's Pharmacy". In: *Dissemination*. Chicago, IL: Chicago University Press.

Graham, P. (ed.) (1991). *Nietzsche and Asian Thought*. Chicago, IL: Chicago University Press.

Grosz, E. (2017). *The Incorporeal: Ontology, Ethics and the Limits of Materialism*. New York: Columbia University Press.

Hörl, E. (2017). "The Ecologization of Thinking" (tr. N. F. Scott). In: *General Ecology: The New Ecological Paradigm* (eds. E. Hörl and J. Burton). London: Bloomsbury.

Howland, J. (2008). "Plato's 'Apology' as Tragedy", *The Review of Politics* 70(4).

Hui, Y. (2021). "Über Kosmotechnik", *Dritte Natur* 4(3).

— (2019). *Recursivity and Contingency*. London and New York: Rowman and Littlefield.

— (2016). *The Question Concerning Technology in China.* London and Falmouth: Urbanomic.

Klossowski, P. (1997). *Nietzsche and the Vicious Circle*. London: The Athlone Press.

Lidell and Scott (2024) "πεῖρας", *A Greek-English Lexicon.*
www.perseus.tufts.edu/hopper/text?doc=Perseus:text:1999.04.0057:entry=-pei=rar (accessed 30 August 2024).

Margulis, L. and Sagan, D. (1987). "Gaia and the Evolution of Machines", *The Whole Earth Catalog* 55.

Nietzsche, F. (2009). *Beyond Good and Evil* (tr. M. Faber). Oxford: Oxford University Press.

— (2007). *The Birth of Tragedy* (tr. R. Speirs). Cambridge: Cambridge University Press.

— (1999). *Die Geburt der Tragödie*. Berlin and New York: De Gruyter.

— (1998). *Philosophy in the Tragic Age of the Greeks*. Washington, DC: Regnery Publishing.

Simondon, G. (2020). *Individuation in Light of Notions of Form and Information* (tr. T. Adkins). Minneapolis, MN: University of Minnesota Press.

— (2020). "Values and the Search for Objectivity". In: *Individuation in Light of Notions of Form and Information Volume II: Supplemental Texts* (tr. T. Adkins).

Minneapolis, MN: University of Minnesota Press.

— (2017). *On the Mode of Existence of Technical Objects* (tr. C. Malaspina). Minneapolis, MN: Univocal Publishing.

— *Philosophy* 189.

Stiegler, B. (2020). *Qu'appelle-t-on panser ? 2. La leçon de Greta Thunberg*. Paris: Les Liens qui Libèrent.

— (2019). *The Age of Disruption* (tr. D. Ross). Cambridge: Polity.

— (2017). "General Ecology, Economy and Organology". In: *General Ecology: The New Ecological Paradigm* (ed. E. Hörl and J. Burton). London: Bloomsbury.

— (2014). *Symbolic Misery, Vol I: The Hyperindustrial Epoch* (tr. B. Norman). Cambridge and Malden, MA: Polity Press.

— (2012). "Relational Ecology and the Digital Pharmakon", *Culture Machine* 13.

— (1998) *Technics and Time, 1: The Fault of Epimetheus*. Stanford, CA: Stanford University Press.

White, J. (2024) "Philosophy of Thermodynamics". Seminar held at The New Centre for Research and Practice. www.youtube.com/watch?v=KALQtI4P-mUs (accessed 30 August 2024).