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# Dialectics, Technoscience and Non-linearity: The Relevance of Hegelian Dialectics for Philosophy of Technology Now

**Natalia Juchniewicz and Hub Zwart**

## Abstract

Our article aims to analyse the significance of dialectics for philosophical reflection on technology. Drawing on the philosophy of Hegel, this article first of all reconstructs the progressive artefactualisation of thought and action, by indicating the transition from labour through tool use to the emergence of intelligent machines in the field of practice, secondly, by indicating the importance of dialectical thinking for the media theory, and thirdly, by pointing out that dialectics delivers both a conceptual and a practical understanding of the possibilities of emergence for cognitive technologies we encounter today (AI and the noosphere). Dialectics captures these dynamics in a non-linear manner, offering a conceptual grounding for addressing developments that are both universal and concrete, offering Hegelian dialectics as a dynamical method of thinking about technological progress without falling into schematism and simplifications.

**Keywords:** dialectics, technoscience, Hegel, media studies, mediation, artefactualisation, non-linearity

Although dialectical thinking is a core dimension of the history of philosophy and the history of ideas, it is hardly involved in philosophical analysis of technologies that are currently developing (such as artificial intelligence). Dialectics suggests an ongoing progression of thought towards more comprehensive levels of understanding, albeit via pathways of conflict and contradiction, discerning a dialectical interaction between technology and thinking between hands-on intervention and hands-off reflection. In response to critics who have argued that it entails an oppressive approach to human-technology relationships,<sup>1</sup> we aim to restore dialectics as a practical and non-linear manner of engaging with technology. With the help of Hegel's philosophy we will demonstrate that dialectics allows us to grasp the transition from *the material* to *the artificial* by understanding this transition as a progression of spirit towards ever broadening scopes of thought and action. At the same time, as we will show, the fact that this process is dialectical does not presuppose that it is linear or predetermined in its movement. Dialectics is at work both in technological practice and thinking as such, and in our philosophical reflections on these developments. The non-linear logic of dialectics furthers our understanding, not only of technological practice, e.g. the production of artifacts and technical knowledge, but also allows us to come to terms with the emergence of new, digital technologies whose inner logic is based on recursivity.<sup>2</sup>

To flesh out how dialectics envisions technological progress, in the first paragraph of the article, we will demonstrate how dialectics engenders technoscientific thinking by subjecting thinking itself to a process of self-criticism and negation. The motor of dialectics as a conceptual process precisely resides in negativity,<sup>3</sup> without which it is impossible to move from accepted or mainstream knowledge towards emerging, affirmative<sup>4</sup> forms of knowledge that are mediated, for instance, by artefacts. Thinking does not take place in a vacuum but is entangled with practice. Therefore, we will demonstrate how, in Hegel's approach, there is a transition from mechanical contrivances to the formation of organic and intelligent structures. In other words, we will show how Hegel discerns an unfolding from the mechanical to the chemical and the biological in technoscientific praxis. For Hegel, this practice is associated with the concept of labour, as labour requires and produces knowledge (know-how),<sup>5</sup> so that history becomes a process of collective self-

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1 Peter-Paul Verbeek, *Moralizing Technology* (Chicago: University of Chicago Press, 2011), 155.

2 Yuk Hui, *Recursivity and Contingency* (London: Rowman & Littlefield, 2019).

3 See the distinction of the moments of the logical into the abstract, the dialectical, and the speculative in Georg W.F. Hegel, *Enzyklopädie der philosophischen Wissenschaften I: Die Wissenschaft der Logik, Werke 8* (Frankfurt: Suhrkamp, 1986a [1830]), §79.

4 Hegel, *Enzyklopädie der philosophischen Wissenschaften I: Die Wissenschaft der Logik*, §82.

5 See Mark Coeckelbergh, "The Tragedy of the Master: Automation, Vulnerability, and Distance," *Ethics and Information Technology* 17, no. 3 (2015). See also: Matteo Pasquinelli, *The Eye of the Master: A Social History of Artificial Intelligence* (London, New York: Verso, 2023).

edification through the transformation of nature.<sup>6</sup> The approach we propose is in line with the idea of Hegel's philosophy as emergentism.<sup>7</sup> Although Hegel's philosophy, as we understand it, assumes that the goal of all progress is the realisation of the idea of self-understanding, it does not pre-determine the directions and ways in which this goal will be realised, which is why we can speak of the non-linearity of dialectics and emergence. In the second part of the article, we will explore the relationship between Hegel's understanding of dialectics and the development of media theory and mediation. Given that dialectics unfolds via negation towards the negation of the negation, we will examine what it means for media to act as a "negative" intermediary between humans and the external world.<sup>8</sup> According to Hegel, true knowledge is not immediate and therefore the dialectical process presupposes a medium as a middle term. The fact that media not only broadens our range of visibility, but also creates distance, thereby challenging us to develop new relationships with nature, necessitates addressing the issue of the *artefactualisation of human action and thought*. We will investigate this process by focusing on the concept of the *noosphere* as an emerging form of global consciousness resulting from technoscientific transformations.<sup>9</sup> Additionally, we will demonstrate how the institutionalization of thinking itself into socially shared forms leads to the emergence of the so-called "second nature"<sup>10</sup>—a sphere of reference for subjects with respect to themselves and others which is technologically saturated.

After presenting Hegel's theory of technological development and explaining its significance for media theory and the meaning of second nature, in the third part of the article, we will focus on presenting *dialectics as a non-linear process*, for two reasons. Firstly, dialectics is not only a way of thinking but also a way of acting. It requires practice, and this practice is not always consistent in its choices, especially in the context of technoscience. In other words, science does not develop linearly because it develops through detours and collisions, and through both quantitative and qualitative change. Secondly, the dialectical schema itself does not in any sense assume that progress is linear. At best, it is a spiralling process resulting in Hegel's anticipation concerning "the return of the spirit to itself" on a higher level of self-awareness. This also implies that we see Hegel's philosophy not as one historical formation among others, but as *a program of thinking* which allows us

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6 Jeffrey O'Jay, "Hegel Reframed: Marcuse on the Dialectic of Social Transformation," *Philosophia: International Journal of Philosophy* 16, no. 1 (2015): 105.

7 See Kenneth R. Westphal, "Philosophizing about Nature: Hegel's Philosophical Project," in *The Cambridge Companion to Hegel and Nineteenth-Century Philosophy*, ed. Frederick Beiser (Cambridge: Cambridge University Press, 2008).

8 Dieter Mersch, "Tertium Datur. Introduction to a Negative Media Theory," *Matrizes* 7, no. 1 (2013).

9 Pierre Teilhard de Chardin, *The Human Phenomenon* trans. Sarah. Appleton-Weber. (Brighton, Portland: Sussex Academic Press, 2015 [1955]).

10 See Georg W. Bertram, "Two Conceptions of Second Nature," *Open Philosophy* 3, (2020).

to come to terms with societal and ideological transitions of the present, and which is therefore presented here in interaction with current technological developments and in dialogue with prominent contemporary perspectives that are moving in the same direction. Referring to the views of Reza Negarestani and Yuk Hui, we will argue that it is precisely this non-linear logic of dialectics as a return (recursivity) that allows us to conceptualize contemporary technologies as learning machines. We will demonstrate, therefore, how Hegel's dialectics allows us to envision the transition from understanding technoscience as the study of that what is material to conceiving technoscience as the ability to create what is artificial, algorithmic, and digital. A non-linear dialectical approach allows us to simultaneously perceive development and change, but also the preservation and incorporation of forms of action and thought characteristic of earlier stages. Hegelian dialectics shows us how the development of the human spirit and its knowledge of itself and the external world develops, but it also serves as a thinking model for artificial learning machines. The fact that Hegel's theory allows us to draw such far-reaching conclusions about the relationship between the spirit and the machine, constitutes a significant contribution to the research in technoscience, media theory, artificial intelligence, and the challenges posed to philosophical reflection by technological development. Finally, in the conclusion, we bring together the key arguments of our paper.

## 1.

Although Hegel is not generally considered a philosopher of technology, and explicit discussions of technology in his work are relatively sparse, when we follow the inherent logic of his thinking, a dialectic of technology undeniably announces itself.<sup>11</sup> In this section, we will present the contours of a Hegelian philosophy of technology in outline. The starting point of dialectical thinking and practice is an initial situation of relative equilibrium (first moment) which is challenged and disrupted by negativity (second moment), coming from the outside (otherness) but at the same time revealing inner contradictions and biases at work in these initial convictions. These challenges must be superseded by reconciling and incorporating the opposing tendencies into a more comprehensive understanding (the negation of the negation, third moment). Therefore, Hegel sees dialectics as praxis: the self-actualisation of thinking,<sup>12</sup> and thinking as a process of self-negating.<sup>13</sup> Dialectics posits that, at the beginning of thinking, there is an abstract assumption about reality ( $M_1$ ) which must be negated and contradicted ( $M_2$ )

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11 See Hub Zwart, *Continental Philosophy of Technoscience* (Cham: Springer, 2022).

12 Zwart, 36. See also Emil Oestereicher, "Praxis: The Dialectical Sources of Knowledge," *Dialectical Anthropology* 1, no. 3 (1976).

13 Robert B. Pippin, *Hegel's Realm of Shadows: Logic as Metaphysics in The Science of Logic* (Chicago, London: The University of Chicago Press 2019), 141.

leading to a moment of *Aufhebung*—sublation or incorporation—which is a negation of the negation ( $M_3$ ). In other words, Hegel's assumption is that thinking is negating because, in the face of a given conceptual way of apprehending reality, which can be described as positive, it formulates an opposition and then seeks to overcome this critical opposition in the negation of the negation.<sup>14</sup> Sublation means superseding the contradiction, negating the previous, tumultuous, and contested moment of development while preserving and enhancing it into a new form. It is not a synthesis, because rather than adding two elements together (which in the case of contradiction between two previous moments of development would be nonsensical), it means understanding the opposites as inevitable dimensions of one and the same process. Dialectics is a method of exposition in which our most fundamental concepts are shown to be self-contradictory, resulting in a striving to supersede these contradictions.<sup>15</sup>

Hegel's dialectical schema is based on the logic of syllogism, where a *general* understanding passes through *particular* dimensions of thinking to finally realise itself in a *concrete* result.<sup>16</sup> This syllogism allows us to understand why Hegel's theory, especially thinking via the "middle term," is so significant for contemporary reflections on technology and also, as we will demonstrate, for media theory. The dialectical syllogism has a teleological character, thus establishing a principle for both thinking and goal-oriented action, while challenging the existing state of knowledge. Furthermore, the middle term serves as an intermediary, which has the ability to reveal and transmit the content but disappears in the conclusion of such a syllogism in the sense of becoming uplifted or incorporated. Hegel explains this clearly in his *Science of Logic*:

Through a means the purpose unites with objectivity and in objectivity unites with itself. This means is the middle term of the syllogism. Purpose is in need of a means for its realization, because it is finite – in need of a means, that is to say, of a middle term that has at the same time the shape of an external existence indifferent towards the purpose itself and its realization.<sup>17</sup>

The fact that the goal requires a means for its realization indicates that in Hegel's thinking, there is an instrumental dimension in reason. However, this moment of instrumentality certainly does not exhaustingly coincide with thinking as such. Thinking and action do not

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14 About the "triplicity" in Hegelian thought see Pippin, 147.

15 Michael Forster, "Hegel's Dialectical Method," in *The Cambridge Companion to Hegel*, ed. Frederick C. Beiser (Cambridge: Cambridge University Press 1993), 132.

16 See Aliston Stone, "Adorno, Hegel and Dialectic," *British Journal for the History of Philosophy* 22, no. 6 (2014).

17 Georg W. F. Hegel, *The Science of Logic* (Cambridge: Cambridge University Press, 2010 [1812]), 659.

merely stay within the realm of mediation. Rather, dialectically, they lead to the negation and elevation of knowledge, in close interaction with technology, being both a product and a driver of knowledge, bringing it to a higher level of performativity. This process is evident in Hegel's understanding of the role of labour, which is intimately connected with the development of tools and technoscience, and becomes increasingly recursive and performative rather than merely instrumental.

According to Hegel, technology co-evolved with human labour and although the first mode of labour is the compulsory work by the servant, Hegel stresses the mediating and transformative nature of labour, resulting in technical know-how and practical knowledge. Agricultural and horticultural labour are mechanical practices compelling plants to produce biomaterials, while the domestication of animals entailed combinations of compulsion with collaboration and trust. All these practices generated important forms of practical knowledge. The next stage is chemical labour (metallurgy, ceramics, etc.), where the middle term (the mediation) between subject and object is the tool (the hammer, the furnace, etc.), which is itself a product (the materialisation of a concept: consciousness transformed into a thing), but also, as Hegel phrases it, the persistent "norm" of labour, because the handling of such tools requires significant skill. The attitude of artisans towards their tools is one of veneration, Hegel notices, while the servants' attitude towards their products is desire held in check.<sup>18</sup> Finally, the agricultural revolution also entailed the development of biological tools (e.g., fermentation). Thus, we may distinguish mechanical, chemical, and biological tools (e.g., ploughs, fertilisers, and yeast respectively).<sup>19</sup> This also reflects the structure of Hegel's *Logic*,<sup>20</sup> moving from mechanism (from §195 onwards) via chemism (from §200 onwards) to life (from §216 onwards),<sup>21</sup> explaining not only *why* this development is logical (e.g. how the mechanism of indifferent parts gives way to the more intimate interaction between chemical components, and how the *finite* chemical process gives way to life as an *infinite* unfolding), but also *how* previous forms are incorporated into the next (e.g. how life incorporates mechanical structures and chemical processes on a higher level of complexity and functionality).

As indicated above, for Hegel, work does not merely involve the processing of nature

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18 Georg W. F. Hegel, *Phenomenology of Spirit*, trans. A. V. Miller (Oxford: Oxford University Press, 1977 [1807]), 118.

19 Zwart, 61.

20 Hegel, *Enzyklopädie der philosophischen Wissenschaften I: Die Wissenschaft der Logik, Werke 8*.

21 These references refer to the so-called *Lesser Logic*, but a similar structure can be discerned in the so-called *Greater Logic*. Here again we notice the same logic of the unfolding of the concept (*Begriff*) from mechanism (§409), via chemism (§428) up to life (§469). And here again, Hegel emphasises how the chemical process initially entails negativity (dissolving and destroying the chemical object) but becomes incorporated in life as a productive process, although after death, the chemical process will resume its destructive work of negativity.

to achieve specific goals but also allows for and requires the development of practical knowledge or “know-how.” Therefore, according to Hegel, while engaging in work, labouring subjects also advance their practical understanding of nature, enabling the creation of technological artefacts such as (increasingly advanced) machines. Human labour has the tendency to start from primary, mechanical forms of labour. The more abstract human labour becomes, the more humans are in a position to withdraw themselves from labour and to substitute their own interactivity with external nature.<sup>22</sup> Humans will increasingly need more power, more mechanical motion, and this they find in external nature in the form of natural energy sources (wind, water, fossilised matter, etc.). In other words, pure motion requires and gives rise to an abstract and mediated relationship with nature (e.g., humans harvesting pure, abstract energy) via the abstract external activity of the machine.<sup>23</sup> This also explains the why and how of the replacement of human beings by machinery. Labour, as a mechanical activity, builds on the resources of nature. As soon as these resources are grasped, it is possible to conceive and subsequently build the machine. The machine changes human bodily power into the mechanical power of the external artefact. The work becomes more abstract and, as a result, easier, so that production can increase due to its uniformity, i.e., a shift of focus from quality to quantity. At the same time, the capacity of the worker is reduced to one particular skill, which implies an unconditional dependence on the social context (the presence of a demand for this skill). Skill becomes mechanical and acquires the ability to let machines take the place of human labour. Hegel focuses here on the fact that new forms of labour create also a new societal context which is much more collective and where individual activities become a part of social production which can eventually be automated.<sup>24</sup> Although initially the mere quantity of mechanical production constitutes a negation of the quality associated with craftwork, eventually these massively produced artefacts will assume new qualities which supersede those that can be realised through manual labour (thereby negating the negation). The dialectics of labour might be understood as a transformation from bodily work through tools to machines. This allows societies to outsource the work of workers to machines, but also makes them dependent on those machines and the system which supports them.

Thus, dialectics discerns a syllogistic dynamic in technoscientific practice. Technoscience evolves from *general* conjectures (theory) via *particular* experimental insights (gained during the process of transformative labour) down to *concrete* products and outcomes resulting from this. Dialectics sees technoscience as a particular way of disclosing and mediating

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22 Georg W. F. Hegel, *Hegel and the Human Spirit: A Translation of the Jena Lectures on the Philosophy of Spirit (1805 – 1806)*, trans. Leo Rauch (Detroit: Wayne State University Press, 1983 [1805-6]), 121.

23 Hegel, *Hegel and the Human Spirit*, 121. See also Pasquinelli, 5.

24 Georg W. F. Hegel, *Enzyklopädie der philosophischen Wissenschaften III: Die Philosophie des Geistes, Werke 10* (Berlin: Suhrkamp, 1986b [1830]), §526.

nature (rather than treating nature as immediately accessible to human experience and knowledge). It is a critical exposition of technoscientific research practices as they appear on the scene—the path or journey of technoscientific consciousness, passing through a series of configurations or stations of knowledge towards more comprehensive forms of understanding.<sup>25</sup>

In line with Hegel's logic outlined above, three modes of machines emerge in the course of the history of knowledge and the development of technology. Firstly, mechanical machines (clockworks, weighing scales, etc.) which function in a quantitative manner (dissecting and measuring the world, parcelling out products as quantities). Secondly, the chemical machine (electrolysis machinery for instance), where quality and proportion become increasingly important. Thirdly, biological machines where the organism's inherent goal-oriented (teleological) behaviour is exploited for productivity. While these three waves of machines exploit natural resources, we currently witness the emergence of intelligent machines or thinking machines, e.g., advanced computers and artificial intelligence (forms of thinking which bypass consciousness), especially developed for technoscientific research. In other words, we notice a gradual displacement from labouring bodies via mechanical machines to sophisticated technoscientific hybrids. Whereas humans used their intelligence to exploit natural resources, now human intelligence is becoming extended or saturated by technology. In technoscientific research we see the *Geist* at work, sublating the subject-object divide through practical and intellectual activities<sup>26</sup> in the context of an institutionalised practice. In the next paragraph, we will examine how dialectics impacts our understanding of technology, not only in terms of tools, but also as a cognitive-practical medium in the relationship between humans and nature, as well as with other people.

## 2.

The dialectical transition from what is physical and mechanical to what is intellectual and noetic constitutes the broadest framework of changes in the field of technology, which becomes logically intelligible in the light of Hegel's theory, as we have seen. Importantly, technology plays the role of an intermediary between the labouring subject and the external world, thus emerging as a medium. As mentioned above, the syllogistic logic of Hegel's dialectics posits technology initially as the middle term, a necessary intermediate element of teleological actions but not their essence. Initially, the goal transcends the means used to accomplish the action. Yet, at the same time these means are more enduring than the

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25 Zwart, 7.

26 See Natalia Juchniewicz, "Dialectical Technology: Hegel on Means, Tools and the Machine," *Filozofia* 73, no. 10 (2018).

action itself. Therefore, rather than occasionally fostering human action, these means increasingly will tend to *structure* the human-nature interaction and eventually, the means will increasingly determine the *goals* to be achieved (e.g., mastery of nature via machines as the ultimate goal of the interaction).

This way of thinking, involving technology as a “third” interactive element between the subject and the world, restructuring both the subject and the object-pole of the process, is at the core of the study of media and understanding their role in shaping human thinking and action. As Mersch argues, the interest of dialectical philosophy in media stems from the proximity to expressions such as *mediation* or *Vermitteltheit* (*mediatedness*), “which also play a prominent role in Hegelian dialectics and can be read as the basic function of the ‘medial.’”<sup>27</sup> All these terms—the “medium” as well as “mediation” and the “medial”—belong together. They do not constitute a subdomain of reflection, but rather turn out to be fundamental for the entire tradition of Western thought. What remains unclear, however, Mersch argues, is whether there is a certain structure—the “medial” or its “mediality”—that conveys processes of *mediation* (or *mediatedness*).

Mersch argues that it is impossible to offer a “positive” definition of media because the essence of that what mediates between the subject and the world is based on “assisting,” “conveying meaning,” or simply “being transparent” (being a *diaphanes* in the Greek sense of this concept).<sup>28</sup> The medium is meant to bring nature closer to us but at the same time introduces distance (separation, negativity) between subject and object. The medium thereby intensifies the very distance which the medium purports to overcome. Therefore, the dialectical schema of transitioning from what is positive (e.g., embeddedness of humans in nature) through what is negative (separation, via the intrusion of technology as a third term) to the negation of negation (superseding this separation, this divide, with the help of technology), is about discovering both the “negative” and the “positive” role of media as something which provides the subject with an outcome (a world) that has attained entirely new meanings. At the same time, the media that bring this productivity about, are themselves consumed in the course of the process. Hegel himself literally writes about this negativity of media:

A house, a clock, may appear as purposes with respect to the instruments employed in their production; but the stones, the crossbeams, or the wheels, the axles, and the rest that make up the actuality of the purpose, fulfil this purpose only through the pressure which they suffer, through the chemical processes

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27 Dieter Mersch, “Meta / Dia: Zwei unterschiedliche Zugänge zum Medialen,” *ZMK Zeitschrift für Medien- und Kulturforschung: Medienphilosophie* 1, no. 2 (2010): 1.

28 See Dieter Mersch, *Medientheorien zur Einführung* (Hamburg: Junius, 2006).

to which they are exposed, with air, light, and water, and from which they shield the human being; through their friction, and so on. They fulfil their vocation, therefore, only through their being used up and worn out, and only by virtue of their negation do they correspond to what they are supposed to be.<sup>29</sup>

This Hegelian understanding of technology as a means for action, disappearing in its fulfilment but significantly affecting the final result of the action, resonates with the post-phenomenological understanding of technological mediation as “doing something” with the meaning of the world for a human being.<sup>30</sup> The dialectical syllogism realises itself in a *concrete* outcome or product, as we have seen, a *concrete* technological contrivance for instance. At the same time, much more than post-phenomenology, we would argue, Hegelian dialectics emphasises how this *concrete* result recursively affects the general system: human collective societal existence as a whole. Dialectically speaking, such concrete outcomes, in the form of a tangible machine may become what Hegel refers to as a *concrete universal*, eventually redefining the whole spirit of an era (e.g., redefining the collective world as the era of the windmill, the automobile, the computer, etc.). Thus, Hegelian dialectics reveals a fascinating paradox, already touched upon above. On the one hand, technologies are temporary means to achieve a goal. At a certain point, human subjects will have consumed, and will do away with, their car, their computers, their iPhone: the action has been achieved, and the means (the medium) has been consumed in the course of the action. At the same time, these so-called means outlive and have redefined human action. From now on, human subjects remain highly dependent on these “means” of “mediums” precisely because they have redefined collective human action. Hegel’s dialectical philosophy of technology suggests that, while technology transforms into increasingly abstract forms (from the body to the mechanical machine to the intelligent machine; from compulsory labour to abstract labour to technoscientific labour), it is also evident that the principle of intermediation—inserting transformative media between the subject and the world—generates the problem of redefining the relationship to nature as that what surrounds humans and grounds their embedded world. Initially, possessing technology seems to imply having the means to control and subjugate nature to human purposes. Following this approach, Hegel himself makes statements about using tools and machines as having “technics” or employing *techne*. Yet, Hegel is well aware of the negativity of technology, consuming its own resources. In his social and political writings, moreover, Hegel fleshes out how in modernity, the subject is no longer confronted with “pure,” “naked,” “raw,” nature but rather with processed, domesticated nature, partly incorporated in the social:

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29 Hegel, *The Science of Logic*, 666.

30 Don Ihde, *Technics and Praxis* (Dordrecht, Boston, London: D. Reidel Publishing Company, 1979), 18.

Within social needs, as a combination of immediate or natural needs and the spiritual needs of *representational thought* [Vorstellung], the spiritual needs, as the universal, predominate. This social moment accordingly contains the aspect of *liberation*, because the strict natural necessity of need is concealed and man's relation is to *his own opinion*, which is universal, and to a necessity imposed by himself alone, instead of simply to an external necessity, to inner contingency, and to *arbitrariness*.<sup>31</sup>

As Kislev phrases it: nature, which is Hegel's name for the immediacy of the world, is continuously being overcome, or humanized, or spiritualized. "Therefore, we can say: step by step, the world becomes increasingly artificial."<sup>32</sup> The transition mentioned in the first paragraph of this article, from what is mechanical-chemical to what is biological-noetic, is precisely related to the emergence of this new relation between the human subject and nature.

This process is well described by another dialectical thinker, Teilhard de Chardin. Teilhard argues that dialectics confronts us with a spiralling view on history, starting (as a first moment) with human awareness of mechanical processes, which were then put to use, followed by the self-conscious use of chemical and biological processes, eventually giving rise to a plethora of new life forms (first in the context of artisanal agriculture but now via technoscience and intelligent machines). The moment the human being understood these mechanisms and began to self-consciously manage these processes, resulted in disruptive interventions, eventually affecting the condition of the planet in a *negative* manner, but also in the necessity of taking responsibility for the future course of evolution. The sublation of the above tension (the necessity to *negate the negativity* of human technological activity) is, according to Teilhard, related to the transcendence of boundaries between the "natural" and the "artificial," announcing synthetisation or the "synthetic" in the sense of *bringing together again*, the literal meaning of the Greek verb *sullogizesthai*<sup>33</sup> i.e., the dialectical turn from understanding life by dissecting it (negation) towards understanding life through reconstruction, bringing a plethora of partial insights together again (the negation of the negation), resulting in artificial life or hybrid life forms (living machines), where the non-living is incorporated in the living.

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31 Georg W.F. Hegel, *Elements of the Philosophy of Right*, trans. H.B. Nisbet (Cambridge: Cambridge University Press, 1991 [1821]), §194.

32 Shachar F. Kislev, "Six Hegelian Theses about Technology," *Techné: Research in Philosophy and Technology* 24, no. 3 (2020): 17.

33 Zwart, 210.

Teilhard describes the emergence of spiritual mediums (language) and cognitive tools which ultimately provide the basis for hyperintelligence or distributed reflection on a planetary scale. Consciousness is seen as an integral dimension of being: from primal cellular consciousness via human self-consciousness (i.e. the co-evolution of consciousness, tool-use, and language) up to the emergence of a global noosphere (the global web of technology, intelligence, and information, resulting in hyper-consciousness).<sup>34</sup> This description of the unfolding of consciousness from immediate awareness up to hyperintelligence, we argue, can be understood as a description of the journey of the Hegelian spirit, from the perspective of advanced technoscience. This “hyper” aspect of these new forms of intelligence is especially intermingled with the collective / systemic / distributed (and therefore enhanced) nature of noetic activities such as extended thinking, calculating, communicating and deliberating, as well as with noetic products such as electronic devices, computer networks, and global social networks. Distributed intelligence as suggested by Teilhard is a technological materialisation of Hegel’s objective spirit, conceived as an extended, externalised and institutionalised structure on which individual thinking and creativity to large degree depend.<sup>35</sup>

The “institutionalized structure of the spirit” is also an expression of the fact that the subject is not primarily related to nature in the sense of an external ambiance but more and more to what is often referred to as a “second nature,” which is the sphere of social relationships and institutions and their multiple practices and habits of disciplining individuals into their actions and thinking.<sup>36</sup> Bertram defines second nature as: “constituted by indeterminate cognitive activities within a specific historical tradition,” functioning as the framework for cognitive activities in general. In this sense, human beings grow up in the midst of second nature: nothing they do can be accomplished independently of it.<sup>37</sup> Objectivity primarily refers to the field of objects, encountered by the spirit in the process of interaction and cognition. It has, however, also the second meaning; something is objective because it is shared with others in a way which makes intersubjectivity possible. This double understanding of objectivity in close connection with the double understanding of nature allows for a distinction between at least two meanings of the concept of media. Firstly, media are literally means inserted between humans and nature, forming the basis for the technosciences as a development of both thinking and practice. However, media also pertain to what exists between people, within the “artificial” nature created by humanity’s cultural activities. The media that fall under the second meaning

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34 Zwart, 209.

35 Zwart, 188.

36 See David Forman, “Second Nature and Spirit: Hegel on the Role of Habit in the Appearance of Perceptual Consciousness,” *The Southern Journal of Philosophy* 48, no. 4 (2010).

37 Bertram, 68.

include language, writing, and law but also currently mass media and social media, which form the basis for building (as well as disrupting) intersubjective relationships.

The fact that by technologically processing the second nature we are actually processing social relations raises the question of the direction in which technology and technoscience will further develop. If we are convinced that this development inherently follows a dialectical path, this requires us to think dialectically about the emergence of new technological forms of action and thinking and the challenges for norms and values (*Sittlichkeit*) they impose.<sup>38</sup> We will address these issues in the third part of our article.

### 3.

The fact that through “artefactualisation,” which involves building intermediaries, i.e. introducing a “third element” between humans and nature, subjects become self-aware and extrapolate their own self onto nature,<sup>39</sup> allows us to posit that artificiality is the horizon of current historical developments. Negarestani emphasizes that self-consciousness is a project of the spirit and of the self, the effect of processual changes. It is the effect of inner transformations resulting in novel forms of intelligence. Artificiality, in this context, means not only the production of artificial things as extrapolations of the spirit, but also the production of novel forms of thinking, of cognitive skills and new forms of conceiving, of “bringing into conception.”<sup>40</sup> The transition from reflecting on external objects (e.g., Cartesian epistemology) as expressions of the spirit towards these newer cognitive functions, entails an ascent towards more comprehensive levels of thinking: a decisive shift from science as studying the external world to technoscience as constructing new forms of thinking and action, such as artificial intelligence. Importantly, as Negarestani points out, the Hegelian model of thinking is inherently intersubjective because it is based on language and building relationships with others. Its frame of reference is not the *abstract* autonomous ego but *concrete* thinking and reflecting networks or communities. Therefore, the model of artificial intelligence that can be developed within the framework of this theory is also entangled with language, understood not only as a medium but as a “semantic space within which computation and logic converge”<sup>41</sup>

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38 Bertram, 76.

39 Reza Negarestani, *Intelligence and Spirit* (Falmouth, New York: Urbanomic, Sequence, 2018), 25–26.

40 Negarestani, 47.

41 Negarestani, 19.

While interpreting Hegelian *Phenomenology of Spirit*, Negarestani states:

Through the logic of self-relations as the form of self-consciousness, mind attains the ability to treat itself as an artefact of its own concept. It artificializes itself, conceiving itself from the viewpoint of an unrestricted world that belongs to no particular where or when. In other words, through self-relations as the formal condition of self-consciousness, mind is now able to investigate the conditions required for its realization, to adapt to ends and purposes that are not given in advance, and to explore the possibility of its realization in types of structures other than those that naturally constitute it. The history of this kind of self – the minding self – is, then, strictly speaking a project of artificialization in the above sense.<sup>42</sup>

Dialectical thinking, we argue, not only provides the possibility for reconstructing the trajectories of historical development of various artifacts but also offers the opportunity to contemplate on the transformative role of these artifacts within technoscience as such. Although history has produced a bewildering multitude of concepts and artifacts, not every concept or artefact has substantial significance. Most of them only produce incremental (quantitative) change, or are quickly discarded, as they fail to live up to their expectations. The idea of substantial (qualitative) change, however, implies that some technological innovations and technology-driven actions can have a *general* and *qualitative* meaning<sup>43</sup> superseding the role of these technologies as mere means while rather emphasising their world-changing repercussions. Hegel's interpretation of human nature emphasises our fundamental openness to change and becoming, but the important point here is the discontinuous nature of qualitative change, engendered by technology and resulting in the establishment of new behavioural patterns, norms, and values. Yet, a key element of Hegelian thinking is the awareness that continuity in a linear sense (quantitative growth) nonetheless entails the possibility of disruption, of digression from a linear pattern. Instead of seeing technologies as the means that are consumed when the end result is reached (as outlined above), the ends themselves become redefined due to the transformative power of the means, resulting in qualitative change of society as a whole. The non-linear approach to progress emphasizes that technological developments entail positive and negative elements in historical change both on the objective and the subjective level of human development. Here, dialectics discerns a process of transgressing previous

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42 Negarestani, 25-26.

43 Kislev, 5.

social forms, but not necessarily in the sense that we are trapped in this movement of negation. Rather, pushed to the extreme, negativity is bound to unleash a negation of the negation, working towards *Aufhebung*, incorporating the (initially disruptive) novelty into the inherent dynamics of social existence. As also suggested by Negarestani, the consolidation and adoption of specific elements of change are part of the social and historical process.

This approach, understanding dialectics as a process of qualitative and nonlinear change, resonates with the research of Yuk Hui, who examines the emergence of cybernetics by studying the relationship between subject and object (humans and nature) in the tradition of German idealism, which eventually engendered the conditions for creating computing machines. In other words, his research is not a philosophy of technology, but rather an explication of philosophy *itself* as a practice of reflection which is inherently connected with technology. His key concepts (recursivity and contingency) are both responsible (in their interaction) for the dialectical progress of technological systems:

It is in the systematic thinking to Fichte, Schelling, and Hegel that we find elaborations of the recursion form. The *ich* is the point of departure in which every confrontation with the *nicht-ich*, which Fichte calls a check (*Anstoße*), forces the *ich* to return to itself, and it is revealed as such. The movement between the *ich* and the *nicht-ich* is the fundamental principle (*Grundsatz*) of the philosophical system.<sup>44</sup>

Dialectics is not a mere repetition of purely *recursive* patterns, but continuously challenged by contingency. Therefore, it is a self-reflective logic, at work not only in history, but also in nature:

In Schelling's early philosophy of nature, contingency is the expression of freedom and nature. In Hegel's philosophy of nature, contingency is a test for the auto-determination of the Notion. (...) Here the progress of the spirit is also the progress toward the death of nature. In this sense, Hegel is probably a step closer to cybernetics, or *mechanical organicism*. In early twentieth century, recursivity is formalized and systematized in cybernetics and other, parallel developments: for example, computation theory (Gödel-Turing-Church) and automata

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44 Hui, §2. See also John W. Burbridge, "The Necessity of Contingency: An Analysis of Hegel's Chapter on 'Actuality' in the *Science of Logic*," in *Art and Logic in Hegel's Philosophy*, ed. Warren E. Steinkraus and Kenneth I. Schmitz (Atlantic Highlands, N.J.: Humanities Press, 1980).

(John von Neumann). Then it arrives at artificial intelligence (AI), machine learning, and more complex forms of automation. Alternatively, paraphrasing Hegel, maybe one can say that this machinic organicism characterizes the new form of the absolute spirit of our epoch.<sup>45</sup>

In other words, rather than seeing dialectics as a reflection on cybernetics from an external philosophical perspective, Hui explores the basic affinity (up to the point of identity) between dialectics and cybernetics. This means that dialectics allows us to explore cybernetics and its logic *from within*. This echoes a basic Hegelian conviction, namely that we can understand technology and technological change because technology is inherently *rational*, albeit in the *dialectical* sense of the term, so that a dialectical philosophy of technology not only allows us to fathom the dialectical dynamics of philosophical change, but also fosters the self-understanding of thinking as such. In other words, starting from the *status quo* at a given point in time (the first moment), technology is an externalisation of the spirit (second moment) which eventually allows the spirit to return to itself (third moment). Hui refers to this third moment (this reconciliation of philosophy and technology on a cosmological level) as *cosmotechnics* or “third nature.”

Hui points out that dialectics, as an expression of both the relationship of the subject to nature, which is absorbed in the cognitive process of the spirit, and as a principle of internal transformations of the spirit itself, should be understood non-linearly.

“Hegel understands this well, since first of all dialectics is a non-linear movement, and in order to advance toward the Absolute, contingency is necessary to affirm freedom and to avoid becoming merely formal (formal in contrast to content [Inhalt]). Contingency stands out as a concept fundamental to rationality and creativity (...). Contingency will not yield a system unless this contingency becomes necessary (...).”<sup>46</sup>

The dialectical understanding proposed by Hui is based on the concepts of recursivity and contingency, involving an incorporation of earlier moments in the process of *Aufhebung*,<sup>47</sup> with contingency as a necessary element of development. Hui clearly emphasizes that Hegel’s dialectical model is not deterministic in the sense of having a straightforward path of development predetermined from the start because, in that case, his theory could not apply to the actual exercise of any free action of the spirit. However, it is a process

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45 Hui, §19.

46 Hui, §3.

47 Hui, §16.

that occurs within the spirit itself. Therefore, Hegel speaks of the “Spirit’s algorithm,” an algorithm that, as Negarestani points out, is its own developmental outcome. In this sense, the concept of the spirit in Hegelian theory may indeed serve as an inspiration for the idea of machine learning or, speaking in Hui’s terms, recursive forms of algorithms.

## **Conclusion**

The aim of this article was to indicate why the logic of dialectics is essential for contemporary philosophy of technology and to demonstrate how dialectical transformations of technology are grounded in the dialectical movement of becoming, as captured by Hegel’s philosophy. Also, we emphasised that Hegel’s dialectics is not primarily a historical formation (reflecting early nineteenth-century technological developments, and therefore a topic of historical research), but rather allows us to understand the internal logic of current technological developments. Above all, we wanted to emphasize that dialectics, although it constitutes a conceptual understanding of transformations in the realm of logic, ontology, and epistemology, is not merely theoretical but first and foremost practical. Moreover, we see emergentism as a key element of both Hegel’s own theory and technological development.

Dialectics is not an anachronistic constellation of thoughts about outdated forms of theory and practice, but a vibrant research program allowing us to come to terms with technological and societal developments that are currently unfolding, in close interaction with each other, offering an elaborate reflection on technological artifacts and their processual changes. This exposure to contemporary transitions invigorates dialectics itself, so that Hegel’s thinking is liberated from the constricted perspective of historical author studies and turned into a critical diagnostic of the present. Thus, our purpose was to point out how dialectical thinking and practice enable not only the gradual artefactualisation of action and thought itself, giving rise to noosphere and artificial intelligence, but also open up pathways for critical reflection and societal action vis-à-vis these unfolding developments.

We began our reflection with the notion of labour to demonstrate how it constitutes, for Hegel, an interactive process linking theory with practice. In Hegel’s philosophy, we see a gradual development of increasingly self-directed human thinking and action, distancing itself from the immediate and natural, and becoming increasingly self-produced and artificial, which for Hegel represents the expression of nature being reshaped by culture. We also emphasise, however, that this ‘liberation’ from external mastery at the same time entails a technological and increasingly technology-driven restructuring of the world of labour, depriving former artisans of the autonomy that was once based on their artisanal

knowledge and skills. In our article, we not only demonstrated the dialectics of labour, tool use, and material nature, but also the quantitative and qualitative development of forms of thought. Likewise, we explained how abstract and general forms of understanding give way to a focus on particular dimensions of the dialectical process, which realises itself in concrete artifacts as exemplifications of a more comprehensive dialectical unfolding. In Hegel's view, as we subsequently demonstrated, technological progress and the advancement of human knowledge is linked to progressive artefactualisation, as can be seen through the notion of medium. We showed that media, understood in the Hegelian sense, act as a "positive" enabler, but also as a "negative" disruptor, producing both proximity and distance, in ways that are not immediately recognised, affecting the subject's relationship to the world, restructuring which the external world is perceived in a particular way. This also impacts the sphere of values and relationships built with others on the institutional level (*Sittlichkeit*), as our so-called "second nature": the social and cultural world which serves as the proper reference point for modernity according to Hegel. In other words, although we continue to interact with external nature, even on a global scale, an even more significant cultural role in human existence is played by the nature and development of social life, which we share with others.

The insight that the ongoing artefactualisation of thought and action, expressed as the "second nature," is based on abstraction from the material and natural, leads to the necessity of posing the problem of the dialectical principle itself. Dialectics has been depicted as a schematic style of thinking, but a thorough reflection on dialectics as a process of simultaneous thinking and action, as opened up by Hegel's philosophy, reveals its non-linearity, which is especially relevant for a philosophical rethinking of technology. Referring to the arguments of Negerestani and Hui, we showed how dialectics, particularly when related to the concept of spirit (besides materiality), offers a basis for thinking about algorithmicity and artificial intelligence as consequences of the interaction between action and thought at work in technological development.

Our reconstruction of the progressive artefactualisation of thinking and practice using Hegel's philosophy is primarily a conceptual analysis, but it enables our understanding of concrete exemplifications of the processes involved. By revisiting the concept of dialectics, we attempted to uncover the principle of technical thought and action and to connect this form of reflection on technology with current challenges, such as the conceptualisation of media or artificial intelligence. In our view, a dialectical understanding of technology not only amounts to a philosophical reflection on technology as such but also entails a philosophical reflection on philosophy of technology itself. The dialectical interconnection of theory and practice in the field of technoscience, allows us to observe relationships between general concepts and concrete exemplifications that enable us to regard philosophical thinking as a theory that must reflect on its own foundations, notably in the sense that technology provides a real basis for thinking as a practice.

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# **When Philosophy Becomes Cybernetics and Cybernetics Becomes Philosophy: Luhmann's Systems Theory as the Foundation for Twenty-first Century Cybernetics**

**Pedro Cárcamo-Petridis**

## **Abstract**

This article examines the intersection of philosophy and cybernetics, proposing Niklas Luhmann's systems theory as a crucial foundation for renewed cybernetics in the twenty-first century. By revisiting Norbert Wiener's foundational insights and reinterpreting key cybernetic principles, it explores how Luhmann's second-order observation and the concept of meaning challenge the traditional distinctions between human consciousness and technology. The paper argues that Luhmann's approach not only addresses concerns of dehumanization in a technologically advanced society but also offers a dynamic framework for rethinking human self-perception and social organization without denying its cybernetic foundations. This exploration highlights the potential of systems theory to redefine the philosophical significance of cybernetics, providing tools for understanding the evolving interactions among humans, machines, and society in modernity.

**Keywords:** Cybernetics, Philosophy, Niklas Luhmann, Systems Theory, Norbert Wiener.

## 1. Introduction: Ideas about the Relationship between Philosophy and Cybernetics.

Interest in cybernetics from the perspective of the humanities, philosophy, and social sciences has been growing in recent years. An example is Yuk Hui's proposal for cybernetics for the twenty-first century,<sup>1</sup> which involves multiple authors with a common position. Namely, the idea that the epistemic reconstruction of cybernetics is both possible and necessary. This reconstruction would unveil the heuristic potential of a discipline that, despite having lost relevance, continues to be vital for addressing the problems, transformations, and new circumstances of a technologically constituted society—<sup>2</sup> particularly for today, as naivety in the face of developments and the growing autonomisation of technology seems to predominate.<sup>3</sup> The aforementioned naivety also illustrates that Langdon Winner's cautionary advice remains pertinent, and instead of accepting the advancement of technology as an inevitable fact and superficially assessing its social consequences, we must come to terms with our new conditions of existence and use the available tools, especially those from sciences and cybernetics, to think about the social sciences, politics, and philosophy of the future.<sup>4</sup>

Given the context of the twenty-first century and the need to think within the margins of a technified world that did not exist, at least to the same extent, in the 1950s or the 1960s, during the rise of cybernetics, it is also worth asking about the relationship that can exist between cybernetics and philosophy. And about which of cybernetics scientific ideas can be valuable for thinking about the present and the future of social organisation and human understanding. It is worth noting that an examination of the interconnection between these two forms of thought has a lengthy historical precedent.<sup>5</sup>

According to Norbert Wiener, the essential object of cybernetics is the problem of control in general,<sup>6</sup> which necessarily implies that cybernetics, since its birth, had to deal with

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1 Yuk Hui, "Why Cybernetics Now?" in *Cybernetics for the 21<sup>st</sup> Century, Vol. 1: Epistemological Reconstruction*, ed. Yuk Hui (Kwai Chung: Hanart Press, 2004), 11.

2 Katherin Hayles, "Detoxifying Cybernetics: From Homeostasis to Autopoiesis and Beyond," in *Cybernetics for the 21<sup>st</sup> Century, Vol. 1: Epistemological Reconstruction*, ed. Yuk Hui (Kwai Chung: Hanart Press, 2004), 85.

3 Hui, "Why Cybernetics Now," 16.

4 Langdon Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*. (Cambridge, MA.: The MIT Press, 1978.), 4.

5 Frederick J. Crosson, "Teoría de la Información y Fenomenología," en *Filosofía y Cibernética*, ed. Frederick J. Crosson y Kenneth M. Sayre, trans. Adolfo de Alba (México, D.F.: Fondo de Cultura Económica, 1971). See also Thomas Marlowe & Joseph Laracy, "Philosophy and Cybernetics: Questions and Issues," *Systemics, Cybernetics and Informatics* 19, no. 4, (2021).

6 Norbert Wiener, *The Human Use of Human Beings* (Boston: Da Capo Press, 1954), 17.

philosophical assumptions from which it cannot detach.<sup>7</sup> This means, on the other hand, that the cybernetic aspiration to construct a system capable of containing and grounding the totality of the sciences<sup>8</sup> inevitably places the discipline on a level analogous to that of philosophy, while raising the question of whether cybernetics and philosophy can coexist—or whether it makes sense for them to do so. As Wilfred Sellars observed, it is not possible to extract a scientifically grounded view of the human being and claim that it is valid in any epistemic context.<sup>9</sup>

It was Martin Heidegger who denounced most decisively the possibility of seeing philosophy reduced to irrelevance and replaced by cybernetics because of the development of modern technology. Towards the end of his intellectual life, in a work entitled *The End of Philosophy and the Task of Thinking*, Heidegger pointed out that philosophy, understood as the intellectual activity of thinking in and about the world, about existence and about the being, had come to an end because philosophy was no longer capable of redirecting humanity towards a self-reflection on its condition. He adds that it is cybernetics, understood as the New Fundamental Science, which has come to take its place through a calculating and rationalising way of thinking.<sup>10</sup>

Here, Heidegger's critique is part of a broader denunciation of metaphysics, a tradition that, in his view, prioritizes the forgetting of being in favor of entities, or the world of things. This idea is further developed in *The Question Concerning Technology*, in which Heidegger argues that modern cybernetic thinking conceals the true meaning of the world. This concealment arises from the lack of an authentically human philosophical inquiry capable of addressing the limitations of a metaphysical tradition that treats the world as mere "reserve stock."<sup>11</sup> As a result, cybernetics is linked to general distrust in classical philosophy, particularly regarding the notion of replicating what it means to be human.<sup>12</sup>

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7 Archie J. Bahm, "Cybernetics as a Systems Philosophy," in *Current Topics in Cybernetics and Systems*, ed. Jacob Rose (Heidelberg: Springer-Verlag, 1978), 305.

8 Ernst von Glasersfelds, *Radical Constructivism: A Way of Knowing* (London & Washington: The Falmer Press, 1995), 146. See also Norbert Wiener, *Cybernetics, or Control and Communication of the Animal and The Machine*. (Cambridge, MA.: The MIT Press, 1973), 50.

9 Wilfred Sellars, *Science, Perception and Reality*, (Atascadero: Ridgeview Publishing Company, 1963), 25.

10 Martin Heidegger, *On Time and Being*, trans. John Stambaugh (New York: Harper Torchbook, 1972), 55–60. See also Martin Heidegger, *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Garland Publishing INC., 1977), 14.

11 Jean-Pierre Dupuy, "Cybernetics Is an Antihumanism. Technoscience and the Rebellion Against the Human Condition," in *French Philosophy of Technology: Classical Readings and Contemporary Approaches*, ed. Sacha Loeve, Xavier Guchet, Bernadette Bensaude (Cham: Springer, 2018), 141–144.

12 Carl Mitcham, "Three Ways of Being-with Technology," in *From Artifact to Habitat: Studies in the Critical Engagement of Technology*, ed. Gayle Ormiston (Bethlehem: Lehigh University Press, 1990), 33.

From this perspective, the coexistence of philosophy and cybernetics suggests total incompatibility. While philosophy acts as a defender of the spiritual nature of human beings, their consciousness, and their surrounding world, cybernetics exists as a tangible testimony of a material reality in which objects rule. Thus, while philosophy deals with the world of meaning, cybernetics is unable to say anything about human beings.<sup>13</sup> Between cybernetics and philosophy, there would be a gap of separation marked by the opposition between the phenomenon of complexity and that of subjectivity.<sup>14</sup>

But is this really the case? Is there a necessity for such a clear-cut distinction between philosophy and cybernetics? Undoubtedly, our ideas and ways of thinking are anchored in the technical devices we use to think.<sup>15</sup> Moreover, our culture exists, survives, and organises itself in large part thanks to the communication platforms through which it is disseminated.<sup>16</sup> In a certain way, as Niklas Luhmann suggest along his work, society is the capacity of society itself to reach beyond the present with communication through technological changes.<sup>17</sup> This means that, on the one hand, albeit problematic, there is an enormous proximity between the domain of the technical-cybernetic and the philosophical. And on the other, that the study of the human is incomplete if it does not include the study of the way in which human life organises in relation to other systems,<sup>18</sup> including technological ones.<sup>19</sup>

The purpose of this paper is to delve into the interrelationship between philosophy and cybernetics in order to examine the apparent paradox of the coexistence of both disciplines. Simultaneously, it seeks to introduce Niklas Luhmann's theoretical proposal to reinterpret the contributions of cybernetics in the framework of contemporary society. To this end, the first part of this work will seek the foundations of Norbert Wiener's cybernetics to identify its philosophical motives and tensions. It also highlights the way in which these ideas contrast with some of the fundamental postulates of modern philosophy and science by Kant and Newton. This section concludes with a discussion

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13 Edmund Husserl, *The Crisis of European Sciences and Transcendental Phenomenology*, trans. David Carr. (Evanston: Northwestern University Press, 1970), §6.

14 Niklas Luhmann, *Complejidad y Modernidad: De la Unidad a la Diferencia*, trans. Josetxo Beriain y José María García Blanco. (Madrid: Trotta, 1998), 16.

15 Mark Coeckelbergh, *New Romantic Cyborgs* (Cambridge, MA.: The MIT Press, 2017), 99.

16 Elena Esposito, "Social Forgetting: A Systems-Theory Approach," in *Cultural Memory Studies: An Interdisciplinary and International Handbook*, ed. Astrid Erll & Ansgar Nünning. (Berlin/New York: de Gruyter, 2008).

17 Niklas Luhmann, *La Sociedad de la Sociedad*, trans. Javier Torres Nafarrete and Darío Rodríguez Mansilla. (México: Herder-Universidad Iberoamericana, 2007), 289.

18 Humberto Maturana and Francisco Varela, *De Máquinas y Seres Vivos*, (Santiago: Editorial Universitaria, 1972), 17.

19 Carl Mitcham, *Thinking Through Technology* (Chicago: Chicago University Press, 1994), 39.

of the possible consequences of cybernetics and the normative helplessness that follows from the hollowing of philosophy.

In the second part of this paper, I seek to explore an alternative way of understanding the human condition and sociability initiated by the same cybernetic tradition, the culmination of which is the work of Niklas Luhmann and his reappropriation of the concept of meaning within a social theory of complexity born in both opposition and observance to Husserl's phenomenology. The central argument of this section is that cybernetics not only poses a risk of dehumanisation but also the potential to offer a form of interrogation of the human self, its relation to history, and the impact of technology in the self-elaboration of modern society's modes of organization, which can serve as a foundation for the project of cybernetics for the twenty-first century, claimed by Yuk Hui as the basis for a future philosophy. It should be noted that although some explanations of Luhmann's thought are offered, the focus of the presentation is on his interpretation. This article dispenses a detailed treatment of his central concepts, which are sufficiently addressed in works in both English and Spanish, not to mention German.

## **2. On the Philosophical Motive of Cybernetics and the Problem of the Naturalisation of the Mind**

When referring to the birth of cybernetics, Wiener<sup>20</sup> mentions two events that would turn out to be fundamental for the discipline, since they would lay the foundations of its conception of the world. These are historical and scientific events. The first was the end of a period of relative peace and stability sustained by the great empires, which until then had been able to guarantee order and security. The second was the discovery of the probabilistic nature of known physical phenomena. This was an achievement of several scientists, among whom Wiener highlighted the work of Josiah Willard Gibbs. However, they go back to other scientists such as Boltzmann, Maxwell, or Pierce.<sup>21</sup>

Now, the relevance of both events apparently unconnected is that they would constitute proof—one historical and the other scientific—that the real world is contingent. That is, any given state of organisation, far from obeying a series of temporal constants given by the structure of a reality available for discovery, as it had been until Newton,<sup>22</sup> is in fact the result of an improbable combination of interlocking phenomena. This means that the universe we came to know, from the organisation of large physical systems to the internal

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20 Wiener, *The Human Use of Human Beings*, 7–8.

21 P.R. Masani, "Norbert Wiener's Place in the History of Science and Philosophy." *Current Science* 67, no. 12 (1994).

22 Wiener, *The Human Use of Human Beings*, 7.

logic of the living, would have to be interpreted as part of an essentially variable universe within a series of similar—though different—equally possible worlds. Otherwise, Wiener argues that there would be no room for contingency, variation, or organisation. Every event would already be determined from its beginning.<sup>23</sup>

The fundamental concept that Wiener rescues from Gibbs's work in the field of thermodynamics is that of entropy, precisely because it allows him to affirm the progressive degradation of everything that exists in nature. Indeed, entropy refers to the tendency to disorganisation of everything organized.<sup>24</sup> This means that the identity of any system can no longer be understood as a constant given by an original design,<sup>25</sup> but as a fleeting state that tends to dissolve between equivalence and similarity with other similar systems. This ultimately implies that any order is much less likely than disorder and that the fundamental question that remains to be asked is how any form of organisation is possible, including the organisation of human life and social order.

Starting from this is not difficult to see how Wiener's and cybernetics' understanding of reality differs from the view held by both Newtonian physics and Kant's philosophy. In *The Critique of Pure Reason*, Kant explicitly states the need for a metaphysical science that can serve as a foundation for all forms of sociability and understanding.<sup>26</sup> As he himself explained, his philosophical enterprise sought in nature what reason itself puts into it. The idea behind this is that between reason and reality, there would be the possibility of a correspondence that could be known, the existence of which could also serve to guide humanity towards the realisation of what he would later describe as humanity's infinite practical mission. That is, an ethical way of life in which happiness and moral duty could coincide.<sup>27</sup> All of which seems quite close to Newton's idea that everything that exists, including human society, does so according to the laws of a previously organised or structured world that can be known, insofar as its rational foundations are known too.<sup>28</sup> Ultimately, this supposes the existence of an inner purposiveness of nature in Kant's terms.<sup>29</sup> That is, a normative orientation of nature itself.

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23 Norbert Wiener, *I Am a Mathematician* (Cambridge, MA.: The MIT Press, 1964), 322–323.

24 Wiener, *The Human Use of Human Beings*, 8–11.

25 Masani, "Norbert Wiener's Place in the History of Science and Philosophy," 921.

26 Immanuel Kant, *Critique of Pure Reason*, trans. Paul Guyer and Allen W. Wood. (Cambridge: Cambridge University Press, 1998), 99–105.

27 Immanuel Kant, *Critique of Practical Reason*, trans. Werner S. Pluhar (Cambridge, MA.: Hackett Publishing Company Inc., 2002), 97.

28 Wiener, *The Human Use of Human Beings*, 7.

29 Immanuel Kant, *Critique of Judgement*, trans. Paul Guyer y Erich H. Goebel. (Oxford: Oxford University Press, 2007), 209.

By contrast, Wiener observes that the world must be understood as part of a deficient reality that lacks foundations and normativity. As he points out: “In control and communication we are always fighting nature’s tendency to degrade the organised and to destroy the meaningful...”<sup>30</sup> This means that what seems secure and stable is subject to degradation. Furthermore, every mode of organisation is the result of operations whose foundation can only be that of the organisation itself. In other words, there is no evidence of the existence of an a priori structure capable of serving as a support or guarantee of the reality of what is real. A crucial point on which Wiener differs not only from Kant but also from Newton is that by rejecting the existence of an aprioristic rational structure, any attempt to base the will and its temporality on the spiritual nature of the subject is rejected in general.<sup>31</sup>

In fact, Wiener went so far as to affirm that life could not be understood in any other way than as a highly improbable accident that is therefore devoid of meaning, marked only by the instants that are realised: “...life is an island here and now in a dying world.”<sup>32</sup> Life, from a cybernetic point of view, is nothing more than a particular mode of organisation, that is, a process of complex self-eco-organisation,<sup>33</sup> as it only emerges from the improbable interweaving of a series of variables of diverse nature that concur with each other to make an organised organism whose only task is to give itself an origin and a meaning.<sup>34</sup> Order, organization, and life are, therefore, the products of a self-produced *creatio-continua* consisting of originating a relative and provisional regularity from the order that is diluted in the past and the disorder, or uncertainty, towards which, at all times, the future is moving.

This same point is perhaps most clearly illustrated by Gregory Bateson regarding the metaphor of the map and territory and the problem of knowledge. The map is not the territory, and the name is not the thing named.<sup>35</sup> This is the enigmatic phrase with which Gregory Bateson sums up his view of the relationship between reality and information. What he seeks to express is that we can only consider reality hypothetically—that is, through models, names, and representations—which are simultaneously imperfect and true because they are responsible for the fact that we can speak of a reality. In other words, everything that exists in cognitive terms is that which contains some kind of organisation, which in turn is always the result of the act of an observer. In other words, for Heinz Von Foerster, language is not an image of reality, but reality is an image that depends on

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30 Wiener, *The Human Use of Human Beings*, 17.

31 Masani, “Norbert Wiener’s Place in the History of Science and Philosophy,” 920.

32 Wiener, *The Human use of Human Beings*, 95.

33 Edgard Morin, *Introduction à la Pensée Complexe* (Paris: Points, 2014), 116.

34 Heinz von Foerster, *The Beginning of Heaven and Earth Has No Name: Seven Days with Second-order Cybernetics* (New York: Fordham University Press, 2014), 2.

35 Gregory Bateson, *Mind and Nature: A Necessary Unity* (New York: E.P. Dutton, 1979), 30.

language. Language allows us to see to the same extent that it hides things from us. No one can see what they do not see.<sup>36</sup>

The implications of this shift in cybernetics extend to the fields of epistemology, ontology, and ethics and are particularly evident in the displacement of subjectivity and its relation to the surrounding world. As Luhmann would explain later, without the transcendental component of the subject, the individual is no longer the one who controls or uses the world at their disposal, as the very idea of an external world dilutes from the point of view of the observer and the *de-ontologization of reality*, which ultimately means that knowledge can only know itself and the distinction between subject and object becomes irrelevant.<sup>37</sup> Henceforth, after the cybernetic shift, as N. Katherine Hayles argues, the individual can only perceive itself as a product or reflection of complex information processes that precede and shape them.<sup>38</sup>

From Wiener's perspective, this shift was achieved through the adoption of the idea of feedback, which describes the process through which animals, humans, and machines relate to the world and learn because of their interactions with the environment. His idea here was that things that belong to the human realm could not be detached from natural and physical processes. Rather, cybernetics should be able to describe the processes and mechanisms through which human development occurs. However, the price to pay was the abandonment of the enlightenment overestimation of the human spirit, which Wiener considered naïve and immature,<sup>39</sup> in favour of a conception of the living sufficiently abstract to unite all kinds of creatures, organic or artificial. As Wiener states: "...the physical functioning of the living individual and the operation of some of the newer communication machines are precisely parallel in their analogous attempts to control entropy through feedback."<sup>40</sup>

Consequently, from Wiener's position, there follows the displacement of the idea of intention and will, which were central to the humanities and philosophy of the first half of the twentieth century, in favour of the complex relationship between chance and necessity. Which means, that the human brain operates in a manner akin to a machine,

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36 Heinz von Foerster, "Visión y Conocimiento: Disfunciones de Segundo Orden," in *Nuevos Paradigmas, Cultura y Subjetividad*, ed. Dora Fried Schnitman, trans. Javier Rodríguez. (Barcelona: Paidós, 1994), 100.

37 Niklas Luhmann. "The Cognitive Program of Constructivism and a Reality that Remains Unknown," in *Selforganization, Sociology of the Sciences*, vol. 14, ed. Wolfgang Krohn, Günter Küppers and Helga Nowotny. Dordrecht: Springer, 1990), 64–67.

38 N. Katherine Hayles, *How We Became Posthumans: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 4.

39 Masani, "Norbert Wiener's Place in the History of Science and Philosophy," 925–927.

40 Wiener, *The Human Use of Human Beings*, 26.

with its actions dictated by prior experiences and inclined towards adapting to the unpredictable nature of an ever-evolving environment. This ultimately implies that it is no longer possible to conceive of human history as an incremental process of improvement and progress in which the natural and social take on the form of ethicity, as it had been for the enlightened modern project.<sup>41</sup> Within a cybernetic modern world, the very idea of humanity no longer possesses differentiating factors from animals or machines, and consciousness can no longer be conceived of as the guiding force of a will capable of guiding itself—in Kant’s enlightenment terminology—free of any determination.

Nevertheless, how does this relate to the issue of the relationship between philosophy and cybernetics? Once the close connection between machines and human beings has been established the distinction between them has to be understood as merely a matter of the varying degrees of complexity in the organisation of information that makes them possible. Which ultimately means that the way is paved for the naturalisation of the mind. I.e., the reformulation of the fundamental concepts associated with consciousness within the framework of the mind as a physiological phenomenon.<sup>42</sup> This is fundamental because the phenomenon of life can now be understood as part of a computational project of increasing the information-processing capacity analogous to that of evolution. As John von Neumann pointed out, the functioning of the nervous system is essentially a digital function in that it establishes the rules that govern the responses of neurons that react to stimuli that, without internal rules for discrimination, would be incapable of reacting in a way other than pure randomness.<sup>43</sup>

On the other hand, this implies that the game of the organisation of the brain and the organism—living or inert—is the game of information management or control and, as Hayles observed: “If the name of the game is processing information, it is only a matter of time until intelligent machines replace us as our evolutionary heirs. Whether we decide to fight them or join them by becoming computers ourselves, the days of the human race are numbered.”<sup>44</sup> Behind the cybernetic view of humans, there is thus, as Heidegger feared, the risk of a total displacement of the human in favour of the technical, understood as the measure of all that exists.

Indeed, as Jean Pierre Dupuy argues, the central focus of cognitive sciences, heirs of cybernetics, has never been to solve the enigmas of the human mind or to decipher its specificities: “The aim of cognitive science always was—and still is today—the

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41 Peter Wagner, *Progress: A Reconstruction* (Cambridge: Polity Press, 2016), 1.

42 Dupuy, “Cybernetics Is an Antihumanism,” 144.

43 John von Neumann, *El Ordenador y el Cerebro*, trans. Josep Borrell and Carolina Mayeur. (Barcelona: Antoni Bosch Editor, 2023), 73.

44 Hayles, *How We Became Posthumans*, 243.

mechanization of the mind, not the humanization of the machine."<sup>45</sup> The normative orientation of movements such as transhumanism, the quest for immortality, or general intelligence seems to follow the same direction towards the reduction of the human to the most absolute simplicity<sup>46</sup> and lack of depth.<sup>47</sup> Which highlights that underlying the cybernetics-inspired technical development agenda is the idea that the mind can be treated as a manipulable and modifiable artifact, whose intervention would lead to human enhancement by artificial means.

However, the problem with this is that this goal, driven by the modern desire for knowledge and technical mastery, also implies an almost certainty of the annihilation of everything that surrounds humanity, meaning it strips it of everything that separates it from mere things.<sup>48</sup> Including every aspect of human experience of the world that refers to the familiar or surrounding world—i.e., the culture—and that constitutes and gives meaning to the fact of being in it. As Sloterdijk observes, with his irrepressible hunger for discovery, the human being has opened up an abyss before everything that links him to others.<sup>49</sup> That is to say, they destroyed the whole tradition and all the foundations on which the meaning of human life was held together, including what constitutes the normal, the familiar, and the paths of enquiry into the meaning of existence. In conclusion, this means that cybernetic success in describing the organised and reproducing the human mind must at the same time mean its end.

### **3. Niklas Luhmann's Cybernetics as a Defense against the All-too-familiarity of the World.**

The attitude of continental philosophy towards cybernetics has been one of criticism mixed with a certain amount of indifference and disinterest. Despite some rather concrete attempts made to incorporate some cybernetic assumptions in philosophy, what Catherine Malabou describes as an intransigent attitude of resistance to the mechanisation and biologisation of the mind has generally predominated.<sup>50</sup> That is, a reaction against technoscientific research on the mind, under the assumption that cybernetic description

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45 Dupuy, "Cybernetics is an Antihumanism," 141.

46 Mark Coeckelbergh, *AI Ethics* (Cambridge, MA.: The MIT Press, 2020), 11.

47 Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology* (New York: The Viking Press, 2005), 9.

48 Dupuy, "Cybernetics is an Antihumanism," 154–155.

49 Peter Sloterdijk, *In the World Interior of Capital*, trans. Wieland Hoban. (Cambridge: Polity Press, 2013), 29.

50 Catherine Malabou, *Morphing Intelligence: From IQ Measurements to Artificial Brains* (New York: Columbia University Press, 2019), 9.

would be a genetic and deterministic description that is not capable of describing the complexity of human intellectual and cultural phenomena or the meaning of moral values. This can be seen in the work of Heidegger, as previously stated. But it is also the case of Ellul, who points out: “Every intervention of technique is, in effect, a reduction of facts, forces, phenomena, means, and instruments to the schema of logic.”<sup>51</sup>

As seen in the previous section, this critical attitude is correct in identifying one of the fundamental ideological and normative tendencies of cybernetic scientific thinking. However, its attitude toward abstinence, distance, and indifference poses at least one fundamental problem. It is no longer possible to say *no* to technology.<sup>52</sup> As Luhmann explains, the modern world is put into operation through technology;<sup>53</sup> technology is a fundamental part of today’s world and the possibilities it offers.<sup>54</sup> And that’s something that Wiener clearly stated too, while referring to the practical consequences of cybernetics and modern sciences: “We have contributed to the initiation of a new science which, as I have said, embraces technical developments for good and evil.”<sup>55</sup> What, on the other hand, means that the main philosophical question of contemporary technological society can be none other than, simultaneously, the central question of any attempt of cybernetics for the Twenty-first Century: How is organisation possible in a world that, now technified, opposes it with its entropic tendency? Otherwise, no philosophical inquiry could be completed.

An author who, within cybernetics, offers a way to think critically about the problems of organisation in a technified world, without having to deny the discoveries or advances of the discipline itself nor succumbing to the complete mechanisation of mind and meaning, is the aforementioned sociologist, Niklas Luhmann. An author little read both within the cybernetic tradition and in philosophy who, however, turns out to be both an important representative of second-order cybernetics<sup>56</sup> and a keen reader of continental philosophy in general and of phenomenology in particular.

The particularity of Luhmann’s sociological work is that, in his understanding of modern

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51 Jacques Ellul, *The Technological Society*, trans. John Wilkinson. (New York: Vintage Books, 1964), 79.

52 Peter Sloterdijk, *Not Saved: Essays After Heidegger*, trans. Ian Alexander Moore and Christopher Turner. (Cambridge: Polity Press, 2017), X-XIV.

53 Luhmann, *La Sociedad de la Sociedad*, 289.

54 Sloterdijk, *Not Saved*, 175. See also Winner, *Autonomous Technology*, 100ss.

55 Wiener, *Cybernetics*, 28.

56 Heinz von Foerster, “An Niklas Luhmann,” in *Gibt es eigentlich den Berliner Zoo noch? Erinnerungen an Niklas Luhmann*, ed. Theodor Bardmann & Dirk Baecker (Munich: UVK Verlagsgesellschaft, 1999), 13–15. See also Michael Paetau, “Niklas Luhmann and Cybernetics,” *Journal of Sociocybernetics* 11, (2013).

society, he incorporates the idea of complexity and improbability to describe society and its organization in a way that could not yet be conceived either by sociology or philosophy, let alone by Wiener's cybernetics. Certainly, Luhmann recovers from Wiener the basic assumption that from the point of view of the modern being, it is no longer possible to conceive of the world that supports human life as fixed in inert institutions embedded in time, but as highly dynamic systems that manage to survive because of their mode of organisation.<sup>57</sup> However, instead of assuming entropy and self-reproduction of systems as constants of nature capable of affecting individuals' homeostatic capacities, Luhmann seeks to construct a general theory of autopoiesis to extend entropy and self-reproduction to the phenomena of consciousness and communication, but no longer as contextual conditionings previously underestimated, but as structural and existential conditions of all becoming.<sup>58</sup>

This attempt to extend the postulates of cybernetics into the domain of the psychic and the social stems from an effort to de-ontologise reality and the individual in favour of the positioning of the observer in relation to the environment. According to this, the world can only be conceived of as an apparent world lacking an ontological right of its own.<sup>59</sup> Luhmann's argument for this is that the reality of everything real must be understood as part of a structure that remains latent and can only be accessed through an effort of observation and distinction, insofar as the limits of cognition suggest that all knowledge is nothing more than knowledge of knowledge.<sup>60</sup> In other words, knowledge, and in particular the language with which it is constructed, never goes beyond the pointing out of a conceivable possibility of the distinction between identity and the difference of the observed, while reality itself remains a real illusion.<sup>61</sup> Between latent reality and the observer, the only thing available is the language in which reality is observed.<sup>62</sup> Meaning, on the other hand, that systems exist insofar as they can produce themselves through differentiation from the environment.

From a theoretical point of view, this means that the organisation of the collective and the common could only emerge as part of a process of self-construction that exists to the same extent that it is degraded. This is because reality has lost its points of support and

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57 Stafford Beer, *Designing Freedom* (New York: Wiley, 1995), 2.

58 Luhmann, *La Sociedad de la Sociedad*, 56.

59 Niklas Luhmann, *Ilustración Sociológica y Otros Ensayos*, trans. Héctor A. Murena. (Buenos Aires: Editorial Sur, 1973), 100.

60 Luhmann, "The Cognitive Program of Constructivism and a Reality that Remains Unknown," 65.

61 Niklas Luhmann "Why does Society Describe itself as Postmodern." in *Observing Complexity: Systems Theory and Postmodernity*, ed. William Rasch and Cary Wolfe (Minneapolis: Minnesota University Press, 2000), 36-37.

62 Humberto Maturana and Francisco Varela, *El Árbol del Conocimiento: Las Bases Biológicas del Entendimiento Humano* (Santiago: Editorial Universitaria, 1984), 137.

certainty. According to Luhmann, these are now replaced by the free play of the observation of observers and the variations that the diversity of points of view produce on attempts to understand the meaning of communication.<sup>63</sup> Luhmann illustrates and explains this through the double contingency theorem. Double contingency, says Luhmann, describes a double dependence or complementarity of expectations.<sup>64</sup> That is to say, the correlative nature of expectations that confront each other and have in common the ignorance of the intentions and desires of the other.

In this sense, double contingency deals with the description of an initial face-to-face situation between strangers who, by necessity of circumstances, need to reach a consensus to develop their actions and pursue their ends. So essentially the concept describes a normative deficit,<sup>65</sup> according to which, without some kind of coercion, society is confronted with an unsolvable problem, as there are no guarantees for the development of collectively oriented action. However, Luhmann's solution to this, which distances him from Talcott Parsons, who originally used the concept to foster the need for the generalisation of values and culture,<sup>66</sup> is to stop placing so much importance on consensus and instead note that it is in fact the negation of consensus, motivated by difference, that allows for change and the evolution of the meaning of communication, since any negation of it is also, and in turn, poiesis.<sup>67</sup> This means, in Luhmann's words, that the double contingency "makes possible the evolution of specifically social orders—even if evolution, again, means only the construction and destruction of structured orders at the emergent levels of reality."<sup>68</sup>

The significance of this is that Luhmann's identification of the evolutionary self-construction of meaning within systems through the tendency towards its construction and destruction is that it manages to incorporate contingency, complexity and entropy within social and psychic systems in a way that no longer requires the individual to be hypostatised through a metaphysical foundation that sustains it in opposition to the disruptions or degradations of the natural environment. Nor of diluting the subject among external determinants. On the contrary, it attempts to ground the groundlessness of the individual and society in the temporality of systems, in the constraint towards the

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63 Niklas Luhmann, "What is Communication?" *Communication Theory* 2, no. 3 (1992).

64 Niklas Luhmann, *Sistemas Sociales. Lineamientos para una Teoría General*, trans. Silvia Pappe and Brunhilde Erker. (Barcelona: Anthropos, 1998), 115.

65 Pedro Cárcamo-Petridis, "La Cultura Como Autodescripción De La Sociedad Funcionalmente Diferenciada". *Revista del Magister de Análisis Sistemico Aplicado a la Sociedad*, 48 (2023).

66 Talcott Parsons, *Toward a General Theory of Action* (Cambridge, MA: Harvard University Press. 1951), 15.

67 Luhmann, *Sistemas Sociales*, 118.

68 Luhmann, *Sistemas Sociales*, 127.

selectivity of meaning by the impossibility of abandoning the world,<sup>69</sup> and in the double contingency and its consequent capacity to create out of destruction. Which means, finally, that it is through communication, but mainly through the negation of its meaning, that the social as well as the psychic world constructs itself as such.

Therefore, according to Luhmann, the problem of organisation is no longer a homeostatic problem, as it would be for Wiener, but a problem of differentiation. And in this, the denial, i.e. the ability to say no, always takes precedence because there is always more information and differentiation in what is alien than in what is familiar. It is the strangeness of rejection and denial that mobilises the continuity of communication and therefore, if an explanation for the organisation is sought, it cannot lie in the mere assumption of a humanistic tendency towards consensus and friendship.<sup>70</sup>

Due to this idea of double contingency and his prioritisation of difference, Luhmann radically separates himself from the philosophical tradition that preceded him.<sup>71</sup> This is also how Sloterdijk puts it. After Luhmann indicates a break with the past, which is not only historical but is characterised by the *de-satanisation* of the problem of the lack of ontological references anchored in familiarity.<sup>72</sup> And for this reason in Luhmann's view, society and the world can no longer be conceived of as given, in the sense that their organisation must necessarily be seen as improbable and problematic.<sup>73</sup> Contrary to the position of Husserl, for whom the world is conceived from the familiarity of the subject with respect to his surrounding world and the other selves around him,<sup>74</sup> for Luhmann it is not enough to imagine a certain correspondence between subjects, neither normative nor ontological, for the emergence of an intersubjective bond capable of guaranteeing coexistence and normativity.<sup>75</sup> On the contrary, sociability is conceived as a contingent and normatively deficient mode of organisation that is characterised by its variation. This is, in other words, by its constant disengagement with the past tradition.<sup>76</sup>

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69 Luhmann, *Complejidad y Modernidad*, 29.

70 Sloterdijk, *Not Saved*, 193.

71 Lionel Lewkow, *Luhmann, interprete de Husserl: El observador observado* (Buenos Aires: Miño y Dávila, 2017), 45. See also Hans-Georg Moeller, *The Radical Luhmann* (New York: Columbia University Press, 2012), 25–27.

72 Sloterdijk, *Not Saved*, 50; 65.

73 Niklas Luhmann, "Globalization or World Society: How to Conceive of Modern Society?" *International Review of Sociology* 7, (1997).

74 Edmund Husserl, *Cartesian Meditations: Introduction to Phenomenology*, trans. Dorion Cairns (Dordrecht, Springer, 1977), 110.

75 Anthony Steinbock, *Home and Beyond. Generative Phenomenology After Husserl* (Evanston, Northwestern University Press, 1995), 173. See also Axel Paul, "Organizing Husserl: On the Phenomenological Foundations of Luhmann's Systems Theory". *Journal of Classical Sociology* 1 no. 3.

76 Luhmann, *Complejidad y Modernidad*, 30.

To defend this idea, Luhmann proposes a shift from the assumptions of what he himself calls the philosophy of consciousness—referring mainly to Husserl—towards the aforementioned paradigm of communication and the system/environment differentiation.<sup>77</sup> And with this, he tries to recover Husserl's concept of meaning but with a significant difference, which is the refusal to seek its foundation in something like a lifeworld.<sup>78</sup> This is because Luhmann's aim is to develop an understanding of meaning that can account for itself as meaning produced in a concrete scenario. Namely, a concept that could submit everything that previously had been taken for granted to an effort of clarification, which also includes the category of meaning itself or the normality of the world on which the sense of the commonplace is based. And this means that now, stripped of the lifeworld, meaning can only exist as a temporalised reference to itself. i. e. as the very demarcation of a contingent limit that is self-realised based on communications whose only fundamental characteristic is that they make sense because they can refer to themselves. That is to say, to what communications themselves have managed to establish as the normal and the constant—or the familiar<sup>79</sup>—as opposed to the unselected possibilities of all communication.<sup>80</sup>

In short, after Luhmann, it is communication that defines and makes coexistence and organisation possible. It is not intention or will, nor is it the common past that drives the association. Not anymore, at least, in a differentiated society.<sup>81</sup> On the contrary, communication and the technical means it uses to overcome the barriers of its context are responsible, according to Luhmann, both for the symbolic or normative construction of meaning and for the underlying possibility of uprooting from history: "...the evolution [narrative of meaning] is at the same time a link to history and liberation from history. It connects with existing conquests, but at the same time makes the system independent of its genetic conditions."<sup>82</sup> This implies that society must be understood as a self-substituting order that depends on its capacity to forget and therefore to de-mystify or even de-theologise itself.<sup>83</sup>

Now, what is relevant to the problem here is that with this approach, Luhmann manages to distance himself from the idea that the existence of society is conditional on a certain structure, which in turn depends on a subjective substratum. In fact, this is the core of his

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77 Luhmann, *La Sociedad de la Sociedad*, 27. See also Paetau, *Niklas Luhmann and Cybernetics*, 87.

78 Lewkow, *Luhmann, Intérprete de Husserl*, 252.

79 Niklas Luhmann, "Familiarity, Confidence and Trust: Problems and Alternatives," in *Trust: Making and Breaking Cooperative Relations*, ed. Diego Gambetta (Oxford: Blackwell, 1988), 95.

80 Luhmann, *La Sociedad de la Sociedad*, 31.

81 Cárcamo-Petridis, "La Cultura Como autodescripción De La Sociedad Funcionalmente Diferenciada", 67.

82 Luhmann, *La Sociedad de la Sociedad*, 201.

83 Dirk Baecker, "Why Systems?", *Theory, Culture & Society* 18, no.1 (2001).

estrangement from Husserl's phenomenology.<sup>84</sup> On the contrary, after detaching himself from the uncomfortable figure of the subject, now replaced by *blackboxes*<sup>85</sup> Luhmann seeks a direct approach to the contingency and self-reference of society. Contingency, after having the problem of the ontology of society displaced, now moves from being a condition of the environment to a defining feature of society and, by extension, the individual. This revalorises observation, and in particular second-order observation understood as observation of observers, as a means through which to investigate complexity and unravel the illusions with which it manages to concretise reality for the individual. A question which, finally, refers to the pretension originally formulated by Gotthard Günther, of finding in cybernetics the key to amend the overvaluation of the image of the human being, above his environment.<sup>86</sup>

To summarise, then, what Luhmann tries to achieve using the tools of second-order observation and cybernetics<sup>87</sup> is to highlight the way in which society self-constitutes reality, while at the same time emphasising its blind spots. That is, its historical specificity and the semantic load of its values, traditions, and ideas, which, on the other hand, reveal the importance Luhmann places on Nietzsche's work as an effort at self-liberation. In fact, Luhmann, in reference to Nietzsche, writes at the beginning of his most important final work—*Die Gesellschaft der Gesellschaft*—that the sense of his work is to reconstruct the relationship with history, in the sense of approaching it from new points of view that might allow to highlight its incongruities, contradictions and paradoxes.<sup>88</sup> This, in turn, would make it possible to find and elaborate new ways of understanding the world, the human being and society's relationship to it. Ultimately, Luhmann seems interested in taking up Nietzsche's impulse, to not to accept ideas whose normativity is simply to be accepted as unconditionally valid,<sup>89</sup> but to advocate instead, as Sloterdijk suggests,<sup>90</sup> for a praise for the not-self. That is, to the emergence of the strange and the novel in a world

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84 Niklas Luhmann, *Theories of Distinction: Redescribing The Descriptions of Modernity* (Stanford: Stanford University Press, 2001), 33.

85 Luhmann, *Sistemas Sociales*, 118. See also Ignacio Izuzquiza, *La Sociedad Sin Hombres: Niklas Luhmann o La Teoría Como Escándalo* (Barcelona: Anthropos, 2008), 23.

86 Gotthard Günther, *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 3 (Hamburg: Félix Meiner Verlag, 1976), 224.

87 Heinz von Foerster, *Understanding Understanding* (New York: Springer, 2003), 242–244.

88 Luhmann, *La Sociedad de la Sociedad*, 20. See also Dirk Baecker, "Gypsy Reason: Niklas Luhmann's Sociological Enlightenment," *Cybernetics & Human Knowing*, 6, no. 3 (1999).

89 Todd Cesaratto, "Luhmann, all too Luhmann: Nietzsche, Luhmann and the human," in *Luhmann Observed: Radical Theoretical Encounters*, ed. Anders La Cour and Andreas Philippopoulos-Mihalopoulos (London: Palgrave Macmillan, 2013), 108–110. See also Werner Stegmaier, *Orientierung im Nihilismus: Luhmann meets Nietzsche* (Berlin: De Gruyter, 2016), 60.

90 Peter Sloterdijk, *Sobre La Mejora De La Buena Nueva. El Quinto «Evangelio» Según Nietzsche*, trans. Germán Cano. (Madrid: Siruela, 2005), 112–113.

overloaded with meaning. Or, as Luhmann himself says: for a gypsy reason.<sup>91</sup>

Considering this, it seems clear that Luhmann considers the mere keeping together of society, i.e., pure human coexistence and reproduction, to be a form of decadence of society. In a world already determined in advance, made from the structure of any subjectivity, according to Luhmann, the pure idea of history is meaningless. History only unfolds in the social system, through the bonding and unbonding with respect to it that becomes possible, not insofar as meaning or familiarity exists—as Husserl would think—but insofar as it can be intervened by the spontaneous and disruptive emergence of the non-familiarity with which the technical and artificial world of a communication that recursively turns back on itself is characterised.<sup>92</sup> And in doing so, Luhmann certainly follows the cybernetic impulse of a ‘naturalisation of the mind’ if that means seeing the mind reduced to its natural conditions. In fact, he also comes surprisingly close to some of the latest behavioural science research, for example that of Nick Charter and his idea of the lack of depth of mind.<sup>93</sup>

However, with his recompression of meaning within the framework of its contingency and second-order observation, Luhmann adds a semantic component to the self-elaboration of systems that allows for the aforementioned blurring of ontological barriers and to highlight instead the self-making process of meaning as part of an evolutionary orientation whose movement brings together consciousness, literature, technology or, in general, anything that can be seen as communication. Evolution whose purpose, in the other hand, is to encourage and promote the constant re-elaboration of human self-understanding in its relation to the world through communication. Sloterdijk explains this while analysing Nietzsche’s influence on Luhmann: “there is no will, so there is no will to power... there is only a multiplicity of forces, discourses, gestures and their composition under the aegis and direction of an I, which asserts, loses and transforms itself.”<sup>94</sup>

As Nick Charter states, “...the unfolding of a life is not unlike to that of a novel...,”<sup>95</sup> and that is particularly true from Luhmann’s perspective. What matters is not the depth of what is given, be it consciousness or tradition, but rather the possibilities that we are able to give ourselves through the reconversion of the past into semantic premises on which to

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91 Luhmann, *Theories of Distinction*, 53.

92 Bernhard Waldenfelds, *Exploraciones Fenomenológicas Acerca de lo Extraño*, trans. Peter Storandt Diller, Marcos Romano Hassán and José María Muñoz Terrón. (Barcelona: Anthropos, 2015), 105. See also Elena Esposito, *Artificial Communication: How Algorithms Produce Social Intelligence* (Cambridge, MA.: The MIT Press, 2022), 1.

93 Nick Charter, *The Mind is Flat: The Remarkable Shallowness of the Improvising Brain* (New Haven & London: Yale University Press, 2018), 21.

94 Peter Sloterdijk, *Sobre La Mejora De La Buena Nueva*, 115.

95 Charter, *The Mind is Flat*, 5.

orient self-reflexively towards the future of meaning. Which is to say, in short, that those involved in the task of self-understanding and observation of the world must find, in the exploration of meaning, a way of analysing and understanding the many ways in which history and its semantic legacy has turned in on itself to shape the fictions that sustain it. That is, the imaginary constructions of the unity of the system.<sup>96</sup>

Finally, this certainly means that in Luhmann's cybernetic thinking there is a rupture with what has been philosophical thinking up to the present. Without the ontological status of reality, it is no longer possible to conceive of man as an engineer of the world or a producer of himself, but rather as the one in charge of setting in motion the machinery through which the right circumstances are created for the realisation of a life according to the standards that history itself, as a narrative of narratives, has defined. To communicate, in this sense, is to be part of a process that never belongs to or derives from any particular or aggregate intention, but rather from a free play of meanings that makes the individual, as Sloterdijk points out, as a part of a medial nature.<sup>97</sup>

However, in a normative sense this medial character does not imply pure passivity in the face of a world that unfolds itself, but rather the adoption of an attitude of abstention in the face of complexity and contingency, with the aim of replacing the critical attitude, accused of being blind to itself,<sup>98</sup> with the observation of the meaning and self-organising strategies of society. And this with the aim of narrating the narratives with which society understands itself to reveal its blind spots and thus offer a glimpse of the reverse side of what has become normal in the organisation.<sup>99</sup> From Luhmann's cybernetic perspective, this constitutes both the basis of his sociological system and the root of all future philosophical endeavours.

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96 Luhmann, *La Sociedad de la Sociedad*, 687.

97 Sloterdijk, *Not Saved*, 176.

98 Elena Esposito, "Author's Response: Opacity and Complexity of Learning Black Boxes," *Constructivist Foundations* 16, no. 3, (2021).

99 Edmundo Balsemão Pires, "The Epistemological Meaning of Luhmann's Critique of Classical Ontology," *Systema: Connecting Matter, Life, Culture, and Technology* 1, no.1 (2013), 5.

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# Which Method is Cartesian? Descartes, Lacan, and the “Accumulation of Knowledge”

Emily Laurent-Monaghan

## Abstract

Most philosophical Lacanians instinctively take Lacan’s engagement with Descartes – not to mention his explicit formulations about not only the identity of the psychoanalytic and Cartesian *methods* but also, moreover, that of the subject of psychoanalysis and the *cogito* – as comprising a crucial and unequivocal philosophical *repère*. Nonetheless, there is a line of thought in Lacan’s oeuvre that this orientation leaves completely unaccounted for: Lacan’s decisive point regarding knowledge as accumulation. In his recently published twelfth Seminar (*Problèmes cruciaux pour la psychanalyse*) from February of this year, Lacan argues that the *cogito* is a hinge between knowledge “in its pre-accumulative state,” to the extent that it is capable of being doubted, and knowledge as a “mode of production” which predates and even motivates capitalist accumulation. It is on this basis that we can comprehend Lacan’s seemingly conflictual or even contradictory claims that, on the one hand, Descartes inaugurates modern science by leaving the eternal truths to God (Seminar XI) and, on the other hand, that modern science forecloses truth (“Science and Truth”).

**Keywords:** psychoanalysis, modern science, Descartes, Lacan, method, technique

*Which Method is Cartesian? Descartes, Lacan, and the “Accumulation of Knowledge”*

To begin, I shall reconstruct Jacques Lacan’s fundamental claims concerning the *cogito*, and in particular, the disjunctive relation between the terms certainty, knowledge, and truth.<sup>1</sup>

For Lacan, the Cartesian *cogito* registers a singular event, namely the philosophical inauguration of the subject of modern science and, consequently, that of Freudian psychoanalysis. Fundamentally, Lacan emphasises in the canonical Seminar XI on the *Four Fundamental Concepts of Psychoanalysis* (*Les Quatre Concepts Fondamentaux de la Psychanalyse*, 1963–64) that this inauguration depends on a concept of certainty as disjunct from truth. Specifically, for Lacan, it is in *certainty* that Descartes anchors the I, and not in *truth*. In the Second Meditation, one should not say that it is *true* that “I am thinking” so much as that it is on the basis of *certainty* that thinking is possible. This certainty, as disjunct from truth, is the first condition of knowledge of one’s own existence as well as that of God and the world. Accordingly, Lacan’s heterodox claim about Descartes—and, implicitly, about psychoanalysis—is that he is the first to treat certainty otherwise than as certainty of truth. This distinction is essential to understanding Lacan’s equally heterodox claim that the primacy of certainty over truth is a necessary prerequisite of scientific progress from Copernicus to Einstein as well as, albeit for slightly divergent reasons to be discussed at length, a precondition of psychoanalysis.

Nonetheless, in spite of the productivity of this singular event, the question still remains of what happens, in the domain of Science with a capital S (to denominate its modern status), to truth? This question is considered most famously in the aptly titled 1966 *écrit* “Science and Truth” (*La science et la vérité*). On the one hand, Lacan claims that the subject of psychoanalysis is divided between knowledge and truth. Indeed, this division is the subject, which suggests a synchronic identification between the subject of psychoanalysis and the *cogito*. On the other hand, Lacan historicises the division of knowledge from truth as decisively and unequivocally modern: firstly, by way of the inaugural epistemological rupture registered by the *cogito* and the constitution of modern scientific knowledge; secondly, by way of psychoanalysis as a symptom of Science’s foreclosure of truth. To these ends, it is unclear whether one can maintain, in the final analysis, that the *cogito* and *a fortiori* the progress of science thereafter is that *with* or *against* which Lacan poses the subject of psychoanalysis.

Conceptually and chronologically it is between these two interpretations of the Cartesian

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1 Limited to Seminars XI, and XII and “la Science et la vérité” (“Science and Truth”). A systematic overview would be deserving of a book-length project, notably on material from Seminars IX through XVII at least. N.B.: all citations indicate, when available, first the established French edition, then the English translation.

*cogito* that Lacan formulates a crucial and until now underestimated argument in his recently published Seminar XII, *Problèmes cruciaux pour la psychanalyse* (1964–65). Here, Lacan proffers the novel conjecture that Cartesian philosophy on the whole not only marks the inauguration of Science but also the beginning of *knowledge as accumulation*.<sup>2</sup> Indeed, Lacan’s argument is not concerned in the first instance with the identification or differentiation between the subject of psychoanalysis and the *cogito*. Rather, it is posed as a critique—and indeed, potentially in Kant’s or even Marx’s sense—of the *cogito* as a path between two kinds of knowledge: firstly, knowledge “in its pre-accumulative state,” i.e., *capable* of being doubted, that is, ancient *epistème* or pre-modern *connaissance*; secondly, knowledge “as a “mode of production”, i.e., *founded* on the primacy of certainty over truth, that is, the domain of modern scientific *savoir* (SXII: 312;300). Moreover, Lacan insinuates, if the division between knowledge and truth renders possible the accumulation of knowledge, then Descartes, even more than Pascal, would be a philosophical proto-capitalist and, what is more, *contra* what Lacan calls “naïve materialism,” it would be *Science that exploits capital* and not the other way around.<sup>3</sup> The accumulation of knowledge, as Lacan describes it, thereby not only functions as a theoretical analogue to the accumulation of capital, but also historically conditions it.

Building upon these remarks, the aim of this essay is to demonstrate that it is in increasing order that the above arguments complicate and ultimately oppose any reading of Lacanian psychoanalysis as identified with Cartesian philosophy or, what is the same, as pre-critically rationalist.<sup>4</sup> The consensus holds that Lacan’s apparently consistent approval of Descartes and avowal of the *cogito* can be taken as a kind of unequivocal philosophical *repère* with which to interpret his work philosophically and thus as the

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2 Accumulation is not limited to Science alone, as Lacan has it: “The foundation, the end, the mark, and the style of the knowledge of science is, above all, that it is a knowledge that can be accumulated. Philosophy has done nothing else since then – I am speaking of the one that we can maintain as the best,” Jacques Lacan, *Le Séminaire, Livre XII: Problèmes cruciaux de la psychanalyse* (Paris: Seuil, 2025), 321.

3 Lacan juxtaposes naïve realism and materialism in the earlier lessons, especially in the third December 16th, 1964). See Lacan’s discussion of Pascal and the God of Philosophers in Seminar XVI, *D’un Autre à l’autre* (Seuil: Paris, 2024).

Lacan’s reading of Pascal has been explored by Lacanian philosophers, see, for instance, Samo Tomšič “Jansenist Morality and the Compulsion of Capitalism” in *Capitalism and the New Political Unconscious* (London: Bloomsbury, 2023), and Dominiek Hoens, “Capital Owes You Nothing” in *From an Other of Structure to the other of Sex: Reading Seminar XVI*, ed. Emily-Laurent Monaghan, (London: Palgrave Macmillan, forthcoming 2026).

4 Unfortunately, given that this proposition leads to all sorts of confusion, Lacan goes as far as to state that “nous sommes ce que nous sommes, c’est-à-dire: rationalistes, Jacques Lacan, *Le Séminaire, Livre XIV: La logique du fantasme* (Paris: Seuil, 2023), 56.

ground of the majority of philosophical approaches to his work.<sup>5</sup> Nonetheless, I argue, though Descartes’ “brand” of knowledge and his celebrated break from the preceding Aristotelian and scholastic philosophy is the precondition of psychoanalysis as well as that of formulating and formalising it, it is nonetheless against the Cartesian primacy of affording certainty over truth and likewise against the division between knowledge and truth that Lacan poises psychoanalysis.

Though Lacan’s reconstruction of Descartes is, as already indicated, heterodox and sometimes at distance from the letter of the text, it nonetheless transpires from an issue familiar in Descartes scholarship, namely the distinction between *cogito* and *res cogitans*.<sup>6</sup> In Part Four of the *Discourse on the Method* (1637), which was written in the vulgate and thus contains no express reference to *res cogitans*, yet, as the title itself suggests, this text serves as the main explanation of Descartes’ (scientific) method. Therein, he writes what is most frequently cited as the *cogito*, by Lacan and others, namely “I think, therefore I am” [*je pense, donc je suis*]. The *cogito* is thus established prior to Descartes’ questioning of *what* he is and thus functions in and of itself independently from any predicate of substance. Accordingly, Descartes’ *method* is not as such dependent on a predication of himself as *subject*. The best one could say, then, of the *Scientific* method—I continually reemphasise—is that the *cogito* is privileged in the order of reasons in the *Discourse* on that method, to the extent—and only to the extent—that it is a first principle of *thought*. The *cogito* as a first principle of thought rather than as a substance is merely a statement, namely one of which Descartes is certain. That this statement would be sutured by Descartes to “seeking truth in the sciences” is in effect secondary to its status as simply *certain*.<sup>7</sup>

Indeed, the certainty of this statement is itself disjunct not only from that of further knowledge founded on it, but also from the “truth” that science supposedly “seeks.” All in all, this reconstruction of the *cogito* as a statement, as opposed to *res cogitans*, permits Lacan to make the tripartite distinction among “certainty” (as pertaining to the statement itself), “knowledge” (as what is founded on the statement), and “truth” (the search for which is sutured to the statement by Science).

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5 Jean-Claude Milner’s *L’Œuvre claire* is the most elegant example of this problem, other philosophers, who have no doubt inspired a re-thinking of the *cogito* have the tendency to reduce Descartes’ entire philosophical advance to the ‘*cogito*,’ as the moment of qualitative evacuation. For instance, for all its ravishing ingenuity, Žižek jumps from the subject to the *cogito* in the opening pages of *The Ticklish Subject*, “the spectre of the Cartesian subject,” to the “*cogito*,” without venturing to expound their relation in a precise manner, Slavoj Žižek, *The Ticklish Subject: The Absent Centre of Political Ontology* (London: Verso, 1999), 1–5.

6 In his careful exegesis Jean-Luc Marion convincingly accounts for the difference between the *cogito* and the *res cogitans*. See Jean-Luc Marion’s *Sur la pensée passive de Descartes* (PUF: Paris, 2013).

7 I therefore agree with Martial Gueroult, who articulates this precisely. See Martial Gueroult *Descartes selon l’ordre des raisons, I Dieu et l’âme* (Paris, Aubier, 1953).

By contrast, in the Second Meditation of the eponymous *Meditations* (1641), which on the whole is far more oriented toward theoretical and philosophical questions, Descartes directs his attention towards *what he is*, under condition that the *cogito* holds. Though he repeats the process of the *Discourse* by reaching a *moment* of doubt—to the point, famously, of hypothesising a *malin génie* who would be deceiving him—and thereby inferring his *being* from the very state of doubting or, for that matter, of *being* deceived, he does not infer his existence from thought as such but from the possibility of deception. This shortcut is evidenced by the significantly abbreviated statement of certainty: that “I am, I exist” (*ego sum, ego existo*). Thus, while it could be argued that Descartes’ existence is inferred on the basis of thinking that he does not exist (“is it possible that I do not exist?”), Lacan emphasises the fact that Descartes never demonstrates that he is the one thinking by which he exists. Nonetheless, it is on this basis that Descartes subsequently arrives at defining *what he is*, namely as *res cogitans*: “But for all that I am a thing which is real and which truly exists. But what kind of a thing? As I have just said—a thinking thing.”<sup>8</sup>In spite of the fact that this definition somewhat diverges from those given in the history of philosophy (e.g., Aristotle’s “rational animal”), Lacan criticises this leap to thought as an essential or necessary attribute of the I (*ego*). In what follows, I will demonstrate how this inference, in spite of productively privileging certainty from truth, permits a more extreme foreclosure of truth.

### **On the *Technique of the Psychoanalytic Method***

Lacan’s basic coordinates in Descartes have now been established and the motivation behind the disjunction between certainty and truth and the privilege that is accorded to the former over the latter has been substantiated. Nonetheless, it remains unclear what this disjunction actually entails: how can certainty—which is often understood as certainty of truth or, more precisely, as a conviction that a statement is true—be disjoined from truth? In order to answer this question, I turn to Lacan’s heterodox epistemology as outlined in the third lesson of Seminar XI, pertinently titled “Of the Subject of Certainty.” by its editor Jacques-Alain Miller. I will unpack what is routinely taken to be a series of uncontroversial statements, chiefly among them that “Freud’s method is Cartesian.” More precisely, I will argue that though this statement is usually taken as a premise of a syllogism whose conclusion is that psychoanalysis is as such Cartesian, the matter is far from unequivocal. One can see the difficulty already in the translation of the term *démarche* as “method,” which suggests an overall correspondence between Freud and

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8 René Descartes, *The Philosophical Writings of Descartes*, Volume II, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch (Cambridge: Cambridge University Press, 1984), 18. Henceforth, *CSM I* or *II*.

Descartes (or, moreover, his *technically* defined method.) Better would be to translate the term as "approach" or even, bearing in mind its etymology (*dé-marche*), as "step," which suggests a more local coincidence in spite of the apparent global consequences.

This series of statements is presented textually in the following way:

1. On the one hand, for Descartes, "the major term" of Freud's method "is not truth. It is *Gewissheit*, certainty." Truth, according to Lacan, applies to the "created eternal truths," e.g., " $2 + 2 = 4$ ," and not of the *cogito* itself. More precisely, for both Descartes and Freud, "doubt is the support of certainty." That is, the certainty of the *cogito*, being supported by doubt, does not in and of itself restore any indubitability of truth. This "point" of doubt/certainty as disjunct from truth is "where the two approaches [*démarches*] are related, converge." Consequently, Freud's discovery of the unconscious proceeded "in an extremely analogous fashion" to Descartes' inference of the *cogito*: "where he doubts [...] it is assured that a thought is there, which is unconscious, which means that it is revealed as absent" (SXI: 36-7; 35).

2. On the other hand, it is exactly "here that the dissymmetry between Freud and Descartes is revealed." This is not immediately in the foundation of the subject of certainty on doubt rather than on truth—i.e., "it is not at all in the first approach of the certainty founded by the subject"—but instead in the distinction between whose doubt and whose certainty is in question. Freud's doubt is that from which he infers the certainty of the subject of the unconscious itself (*I think as absent*), whereas Descartes' doubt is that from which he infers his own certainty of himself as thinking thing (*I think as present*). Accordingly, for Freud, certainty no longer proceeds from the resolution of doubt whereas for Descartes — in a "restoration of truth in the hands of the Other"— it proceeds from the guarantee of truth. (SXI: 36-7; 35).

It is clear from these above passages that Lacan's statement "Freud's approach is Cartesian" is not an avowal of Descartes' method—especially as concerns the "created eternal truths"—so much as an attempt to distinguish between the *cogito*, otherwise named "the Cartesian subject," and *res cogitans*, which, for Descartes, is the subject. The former is the subject of certainty, both the *cogito* and the subject of the unconscious, whereas the latter is the supposed truth of this subject as guaranteed by God/the Other. Thus, the initial disjunction between certainty and truth is merely momentary, identifiable only in

the Second Meditation, and immediately lost in the proceedings.

Having established this divergence between Descartes and Freud, let us now investigate an at once broader and more rigorous interpretation of the statement that “Freud’s approach is Cartesian”:

a. The “doubt” and “certainty” on which Freud and Descartes converge is restricted to the First and Second Meditations. Indeed, when Lacan speaks about doubt, he is referring to the “hyperbolic doubt” of none other than the First Meditation. This doubt is not Descartes’ method—certainly *not* a permanent feature of this method, only necessary to exercise once in one’s life—but rather a strategic *procedure* for establishing the foundations of what would be the Cartesian method. Indeed, if Descartes’ *Discourse* is “on the method,” it is precisely because its entire procedure is precursory with respect to this method, which is itself exercised in the *Dioptrics*, *Geometry*, and so forth. Thus, to suggest that “Freud’s method is *the Cartesian method*” or, better, that “Descartes was *Freudian*,” even *avant la lettre*, misses Lacan’s point entirely: Freud’s method in the *Traumdeutung* (*The Interpretation of Dreams*) is Cartesian *only to the extent that* it aims “to surmount that which connotes all of the content of the unconscious [...] *I am not sure, I doubt*”; yet, by prolonging this very step, Freud precisely *makes a method* of what in Descartes is *purely a precursor* to this method, thereby performing, methodologically, a retrograde of the *Meditations* (SXI: 36;35). Thus, hyperbolic doubt is transformed from a one-off procedure into a *permanent* feature of the Freudian method of interpretation.

b. As we have already established, the point of *convergence* between Freud and Descartes is that, in both cases, “doubt is the support of certainty.” Nonetheless, this should not be confused with saying that for Freud *as much as* for Descartes, this certainty would be of God (which would be suggested by a homology between the one and the other). Hence, the Third and *a fortiori* the Fifth Meditations are nowhere to be found in the Freudian method. Indeed, Lacan’s point is that certainty impedes technique “Doubt, then, is a sign of resistance,” (SXI: 36;35). For example, in an analysis, on the one hand “something is there” and yet, on the other hand, “oh, it couldn’t possibly be *that...*,” that is, “I am *certain* that it is *not* that”—*not* my mother, and so on. Hence, in order for a psychoanalysis to *work*, the *certainty supported by doubt must itself be doubted*. In this sense, if not for the fact that in both cases doubt is the support of certainty, it could be said that psychoanalysis is, as far as the method is concerned,

*anti*-Cartesian. Furthermore, doubting is not specific to analysis but is the generic functionality/operativity of the unconscious. To formulate the above in a more reduced manner: (1) Cartesian certainty is *supported* by doubt—that is, if we take the Cartesian method to be hyperbolic doubt (2) Freudian psychoanalysis *doubts* this certainty.

c. Freud’s method is more akin to a “retrograde” of the *Meditations*. For Descartes, in order to reach the point-zero of certainty, that is, the *cogito*, one must doubt; thus, one begins with doubt, and ends up with certainty within the bounds of this procedure about “what is [...] *incapable of being doubted*.”<sup>9</sup> For Freud, on the other hand, the subject is always capable of being doubted, since “the subject is ‘at home’ in the field of the unconscious” (SXI: 36; 37). Indeed, the practice of psychoanalysis is none other than the procedure of *doubting* this certainty in the form of various resistances, proceeding from this dissymmetry: in Descartes’ case, we begin with doubt but, on the basis of the *cogito*, end up being certain of God, that is, what Lacan calls “the subject supposed to know;” by contrast, a psychoanalysis begins by developing a transference, that is, by propping the analyst up as the subject supposed to know, precisely to the extent that, by means of the aforementioned certainty, one begins to doubt it. Thus, all in all, as Lacan puts it, “Descartes did not know, except that [his philosophical method] involved the subject of a certainty and the rejection of all previous knowledge—but we know, thanks to Freud, that the subject of the unconscious manifests itself, that it thinks *before* it attains certainty” (SXI: 38; 37). Arguably, then, the subject of the unconscious is in a perpetual state of (absent) thought without *any* ultimate certainty.

All in all, if there were a homology between Freud and Descartes on the basis of method, then we would get something like the *opposite* of a psychoanalysis. Furthermore, we would miss the point that Freud systematises hyperbolic doubt as a *technique*, and thus “reverses” the constructive order of the *Meditations*. In this sense, Freudian technique *hyperbolises hyperbolic doubt* by transforming a “moment” into an enduring feature. More precisely, Freud’s technique “reverses” the Cartesian *theoretical* order of reasons—against Descartes’ “secret of [the] method”, namely that “some things can be known on the basis of others”<sup>10</sup>—in a *practical* retrograde (such that some things are precisely consciously *unknown* by the fact of unconscious knowledge). We will return to this point in due course. For now, let it suffice to say that it is on this basis that one can see how the statement

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9 Descartes, *CSM I*, 10.

10 Descartes, *CSM I*, 21.

“Freud’s method is Cartesian” is, when one gets down to the fact of the matter, a *critique* of Descartes, already anticipating his more or less straightforwardly anti-Cartesian train of thought in Seminar XII: Freud operates with a subject that, being unconscious and thus to the extent that it thinks, is *not yet* certain of itself—thus *not the Cartesian subject* in the final analysis—that is, with a subject that doubts *prior* to any certainty that “I am,” or that “it is.” This suggests, *in nuce*, that Freud’s method concerns precisely *not* knowledge as accumulated by Descartes but rather in its *being doubted* prior to any certainty that would license this accumulation.

This conclusion covers Lacan’s position on the structural relationships and divergences between Descartes and Freud. Nonetheless, to begin exploring the historical ones—and specifically the stronger, perhaps overstated claim (not made *per se* by Lacan but suggested) that the subject of the unconscious is the *cogito*—let us now reappraise the “created eternal truths.” As I have already suggested, the transferral of truth to God is crucial not only to the privileging of certainty, but also to the accumulation of knowledge.

How can a truth, for Descartes, be at once eternal *and* created? Descartes introduces into philosophy a “divine arbitrariness” that is expressed in his *Replies*, but never, interestingly enough, in his published work: it is not simply that God is eternal, hence the guarantor of truth as eternal, but precisely that God himself *creates* these truths—not only the truths of metaphysics (e.g., “all bodies are extended”), but also those of logic and even mathematics (e.g., “ $a = a$ ”). Indeed, he goes as far as suggesting that God is able to change these truths if He wishes to do so.<sup>11</sup> For Lacan, the importance of this stipulation is the following: on the one hand, it is Descartes’ transferral of truth to God that makes the shift from arithmetic (as presupposing intuitive truths about integers) to algebra (as operating purely formally among letters); on the other hand, this transferral is what permits the purely self-coherent operativity of *knowledge*, which, albeit transpiring from an initial *certainty*, has nothing to do with *truth* beyond its guarantee by God (cf. SXI: 208;243). Put another way: conceiving “truth” not in terms of a pre-existent fact of the world but instead in terms of something that is strictly the result of a *decision* is a basic conceptual precondition of modern Science; yet, it is precisely by conceiving the decision from which it is a result as that of God’s that permits truth never to be in question in Science and thus, as will be seen, licenses the accumulation of knowledge. Accordingly, one already sees to what extent a theoretical shift (“created eternal truths”) not only became possible with the advent of Science but also made possible a practical shift (“accumulation of knowledge”). Let us now expound some important points related to this double-edged corollary by way of Lacan, insofar as it concerns the *cogito* itself:

- a. Firstly, there is the issue of intuition. On the one hand, as Lacan puts it

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11 Descartes, *CSM* II, 93.

in the 1964 revision—under the title “The Position of the Unconscious”—of a 1960 remark, “the *cogito* marks [...] the break with the very assurance conditioned by intuition.”<sup>12</sup>

Indeed, to the extent that Descartes has doubted all previously certain knowledge, at least as far as pertains the “wavering assurance of the senses” (or the imagination), there is no pre-existing intuitive presupposition left by the Second Meditation. On the other hand, Descartes makes clear that the foundation of his Method thenceforth is the *simplex intuitus* (the “clear and simple idea” or, more literally, “intuition”): e.g., anyone can see by mental intuition alone, by the sheer cognitive clarity that the subject himself exists or that a triangle is bounded by three lines.<sup>13</sup> Hence, it is not only that Descartes evacuates intuitive knowledge but also, precisely, *re-defines* intuition on the functional, ground-level certainty that results from this evacuation. Therefore, intuition remains intact, only not conceived on the basis of any kind of *naturally* assured intuition so much as on that of a *divinely* assured intuition, thereby only doubling down on the Other as guaranteeing the efficacy of this purely formal operativity.

b. Secondly—and consequently—there is the issue of deduction. On the one hand, Lacan famously “translates” *I think, therefore I am* into *I am the one who thinks: therefore I am* in order to resolve the infamous problem of the *therefore* and the deduction or, at the very least, inference that it implies: the *I* of the *I think* is divided from the *I* of the *I am*, the subjective split is the *Entzweiung* (literally, “two-ing”) of the one from the other, hence the *ergo* itself. Accordingly, for Lacan, this inference is not a deduction at all (or even an inference, for that matter) but rather the mark of the psychical causality *qua* logical implication in or even as the subject of the unconscious (cf. SXII:309-313).<sup>13</sup> Nonetheless, on the other hand, *if taken as a deduction*—and, specifically, if this *ergo* is taken as *true* and not merely the support of certainty—then it must be God who guarantees its truth: “In the ego that Descartes accentuates [...] one must grasp the point at which it continues to be what it presents itself as: *dependent on the god of religion*.”<sup>14</sup> Put simply, then, from the perspective of the *cogito*, the *ergo* is its disjunction from the *ego*, whereas from the perspective of the *ego*, the *ergo* is its conjunction with the

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12 Jacques Lacan, “Position of the Unconscious” in *Écrits*, trans. Bruce Fink, (New York: Norton, 2007), 832; 705.

13 For an excellent development and consolidation of these points, see 309-311.

14 Lacan, *Écrits*, 865; 735.

*cogito*: hence the (in the new sense “intuitive”) idea of a *res cogitans* who makes further deductions.

This insight into the two-sidedness of Descartes’ “created eternal truths” and its effect on both intuition and deduction seriously complicates the most important of all features of Lacan’s reading of Descartes with which I began: that the function of the *cogito* as a singular event, however punctiform, is the one by which pre-modern *connaissance*, assured by intuition yet concerned with truth, was relinquished and modern *savoir*, assured by deduction yet unconcerned with truth, had commenced.

This thesis is not unique to Lacan’s oeuvre, and is articulated at length by theorists of science working in close proximity to Lacan, from Alexandre Koyré, whom Lacan invited to his seminar in 1955, to Louis Althusser who had invited Lacan to the ENS in 1964, all of whom more or less agree on the above-cited break.<sup>15</sup> Yet more specifically, for all of the above-cited authors, pre-modern *connaissance* (or “ancient episteme”) is predicated on a relationship of sensation, thereby fundamentally qualitative, between the subject and the object, whereas modern *savoir* or Science is conversely predicated on mathematical formalisation (specifically a mathematised physics) to evacuate the realm of sensible appearances and qualities.<sup>16</sup>

Specifically, Descartes’ *cogito* is the first inauguration of a subject *itself* stripped of all of the qualitative markers of empirical individuality, although—to the extent that he refers to “a thinking thing” as one that “doubts, affirms, denies, wills, and refuses, and which also imagines and senses”—Descartes himself did not sustain this subject, instead he reinstates the subject with qualities on the basis of the certainty that he achieves through doubt.<sup>17</sup> Properly speaking, then, it is on the basis of the *cogito* as a subject of certainty and not, supposedly, of truth that, beginning with Galileo—as epitomised by the famous aphorism by which “the great book of the universe is written in the language of mathematics”<sup>18</sup>—that, strictly speaking, the subject of science is sustained without reference to consciousness such that the so-called Universe becomes sufficiently knowable through or, better, as a formal “language.”<sup>19</sup>

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15 See Chapter Two of Jean-Claude Milner’s *L’Œuvre claire* for a systematic account of the theory of modern science. Jean-Claude Milner. *L’Œuvre claire: Lacan, la science, la philosophie* (Paris: Seuil, 1995), 33–69; 17–46.

16 Milner, *L’Œuvre claire*, 37–39; 21–23.

17 Descartes, *CSM II*, 18. Italics mine.

18 Galileo, quoted in Milner, *L’Œuvre claire*, cf. Galileo, 1960 [1623], 184. Italics mine.

19 As noted by Milner, Descartes’ *cogito*, which is in fact the *res cogitans*, concerns the subject irrespective of empirical individuality. Moreover, this subject, which Milner describes as “a correlate without qualities assumed by a thought without qualities: we can see how this being-called the subject by Lacan, but not by Descartes—corresponds to what modern science does,” Milner, *L’Œuvre claire*, 22.

Consequently, by evaluating this division, let us now confirm that pre-modern *connaissance* is non-productive, since, by way of the subject-object relationship of sensible quality, it is supposed merely to re-articulate, by way of method or the "use of reason," what is already there in the "cosmos," or the pre-Universal world. Accordingly, for this knowledge, truth is always that of knowledge, namely the one that pre-exists it, on which it is based, and that thereby confirms it and to which it should aim: knowledge begins and ends with truth. Conversely, modern *savoir* is productive to the extent, precisely, that by re-founding knowledge on a subject of certainty and not of truth, thereby subtracting knowledge from sensation or quality, it is able, by way of "writing in the language of mathematics," to produce new knowledge, irrespective of its truth.<sup>20</sup>

In this sense, Lacan's reading of the *cogito* at least *appears* to be historicist to the extent that the subject of the unconscious itself (and not merely the subject of science) would be variable or even emergent in history: as Lacan unambiguously puts it in the "Position of the Unconscious": "The unconscious, prior to Freud, is *not* purely and simply."<sup>21</sup>

As a clarifying counterpoint to this line of argumentation, consider Lacan's example of Newton's laws of gravitation. Clearly, on the one hand, physical objects obey the laws of gravitation before Newton discovered them or, more precisely, formulated them. Nonetheless, in Seminar XII, Lacan asks the viable question of whether these laws or their formulations would have any *truth* before the advent of Science: "where was the truth before the establishment of knowledge?" (SXII: 287;249). His answer is, paradoxically, that the truth of the laws is simultaneously "authenticated" and irrelevant after its formulation. Hence, on the other hand, Newton's discovery of these laws attests more to himself as a subject of science than to the objects that obey them.

Accordingly, we will see that the apparent historicism of Lacan's reading is merely the vehicle for discerning not only what is structural (the subject of the unconscious or the laws of gravitation) but also what has been vacillated over against the invariance of structure (the subject of science as one capable of formulating those laws): the subject of the unconscious is *not* the subject of science so much as the latter is what makes the discovery of the former possible (like the laws of gravitation) and, even more pertinently, necessitates the emergence of psychoanalysis as well as both its *subjects* and its theory of *the* subject.

Now, the paradox is that though this Science, evacuated of sensible quality, stripped the

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20 As Lacan quips in "Science and Truth," "Need it be said that in science, as opposed to magic and religion, knowledge is communicated?" 877; 744. Yet at the same time, "[...] this knowledge includes a mode of communication which sutures the subject it implies," Lacan, *Écrits*, 877; 744.

21 Though it should be noted that Lacan's argument also hinges on several structural, and not historical propositions, including "the unconscious is a concept founded on the trace left by that which operates to constitute the subject," Lacan, *Écrits*, 830-31; 703-704.

subject of (any pretence to) empirical individuality, Lacan clearly identifies the change at stake in the shift from the subject of the unconscious to the subject of science as, precisely, the *empirical sensibility* of this subject: “our *experienced* division as subjects” is the “division between knowledge and truth.”<sup>22</sup> Put another way, though the subject is not an empirical individuality to begin with—and Science makes this obvious—it is the evacuation of sensuous quality in Science—to the extent that it has an effect on the subject—that makes the subject’s not being an empirical individual to begin with *empirically sensible*.

Accordingly, the subject of science would not be that of the unconscious as such but rather the condition that it be *experienced* as such. It is by way of this paradoxical but also empirically sensible premise that one could indeed begin to unpack Lacan’s equally (if not more) famous statement in the *écrit* that “the subject upon which we *operate* in psychoanalysis can only be the subject of science.”<sup>23</sup> Put another way, the subject of psychoanalysis is the one who, as conditioned by Science, *experiences* the subject of the unconscious, indeed symptomatically. Hence why, for Lacan, psychoanalysis, as an experience, is a *symptom* of Science while, as a discourse, it is just as much the emergent yet tentative antidote to it. Literally, one could say that psychoanalytic practice arose as a manner of attempting to “treat” Science *qua* affliction of the subject.

In this sense, psychoanalysis is *literally* a retrograde of Science to the extent that it is not only made possible by it but also operates *on* its product, is effected by it, and, arguably, attempts to halt its effects, or at least put them in doubt, hence the claim that the subject upon which we *operate* in psychoanalysis can *only be* the subject of science: in fact, if, as Lacan puts it, “we [psychoanalysts] no longer have anything with which to join knowledge and truth together but the subject of science,”<sup>24</sup> then it is precisely to the extent that psychoanalysis, by operating *on* the subject of science, her *symptoms*, re-joins knowledge and truth in the face of the foreclosure of the latter by the former; or, again in terms similar to the same *écrit*, if Science evacuates all reference to the empirically sensible object, then the object of psychoanalysis, namely the *objet a* must be *inserted* into the subject of science.

Now, we are in a position whereby we can critique the apparent equivalence between the psychoanalytic subject and the *cogito*. As one can tell from the above, the point is *not* that the most exemplary model of the subject, Freudian or Lacanian, would be the *cogito*—which would, again, implicitly entail that there be a homology between one method and the other—but rather that psychoanalysis itself must treat the “problem”

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22 Lacan, *Écrits*, 856; 727.

23 Lacan, *Écrits*, 858; 729. Italics mine.

24 Lacan, *Écrits*, 869; 737.

or even “symptom” of the modern subject, the one *produced* by Science. Indeed, if truth is foreclosed by Science in the symbolic, as Lacan points out in the same *écrit*, then it must reappear in the real, in the form, precisely, of a psychoanalysis.<sup>25</sup> This historical dimension is explored at some length in Seminar XVI *From an Other to the other*, where Lacan says that psychoanalysis is a “symptom” that “emerges in relation to a turning of knowledge in history”, that of the *cogito*.<sup>26</sup> If the *cogito* is the subject of Science, then, by “operating” on this subject in psychoanalysis, the Freudian method is literally *counter-Cartesian*.

Nonetheless, psychoanalysis’ “re-joining” of knowledge and truth does not amount to a regression to a pre-modern *connaissance*—which nonetheless unfortunately pervaded among psychoanalysts from Carl Jung to Michael Balint, as made clear by Lacan—but rather articulates, and thus avows, precisely what has been foreclosed by Science. That this foreclosure is constitutive of the subject of science necessitates a specific methodological intervention on behalf of psychoanalysis. Instead of beginning with hyperbolic doubt, and thus certainty instead of truth, leaving the latter to God, which would afford an interrupted continuation of the accumulation of knowledge, psychoanalysis takes the subjects of science *qua* products of this accumulation and treats them clinically and theoretically.

### ***Disquisition on a “Crucial Problem”: Knowledge as Accumulation***

The historical import of Lacan’s thesis puts him at odds with the likes of Louis Althusser with respect to the relationship of Science and capitalism. For example, in *Pour Marx*, Althusser argues firstly that *science* is not inherently ideological, and *a fortiori* that science can be thought of as *distinct* from *ideology*. Lacan would likely reject the former (“weaker”) claim, while avowing the latter (“stronger”) claim insofar as he argues, albeit for different reasons, that Science operates autonomously owing to its division from truth. While Althusser and Lacan may agree on this thesis, they would not agree on its consequences. It is precisely the autonomy of science (as distinct from ideology), Althusser avers, which affords the possibility of its radical potential *qua* science, exemplified by the respective “new sciences” of Galileo and Marx.<sup>27</sup> By contrast, however, Lacan’s emphasis is that Science’s revolutionary force, is precisely what bolsters and even exploits capitalism for its own purposes in a “curious copulation.” While, a lengthy disquisition on their respective texts is outside the remit of this one, what shall be emphasised in what follows is the difference in their respective emphases regarding the autonomy of Science, which

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25 Lacan, *Écrits*, 874-5; 742-3.

26 Jacques Lacan, *Le Séminaire, Livre XVI: D’un Autre à l’autre* (Paris: Seuil, 2006), 116.

27 Louis Althusser, *Pour Marx* (Paris: Maspero, 1965), 187.

makes it operate more efficiently.

It is at this point that we should turn now to the arguments Lacan proposes in Seminar XII on the relation of the *cogito* not only to Science but also, consequently, to capitalism. As previously mentioned, Lacan describes this initiation of science as introducing an epistemological schism between the pre-accumulative state (knowledge as pre-modern *connaissance*) and the accumulation of knowledge (knowledge as modern scientific *savoir qua Science*), which is precisely congruent with the division between knowledge and truth. But the dimension that Lacan adds here—before his lengthy ruminations on Marx—is that what serves to *grow* knowledge, is what also serves to grow capital. In this sense, Descartes is a proto-capitalist. To draw our attention to another Marxian reading of Descartes, Antonio Negri makes a similar argument in *Political Descartes* when he suggests that Descartes puts forth a “reasonable ideology” that gives rise to the emergent bourgeoisie, and, more generally, liberal ideology. But what is surprising—and even ironic—for a Marxist is that he makes this argument on a purely “theoretical” or “methodological” level in reading Descartes and even goes as far as to explicitly deny any *historical* development to Descartes’ thought *as thought*, thereby ultimately reducing Descartes to a kernel of this ideology. While Negri’s book is certainly erudite, he fails to register the schism that I defend herein: namely, the one that Descartes introduces between knowledge and truth.<sup>28</sup> By contrast, Lacan’s point explicitly goes in this latter direction in which Negri does not dare to go: the Cartesian method *qua* method of modern Science is *literally* that of the accumulation of capital, not to the extent that capital “uses” the scientific method, but rather the other way around; or, as Lacan says in a striking passage from SXII:

From Descartes onwards, knowledge, that of science, is constituted on the *mode of the production of knowledge*. Just as an essential stage of our structure which is called social, but which is in reality metaphysical, and which is called capitalism, is the accumulation of capital, the relationship of the Cartesian subject to that being which is affirmed in it, is founded on the accumulation of knowledge. Knowledge from Descartes onwards, is what can serve to increase knowledge. And this is a completely different question to that of the truth (SXII: 312;300).

Indeed, if we think of the Cartesian epistemic ideal, it is nothing less than the unity of the sciences, but precisely in a *generative* sense. His metaphysical system aspires to nothing less than an explanation of “all natural phenomena, that is, all of physics,” as Descartes puts in his *Traité de l’homme*.<sup>29</sup> And thus there is no doubt that the Cartesian system

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28 Antonio Negri, *The Political Descartes: Reason, Ideology and the Bourgeois Project* (London: Verso, 2007), 216–17.

29 Descartes, *CSM I*, 81.

aspires to the One, that is, the “de-creation” of the eternal truths and thus of God, which is indeed no way of abolishing religion, whatever Freud himself might have thought about the gradual secularisation of modern Science. One need but recall Jean Hyppolite’s remark that Freudian science can be described as “a religion *against* religion” – which, incidentally, is one manner in which Freud’s affinities at the very least are occasionally Cartesian, but only to the extent that they are counter-psychoanalytic.<sup>30</sup>

Going further, all of the above takes on a completely different meaning when we consider what Lacan means by “pre-accumulative knowledge.” While Lacan does not define it explicitly, we can infer from a number of closely related passages that the pre-accumulative state of knowledge, which we may call pre-modern *connaissance*, amounts to the scholastic cosmology against which Descartes is explicitly working or, more generally, to cosmology broadly construed. Examples of this line of reasoning abound, notably in SXI: “primitive science has taken root in a mode of thinking which, playing on a combinatory, on such oppositions as those of Yin and Yang, water and fire, hot and cold, make them lead the dance—the world is chosen for its more than metaphorical implications (SXI:152;151). Yet more specifically, these cosmologies are, as already partially suggested, *sexual* to the extent that they postulate masculine and feminine principles (e.g., form/matter or Yin/Yang) which supposedly complement one another such as to create and indeed reproduce the cosmos as well as the subject’s relationship to it: hence the *presence* of an unformalized yet presumed sexual relationship. Accordingly, then, modern Science registers the moment where the “parallelism” between the subject and the cosmos no longer obtains. As Lacan has it,

Cosmological thought is essentially founded on the correspondence—*not biunivocal but structural*—between the microcosm and the macrocosm: the enveloping of the former by the latter. This microcosm, you may call it whatever you like—subject, soul, *noûs*. This cosmos, you may call it whatever you like—reality, universe. But you can suppose that the one envelops the other and contains it, and that the one contained manifests itself as the result of the cosmos, as that which corresponds member to member. It is impossible to extirpate from cosmological thought this fundamental hypothesis... (SXII: 68; 33).<sup>31</sup>

For this reason, we may conclude that pre-accumulative knowledge, or pre-modern *connaissance* is not “productive,” in the sense of accumulative knowledge, or even

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30 Lorenzo Chiesa brought this remark to my attention. It is from Lacan’s exchange with J. Hyppolite in Jacques, Lacan, *Séminaire II: Le moi dans la théorie de Freud et dans la technique de la psychanalyse* (Paris: Seuil, 1978).

31 The quote continues by stating that this hypothesis is in fact dependent on a “certain use of language,” a proposition that I do not have the space to analyse here. Translation mine, italics added.

*reproductive*, since it presupposes the One that it wants to prove, namely the One of the sexual relation and hence the possibility of positing such equal and opposite “ratios” as above mentioned. From this point of view, modern Science is certainly a mode of production, and the Cartesian subject is the locus of said production, but it is also literally a “mode of reproduction,” which grounds the possibility of a new (and smoother) way of “negating” the absence of a sexual relation (not by disavowal, but by foreclosure): precisely, not by presupposing a One so much as by *aiming toward* a One, which would be the completion of knowledge and ultimately the realisation of a sexual relation. This is a further problem for psychoanalysis, if one considers Freud’s dubious presumption of a unifying principle (Eros) in spite of—or indeed because of—his scientism.<sup>32</sup>

The consequence of interpreting “pre-accumulative” knowledge as I have is perhaps textually forced yet also profoundly explanatory. Indeed, we can see the resonance between *connaissance* as sexual cosmology and *savoir* as *both* ultimately realising (or attempting to realise) a sexual relation by way of the following surreptitious remark from SXII: “Knowledge [...] in its own growth is regulated by laws which are different to those of intuition, which are those of the symbolic operation and of a *close copulation of number with a real*, which is above all the real of a knowledge” (SXII: 300;312). What does this mean, “a close copulation of number with a real”? Numerically speaking if number could “copulate” with the real of sex this would mean that the sexual relation can be written as though it were just as writable as any other scientific formula, such as Newton’s formula for gravity. This would mean that where a pre-modern cosmology simply *presupposes* that there *is* a sexual relation, Science would be the one to set out to *write it*. Or, as Lacan comically yet revealingly puts it in Seminar XX (*Encore*), “one could, in a pinch, write  $xRy$ ,  $x$  being man,  $y$  being woman, and  $R$  being the sexual relation, but that would be stupid [*bête*: alternatively, ‘brute’].”<sup>33</sup>

Nonetheless, this is what Science aims at doing all of the time, either in the form of an actually-existing “biological” rendering the real of sex in terms of chromosomes (i.e., the writing of  $XX$  or  $XY$ ), or, in Freud’s case, “agnostically” granting that there could be a sexual relation—and a way of writing it—afforded by the Science of the future *in spite* of the fundamental insight of psychoanalysis. In short, psychoanalysis—at least in the way that Lacan recuperates Freud—is precisely *contrary* to this arbitrary will of

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32 For a more robust account of Freud and Lacan’s respective “theories of science,” see Milner’s *L’Œuvre claire*, Ch.2. Lacan argues in *L’Étourdit* that for Freudian psychoanalysis “there is no sexual relation” amounts to a saying (*dire*) that remains forgotten behind what is said (*dit*). In other words, Freud failed to stipulate the empirical manifestations of sexual discordance as a transcendental account of the absence of the sexual relation.

33 Jacques Lacan, *Le Séminaire, Livre XX: Encore* (Paris: Seuil, 1975), 36; 35.

Science.<sup>34</sup> Moreover, the lack of a formula for sex—the possibility of writing the sexual relation—amounts to a “*refus au savoir*,” a refusal of knowledge, as the above example demonstrates. In this sense, psychoanalysis functions as a possible bulwark with respect to the accumulation of knowledge by virtue of its reference to the truth of the absence of a sexual relation. It does not seek out the “truth about knowledge” of sex in the manner of pre-modern *connaissance*, but rather demonstrates a knowledge *about* truth as “a fundamentally *lateral position*” (SXII: 287;249).<sup>35</sup> As Lacan puts it:

The truth is to be said about sex, and it is because it is impossible - this is in Freud’s text - because the position of the analyst is impossible, that is why [...] there flows from it this suspense, weakness, of secular incoherence in knowledge, which is properly the one that Descartes denounces and articulates in order to detach from it his certainty about the subject, by which the subject is manifested as being precisely the signal, the test, the remainder of this lack of knowledge, through which he rejoins what bound him, what refuses itself to knowledge, in the sex on which the subject finds himself suspended in the pure form of this lack, namely as desexualised entity (SXII:287;249).

Put another way, then, Freudian experience registers the impossibility of saying the truth about sex. This impossibility is double: the truth about sex *is to be said* but *cannot be said*. The analyst’s position—the one meant to sustain or receive that truth—is itself impossible. The “suspense” Lacan mentions later follows from this. Here, Lacan attributes to this impossibility of sexual truth a “weakness” in knowledge itself, hence a “secular incoherence.” That is, there is a necessary, intrinsic gap in the very order of knowledge, and this incoherence is *not accidental* but constitutive. It is “secular” insofar as it concerns the entire field of modern *savoir qua* human knowledge, not only religious or metaphysical truth (whether ancient or modern). It is no surprise, then, that Lacan links this “secular incoherence” to the very operation of the Cartesian *cogito*. Descartes, he says, *denounces* this incoherence: he isolates it, thematises it, in order to *detach* from it the *certainty* of the *cogito*; he ensures certainty *by excluding* this incoherence. The *cogito* is thus inaugurated by cutting away from the field of knowledge that “refuses itself” to it. In the final analysis, the *cogito* is the subjective “scaffolding,” the point at which the subject sustains itself only through the exclusion of the real (i.e., the absence of the sexual relation). Yet with Freud, this exclusion no longer guarantees *certainty* but becomes the

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34 As stated in Seminar XVII: “*Marche! Continue à toujours savoir.*” Jacques Lacan, *Livre XVII: L’Envers de la psychanalyse* (Paris: Seuil, 1991), 121; 105.

35 These remarks are the textual basis for what Lorenzo Chiesa calls ‘para-ontology’, namely a lateral ontology founded in the truth of incompleteness *rather than* in the privileging of certainty over truth. Para-ontology is developed by Chiesa in Lorenzo, Chiesa, *The Not-Two: Logic and God in Lacan* (Cambridge, MA: MIT Press, 2016).

very motor of knowledge. Psychoanalysis is thus set against the foreclosure of truth characteristic of both Science and capital, each of which, for the later Lacan, entails a rejection of castration structurally homologous to that foreclosure.<sup>36</sup> Both capitalism and modern Science foreclose the truth of at least Lacanian (if not implicitly Freudian) psychoanalysis, i.e., the truth of the absence of a sexual relation for the human species. The only way for psychoanalysis to be *anti-capitalist*, and from this perspective, *truly* psychoanalytic, is to be *methodologically anti-Cartesian*.

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<sup>36</sup> Regarding the rejection of castration, see for instance the discussion in SXIXB. Jacques Lacan, *Je parle aux murs* (Paris: Seuil, 2011), 96; 40-1.

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# The Good, The Bad and the Grimdark: Why Technological Mastery Precludes Collective Self-Mastery

David Roden

## Abstract

This paper argues that a modern technological society devoted to socially determined ends is impossible. This “Grimdark Thesis” assumes a posthumanist “New Substantivist” theory of technology whose upshot is that modernity renders technical entities *abstract* and *highly repeatable*. Abstract technology is functionally indeterminate and counter-final, lacking either intrinsic or extrinsic teleology. In particular, I argue that extrinsic teleology – e.g., socially determined ends – is foreclosed by modelling a technological society as a Hyperagent – a maximally mutable being capable of arbitrary changes to its technical or material substrate. Finally, I consider whether this technological “Outside” can be reintegrated into the normative space of reasons as lack or negation, along the lines explored in contemporary Hegelian/Lacanian theories of the Subject. I argue that there are no grounds for assuming that the barred subject assumed by Hegelians/Lacanians is a transcendental invariant, implying the Technological Outside is a subtracted but not a constitutive lack.

**Keywords:** Autonomy, Posthumanism, Pessimism, Disconnection

## Introduction: First the Good News!

Much as we might aspire to a condition in which advanced technologies are devoted to collectively determined, just ends—rather than expanded for profit, or for no reason at all—we can't have such nice things. We either relinquish modernity for some primitivist or despotic alternative or accept that the (possibly short) future of humanity is to inhabit a vast, ramifying, inhuman system we can never hope to control “like fleas on a cat.”<sup>1</sup>

The reasoning behind this pessimistic claim stems from a philosophy of technology I dubbed “New Substantivism.”<sup>2</sup> In outline, Old Substantivism claimed technology is a controlling and determining feature of human society. New Substantivism dispenses with the first proposition (The Good) while asserting that technology in its modern form cannot be controlled (The Bad). Both positions, however, assume that technology is an important, often disruptive, factor in socio-cultural change. Here, I want to sharpen its ontology and further consider its implications for theories of technological governance.

The argument assumes an anti-holist ontology that I set out in the first two sections. Its upshot is that modernity frees up technical entities from finite socio-technical contexts and renders them both *abstract* and *highly repeatable*.

Abstraction is a condition of the self-augmenting or self-catalyzing character of modern technique explored in Jacques Ellul's *The Technological Society*.<sup>3</sup> Self-augmentation, according to Ellul, is a condition of the normative control exerted by technology on culture. But while abstraction is a condition of self-augmentation, I argue that rampant functional indeterminacy forecloses autonomy. The disruptive and determinative effects of modern technique thus lack normative constraints from technology itself (Section 3). However, I also adapt the speculative posthumanist idea of a maximally flexible and self-modifying agent—or hyperagent—to argue that abstract technique could never be “clamped” to ensure it reflects collective values such as justice or some other wider social good (The Grimdark).

The Grimdark Thesis derives its name from the iconic lines introducing the hag-ridden,

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1 The phrase is borrowed from the human Gaius Baltar's description of the robotic Cylons' relation to the sentient, living ships they inhabit in “The Passage,” *Battlestar Galactica*, Season 3 (Universal Playback, 2009), DVD.

2 See David Roden, *Posthuman Life: Philosophy at the Edge of the Human* (London: Routledge, 2014), 150–165.

3 Jacques Ellul, *The Technological Society*, trans. John Wilkinson (New York: Vintage Books, 1964).

demon-haunted universe of the 41<sup>st</sup> Millennium in the Warhammer 40K universe.<sup>4</sup> But rather than the post-secular conflict between Chaos and the Jackbooted Empire of Mankind, the tag implies a technological future of purposeless self-augmentation, though similarly unbounded by reason or sense. Abstract technology is fundamentally counter-final, lacking either intrinsic or extrinsic teleology. It bears no resemblance to a human agent or to a transcendental function. In contrast to those “anthropotechnic” holisms conceiving technology in terms of its ambivalent correlation with human social practices, it is radically inhuman, fissured from the human “manifest image” despite its contingent and, perhaps, passing dependence upon it. I refer to this as the “Second Disconnection Thesis.” The First Disconnection Thesis prescribes the satisfaction conditions for posthuman agency which I set out in my first book, *Posthuman Life*.<sup>5</sup> The Second describes our posthuman predicament.

In the final section I consider, briefly, whether this technological “Outside” can be reintegrated into the space of reasons as lack or negation in a qualified manner, along the lines explored in contemporary Hegelian/Lacanian theories of the Subject. I use the hyperagency argument and the constraints of dark phenomenology to argue that there are no grounds for assuming that the barred subject assumed by Hegelians/Lacanians is a transcendental invariant; thus, that the Technological Outside is a subtractive not a constitutive lack.

## 1. Substantivism, Holism and Self-Augmentation

Most critical philosophy of technology has sought to complicate the instrumentalist view that the agency of technology depends only on the intentions of its users. Most radically, “Substantivist” philosophies of technology associated with thinkers like Martin Heidegger and Jacques Ellul conceive technology as a system that distorts the human lifeworld by subordinating it to technical ends.<sup>6</sup> Technology, so conceived, is “autonomous,” determining its own principle of action.<sup>7</sup> According to Ellul, this principle

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4 “[In] the grim dark future there is only war. There is no peace amongst the stars, only an eternity of carnage and slaughter, and the laughter of thirsting gods.” *Warhammer 40,000*, September 23, 2025, [https://warhammer40k.fandom.com/wiki/Warhammer\\_40k\\_Wiki](https://warhammer40k.fandom.com/wiki/Warhammer_40k_Wiki)

5 See David Roden, “The Disconnection Thesis,” in *The Singularity Hypothesis: A Scientific and Philosophical Assessment*, eds., A. Eden, J. Søraker, J. Moor & E. Steinhart, 281-298 (London: Springer, 2012). Roden, David. *Posthuman Life: Philosophy at the Edge of the Human* (London: Routledge, 2014). See also Section 3.

6 P-P Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design* (University Park PA.: Penn State Press, 2005), 11.

7 Langdon Winner, *Autonomous Technology: Technics-out-of-control as a Theme in Political Thought*. Cambridge Mass (The MIT Press, 1978), 16

is the injunction to maximize efficiency which constrains the conceptions of the good available to human users:

Technical progress today is no longer conditioned by anything other than its own calculus of efficiency. The search is no longer personal, experimental, workmanlike; it is abstract, mathematical, and industrial. This does not mean that the individual no longer participates. On the contrary, progress is made only after innumerable individual experiments. But the individual participates only to the degree that resists all the currents today considered secondary, such as aesthetics, ethics, fantasy. Insofar as the individual represents this abstract tendency, he is permitted to participate in technical creation, which is increasingly independent of him and increasingly linked to its own mathematical law.<sup>8</sup>

I refer to the thesis of autonomous technique as “Old Substantivism” as opposed to a posthumanist “New Substantivism.” New Substantivism agrees that technology is a highly disruptive influence but denies that it possesses any inherent normativity. Technology is not *in control*, even if it is significantly *outside* our control. The scope of this “Outsideness” will be considered in Sections 3–5.

The title of this section implies a relationship between philosophy of technology and holism. Let me explain. As Fodor and Lepore put it “Holistic properties are properties such that, if anything has them, then lots of other things must have them too.”<sup>9</sup> In other words, a property is holistic if it is constituted by multiple liaisons between its possessor and other similar entities with similar properties. In contrast, atomistic properties can inhere in a thing independently of whether other entities of a similar kind have them.

Traditional substantivisms entail holism because the ability to determine society they attribute to technology plausibly requires technical items to occupy nodes in large and ubiquitous functional networks.<sup>10</sup> It is the networks of interconnected techniques, rather than individual devices, which exert normative constraints on society. *Failing ubiquity*, the system’s demands could be escaped or avoided too easily, diminishing its influence and interest. *Failing functional connectedness or integration*, its normative demands would be too weak. Integration has the effect of prescribing standards for machines as well as machine users. Thus, networked computers require compatibility protocols to allow them to communicate with other computers or with ancillary devices: for example, the TCP/IP protocols which handle information transfer across the internet and the MIDI protocol

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8 Ellul, *The Technological Society*, 74.

9 J Fodor and E. LePore, *Holism: A Shopper’s Guide* (Oxford: Blackwell, 1992), 2.

10 Babette Babich, “Constellating Technology: Heidegger’s Die Gefahr/The Danger” in *The Multidimensionality of Hermeneutic phenomenology*, eds., Babich B and Dmitri Ginev, 153–182 (Springer, 2014.)

which standardises the way computers and electronic musical instruments communicate with each other.

An example of the normative pressure of ubiquity: In advanced economies, it is currently impossible to work in any area of business, communications, or education without competence in ICT technology. An example of integration: if you use such ICT technology at all, you will need to be familiar with one of a few dominant operating systems and software packages, as well as various forms of visual, textual, or haptic interfaces. Even in the few years during which this article has been written, the normative pressure has been exacerbated by the massive investment in Generative AI systems employing Transformer Architecture and the data centres required to store their training data and weights. These multi-parameter neural networks, which utilise self-attention mechanisms to tractably encode dependences within large input vectors (corresponding to complex texts, images, etc.) constitute an industrial step change beyond the recurrent networks that earlier generation of natural language processing and computer vision research explored.<sup>11</sup> In particular, they have scaled up in a way that allows them to exhibit fluent language capacities, including the ability to write complex text far faster than a human. Of course, there are issues of reliability, relevance and epistemic justice raised by such systems. But their ubiquity means that anyone working in areas like information science, education, or complexity science must learn to address both their capacities and their limitations.

Now, function holism, characterised by ubiquity and integration, *prima facie* supports Old Substantivism's autonomy thesis for it explains how a technical system at a given stage of its development imposes efficiency standards on its human and nonhuman components alike. As Ellul observes, technology produces problems that only further technical change can address, catalysing new problems in multiple feedback loops. The demand of integration provides one basis for self-catalysing technical change, since change can produce integrative difficulties that require further novelty by way of a solution. Ellul cites John Kay's invention of the flying shuttle in 1733. This greatly increased productivity of weavers but, the increased speed of weaving necessitated increases in the production of yarn, later addressed with the invention of the spinning jenny. However, this initially caused an over-production of yarn—a problem resolved by the invention of Cartwright's power loom.<sup>12</sup> The mechanised loom in turn allowed the introduction of "adjunct" techniques such as steam power and the development of mechanised textile production, with all its concomitant demands on the integration of transportation, raw materials, and

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11 Vaswani, Ashish, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Łukasz Kaiser, and Illia Polosukhin, "Attention is all you need," *Advances in Neural Information Processing Systems*, 30 (2017). See also Jeffery Elman, "Language as a Dynamical System," in R Port and T Van Gelder (eds), *Mind as Motion: Explorations in the Dynamics of Cognition*, (MIT: Cambridge Mass., 1995), 208–222.

12 Ellul, *The Technological Society*, 112.

the disciplinary organisation of factory life.<sup>13</sup>

This feedback process is an example of what Ellul calls *self-augmentation*. Self-augmenting technical systems evolve through a circular causality whereby technical developments catalyse further developments.<sup>14</sup> Function holism produces an environment in which technical self-augmentation can occur. For the tight integration and ubiquity of industrial scale processes generates the pressure for novel solutions.

Self-augmentation can exert pressure to increase such integration—as in the case of the introduction of adjunct technologies. Thus, it can account for the progressive emergence of more integrated or holistic technological systems.

Finally, self-augmentation is a causal precondition for the autonomy of technique. It is the self-catalysing character of technical change that explains why, as in the ferment over generative AI, we are continually forced to accommodate to multiply interlacing processes of technological change which we contribute individually (if only as passive consumers) to without being in a position to exert control. As Ellul puts it:

[In self-augmenting technical systems] it is possible to speak of the “reality” of technique – with its own substance, its own particular mode of being, and a life independent of our power and decision. The evolution of techniques then becomes exclusively causal; it loses all finality.<sup>15</sup>

Finally, self-augmentation requires a feature I refer to as “technical abstraction.” Prior to the modern era, according to Ellul, technique was diffused slowly with many false starts.<sup>16</sup> However, once technique can diffuse on an industrial-planetary or, prospectively, an extra-planetary, scale it becomes capable of squeezing out forms of life that do not answer to its increasingly enveloping functional requirements.

## 2. Abstraction vs Holism

The model that I draw from Ellul implies hierarchy of technical holisms, each subtending a less basic one:

- 1) *Functional holism* obtains when there is a complex interconnected

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13 Winner, *Autonomous Technology*, 102.

14 Ellul, *The Technological Society*, 93.

15 Ellul, *The Technological Society*, 93.

16 Ellul, *The Technological Society*, 68.

network of technical elements, resources, infrastructures, users, and producers.

2) *Normative holism* depends on 1 for the reasons explained in Section 1.

3) Function holism and normative holism institute *semantic holism* for our concepts of concrete technical systems since they are typically conceptualised in terms of the functional roles they serve and the practical constraints they impose.<sup>17</sup>

4) Finally, we can add *anthropotechnic holism* to the hierarchy as an optional plug-in. According to anthropotechnic holism technology and human subjectivity are not two distinct entities but are locked in cycling coevolutionary spirals. Bernard Stiegler's anthropotechnic approach holds that the openness of the human to Being, to historical temporality depends on the ways humans exteriorise sensation and thought in technical media.<sup>18</sup> Similar indissociability claims are, of course, made via extended mind theory, cyborg theory, process externalism or theories of embodied/embedded cognition.

Stiegler's anthropotechnic account also draws on Jacques Derrida's account of generalised writing. Derrida's input is important here because his discussion of the retentional and iterable mark abstracts from regional phenomenological and mentalistic vocabularies and allows us to understand how generalised writing implements, but also modifies, the functions of the psyche, implementing them on inorganic as well as organic platforms. For example, Derrida's discussion of the role of copyright law in framing the boundary of the literary work allows us to see how one technology of repetition (printing) prompts legal framing that individuate the work in relation to the figure of the author.<sup>19</sup> This in turn allows us to see how the experience of the literary object emerges from a specific socio-technological juncture.

Anthropotechnic holism can thus explain how pervasive features of human cognition and

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17 Dionysis Christias, "On the Proper Construal of the Manifest-Scientific Image Distinction: Brandom contra Sellars," *Synthese*, 195, no. 3 (2018), 1295–1320.

18 See Bernard Stiegler, "Elements for a General Organology," *Derrida Today*, 13, no 1, (2020): 72–94; Pieter Lemmens, "From Ontology to Organology: Heidegger and Stiegler on the Danger and Ambiguity of Technology and Technical Media," preprint, n.d., [https://www.academia.edu/33717425/From\\_Ontology\\_to\\_Organology\\_Heidegger\\_and\\_Stiegler\\_on\\_the\\_Danger\\_and\\_Ambiguity\\_of\\_Technology\\_and\\_Technical\\_Media](https://www.academia.edu/33717425/From_Ontology_to_Organology_Heidegger_and_Stiegler_on_the_Danger_and_Ambiguity_of_Technology_and_Technical_Media).

19 Jacques Derrida, "Before the Law," in *Acts of Literature*, ed. Derek Attridge (London: Routledge, 1992), 181–220.

culture—like the possibility of a modernist literary aesthetics, or the existence of state societies—are intimately bound up with technical media.

However, while philosophically rich, I think old substantivism and its holist ontology implies an anthropocentric view of technology as a quasi-transcendental organising principle—a kind of impersonal subject—which fails to reckon with the radical ontological departure constituted by technical modernity. We can begin to see why this fails if we circle back to consider the implications of *technical abstraction*.

Technical repetition is any repetition of technical patterns mediated by technique. It comes in degrees since some technologies are easier to replicate than others given the available media. Technical repetition is also a special case of the minimal repeatability of particulars. A repeatable particular is any entity that occurs in a local spatiotemporal context and can be made to recur through some reliable causal process. We can contrast a repeatable particular both to a one-off object or event, on the one hand, and to a potentially occurrent eternal event, which is a purely abstract entity without the spatiotemporal properties of its instances.<sup>20</sup> Repeatable particulars have a historical existence and make a historical difference. They can come into being and pass away and be repeated inexactly, as when an utterance gets cited, ironised, or translated, or a germline genetic mutation occurs.

For a particular like an event to be repeatable, it must include a replicable pattern that can be inputted into a replicator. The pattern remains inherently variable; abstract but not eternal. Minimal repetition does not require that a repeating event exemplifies the exact patterns, forms, or structures the repeated event exemplifies. It is *non-identical repetition*, necessarily affected by variation. As Derrida argues, this differential repeatability is not rule-constrained. Patterned repetition clearly transcends the cultural world of language and convention, as examples such as genetic replication or recurrence in biological neural networks demonstrate.<sup>21</sup> However, even within the cultural sphere it can be shown that no set of rules can capture all the possible future uses of a sign. *So, differential repetition must likewise transcend any constitutive rules. It is, rather, a condition of there being any norms or rules in the first instance.*

Being differentially repeatable, abstract techniques are thus available for reconfiguration in disparate contexts of *re-use*. More abstract techniques are more functionally indeterminate, or “multistable” than less abstract techniques. As an example, Don Ihde

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20 See David Roden, “Radical Quotation and Real Repetition,” *Ratio* 17, no. 2 (2004): 203–4.

21 This idea is obviously inspired by the account of iterability as one of the infrastructures of generalised writing in Jacques Derrida, *Limited Inc*, trans. Samuel Weber and Jeffrey Mehlman (Evanston Ill.: Northwestern University Press, 1988). However, I opt for a more neutral account of repetition in this essay so as to minimize ontological commitments at the base of the theory.

cites sardine cans left in New Guinea by Australian gold prospectors and later appropriated by the indigenous inhabitants as ornaments for headgear.<sup>22</sup> Ihde and Verbeek both argue that the phenomenon of multistability shows that technologies are *just their roles in human practice* and not their intrinsic features:

Just as perception can be understood intentionally only as perception-of, and consciousness only as consciousness-of, so technology can only be understood as technology-in-order-to. The “in order to” indicates that technologies always and only function in concrete, practical contexts and cannot be technologies apart from such contexts.<sup>23</sup>

Unfortunately, multistability demonstrates the complete opposite. *Function shifting* is only possible if technical entities are more than any list of functions that they have in concrete, practical contexts. *This functional indeterminacy is, moreover, a technical power.* For example, modern inertial guidance technologies are based on an effect whereby rotational movement in an interferometer causes a phase difference between two beams from a split light beam. The interference can be recorded at their destination and used to measure the angular velocity of the apparatus. The technique was originally designed by George Sagnac in 1913 to detect the luminiferous ether, replicating the 1887 Michelson-Morely experiment with greater accuracy. To be sure, Sagnac had speculated that the interferometer could be used to measure changes of course on a ship, but it was not until the development in quantum electronics and lasers that a device small and accurate enough for use in aircraft or missile guidance systems could be developed.<sup>24</sup>

As Brian Arthur puts it, a technology is “like a highly reactive building block in chemistry – the hydroxyl ion say – doing little on its own but appearing in a host of different combinations.”<sup>25</sup> Parts of technical assemblages thus acquire new powers to affect the world through re-use. Abstract techniques are consequently neither eternal nor ephemeral. Their repetition does not have to take place in conformity to constitutive rules. *Since there are no rules determining what counts as an instance of a repeatable technique, there can also be none to fix what one should do with it.*

*Technical abstracta consequently elude the functional, normative, and semantic holisms discussed above. They are ontologically independent of mechanisms or rules governing given context so long as some causal channel exists for their replication. Thus, even if functional holism is*

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22 Verbeek, *What Things Do*, 136.

23 Verbeek, *What Things Do*, 117.

24 D.A. MacKenzie, *Knowing machines: Essays on technical change* (MIT Press, 1998), 73.

25 W. B. Arthur, *The Nature of Technology: What It Is and How It Evolves* (New York: Free Press, 2009), 25.

true of concrete technical things like networked computers, abstract technique is, of its nature, functionally indeterminate, free to range between disparately patterned technical assemblages and thus not constrained by the demands of integration. It follows that the abstract techniques are not determined or normatively constrained by any finite, local functional context.

### 3. Against Autonomy

It might be objected that technologies are limited to some higher order or “transcendental” context if not to particular contexts of use. For example, it could be claimed that technologies are essentially human or “anthropoform.” Otherwise put, does it follow that techniques might be constituted by a hypothetical “totality” of human practices not as particular technical types but simply as tokens of the type *technical entity*?

This would not be so if *posthuman life* is metaphysically possible *as per* Speculative Posthumanism (SP)<sup>26</sup> and thus separable from the Wide Human—the historically variable mass of human, cultures, environments and practices—*as per* the (First) Disconnection Thesis. According to the First Disconnection Thesis, a wide human descendent of humans is a Posthuman if and only if (I) It has ceased to belong to WH (the Wide Human) as a result of technical alteration. Or (II) is a wide descendant of such a being (Outside WH). The notion of wide human descent is introduced to accommodate the fact that when considering hypothetical posthumans, emphasis on biological descent from biological humans is excessively narrow. An entity is a wide human descendant of humans if it is the result of a technically mediated process:

A) Caused by a part of WH where the ancestral part may be wholly biological, wholly technological or some combination of the two.

B) Caused by a wide human descendant.

Clearly a wide ancestor of a posthuman need not be a biological human at all, given this definition—they could be an AI or synthetic organism produced within WH, for example. Equally clearly, some wide descendants of wide humans (biological humans or their artifacts) could have ceased to be human by virtue of leaving WH.

Disconnection is technologically mediated by definition. Disconnected technologies would be incorporated (thus differentially repeated) in nonhuman wide descendants of

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<sup>26</sup> The SP schema simply states: *Descendants of current humans could cease to be human by virtue of a history of technical alteration.* See Roden, *Posthuman Life*, 107.

current humans—known as “posthumans.”<sup>27</sup>

I assume, in what follows, that some kind of posthuman technology is possible and thus that *technology cannot be an anthropological kind*. Not only this, but I also want to show that technology already qualifies as an Outside, radically exterior to human practice, albeit one that our current technical civilisation is participating in replicating into this potentially nonhuman future (Second Disconnection).

The first step in the demonstration is to show that the old substantivism of the Ellul/Heidegger variety is incoherent in its own terms. Then I want to argue against the heteronomy of technology with respect to human ends. We have seen that technical autonomy presupposes self-augmentation, while self-augmentation requires high transmissibility and promiscuous re-use. *However, it is easy to show that normative autonomy is also incompatible with the abstraction and functional indeterminacy of techniques; thus, incompatible with its own preconditions.*

We can see why, if we note that Ellul’s account of technical autonomy invokes a *second order efficiency concept*. This is because there is no efficient process *per se*. Considered abstractly, any technique can be efficient in some ways but not others. However, according to Ellul, all particular techniques are goal-directed operations. As he put it: “Technical methods are not multipurposive, or adaptable, or interchangeable.”<sup>28</sup> So even if technologies can in principle be evaluated according to different efficiency criteria, concrete technologies have their efficiency criteria fixed by their purposes.

It follows that first order efficiency in autonomous systems must be pinned down by local norms of use. Autonomy thus requires a mapping from the higher order efficiency requirement of the global system to the first order efficiencies of local use. *However, we have seen that this mapping strictly does not apply to abstract techniques, which are unbounded from local uses.* And since abstract techniques account for the universality and power of modern technique, *old substantivism and the autonomy thesis are false with respect to the technical dynamics of modernity; that is, regarding the transmission and modification of repeatable technical entities over time.* Modern technology cannot, then, be autonomously self-governing with regard to its dynamics. *Normative function holism applies, if at all, only to the synchronic organisation of situated technical networks. But this is of less significance than the diachronic aspect when considering the implications of technology for social disruption and governance.*

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27 See Roden, *Posthuman Life*, 107–113 and “The Disconnection Thesis.”

28 Ellul, *The Technological Society*, 75.

#### 4. The Grimdark Thesis

If the autonomy thesis signally fails for modern technique, might this be the unalloyed Good News, might it salvage instrumentalism, nay even humanism? Might it follow that abstract techniques are, potentially at least, *heteronomous* with respect to the determining norms and values of humans and their societies? I will argue that instrumentalism fails for the same reasons that the Technical Autonomy thesis does. However, the argument is somewhat more involved. To see why heteronomy fails, I want to consider what the reliable human governance of abstract technique would require. It is plausible to suppose that it would require method for monitoring technical innovations by predicting their outcomes for wider society. Such an organon is arguably a condition of realising the “mastery of mastery” Ray Brassier identifies with Hegel’s Absolute Spirit and the conditions for communism.<sup>29</sup> The domination of domination plausibly requires a social capacity to prevent undirected technical change.<sup>30</sup>

Let’s call this organon a “Controller.” A Controller would be a kind of simulation technology that would allow future divergences of abstract techniques to be modelled ahead of their adoption. By “simulation” I mean that some representational model of the technology and its potential repetitions and applications. Since a Controller could generate a representation of a notional technology and its socio-technical relations, it could also be used to *bring about those same divergences effectively* and not just in simulation. This implies what we might call “technical hyper-abstraction”: the capacity to rapidly replicate and modify any arbitrary component of the technical system in multiple ways. Of course, this is an idealisation of the requirements for the social direction of technique, but not an entirely fanciful one. The existence of AI systems that can write code based on functional specification given in natural languages suggests that it might be possible for later iterations of AI systems to generate models of notional technologies, which models could be later exploited by humans or AIs to implement in the real world. Such a simulation technology must itself be highly replicable because, as the general technology of replication *par excellence*, it must be capable of modelling its own effects. Secondly, it would need to be accessible to every node in the technical system to furnish the tools for deliberation on the human future.

In what follows, I will develop an argument to show that the Controller simply could not furnish the human control of its own technical mastery that the mastery of mastery necessitates.

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29 Ray Brassier, “The Human,” Accessed December 10, 2022, <https://www.foreignobjekt.com/post/ray-brassier-posthuman-pragmatism-selecting-power-the-human-from-subversion-to-compulsion>.

30 One might claim, for example, that this highly deliberative arrangement would have a) predicted anthropogenic climate change and b) mobilized effectively to prevent it.

This proceeds by modelling the Controller as a Hyperplastic agent (Hyperagent), a maximally flexible agent with a highly efficient and detailed self-model that allows it to intervene in its own substrate at arbitrary grain. Elsewhere, I have argued that a hyperagent would find it impossible to follow basic maxims involving *categorical values* which furnish its reasons to continue existing.<sup>31</sup> A plausible such maxim might be that if a collective or individual agent **A** has a categorical value **V** at a given time it would act to ensure that future iterations of itself retain **V**. However, for **A** to achieve this assurance with respect to a given **V** is impossible, as we shall see.

Assume that some repeatable cortical circuit pattern *s* in **A** codes for **V**. Each circuit pattern *s* can be instantiated or repeated in multiple tokens in different configurations of **A**'s hardware. Now, we can expect this value fact to be radically contextual because such content is itself liable to be holistic. That is, *no s intrinsically represents a value but only by virtue of some wider context whose affiliations fix the relevant content*. Consequently, ensuring **A** retains **V** in its future iterations would require **A** to use its excellent self-model (its *inner Controller*) to *clamp* that circuit, ensuring some of its circuits (the *s*'s) only occur in those contexts where they mean **V**, not **V\***, **V\*\***, etc. This creates a search problem for a highly flexible agent that wants to retain **V** as a categorical value in its future forms: *how to generate a list of configurations in which one of its states implements or represents V and thus avoid losing whatever gives purpose and reason to its existence*.

To solve the search problem, we can picture the Controller generating partitions between contexts in which **V** is retained and those in which it is not. Call each such output a "Tier." Each Tier can be thought of as a finite but arbitrarily large set which is part of a partially ordered series of Controller outputs. Each tier contains previous tiers as subsets but may include additional new elements that do not have that container structure. Within each tier there would be two disjoint subsets corresponding to the partition between *s*'s. Each element would be allocated to one or the other and their union would be the Tier itself.<sup>32</sup>

It is easy to see that the contents of each Tier are just more circuits of the same kind as the *s*'s, *so the same problem recurs for each tier*. Thus, we move onto a second tier partition, and a third .... and so on. The "and so on" applies because of the technical flexibility (hyperplasticity) of **A**, which can always intervene in its architecture and generate new contexts for its circuits. Some may contain the earlier ones, while others may not. Some may clamp some *s* tokens to **V**, and some of which may not. Where an *s* which happened to clamp to **V** in an earlier tier is included in a new context in a subsequent tier, the holistic

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31 David Roden, "The Filter Problem for Posthuman Bioethics: The Case of Hyperagency," in *Bioethics and the Posthumanities*, ed. Danielle Sands, (London and New York: Routledge, 2022), 116–128.

32 I derive my description of the "tier" from Thagard and Verbeurgt's description of the Max Cut problem in Thagard, P. & Verbeurgt, K, "Coherence as Constraint Satisfaction," *Cognitive science* 22, no. 1 (1998): 1–24.

principle means that there is no guarantee that it will still represent that value for the new Agent it composes.

Thus, clamping any given  $s$  token to  $V$  requires that *all tiers in the hierarchy are computed in advance: a complete partition of all possible contexts in which  $V$  is retained and not retained*. For even if it outputs a list of contexts sufficient to clamp  $s$  to  $V$  up to a given tier <sub>$n$</sub> , that is consistent with any of these contexts being inserted into the “wrong” partition in a further iteration. A search algorithm specified along these lines could not terminate without leaving the search problem unsolved (though of course, following Turing's proof of the insolubility of the Halting Problem, we could never acquire a method to prove this for an arbitrary program).<sup>33</sup>

Although this falls short of a formal proof (something I will leave to those more mathematically talented than I) it gives us reason for thinking that the clamping problem is undecidable—there is no algorithm that could spit out the answers that a hyperagent would need to solve it. Since the clamping problem is essentially a computational problem *only computation provides the power to solve it. But, assuming the arbitrary flexibility of the Hyperagent, it cannot*. The very flexibility and power of the Controller to generate new shapes for its Being (its technological mastery) precludes self-mastery: *the Grimdark Thesis*.

The preservation of categorical value commitment proves impossible for the individual hyperagent. But whether we think of the hyperagent as an individual like a self-modifying robot or a collectivity or swarm intelligence is irrelevant here. The same considerations apply, then, for a *social hyperagent* attempting to clamp abstract technologies, ensuring their use exhibits a favoured set of values (justice, equality, freedom, individual or political autonomy, etc.) Here the  $s$ 's are not cortical states but *abstract technologies* and their concrete applications their tokens. Clamping requires not only that we can simulate

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33 See Alfonseca, Manuel, Manuel Cebrian, Antonio Fernandez Anta, Lorenzo Coviello, Andrés Abeliuk, and Iyad Rahwan, “Superintelligence cannot be contained: Lessons from computability theory,” *Journal of Artificial Intelligence Research* 70, (2021): 65–76. They argue that the undecidability of the Halting problem means that the problem of containing a superintelligent AI is also uncomputable. They do this by defining a function *HaltHarm* ( $T, I$ ) where  $T$  is an arbitrary Turing machine and  $I$  some set of inputs that it executes. *HaltHarm* first implements  $T$ , whatever that is, and then implements an algorithm *HarmHumans*. *HaltHarm* will harm humans only if  $T$  halts and gives an output. Now, if the problem of whether an arbitrary program will harm humans is computable then it must be possible to compute whether *HaltHarm* ( $T, I$ ) will harm humans for arbitrary  $T$  and  $I$ . But this would require solving the halting problem and thus the assumption that it can be computed leads to a contradiction. If the Harm Problem cannot be computed, we cannot have an algorithm for computing whether a given superintelligent AI can be let out of containment. Now, I do not assume a Hyperagent or any other posthuman would be superintelligent (See Roden, *Posthuman Life*, Chapter Five.) However, if superintelligence is possible in our world and this argument is sound, we get the same result: namely that no technological society, communist, capitalist, or whatever, can ensure its technologies harmonize with its categorical values.

technical divergences but all the contexts in which these obtain and their contexts in turn (up the hierarchy of tiers) which, as in the first case, are still more technical divergences for which the same question must again be posed.

Thus, as with the individual hyperagent, this subjectification of technology would never be achieved because clamping a particular abstract technology would require clamping members of all the achievable contexts into which it could be iterated.

We can make a supplementary twist of Grimdark Blade (or 40K Chain Sword) by noting that the problem of the hyperagent is rendered even more challenging if we consider what *kind* of agent it is. It cannot be intentional, rational, or reflexive since—given modest anti-reductionist assumptions—it would have no means to predict the psychological consequences of an arbitrary functional or physical self-modification. The only assumption we need to make to demonstrate this is milquetoast anti-reductionism: the kind that denies that there are any robust psychophysical laws.<sup>34</sup> Assuming this modest metaphysics, a hyperagent would have no reliable way of determining the psychological consequences of any changes it makes to its functional or physical substrate. Any belief/desire could be deleted with the merest self-tweak. In this situation, sapience becomes impotent and unimplementable.

It would be useless to treat such a radically extended agent as an “intentional system” or as a user of symbolic language since interpreting a system as a symbol user would require ascribing propositional or conceptual content to beliefs and desires that are likewise robust over time, saving ordinary processes of rational belief fixation. Since the hyperagent would not be able to do this for itself, neither would a human or anthropoform interpreter. A hyper-reflexive social-technical system consequently resembles an individual hyperagent in all the ways that matter. It can have no collective intentions or symbolic structure at all.

## 5. Conclusion: The Second Disconnection

*A technological society organised on modern lines cannot exhibit rational and collective self-mastery.*

The Grimdark Thesis follows from the Second Disconnection Thesis: namely, that technologies are not only concrete correlatives of human practices but also abstract repeatables disconnected from any such correlation. Technology in its abstract form is neither for us nor for itself. The dynamics generated by technical abstraction cannot

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<sup>34</sup> David Roden, “Nietzschean Hyperagents,” in *Nietzsche, Critical Posthumanism, and Transhumanism*, ed. Aura Schussler, 159–171 (Trivent, 2025).

conform to our collective intentions *in principle*, as shown in Section 4.

Whereas the First Disconnection Thesis is a speculative futural hypothesis, the Second defines our “posthuman predicament.”<sup>35</sup> Abstract technique does not belong to a symbolically constructed world.<sup>36</sup> The encounter with it is “phenomenologically dark”: experiencing it through technical practices does not afford non-trivial knowledge of its nature.<sup>37</sup> From the perspective of a human manifest image (structured by reasons and purposes) the Technical is an ontological monster, made for reasons while eluding normativity or finality.

The Second Disconnection Thesis could prompt an idealist rejoinder inspired by Lacan’s psychoanalytic conception of the real and Hegel’s introjection of the antagonism between subject and substance, subject and essence, within subjectivity itself.<sup>38</sup> The *real*, so understood, is an “impasse in formalisation or that which cannot be exhausted by the symbolic.”<sup>39</sup> Here, the Symbolic is roughly the “signifying order” of rule-governed linguistic practices that constitute science and objectivity.<sup>40</sup> *The real* is not a metaphysical realm independent of the signifying order but the constitutive gap in its capacity to secure objective claims and determinate desires.

This would only be a partial solution to the problem posed by the Grimdark Thesis. It would amount, firstly, to a form of “Bounded Posthumanism,” where the scope for disconnection is restricted by the invariant structure of human subjectivity or agency.<sup>41</sup> Technology would be restored to an anthropological kind along the lines of anthropotechnic holism (Sections 2, 3) and thus bound to normative realm by default. This would not, of course, ensure our capacity to control technological systems according to collective ends, but it would at least place bounds on the possible outcomes of this lack. It thus amounts to a qualified denial of the Second Disconnection Thesis. A Hegelian/Lacanian understanding of the technological real could accordingly treat the technical as a further iteration or exacerbation of an unreason immanent to the dynamics of the Symbolic (or Thought) rather than a wholly inhuman and arational formation.

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35 Roden, *Posthuman Life*, 186.

36 David Roden “Ways of Unworlding: Against Aesthetic Inferentialism,” *Identities: Journal for Politics, Gender and Culture*, 18, nos.,1–2 (2021): 54–64.

37 David Roden, “Nature’s Dark Domain: An Argument for a Naturalised Phenomenology,” *Royal Institute of Philosophy Supplements*, 72 (2013): 169–188.

38 Slavoj Žižek, *Sex and the failed Absolute* (London: Bloomsbury Academic, 2019), 20.

39 Isabel Millar, *The Psychoanalysis of Artificial Intelligence* (Basingstoke: Palgrave Macmillan, 2021), 61.

40 Millar, *The Psychoanalysis of Artificial Intelligence*, 58–9.

41 For the distinction between bounded and unbounded posthumanism see David Roden, “On Reason and Spectral Machines: Robert Brandom and Bounded Posthumanism,” *Philosophy After Nature*, eds. Rosi Braidotti and Rick Dolphijn (New York: Rowman & Littlefield International, 2017), 99–119.

As I will show, this prospectus for reincorporating the metaphysical reality of technique into the real of subjectivity is explanatorily inadequate. Nonetheless, it may be fruitful for exploring the ways technical self-augmentation enlists, alters or (in a value-neutral sense) *perverts* desire. Of special relevance to this supplementary task, perhaps, is the Lacanian idea of *extimité*, or “extroverted interiority” discussed in Isabel Millar’s *The Psychoanalysis of Artificial Intelligence*.<sup>42</sup> The Extimate straddles the psyche considered as a subjective domain and the extra-mental, extra-bodily world. Millar argues that our anthropotechnic dependence on exteriorized technological supplements “propels” and produces need rather than constituting an instrumental response to them. This process is extimate insofar as it exteriorises the psychological operations of the drive beyond the meat sac.

This ambivalent investment in technological entities and systems is explored in her discussion of Baudrillard’s *Consumer Society* and the idea of the “gizmo” as the techno-fantasy object which propels our desire rather than offering the solution to particular problems:

Whilst most objects seem to fulfil some sort of obvious functionality, the distinction he makes with the gizmo is that its supposed hyper-functionality conceals the complete opposite, the fact that the gizmo is actually itself the creation of a function or need as opposed to the solution to one. The technological object for Baudrillard is one, not driven by functionality but *rather defined by its relationship to human fantasy and desire*. “The myth of the ‘wonder-working functionality of the world’ as he calls it, is the idea of a world which “works,” a world which makes sense as a functional whole. This myth of unity and teleology Baudrillard believes finds its parallel in the phantasy of the human body as a similarly functional whole.”<sup>43</sup>

As an iteration of the Lacanian real, the technical thing is “defined” in terms of this constant displacement of local function by what Baudrillard terms the “hyperfunctional,” shattering the anthropocentric, symbolically coded fantasy of technology embodying human ends, intentions, or purposiveness as such.<sup>44</sup>

Given our intimate dependence on self-augmenting technological systems, their impact

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42 Millar, *The Psychoanalysis of Artificial Intelligence*, 49–81.

43 Millar, *The Psychoanalysis of Artificial Intelligence*, 68–9. My emphasis.

44 See also Jean Baudrillard, *Simulacra and Simulations*, trans. Sheila Faria Glaser (Arbor: University of Michigan Press, 1994), 113; David Roden, “Cyborgian subjects and the Auto-destruction of Metaphor,” in *Crash cultures: Modernity, Mediation, and the Material*, eds. Jane Arthurs and Iain Hamilton Grant (Intellect Books, 2003), 91–102.

on desire and the place of desire in a posthuman dispensation absolutely needs to be theorized. After all, given the Second Disconnection, our investment in technology existentially commits us to facilitating an undirected process immanent to the Wide Human in any advanced technological form. This constitutes a perverse will to technical difference without determinate content since, as the hyperagency argument shows, there is no *a priori* guarantee that a disconnected posthuman will be a subject or agent as we presently understand it. I refer to this pre-emptive desire or will as “xenophilia.”<sup>45</sup>

Millar’s subtle discussion is helpful for getting a grip on the idea of xenophilia. Using the notion of *Extimité* to think the inhuman automatism of technical self-augmentation as a kind of outsourced, disembodied drive—a drive for nothing beyond difference, without telos, subject or object—captures what is distinctive about this operation of posthuman desire and the way in which it is expressed within planetary technological systems.<sup>46</sup> Thought in these terms, Xenophilia isn’t the psychological cause of undirected technical change—it is not, for example, driven by fantasy, though it can also be expressed in fantasy. It is what being *existentially committed to an uncontrollable, self-catalysing technical system consists in or does*.

Likewise, it is possible Baudrillard is right about the fantasy of wholeness *insofar as it is effectuated in technical practice as such*. The fantasy could be enacted via the serviceable, if patently false, heuristic that these evanescent concreta conform to a functionally integrated “world.”<sup>47</sup> By the same token, xenophilic desire would be vehiculated through all the defiles by which abstract technique diverts practice into the void of hyperfunctional excess; seducing us away from the “Manifest Imaginary” of a teleologically and normatively ordered human world. Its fabulation would be neither purely psychic or biological, nor purely outside the meat-bag, but, in Millar’s terms, *extimate*. Thus, the technological and its extimate displacements imply xenophilia as an operative perversion behind all our technical agency.<sup>48</sup>

However, defining the technical as a newly intricately impasse in the Human Subject would be legitimate only if the barred subject of this lack is a transcendental invariant: a presupposition of any conception of reality or agency, for example. Dark Phenomenology and the Hyperagency Argument (Section 4) each give us reason to reject a “bounded” posthumanism in favour of one devoid of transcendental bounds. The Dark phenomenology principle obviates the Lacanian move because it makes it illicit to infer cognitive or ontological necessities from contingent limits on the mind’s capacity to consciously

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45 See David Roden, “Subtractive-Catastrophic Xenophilia,” *Identities: Journal for Politics, Gender and Culture* 16, no 1–2 (2019): 40–46.

46 Roden, “Subtractive-Catastrophic Xenophilia.”

47 Roden, “Ways of Unworlding.”

48 “Subtractive-Catastrophic Xenophilia.”

represent its activity.<sup>49</sup> This lacuna is born of “medial neglect,” the mind/brain’s inability to represent its representational machinery.<sup>50</sup> Since, we are not aware of our experiences as involving such subpersonal mechanisms, it is natural to infer that they are diaphanous, magical; reaching directly out to the world (as in the assumption that mind possesses “intrinsic aboutness” or intentionality). Thus, since our access to our mental life is largely privative, *we are prone to conflate absence of information about causes for information regarding a causally effective or active absence*: the pole of negativity around which the barred subject of Lacanian-Hegelian ontology pivots.<sup>51</sup>

Now, I also want to insist on an epistemological void arising from the abstract, inhumanist character of technical modernity, but this is not a constitutive negativity or lacunary subject. Its Outside has only a passing connection to Subjectivity or Thought. It cannot be converted to a transcendental function of thought or subjectivity as such because it renders the hyper-agential extension of agency *unthinkable as thought or subjectivity* (Section 4).<sup>52</sup> From this purview, Millar appears to make the idealist error of defining the hyperfunctional technical entity as a correlate of human subjectivity or fantasy, whereas it is as structurally uncorrelated with desire as it is to social practice.<sup>53</sup>

The metaphysics of repetition set out here accounts for the capacity of technical systems to produce ramifying cycles of need as new constellations of technique form through proliferating re-use. Consequently, we do not need to postulate the fantasy of a perpetually incomplete “phallic body” to “drive” self-differentiating technical systems.<sup>54</sup> The phantasy does not produce hyperfunctionality but may be its manifest consequence. Technical systems will disseminate themselves just fine as long as mechanisms for proliferating technical abstracta across planetary or post-planetary technical networks exist. How these are effectuated at a psychological or micro-social level is underdetermined and, arguably, multiply realizable. They may involve such fripperies as the “phallic body” but others (distributive justice, profit, longtermist utilitarian calculation or simple curiosity) might work as well.

This is why *Posthumanism is Grimdark to its core*. There is no human, inhuman or posthuman

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49 “A feature of conscious experience is intuition-transcendent or “dark” if it confers no explicit or implicit understanding of its nature on the experiencer” see David Roden, “Nature’s Dark Domain,” 172.

50 R. Scott Bakker, “From Scripture to Fantasy: Adrian Johnston and the Problem of Continental Fundamentalism,” *Cosmos and History: The Journal of Natural and Social Philosophy* 13, no. 1 (2017): 540.

51 Bakker, “From Scripture to Fantasy,” 542, 545–548.

52 See Roden, “Subtractive-Catastrophic Xenophilia,” 40–46.

53 This is also evidenced in her preemptory dismissal of the question of artificial superintelligence as “hyperbolic” see Millar, *The Psychoanalysis of Artificial Intelligence*, 62.

54 Millar, *The Psychoanalysis of Artificial Intelligence*, 68.

subject that provides a transcendental source of meaning or value—not through the rational fixation of higher order beliefs or values, nor through an infantile and redundant “unconditional accelerationism” which affirms the Molochs and Medusas of planetary technical production. There is nothing to affirm, nothing to identify with. We are irrevocably invested in becoming *xeno* through being enmeshed in “divergent, disrupted and diffuse systems of forces, in which the role of human decisions and perceptions is a contributing factor at best.”<sup>55</sup>

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55 Claire Colebrook, “A Globe of One’s Own: In praise of the Flat Earth,” in *Death of the Posthuman: Essays on Extinction, Vol 1* (Open Humanities, 2014), 70.

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The Good, The Bad and the Grimdark: Why Technological Mastery Precludes Collective Self-Mastery

Vaswani, Ashish, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Łukasz Kaiser, and Illia Polosukhin. "Attention is all you need." *Advances in Neural Information Processing Systems* 30 (2017).

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# Shadows And Everything Between: What Is Lost When Technology Takes Over

Joshua Clements

## Abstract

Drawing on media ecology and philosophy of technology frameworks, this essay first aims to illustrate the impacts of technology and second to discuss a possible way forward amid technological change. I will examine the influence of electric light on Japanese aesthetics, particularly through the perspective of Jun'ichirō Tanizaki and his essay, *In Praise of Shadows*. Subsequently, I will extend the concept of electric light to digital technologies in general, with the aim of linking the loss of beauty in Tanizaki's view to the loss of betweenness and nuance in the digital environment. Just as electric light redefined notions of beauty in Tanizaki's Japan, digital technologies have likewise transformed our understanding of human interaction and information. Finally, in a call for awareness and human solidarity, I suggest that resisting technological change is not futile; indeed, it is essential if we wish to free ourselves from the matrix we have created and perpetuated.

**Keywords:** Digital Environment, Technological Resistance, Jun'ichirō Tanizaki

Were it not for shadows, there would be no beauty.  
—Jun'ichirō Tanizaki, *In Praise of Shadows*

## 1. Introduction

Technology has a long history of influencing humanity. While this statement seems monolithic and perhaps deterministic, this essay first aims to illustrate the impacts of technology and, second, to discuss a possible way forward amid technological change. This essay draws on media ecology and the philosophy of technology to call attention to certain human elements that are lost in technological change, particularly with the advent of digital environments. The nuance of human existence cannot be reduced to binary code, to 1 and 0, to pure black and white. Nuance, instead, implies a shadow, a between state. It is this liminal space that will serve as the main analogy for the essay. I wish to offer a brief overview and critique, while also maintaining a mild optimism that we are never beyond the scope of recovering ourselves from the throes of technological change.

The purpose of this essay is to follow through and observe some of the implications of “technological progress.”<sup>1</sup> I will use the impact of electric light on Japanese aesthetics, particularly from the perspective of Jun'ichirō Tanizaki and his essay *In Praise of Shadows*. Electric light, as a medium, will help us see a pattern of technological change, particularly one whose positive impacts are often foregrounded while its negative effects are left in the dark. Then, I will extend the conception of electric light as a pattern to digital technologies more broadly, with the goal of connecting the loss of beauty in Tanizaki's view to the broader harm to humanity in the digital environment. This section will evaluate digital technology philosophically and metaphorically, using electric light as an analogy. Lastly, in a call for awareness and human solidarity, I suggest that resistance to technological change is not futile. Indeed, it is imperative if we intend to free ourselves from the matrix we have fashioned and enabled.

## 2. Japanese Industrialisation in the Meiji Era

Japanese culture shifted drastically in the late 1800s. The Japanese Meiji era of the 1870s exhibited more curiosity about Western ideas and technologies than previous regimes.<sup>2</sup> However, to some, adopting foreign ideas and technologies gave the Japanese a bad light (pun intended). Japan ultimately “relied on the West as the source of technological knowledge... a dependency that gave rise to the unflattering view that the Japanese could

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1 Marshall McLuhan and Eric McLuhan, *Laws of Media: The New Science* (Toronto: University of Toronto Press, 1988), 93.

2 Andrew Gordon, *A Modern History of Japan: From Tokugawa Times to the Present*, (Oxford: Oxford University Press, 2003).

only borrow and imitate, not invent.”<sup>3</sup> If the Japanese had been left to their own devices, literally, they might have come into a “world of technology entirely its own.”<sup>4</sup> Of course, the sentiment that Japan merely aped the West would later change when many new technologies and innovations began to flow from the island nation to Western shores.

Don Ihde suggests a categorisation of how technologies are carried from more industrialised countries to those less adapted to technical means of existence, and the responses of indigenous cultures to “technologization.”<sup>5</sup> He considers the first group as having no coping mechanism to stave off or slow the invasion. They are over-taken and overwhelmed, consumed by the novelty and newfound abilities technology provides. Ihde sees the second group as compromising by adopting certain technofacts (technological artefacts) and adapting them to the indigenous way of life. A third group resists the majority of the incoming group’s technologies. This is, however, a rare occasion. The last group in Ihde’s taxonomy goes beyond merely adopting certain technofacts, as seen in group two, but takes on the incoming group’s cultural shape and thinking process. Once sufficiently adopted and adapted, the mindset becomes pervasive, and the indigenous group begins to go beyond the incoming group’s previous innovations. Ihde notes that Japan, “in different historical periods, has exemplified both (3) resistance and (4) the willing adaptation of high-technology culture and, on the surface, even many of its Western accoutrements.”<sup>6</sup> Although initially completely resistant to foreigners and foreign ideas, the Japanese would eventually adopt Western ideals and technologies in new territory, in an ironic fashion.

Despite their deep connection to the traditional way of life in Japanese culture, with its love of ritual and symbolism, “for most young Japanese the modernization of their country along Western lines and personal advancement were stronger motivations.”<sup>7</sup> The pervasive sentiment was summed up by the slogans, “*bunmei kaika*, civilization and enlightenment, and *risshin shusse*, be a success!” with both slogans expressing “the reform enthusiasm and optimism of early Meiji.”<sup>8</sup> However, the early to mid-20<sup>th</sup> century displayed a tempering of this thought.

In 1942, a group of prominent Japanese “critics, thinkers, scholars, and writers met in the old imperial capital city of Kyoto during what was described as two very hot summer days to discuss the question of how to ‘overcome the modern’ (*kindai no chōkoku*) and

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3 James L McClain, *Japan: A Modern History* (New York: W. W. Norton & Company, 2002), 229.

4 Jun’ichirō Tanizaki, *In Praise of Shadows* (translated by Thomas J. Harper and Edward G. Seidensticker) (Sedgwick: Leete’s Island Books, 1977), 7.

5 Don Ihde, *Technology and the Lifeworld: From Garden to Earth* (Indianapolis: Indiana University Press, 1990), 151

6 Ihde, *Technology*, 151.

7 Marius B. Jansen, *The Making of Modern Japan* (Cambridge: Belknap Press, 2000), 460.

8 Jansen, *The Making*, 460.

the meaning of the war for the nation.”<sup>9</sup> By this time, the concern was not only on the consumption of goods but also a change in customs. Assimilation had occurred to such an extent that many in Japan at the time rarely recognised that the goods they consumed were imported, or that using technological innovations such as telephones, cars, and radio was still relatively new to Japanese life.<sup>10</sup>

The concerned group, labelled the Kyoto School even though there was no formal membership, sought to overcome modernity not by dismissing or overturning it, but by living through it. They sought resistance to the imported capitalistic and material nature they saw as connected with modernity. Fearing that Japanese culture “would disappear into that large, boundless realm of sameness called modernity,” the symposium suggested, as a means of overcoming, “a rediscovery of the classics, the return of the gods and... a new kind of subjectivity that owed as much to modern philosophy as it did to Buddhist metaphysics.”<sup>11</sup> Within this resistance was an appeal to tradition that privileged “art and culture produced before and outside of capitalism” as a critique and a call to action.<sup>12</sup> Yet the impact of one particular innovation was difficult to overcome: electricity, specifically electric lighting.

In 1886, a Japanese manufacturer named Shibusawa “installed electric lighting throughout his mills, becoming the first textile manufacturer in the world to do so, and he then added a second shift of workers so that he could operate his expensive imported machinery twenty-two hours a day.”<sup>13</sup> The use of electricity had already disrupted labour in many Western nations. Electricity made the industrialised world more efficient, with smaller units able to supply the same outputs as the former coal and steam systems.<sup>14</sup> Electricity became a driver of technological innovation, but it also became an end, with automation as the ultimate goal. Lewis Mumford notes that in the mid-1900s, “Power production and automatic machines have steadily been diminishing the worker’s importance in factory production.”<sup>15</sup> This diminishing of the worker’s importance to factory work foretold many structural changes in society, for Western communities and Japanese alike. The fascination with power and electricity also began to infiltrate the home life of many Japanese, displaying a cultural shift at the local level that many Westerners had long since incorporated.

By the end of the 1800s, Japan had embraced electric lighting so thoroughly that it led the

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9 Harry Harootunian, *Overcome by Modernity* (Princeton: Princeton University Press, 2000), 34.

10 Harootunian, *Overcome by Modernity*, 50.

11 Harootunian, *Overcome by Modernity*, 91.

12 Harootunian, *Overcome by Modernity*, 218.

13 McClain, *Japan*, 229.

14 Lewis Mumford, *Technics & Civilization* (Chicago: University of Chicago Press, 2010).

15 Mumford, *Technics*, 228.

world in the use of fluorescent lights, which had become a standard fixture in Japanese homes, replacing paper lanterns as the main source of light.<sup>16</sup> This effect also began to change domestic and foreign views of Japanese culture and other areas of their existence. Electric light, as opposed to natural light sources such as sunlight and firelight, exemplifies how one culture adopting the technological inventions and ideas of another can create a Faustian bargain, in Neil Postman's terms.<sup>17</sup> For the Japanese, the changes that followed were significant, and for some, destructive of traditional aesthetics and ideals.

### 3. The Problems of Electric Light

As a technological medium, electric light offers vast benefits, such as illuminating darkness at the flip of a switch. No longer does a person have to harness fire or wait for sunlight to navigate the night. Light is the purest medium because most other activities could not exist without it.<sup>18</sup> The purity of light stems from its function as a "medium without a message," as a medium that provides a context for other media.<sup>19</sup> However, what happens when electric light overpowers or negatively impacts other parameters? Marshall McLuhan notes that "the message of the electric light is total change. It is pure information without any content to restrict its transforming and informing power."<sup>20</sup> I will address the implications of light as information later in the essay, but for now, suffice it to say that electric light as a medium brings about changes in our perceptions of the world, and subsequently in our understanding of it. McLuhan discusses how various media impact our existence by stating, "All media work us over completely. They are so pervasive in their personal, political, economic, aesthetic, psychological, moral, ethical, and social consequences that they leave no part of us untouched, unaffected, or unaltered. The medium is the message. Any understanding of social and cultural change is impossible without a knowledge of the way media work as environments."<sup>21</sup> This assertion shows just how powerful and environmentally damaging technological change can be. We must then ask, what kind of environment does electric light create, and what are the implications?

In answering the above questions, we might start by observing what is lost by adopting electric light. While Jun'ichirō Tanizaki was not a member of the Kyoto School, his critiques of modernity's impact on culture bear resemblance to the group and offer a

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16 Miya Elise Mizuta, "Luminous Environment: Light, Architecture and Decoration in Modern Japan," *Japan Forum* 18, no. 3 (2006): 339-360.

17 Neil Postman, *The End of Education: Redefining the Value of School* (New York: Vintage, 1995), 192.

18 Marshall McLuhan, *Understanding Media: The Extensions of Man* (Cambridge: MIT Press, 1994), 9.

19 McLuhan, *Understanding Media*, 8.

20 McLuhan, *Understanding Media*, 52.

21 Marshall McLuhan and Quentin Fiore *The Medium is the Massage* (New York: Random House, 1967), 26.

valuable perspective.<sup>22</sup> Initially known for his fiction writing, Tanizaki wrote an essay about his views of shadows as a quintessential part of the Japanese aesthetic that had been largely lost due to the Japanese embracing electric light. He titled the essay, *In Praise of Shadows*, a “lament,” an “elegy for a Japanese architecture destroyed by illumination, by an electric force, which disperses the shadows that linger in and constitute the essence of the Japanese house.”<sup>23</sup> During World War II, writers such as Tanizaki were silenced due to their commentaries on modernization.<sup>24</sup> Tanizaki and his writings were later rediscovered by both Japanese and Western readers. The following section will describe Tanizaki’s phenomenological insights into shadows and why they were important to Japanese culture during his youth and prior.

#### 4. Tanizaki’s *In Praise of Shadows*

Early in his essay, Tanizaki notes how far transitioned the Japanese had become by electricity, stating, “For so accustomed are we to electric lights that the sight of a naked bulb beneath an ordinary milk glass shade seems simpler and more natural than any gratuitous attempt to hide it.”<sup>25</sup> Tanizaki understood, similarly to McLuhan, that the medium shapes perception. He submits that something as insignificant as a pen can have “a vast, almost boundless, influence on our culture.”<sup>26</sup> This is in reference to the fountain pen as opposed to the Oriental use of the brush. This invasion, he writes, has forced the Japanese to stray from the path they have followed for thousands of years. What has been deemed progress in Western eyes has imposed a direction upon the Japanese that removed the opportunity for them to arrive at a notion of progress that suited their culture. While Japanese progress might have been slow if they had been left unadulterated, Tanizaki writes that there would “have been no borrowed gadgets, they would have been the tools of our own culture, suited to us.”<sup>27</sup> However, the nature of technological change is such that it occurs irrespective of whose culture it affects, instead imposing its own culture on the human lifeworld.<sup>28</sup>

Tanizaki criticises how Western technologies, such as the phonograph and radio, affected

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22 Michael Gardiner, “Tanizaki Jun’ichirō, the Kyoto School, and the Twenty-first Century Transparency Society,” *Philosophy East and West* 73, no. 4 (2023): 854–876.

23 Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis: University of Minnesota Press, 2005), 21.

24 Jansen, *The Making*, 710.

25 Tanizaki, *In Praise*, 1.

26 Tanizaki, *In Praise*, 8.

27 Tanizaki, *In Praise*, 9.

28 Ihde, *Technology*; Neil Postman, *Technopoly: The Surrender of Culture to Technology* (New York: Vintage, 1993).

Japanese music and the value placed on silence. Western machines and innovations, he adds, are suited to Western arts but disadvantage Japanese arts, such as Western paper, which turned light away. In contrast, Japanese paper gently takes it in.<sup>29</sup> Much of Japanese artwork was reserved and minimalist in order to embrace contrasting shadow and light, as seen in Miyamoto Musashi's *Shrike on a Withered Branch* and Hokusai's *Great Wave*. Shiny things, such as polished silver and nickel tableware, were not aesthetically pleasing to Tanizaki. For him and the Japanese culture he looks back toward, enjoying shiny things began when the lustre had worn off, and a bit of grime or soot had demurred the sheen.<sup>30</sup>

Shadows were needed to texture other elements in Japanese life, such as food and living spaces. Tanizaki proposes, "with Japanese food, a brightly lighted room and shining tableware cut the appetite in half... Our cooking depends upon shadows and is inseparable from darkness."<sup>31</sup> The contrast of light shadows and dark shadows permeated the rooms and houses in the former Japanese culture, impacting the beauty one perceives within the space.<sup>32</sup> An example Tanizaki describes is the alcove. For him, the alcove is beautiful not because it is a cleverly built design feature, but because of the emptiness created within it by its construction. There in the alcove, silence reigns, and "tranquility holds sway."<sup>33</sup>

Moving beyond the aesthetics of things, Tanizaki shifts to human beauty, where, were it not for shadows, beauty would not exist.<sup>34</sup> Women in the older Japanese society were accented, similarly to ornamental lacquerware, by shadows. Only their faces stood out, a pale complexion contrasting with the darkness of shadows, with the rest of their bodies concealed in their kimonos. Expounding on Tanizaki's point, Akira Mizuta Lippit suggests that electric light exposes the secret body, making it indecent.<sup>35</sup> The shaded, obscured, dark body, according to Tanizaki, contrasts with the clean, overexposed body.

Tanizaki notes that Westerners, like the Japanese, have not always had modern trappings such as gas and electricity, but unlike the Japanese, they have also never had a disposition to shadows. He opines, "What produces such differences in taste? In my opinion, it is this: we Orientals tend to seek our satisfactions in whatever surroundings we happen to find ourselves, to content ourselves with things as they are."<sup>36</sup> This contrasts with the Westerner's desire to change his condition, particularly dealing with darkness: "From candle to oil lamp, oil lamp to gaslight, gaslight to electric light—his quest for a brighter

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29 Tanizaki, *In Praise*, 9-10.

30 Tanizaki, *In Praise*.

31 Tanizaki, *In Praise*, 16-17.

32 Tanizaki, *In Praise*, 18.

33 Tanizaki, *In Praise*, 20.

34 Tanizaki, *In Praise*, 30.

35 Lippit, *Atomic Light*.

36 Tanizaki, *In Praise*, 31.

light never ceases, he spares no pain to eradicate even the minutest shadow."<sup>37</sup> Instead of being used to highlight something artistically, or for some constructive activity such as reading, writing, or sewing, light is used to dispel shadows from every nook and cranny. For Tanizaki, this runs counter to the Japanese embrace of shadows as part of their aesthetic and culture.

Still, Tanizaki submits himself to the fact that Japan has "chosen to follow the West, and there is nothing for her to do but move bravely ahead and leave us old ones behind. But we must be resigned to the fact that as long as our skin is the colour it is the loss we have suffered cannot be remedied."<sup>38</sup> This concession is not necessarily defeat, but a realisation that the present condition is now Japanese as much as it is Western, that the "version of progress based on the unification of space by all-penetrating light can't simply be reversed."<sup>39</sup> Just as the disposition toward electricity started in the West and moved East, the tendency toward technological innovation and expansion has now become a global phenomenon. This blurring is no mere grey area, because, in Tanizaki's terms, just as light consumes and washes out a space, the shadows are swallowed up, leaving an aesthetic void and, simultaneously, a false sense of reality. There is more to shadows than what Tanizaki could state, however.

## 5. Light, Darkness, and the Something in Between

Light is fundamental to our lifeworld, as plants need it for photosynthesis. When we find ourselves suddenly in the dark, we become disoriented and often scared.<sup>40</sup> Light also shapes our worldview by conditioning how we perceive, "guiding what we are able to see, inflecting visible colours and informing our sense of the shape of space."<sup>41</sup> Despite light's intrinsic value to biological existence, our sensory orientation, and our perceptual abilities, we can be blinded by light as well.<sup>42</sup> There is a reason we wear sunglasses or hats outside in the daytime, and can flip a switch or dim the lights while inside. Beyond just biological and phenomenological areas, "the *absence* of light can condition atmospheric settings."<sup>43</sup> This conditioning, as Tanizaki alludes to, occurs via light's relationship with darkness, to which it is often seen as an opposing force. In this created dichotomy of light and darkness, the space between, the shadow, often gets forgotten or ignored, or merely

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37 Tanizaki, *In Praise*, 31.

38 Tanizaki, *In Praise*, 42.

39 Gardiner, "Tanizaki Jun'ichirō," 856.

40 David J. Macauley, *Elemental Philosophy: Earth, Air, Fire, and Water as Environmental Ideas* (Albany: State University of New York Press, 2010).

41 Tim Edensor, "Light Design and Atmosphere," *Visual Communication*, 14, no. 3 (2015): 331.

42 Macauley, *Elemental Philosophy*, 247.

43 Edensor, "Light Design," 332.

lumped in as a form of darkness and therefore often demonised.<sup>44</sup>

In Plato's conception, and by extension much of later philosophy's, shadows have long been seen as a falsity or figment of the real, cast on a cave wall by firelight. At the same time, truth was found in the sunlight outside the cave.<sup>45</sup> Plato's cave, where darkness inside contrasts with the blinding sun outside, illustrates a form of being and closedness. Byung-Chul Han notes that this contrast is anathema to the Far Eastern sense of space, wherein the relationship between inside and outside, light and shadow, "creates an indifference, an in-between."<sup>46</sup> The give and take, ever-shifting nature of light in Tanizaki's and Han's writings demonstrate change and tension without the necessity of fusion. For the Far East, "neither the permanence of *being* nor the stability of *essences* is part of the beautiful. Things that persist, subsist or insist are neither beautiful nor noble."<sup>47</sup> Beauty is found in the "fleetingness of a *transition*" rather than the "duration of a *condition*."<sup>48</sup> The hazy horizon bears more beauty than the clearly defined edge. In this regard, the "heroic light that seeks to reduce the darkness"<sup>49</sup> is antithetical to the Far Eastern view, largely because both are needed, ever in dialectical tension, to maintain the beauty created by the shadow.

Han follows Tanizaki, who notes the interplay between light and darkness, in which absolutes and stark dualisms are disdained. For Tanizaki, this interplay is the essence of the shadow. The excess of electric light in present-day Japan had destroyed the elegance of Japanese aesthetics. The desirable space in Tanizaki's mind was one "not perforated by communication," an un-dated space similar to a Buddhist temple wherein the shadows add a sense of completeness rather than the conquest of electric light.<sup>50</sup> As opposed to simpler forms of lighting such as candlelight or oil lamps, electric light invades space and "erases distinction between discrete spaces, making difference invisible."<sup>51</sup> What gets erased is the between, the liminal space that carves out and protects space for differences on either side.

Miya Elise Mizuta suggests shadows as a third term between the dialectic of light and darkness. Rather than seeing shadows as merely a lessened form of darkness, "the

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44 Macauley, *Elemental Philosophy*, 248.

45 Plato, "The Republic" in *The Best Known Works of Plato*, trans. B. Jowett (New York: The Book League, 1942), book VI and VII.

46 Byung-Chul Han, *Absence: On the Culture and Philosophy of the Far East*, trans. Daniel Steuer (Cambridge: Polity Press, 2023), 28.

47 Han, *Absence*, 33.

48 Han, *Absence*, 34.

49 Han, *Absence*, 35.

50 Michael Gardiner, "Tanizaki Jun'ichirō's In Praise of Shadows and critical transparency," *Textual Practice*, (2023): 5, emphasis in original.

51 Mizuta, "Luminous Environment," 343.

shadow is that which grows out of darkness to encompass light... an indeterminate body suspended between the voids of light and darkness."<sup>52</sup> There is an ironic view here in the term void, given that shadows are often seen as the void rather than light or darkness. Shadows, suspended between the polarities of light and dark, indicate absence rather than presence.<sup>53</sup> In this way, light and dark become the void since they close off indefinitely the possibility of something other than itself. In phenomenological terms, shadows have a different form of being from other phenomena since their being is not comprised of substance but of absence. This absence, as opposed to a void, embraces an Eastern view of existence.

Han points out that the "fundamental topos of Far Eastern thinking is not being but the way (*dao*)... The difference between *being* and *path*, between *dwelling* and *wandering*, between essence and absencing, is critical."<sup>54</sup> Following this assertion, the way, as opposed to being, "does not permit any substantive closure."<sup>55</sup> This lack of closure allows for things to flow into each other, to coalesce and converge, without necessarily fusing together. In its infatuation with essences, the West has a view foreign to the East. Han notes, "Essence is difference. Thus, essences block transitions. Absencing is in-difference."<sup>56</sup> Essence, as being or substance, evacuates the middle, the between. It places a distinction between the subject and object, the figure and ground. In contrast, through absencing, space is made for the relationship between the subject and object. Space is made for transition, for collaboration, for meaning to be created. Absencing, as Han illustrates it, "makes space more permeable" without the need for finality and closure.<sup>57</sup> In contrast, essences create closure, removing possibilities and horizons. This effect becomes problematic, at least metaphorically and aesthetically, in Tanizaki's terms.

With the advent of electric light, shadows become increasingly diluted.<sup>58</sup> Just as Tanizaki lamented the beauty that was lost when electric lights entered the room, we must ask, if shadows are analogous to a liminal space, what is the cost of eradicating shadows, of invading our lives with electric light? Mizuta demonstrates how the "'problem of lighting' is equated with Westernization or Western enlightenment," whereas the "'Japanese style'... the true beauty of Japanese art that Tanizaki argues is 'inseparable from darkness,' is fading under the glare of this blinding light."<sup>59</sup> On the global scale, if, as McLuhan suggested, electric light is "pure information without any content to restrict its transforming and

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52 Mizuta, "Luminous Environment," 345.

53 Carlos A Morujão, "Shadows: A Phenomenological Analysis," *Phainomenon* 30, (2020): 21.

54 Han, *Absence*, 5.

55 Han, *Absence*, 6.

56 Han, *Absence*, 22.

57 Han, *Absence*, 23.

58 Mizuta, "Luminous Environment," 345.

59 Mizuta, "Luminous Environment," 343.

informing power,"<sup>60</sup> what are we to do with this blinding light? Here, electric light can be seen as a metaphor for information and the glut of it in the digital age.

## 6. Between-ness Lost and Blinding Light

In his essays *Saving Beauty* and *The Transparency Society*, Byung-Chul Han suggests that what we often find beautiful in the modernised world are smooth things, reflecting a social imperative of positivity. Smooth things do not injure or resist, and instead remove negativity, creating what Han calls a society of positivity and of transparency.<sup>61</sup> In such a transparent society, all forms of distance must be eliminated from information, which must be free from otherness, instead valuing conformity and uniformity.<sup>62</sup> In Han's interpretation, modern communication is smooth, "a frictionless exchange of information... free from any negativity of the other or alien."<sup>63</sup> Digital beauty contrasts natural beauty, which is often coarse on the edges, sometimes blurry, or what we might say, shadowed, in Tanizaki's terms. Digital beauty, distinct from the blending of between spaces, "forms a *smooth space of the same*, which does not permit anything alien, any *alterity*, to enter."<sup>64</sup> To save beauty, we must also preserve a sense of the *other*, of difference.<sup>65</sup> Just as Tanizaki viewed the beauty of Japanese aesthetics through the use of shadows, inseparable from darkness, our rich and beautiful landscape of culture is being smoothed out by digital representation and "fading under the glare of this blinding light."<sup>66</sup>

Information in the digital age, like its predecessor, electric light, makes everything instantly present, forced to stand outside historical time.<sup>67</sup> Information is now taken for granted, a transparent aspect of our current environment in the same manner as electric light. Following this realisation, information is not to be mistaken for knowledge, which is often private and the result of deliberate thought or reflection.<sup>68</sup> Instead, information may be seen as a "form of garbage" because it "appears indiscriminately, directed at no one in particular, in enormous volume and at high speeds, and disconnected from theory, meaning, and purpose."<sup>69</sup> Indeed, we are "awash in information"<sup>70</sup> just as Japan had become

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60 McLuhan, *Understanding Media*, 52.

61 Byung-Chul Han, *Saving Beauty* (Cambridge: Polity, 2018), 1. Byung-Chul Han, *The Transparency Society*, (Stanford: Stanford University Press, 2015), 13.

62 Han, *The Transparency Society*, viii.

63 Han, *Saving Beauty*, 10.

64 Han, *Saving Beauty*, 25.

65 Han, *Saving Beauty*, 68.

66 Mizuta, "Luminous Environment," 343.

67 Mizuta, "Luminous Environment," 346.

68 Han, *Saving Beauty*, 31.

69 Neil Postman, *Technopoly: The Surrender of Culture to Technology* (New York: Vintage, 1993), 70.

70 Postman, *Technopoly*, 69.

awash in electric light in Tanizaki's era. In both cases, electric light and information, the relationships between humans and their technologies become disoriented, often shifting the user to the used and vice versa.

Douglas Rushkoff, an ardent critic of modern technology and media, states, "Our technologies change from being the tools humans use into the environments in which humans function... as technology goes from tool to replacement, the humans using it devolve from users to the used."<sup>71</sup> Tanizaki recognized that electric light destroyed the aesthetic of Japanese beauty, completely remaking Japanese beauty into something bereft of its originality and vibrance. In the above realization, Rushkoff recognizes that digital technologies (or just technology in general) completely remake human environments into something devoid of their humanistic orientations. Instead, the technologies morph into grand-scale puppets with a handful of puppet masters controlling the play.

They also eradicate between-ness. Rushkoff affirms, "There are no in-betweens... The internet reinforces its core element: the binary. It makes us take sides."<sup>72</sup> As a design feature of modern digital media and technologies, choice and agency are replaced by algorithms. Human reasoning and the adventure of uncertainty are replaced with computer logic and the perceived safety of someone or something else making a decision for us. Computers and similar technologies rely on certainty, binary logic, and linear progression because that is their primary function. They are inputs and outputs, 1s and 0s. There are no in-between states, or as Rushkoff notes, ambiguity is prohibited.<sup>73</sup> However, it is the ambiguity, the middle, the between, that makes us human, just as the middle ground of the shadow creates beauty for Tanizaki.

The digital environment not only forces us into the paradox of choice by giving us so much information to choose from yet simultaneously nudging us toward single options, but it also creates a vortex of distraction from the present reality. Rushkoff states that we "tend to exist in a distracted present, where forces on the periphery are magnified and those immediately before us are ignored."<sup>74</sup> This disorientation, what Rushkoff calls a present-shock nightmare, is alarming because we physically cannot be in two places at once, no matter how much our digital technologies attempt to create that illusion. No matter how much we adopt a technology (short of the singularity in Ray Kurzweil's sense), our bodies are still analog and therefore remain bounded by certain physical characteristics.<sup>75</sup>

In the race to adopt newer and newer technologies, we often fail to count the costs. No

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71 Douglas Rushkoff, *Team Human* (New York: W. W. Norton & Company, 2019), 52.

72 Rushkoff, *Team Human*, 85-86.

73 Rushkoff, *Team Human*, 135.

74 Douglas Rushkoff, *Present Shock: When Everything Happens Now* (New York: Penguin, 2013), 4.

75 Rushkoff, *Present Shock*, 71.

matter how much we think online presence “feels” real or believe that it allows us to stay connected with others, there is a certain loss of humanity in the move to digital spaces. Rushkoff insists that humans “rely on the organic world to maintain our prosocial attitudes and behaviours. Online relationships are to real ones like internet pornography is to making love. The artificial experience not only pales in comparison to the organic one, but degrades our understanding of human connection.”<sup>76</sup> Similarly, Tanizaki suggests that this effect also occurs with natural light. In his critique, he noted that his homeland had become accustomed to the institutional feeling of fluorescent light, thereby degrading the beauty and intrigue of the shadowed visage.

A key feature of our (human) existence is our diversity, recognizing that we are not all the same. Following this assumption, we do not all know the same information, and if we did, we would not need the medium of communication.<sup>77</sup> The existential state of humanity implies plurality rather than singularity, which is characteristic of digitality given the binary logic underlying the digital environment. As Timo Kylmälä highlights, “the machinate ‘mind’ (e.g. a functional totality of networked computers) is an environment unto itself, where medium loses its function as an in-between.”<sup>78</sup>

Kylmälä’s fear is akin to Tanizaki’s lament for the loss of shadows, Han’s critique that friction is smoothed out, and Rushkoff’s notion that ambiguity is irradiated. For Kylmälä, the plurality of human existence is compressed into a singularity: “Our digital machines are by their very organization a *singularity*; they are designed to merge together flawlessly and comprise one, massive, uninterrupted superstructure.”<sup>79</sup> Echoing McLuhan’s terms, the danger here is that the “in-betweens” of human existence are at risk of obsolescence or amputation. Kylmälä argues that as the human experience shrinks due to living in digital environments, we become more informational, less and less of a medium or a between.

A last facet where the advent of digital technologies overlaps with electric light is the dislocation of figure from ground and the collapsing of contexts. McLuhan believes that electric light is pure information, a medium without a message.<sup>80</sup> In this formation, light becomes the ground, but one that completely engulfs and eliminates the figure. In a normal situation, the figure-ground dialectic is always in flux. McLuhan and his son Eric propose that figures “rise out of, and recede back into, ground, which is con-figurational and comprises all other available figures at once... Each new figure in turn displaces the others

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76 Rushkoff, *Present Shock*, 72.

77 Timo P. Kylmälä, “Medium, the Human Condition and Beyond.” *Empedocles: European Journal for the Philosophy of Communication* 4, no. 2 (2012): 133–151.

78 Kylmälä, “Medium,” 140.

79 Kylmälä, “Medium,” 144.

80 McLuhan, *Understanding Media*, 8.

into ground.”<sup>81</sup> In this configuration, ground is subliminal and structural even while it is ever-shifting. However, if electric light and digital media eliminate the figure and stifle the dialectical tension, then the threat of making the original subject (us) into an object of utility is a likely result. Rushkoff states, “When we lose track of figure and ground, we forget who is doing what for whom, and why. We risk treating other people as objects. Worse, we embed these values in our organisations or encode them into our technologies,” thereby disguising the problem for future users.<sup>82</sup> While we, the humans, were once the tool-users, in the digital environment, we have become the used. We have gone from being the figure in the digital world to being the ground.<sup>83</sup> In contrast, technologies were once extensions of our nervous systems, according to McLuhan, then simultaneously became our environments, according to Postman, and have now consumed us, as Rushkoff points out. Technologies began as a way of helping us exist but have become our existence. The entire context has collapsed.

In *Context Blindness*, Eva Berger describes context collapse as “how people, information, and norms from one context leak into another.”<sup>84</sup> Context collapse means simultaneity, everything converging all at once. Berger notes that we have been deprived of context in the age of the Internet, social media, and digital technology. Once a context collapses, the figure and ground, or the inside and outside, no longer exist. A parallel effect of context collapse for Berger is context blindness, a useful metaphor for understanding “the human condition in this technological age.”<sup>85</sup> However, as Berger illustrates, context blindness, an effect normally associated with autistic behaviour, is becoming a trait among neurotypical individuals who are no longer in control of their digital environments. Berger uses both the metaphor and the condition of autism to demonstrate that “autistics’ difficulty in imagining minds other than their own and their struggle with social skills may be a preview of our imminent context-blind human circumstances.”<sup>86</sup>

Given the smoothening out of difference in Han’s work on beauty, the loss of in-betweenness in Rushkoff’s and Kylmäla’s summation of digital environments, the dislocation of figure and ground in McLuhan’s perception, and the context blindness Berger suggests, what can, or should we do? How might we resist the changing dynamics of our environments? Tanizaki’s essay on the loss of shadows in Japanese aesthetics ultimately ends in his acceptance of the changes and a resignation that the Japan he so fondly remembers is a thing of the past. Is it too late to steer this ship in a different direction? Perhaps for some, particularly the techno-optimists, we have never gone off course. The

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81 McLuhan and McLuhan, *Laws*, 5.

82 Rushkoff, *Team Human*, 44.

83 Rushkoff, *Team Human*, 63.

84 Eva Berger, *Context Blindness: Digital Technology and the Next Stage of Human Evolution* (New York: Peter Lang, 2022), 58.

85 Berger, *Context Blindness*, 31.

86 Berger, *Context Blindness*, 32.

opportunities of new technologies are exciting and often open doors that were previously closed. Still, for those who worry about the changes, there must be a way to break from the “machine,” or at minimum, resist it.

## 7. Conclusion: Resisting Without Revolting

Technology resistance can take many forms,<sup>87</sup> including violent extremism (i.e., Ted Kaczynski, the Unabomber or the Luddites), healthy pacifism (i.e., the Amish), and those who question the effects technology has on culture and society (i.e., Neil Postman, Jacques Ellul, and Lewis Mumford). The Kyoto School resisted by seeking to overcome the issues of capitalism and modernization through rediscovering their previous art and culture. In the works of Tanizaki and modern-day techno-critics such as Wendell Berry, we find “a profound sense of loss and an awareness that technology has a way of coming between the individual and feelings that cannot be measured or charted or counted but are nevertheless treasured.”<sup>88</sup> Postman calls for a loving resistance to technology wherein we recognize the historical ramifications of various innovations and advancements, and also embrace a healthy hesitation and scepticism of new technologies.<sup>89</sup> McLuhan affirms, “there is absolutely no inevitability as long as there is a willingness to contemplate what is happening.”<sup>90</sup> Building on McLuhan’s work, Rushkoff recommends that if we learn “to recognize reversals of figure and ground, we can liberate ourselves from the systems to which we have become enslaved.”<sup>91</sup> In Postman, McLuhan, and Rushkoff, we find imperatives to step outside our environments from time to time and “see the light,” as the saying goes.

In many ways, both electric light and digital media were created to help humans see the world differently and interact with each other more cohesively. However, these “painstakingly evolved mechanisms for social connection—for playing as a team—fail in the digital environment.”<sup>92</sup> Ironically, as explained above, our technologies harm as much as they help. In so many ways, the natural world and human existence are both collaborative acts.<sup>93</sup> It is a collaboration between light and dark, figure and ground, and myriad other things that need the between. Electric light and digital technologies both often wash out our differences, the very things we have that make us human. Indeed, it is

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87 Nicole Fox, *Against the Machine: The Hidden Luddite Tradition in Literature, Art, and Individual Lives* (Washington: Island Press, 2013).

88 Fox, *Against the Machine*, 15.

89 Postman, *Technopoly*.

90 McLuhan and Fiore, *The Medium*, 25.

91 Rushkoff, *Team Human*, 44.

92 Rushkoff, *Team Human*, 72.

93 Rushkoff, *Team Human*, 11.

in the between that we exist.

Lance Strate sums up the human condition as “a middle ground, an environment that constitutes the medium of our being and becoming. We emerge, individually and collectively, out of those same gaps and cracks... the interstices and intervals, the stuff that lies in-between.”<sup>94</sup> This statement roots resistance in an attention to our humanness and emphasises the need to protect ourselves from the things we have created,<sup>95</sup> the things that “are replacing and devaluing our humanity.”<sup>96</sup> Tanizaki lamented the loss of beauty in his era, seeing the devaluation of shadows and the replacement of natural light with electricity. Just as he worried over the cost of aesthetics, we, too, might ask what elements of the natural world or the tangible creations of humans are losing their existence to the digital space. As electric light redefined beauty for Tanizaki’s Japan, so, too, have digital technologies redefined what we consider human interaction and information. Western influence on Japanese culture was boundless in Tanizaki’s estimation. He questions whether Japan could have “pushed forward into new regions quite on their own” if they had been left alone.<sup>97</sup> Perhaps we might follow suit and ask what humanity might be capable of if we were more hesitant to adopt new technologies and more resistant to allowing them to invade our existence and between spaces.

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94 Lance Strate, *Media Ecology: An Approach to Understanding the Human Condition* (New York: Peter Lang, 2017), xi.

95 Rushkoff, *Team Human*, 39.

96 Rushkoff, *Team Human*, 5.

97 Tanizaki, *In Praise*, 8.

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# Learning to Swim in the Dirac Sea: Deleuze and the Cosmologies of Time and Chance

Aragorn Eloff

## Abstract

In this article, I reflect on Deleuze's provocative critique of the second law of thermodynamics in *Difference and Repetition* by drawing his philosophy into conversation with cosmology—specifically quantum physics. In dialogue with the work of the late Bill Ross, whose recent *Order and the Virtual* represents the most substantial critical engagement with the entropic principle vis-à-vis Deleuze, I turn to the physicist David Bohm's distinction between explicate and implicate orders, which Ross argues bear strong similarities to Deleuze's actual and virtual, respectively. Bohm's theory, as Ross and others have pointed out, entails a recognition of the pluripotent creative potential of the quantum dynamisms that give rise to the spatiotemporal order—what Deleuze would describe as non-exhaustive intensive differences that are only apparently cancelled out in extensity. Here, with reference to Deleuze's distinction between the divine and human games, and their respective distributions of chance, I propose—following Ross and Bohm, as well as contemporary loop quantum gravity—an alternative to string theory most commonly associated with the physicist Carlo Rovelli: that whereas the emergent regularities of the macroscopic world are inexorably bound to the arrow of time and thus to the law of entropy, this is not the case for the divine game that takes place within the quantum foam, and that it is here that the *Eventum tantum* takes place in which all of chance—including said laws—are continuously redistributed. Turning to the both non-continuous and continuous nature of this eventual dynamism relative to quantum and macrophysical realities respectively, I close by considering Ross's eschewal of dynamic systems theory in favour of other quantum-theoretic resources and suggest that perhaps both can be usefully employed to think the reciprocal becomings of Deleuze and the philosophy of cosmology.

**Keywords:** Deleuze, David Bohm, quantum physics, cosmology, Bill Ross, entropy, negentropy.

“[B]ecoming is not merely a relationship of the present to a past that is gone. Rather, it is a relationship of enfoldments that actually are in the present moment... The understanding of this requires that we weave together the two principles of the *being of becoming* and the *becoming of being*.”<sup>1</sup>

—Bohm, “Time, the Implicate Order and Pre-Space

In some particularly challenging pages near the beginning of *Difference and Repetition*'s fifth chapter, *Asymmetrical Synthesis of the Sensible*, Deleuze appears to critically engage with the second law of thermodynamics, usually described as the inexorability of the “arrow of time.” i.e., the overall tendency of the universe towards a final equilibrium of maximal entropy or “heat death.”<sup>2</sup> At first glance, Deleuze’s critique may appear to be the worst kind of “intellectual imposture.” After all, the laws of thermodynamics are commonly understood to constitute the inviolable foundations of all of physics, which is why the physicist Arthur Eddington once polemically claimed that “if your theory is found to be against the Second Law of Thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation.”<sup>3</sup> Deleuze, no stranger to provocative claims, appears wholly unbothered by such concerns and proceeds to argue that thermodynamics was in fact the furnace in which “a strange alliance at the end of the nineteenth century between science, good sense and philosophy”<sup>4</sup> was forged. Within this alliance the principle of difference—and by extension of change—was understood solely from the vantage point of the actual, resulting in a view that “difference is the sufficient reason of change only to the extent that the change tends to negate difference.”<sup>5</sup> By grasping change vis-a-vis the differentiated,<sup>6</sup> in other words, we are led to the assumption that the unfolding of the universe follows an arrow of time that terminates in a final tepid equilibrium of absolute stability.

The gist of Deleuze’s argument against this view is that the intensive and virtual orders are not subject to this supposedly universal law which results, broadly speaking, from a conflation—wrought by the good sense which forms part of the dogmatic image of thought—of the end result of processes of indi-drama-different/ciation and the virtual dynamisms that inform and give rise to those processes. Against this transcendental

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1 David Bohm, “Time, the Implicate Order and Pre-Space,” *Physics and the Ultimate Significance of Time: Bohm, Prigogine, and Process Philosophy*, ed. David Ray Griffin (State University of New York Press), 1986, 185.

2 Gilles Deleuze, *Difference and Repetition* (London: Athlone, 1994), 222–61.

3 Arthur Eddington, *The Nature of the Physical World* (Cambridge: Cambridge University Press, 1928), 74.

4 Deleuze, *Difference and Repetition*, 223.

5 Deleuze, *Difference and Repetition*, 223.

6 Recall that Deleuze distinguishes between the differentiation of the virtual and the differentiation of the actual.

illusion,<sup>7</sup> Deleuze argues that “[d]ifference in the form of intensity remains implicated in itself, while it is cancelled by being explicated in extensity.”<sup>8</sup> For this reason, he avers, we have no need to challenge the veracity of the second law qua the established in order to preserve a principle of difference or, indeed, the eternal return, for “difference has never ceased to be in itself, to be implicated in itself even while it is explicated outside itself.”<sup>9</sup> One of the ostensible motivating factors for Deleuze’s argument, beyond simply wishing to defend his philosophy of difference from what is perhaps the ultimate enemy of difference, the absolute identity of entropy’s teleological endpoint, is that the second law, as Schrödinger<sup>10</sup> and numerous others (including, in their own manner, Ruyer and Simondon) earlier pointed out, appears to fly in the face of the profoundly negentropic nature of reality<sup>11</sup>—of its seemingly ubiquitous tendency towards increased order. In this regard, “[t]he principle of degradation obviously does not account either for the creation of the most simple system or for the evolution of systems.”<sup>12</sup>

While the usual response to this line of reasoning is to argue that local order externalises its thermodynamic debt, i.e., that the overall heat death of the universe continues unabated, regardless of more proximate negentropy, Deleuze’s point is, as we have seen, more far-reaching: the universe itself, in all its supposed thermodynamic unfolding, is merely the emergent spatiotemporal expression of the ostensibly inexhaustible dynamisms of the depths or intensive spatium. Or, as the late Bill Ross puts it in the groundbreaking *Order and the Virtual: The Philosophy and Science of Deleuzian Cosmology*, “[d]isequilibrium, radical chance, is a positive, indispensable, internal motor of the Chaosmos.”<sup>13</sup> It is precisely this tension between the second law and Deleuze’s philosophy of infinite folding, unfolding and refolding that frames Ross’s engagement, which proceeds via a wide-ranging but careful examination that leaps from Nietzsche to Leibniz to loop quantum gravity to physicist David Bohm’s remarkably Deleuzian concept of the implicate order in pursuit of a solution to the problem “can the Leibnizian-Deleuzian philosophy of difference

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7 “The paradox of entropy is the following: entropy is an extensive factor but, unlike all other extensive factors, it is an extension or ‘explication’ which is implicated as such in intensity, which does not exist outside the implication or except as implicated, and this is because it has the function of making possible the general movement by which that which is implicated explicates itself or is extended. There is thus a *transcendental illusion* essentially tied to the qualitas, Heat, and to the extension, Entropy.” (1994:229; emphasis mine)

8 Deleuze, *Difference and Repetition*, 228.

9 Deleuze, *Difference and Repetition*, 223.

10 Erwin Schrödinger, *What is Life?* (Cambridge: Cambridge University Press), 1944.

11 i.e., “the tendency of certain forms of organisation, including principally those associated with life, to form local pockets or islands of increasing order in apparent contradiction to the mandate of entropy” (Ross 2024:20).

12 Deleuze, *Difference and Repetition*, 255.

13 Bill Ross, *Order and the Virtual: The Philosophy and Science of Deleuzian Cosmology* (Edinburgh: Edinburgh University Press, 2024), 7.

coherently dismiss the heat death of the universe?"<sup>14</sup> In this regard, Ross's work is exemplary of the science-informed approach to Deleuze that has become increasingly common within the sprawling and heterogeneous field that constitutes contemporary Deleuze and Guattari studies. While in a recent article George Webster convincingly argues that "such scholarship typically focuses on elucidating Deleuze's claims in light of these [scientific and mathematical] engagements, rather than examining the relation between the two,"<sup>15</sup> *Order and the Virtual* is dedicated to precisely the latter task, which is, as Webster puts it, "to make better and more precise sense of the relationship between the sciences and Deleuze's philosophical claims... [and] to do so in a way that better advertises both the novelty and relevance of such claims to philosophers of science."<sup>16</sup> Indeed, as Ross describes his task, it "is not so much how to reconcile Deleuze's natural philosophy with fundamental tenets of science, as to establish what it might mean in a scientific register to accommodate the direction of travel."<sup>17</sup> In this regard, "there is no question which metaphysics would put in play that science does not also want to resolve."<sup>18</sup> Within the field of philosophy of cosmology specifically, said approach is, beyond Ross, also evident in the richly diverse engagements in the recent edited collection *Deleuze and Cosmology*,<sup>19</sup> as well as by seminal work in the field by physics-informed Deleuze scholars like Arkady Plotnitsky<sup>20</sup> and Martin Calamari,<sup>21</sup> not to mention Thomas Nail's Deleuze-inflected project. It thus seems increasingly evident that Deleuze and Guattari's work is rich with potential resources for grappling with cosmological questions and that this is an underexplored vein in their oeuvre. As the editors of *Philosophy of Cosmology* underscore in this regard, cosmology has long been associated with fundamental philosophical questions such as "the problem of understanding the world, including ourselves, and our knowledge, as part of the world" and a close association between the two fields stretches "from Plato and Aristotle to Nicholas of Cusa, Giordano Bruno and Kant."<sup>22</sup>

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14 Ross, *Order and the Virtual*, 56.

15 George Webster, "The metaphysics science needs: Deleuze's naturalism," *European Journal of Philosophy* 32, no.3 (2024): 821.

16 Webster, "The Metaphysics Science Needs," 821.

17 Ross, *Order and the Virtual*, 175.

18 Ross, *Order and the Virtual*, 15.

19 Janae Sholtz and Alain Beaulieu, eds. *Deleuze and Cosmology: Between Art, Philosophy, and the Sciences*, (Edinburgh: Edinburgh University Press), 2026.

20 See, for instance Arkady Plotnitsky, "Chaosmologies: Quantum Field Theory, Chaos and Thought in Gilles Deleuze and Félix Guattari's What is Philosophy?," *Paragraph* 29, no. 2 (2006): 40–56.

21 For example, Martin Calamari, "The Metaphysical Challenge of Loop Quantum Gravity," *Studies in History and Philosophy of Science* 86, (2021): 68–83.

22 Sholtz and Beaulieu, *Deleuze and Cosmology*, 2

## Games, Human and Divine

In *Order and the Virtual*, Ross's attempt to resolve the issue of Deleuze's relation to thermodynamics leads him to an interrogation of Deleuze's notion of the divine game, which is read via Nietzsche, Leibniz and Michel Serres. In *Difference and Repetition*, Deleuze famously distinguishes between two games in order to explain the repetition of difference via his unique interpretation of the notion of eternal return.<sup>23</sup> On the one hand, we have what he calls the "human game;" this is the game of the Same and the categorical—a game grounded in the primacy of identity and the dogmatic image of thought. Deleuze makes this clear when he notes that the human game is "indistinguishable from the practice of representation, of which it presents all the elements: the superior identity of the principle, the opposition of hypotheses, the resemblance of numerically distinct throws, and proportion in the relation between the hypothesis and the consequence."<sup>24</sup> This is a poor game because it is a game of simple redistribution of the actual—of "sedentary distributions" whereby "the *pre-existing rules* define distributive hypotheses according to which the results of the throws are repartitioned."<sup>25</sup> Pascal's wager is exemplary of this kind of game, based as it is upon a kind of pseudo-contingency that does not critically explore—and thus tacitly reifies—what gives rise to the pre-established order within which chance is distributed. The wager does not acknowledge the contingency of its own grounding and thus does not affirm the whole of chance. The divine game, on the other hand, is the game of the eternal return and serves as a positive and productive force that "affirms everything of the multiple, everything of the different, everything of chance except what subordinates them to the One, to the Same, to necessity."<sup>26</sup> As Deleuze avers, the divine game, which is the game of Heraclitus, Mallarmé and Nietzsche, is difficult to understand as it cannot be dealt with from within the world of representation given that it is precisely what is always distributing and redistributing this world—and here Deleuze refers to throws within the divine game as effectuating a *nomadic* as opposed to *sedentary* distribution—which in turn becomes amenable to the logic of the One, the Same and so forth. In this divine game, which Deleuze, following Lautman, describes as problematic, i.e., as a virtual problem that is non-exhaustively actualised in various solutions or throws of the dice, "there is no pre-existing rule, since the game bears already upon its own rules and since the child-player can only win, all of chance being affirmed each time and for all times."<sup>27</sup> This is why Deleuze can make the strange claim that the various rules resulting from each throw are "the forms of a single ontologically unique throw, the same across

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23 Which he interprets as the return only of what differs: what repeats is difference.

24 Deleuze, *Difference and Repetition*, 283.

25 Deleuze, *Difference and Repetition*, 303; emphasis mine.

26 Deleuze, *Difference and Repetition*, 115.

27 Deleuze, *Difference and Repetition*, 116.

all occasions”<sup>28</sup>—what he will elsewhere describe as *Eventum Tantum*, one event for all events.<sup>29</sup>

Ross applies this notion of the divine game in proposing an approach to cosmology that eschews the absolute nature of the second principle—as well as a hylomorphic view of play—in favour of a more profound principle of difference. As he puts it, “[c]onstrued in terms of physical causality or expression, in the site of the Ideal Game, the cosmos, events are not totalisable, the world is ‘open,’ though this is in another sense than the one typically adopted in the register of thermodynamics, where an ‘open’ system is one through which external sources of energy are free to flow.”<sup>30</sup> We can see where this provocative claim is leading: the entropic principle may be the case if we are playing the human game that evaluates the distributions of chance vis-a-vis the established, as though the rules of the universe were unchanging, but if we accept that the rules themselves may change then the second law is potentially obviated. “Rules determine the distribution of pieces, yet the distribution of pieces determines the rules; a flat ontology.”<sup>31</sup> The implication of this view is that the universe is non-ergodic, and it is here that Ross parts ways with Nietzsche’s principle of the eternal return as, on his view, tacitly assuming ergodicity via its reliance on the anachronistic—for contemporary physics—notion that the universe has already existed forever, whereas Ross follows David Bohm in arguing that “eternity means the depths of the implicate order, not the whole of the successive moments of time.”<sup>32</sup> In fact, Ross argues via the groundbreaking work of Prigogine and Stengers<sup>33</sup> that said non-ergodicity is typified by the larger scale phenomena examined by chaos theory, wherein fluctuations and bifurcations in far-from-equilibrium nonlinear systems act as emergent constraint regimes on unfolding dynamics,<sup>34</sup> a view reiterated in Stuart Kauffman’s work on the negentropic emergence of complex order in living systems.<sup>35</sup> In light of this we should, Ross suggests, amend Leibniz’s principle of sufficient reason via Deleuze and

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28 Deleuze, *Difference and Repetition*, 283.

29 “[N]othing but the Event subsists, the Event alone, Eventum Tantum for all contraries, which communicates with itself through its own distance, resonating across all its disjunctions” (Deleuze 1990:176).

30 Ross, *Order and the Virtual*, 101.

31 Ross, *Order and the Virtual*, 94.

32 Bohm, “Time, the Implicate Order and Pre-Space,” 200.

33 Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man’s New Dialogue with Nature* (New York: Bantam Books), 1984.

34 Alicia Juarrero, *Context Changes Everything: How Constraints Create Coherence* (MIT Press, 2025).

35 See Stuart Kauffman, “Res Potentia And Res Extensa Linked, Hence United, By Quantum Measurement,” *Physics and speculative philosophy: potentiality in modern science* eds. David Ray Griffin, Michael Epperson & Timothy E. Eastman (Boston: De Gruyter, 2016) and Stuart Kauffman, *A World Beyond Physics: The Emergence and Evolution of Life* (New York: Oxford University Press, 2019). Notably, Ross cites Kauffman’s development of the notions of *res potentia* and the adjacent possible at several points in his argument.

quantum physics so that sufficient reason simply *is* disequilibrium and divergence and compossibility the compossibility of *impossibles*—a compossibility of metastability, superposition and disjunctive inclusion.

Beyond this, Ross examines the work of several theoretical physicists, most prominently Bohm and Lee Smolin, in order to put forward the view that the underlying quantum field which, on some models, gives rise to the spatiotemporal ordering of the universe is itself the site of the divine game. Essentially, the argument Ross makes is a transcendental empiricist one:

If we proceed on the assumption that everything (even the Big Bang) is subject to law, we are irredeemably in the position of attempting to identify which among the laws we impute to our own universe could serve as the condition for any possible universe. If we think rather in terms of conditions, the transcendental point of view, in the case of both Kant and Deleuze, reminds us that the condition may not resemble in the slightest that which it conditions. The point of contention rests further on, in the formulation arising from the Ideal Game; for Deleuze, *we should not seek the laws*, the necessities which labour invisibly beneath the phenomena, *but the repetitions which serve to constitute the law (and work to undo it)*... And as much could be said for the cosmologist, who is just as surely conscious that assertions about the state of the universe are accompanied without exception by questions about conditions for the multiverse.<sup>36</sup>

There is, in short, at least if Ross's preferred branches of speculative quantum physics and contemporary fields like loop quantum gravity are correct, a fundamental asymmetry or inexhaustible disequilibrium to reality at a quantum level—a clinamen-like process of continuous differentiation that gives rise to the spatiotemporal order and with it to the contingent laws of that non-exhaustive ordering.<sup>37</sup>

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36 Ross, *Order and the Virtual*, 107; emphasis mine.

37 Some readers may be reminded of Quentin Meillassoux's notion of absolute contingency at this point. Ross however underscores that this is a misreading and that Meillassoux's conception of contingency is a profoundly non-realist one given that it pays no attention to the virtual conditions - the turns within the divine game - that gives rise to the contingency he is so quick to appeal to. As Ross insightfully points out, "[t]he openness entailed by Meillassoux's contingency requires an acute adherence to the weightless equivalence of radically incongruent possibilities, without delay or retardation in actualisation, without mechanism, process or propagation. This is precisely what scientists tend to call 'magic thinking', a charge often laid at the door of religious or theological accounts of nature. Deleuze's own critique of this style of reasoning consists in the injunction always to seek virtual conditions over merely 'possible' eventualities" (Ross, 178).

## The Implicate and the Explicate

This distinction between the spatiotemporal and an underlying dynamic field should remind us of the well-worn Deleuzian distinction between the virtual and the actual. Ross prefers to discuss the virtual in terms of the intensive,<sup>38</sup> referring frequently to Simondon in this regard, but his view is broadly similar to the picture Deleuze paints in *Difference and Repetition*. Here, Ross draws attention to a barely explored but remarkably fruitful connection between Deleuze's virtual-actual distinction and Bohm's implicate and explicate orders. In *Wholeness and the Implicate Order*, Bohm, drawing on then-contemporary theoretical physics, argues that what we usually think of as space and time—the manner in which we conceive of the former in terms of discrete spatially separated phenomena and the latter in terms of discrete temporally separated instants<sup>39</sup>—is what he terms the explicate or unfolded order. Bohm argues however that this common sense image is misleading and that the explicit order is quasi-supervenient upon, while also reciprocally entangled with, an enfolded high-dimensional implicate order<sup>40</sup> that has neither spatiality nor temporality but is instead comprised of zero-point energy fluctuations at the Planck level ( $10^{-33}\text{cm}$ ), i.e., what the physicist John Wheeler once described as the quantum foam.<sup>41</sup> In Ross's words, "[t]he implicate order, first and foremost for Bohm, is a structuration of the prodigious energy inherent in the vacuum, the so-called "Dirac Sea," which underlies the phenomena we encounter in the explicate order."<sup>42</sup> The explicate order—the order of time, space, particular matter and the laws of thermodynamics—is thus just the unfolding of a series of ripples expressed on the surface of an underlying and enfolded quantum ocean and this entire movement of folding, unfolding and refolding, in which even the Big

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38 As will be seen later, on some readings, e.g., DeLanda's tripartite ontology of virtual, intensive and actual, we could argue that Ross in fact conflates the virtual and intensive processes to a greater degree than is warranted.

39 This, of course, is not the view that is espoused by the "block universe" interpretation of special relativity, wherein all times exist equally as part of a four-dimensional spatiotemporal Riemannian manifold. It should be recalled in the following that quantum theory is a separate but related—and arguably even more radical—view on spatiotemporality, although some researchers, notably Carlo Rovelli, have attempted to reconcile relativity and quantum physics in contemporary loop quantum gravity.

40 Technically a recursion of increased enfolded implicate orders that in principle has no terminus: "[w]hat I propose, therefore, is a succession of vacuum states, all enfolded in the deeper implicate order, as ordinary time intervals are enfolded in the vacuum state" (Bohm, 197).

41 As Bohm explains, "[a]s physics is pursued further, we do indeed find that this atomic structure dissolves into electrons, protons, neutrons, quarks, subquarks, etc., and eventually into dynamically changing forms in an all-pervasive and universal set of fields. When these fields are treated quantum-mechanically, we find that even in what is called a vacuum there are 'zero-point' fluctuations, giving 'empty space' an energy that is immensely beyond that contained in what is recognized as matter." (Bohm, 187)

42 Ross, *Order and the Virtual*, 158.

Bang is “just a ‘little ripple,’”<sup>43</sup> is what Bohm calls the *holomovement*<sup>44</sup>:

[O]ne is to begin with the holomovement, in which there is the immense ‘sea’ of energy... This sea is to be understood in terms of a multidimensional implicate order... while the entire universe of matter as we generally observe it is to be treated as a comparatively small pattern of excitation. This excitation pattern is relatively autonomous and gives rise to approximately recurrent, stable and separable projections into a three-dimensional explicate order of manifestation, which is more or less equivalent to that of space as we commonly experience it.<sup>45</sup>

Timothy Murphy, in an early article linking Bohm to Deleuze, describes the holomovement as a “differential omnipresence,” explaining via analogy to holography that in order to conceive of the unfolding of the implicate order “one must imagine each point, like each moment in time, to condense within itself the entire shifting structure of that universe, viewed from different perspectives.”<sup>46</sup> Here, “the vacuum state would be an enfolded virtual generator of times (and spaces) yet unknown and unmeasured.”<sup>47</sup> The parallels with Deleuze’s notion of the generative principle of *indivisible-difference*,<sup>48</sup> which operates as a condensed descriptor for the complex unfolding of difference detailed in chapters four and five of *Difference and Repetition*, are striking here, and one can similarly recognise a strong similarity between the Bohmian holomovement—which is

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43 David Bohm, *Wholeness and the Implicate Order* (London: Routledge, 1980), 244.

44 Bohm refers extensively to holography in developing this term, explaining how the visible expression of the holograph is the result of the capturing of a different aspect of overall electromagnetic interference patterns/phase differences at each point of the underlying photographic medium. The holographic metaphor is evident not only in Bohm’s description of the emergence of space but also when he argues that “each moment of time is a projection from the total implicate order” (Bohm, 189) and that thus “all these projections into any given moment will have the past of the entire universe as their potential content, which is thus enfolded into the moment in question” (191). Or, as he says elsewhere, “[i]n terms of the implicate order one may say that everything is enfolded into everything.” (Bohm, 225)

45 Bohm, *Wholeness and the Implicate Order*, 243.

46 Timothy Murphy, “Quantum Ontology, A Virtual Mechanics of Becoming,” *Deleuze & Guattari: New Mappings in Politics, Philosophy, and Culture*, (1998), 223.

47 Murphy, “Quantum Ontology,” 220.

48 Deleuze, *Difference and Repetition*, 246.

the immanent expression of what Bohm, following Wheeler, terms *pre-space*<sup>49</sup>—and the Deleuzian-Guattarian chaosmos. Indeed, cutting a section out of chaos, as Deleuze and Guattari put it,<sup>50</sup> is precisely a collapse of the wave function<sup>51</sup>—a provisional and non-exhaustive solution to a superpositional virtual problem. If, in the explication of solutions, “the differentials disappear in the result, this is to the extent that the problem-instance differs in kind from the solution-instance; it is in the movement by which the solutions necessarily come to conceal the problem.”<sup>52</sup> Notably, in his discussion of thermodynamics, Deleuze uses remarkably Bohmian language to reiterate that that “[d]ifference in the form of intensity *remains implicated in itself*, while it is *cancelled by being explicated* in extensity.”<sup>53</sup> As Bohm would put it, “the particle is only an abstraction that is manifest to our senses. What is is always a totality of ensembles, all present together, in an orderly series of stages of enfoldment and unfoldment, which intermingle and inter-penetrate each other in principle throughout the whole of space.”<sup>54</sup>

Similarly to Deleuze, Bohm encourages us to consider both aspects of the folding and unfolding of reality in this regard, arguing that “[i]n the [explicate] time aspect is comprehended the *becoming of being*, while in the ‘timeless’ [implicate] aspect is comprehended the *being of becoming*.”<sup>55</sup> This goes some way towards rescuing Bohm from charges of “emanationism” that are sometimes levelled against him and which Deleuze has also occasionally been accused of based on readings that misconstrue the reciprocally

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49 Bohm, “Time, the Implicate Order and Pre-Space.” As he continues, “Wheeler has appealed to the image of space-time as a kind of very fine ‘foam’ out of which the familiar patterns and forms of continuous space, time, and matter emerge as approximations on the large-scale level. He is thus regarding this foam as a kind of prespace, from which ordinary space-time emerges as a suitable limiting case. However, because the structure of the foam is given by quantum laws, one should more accurately regard pre-space as a form of the implicate order.” (1986:192) Bohm takes care to note that he is not arguing for a Spinozist substantialism in his use of the notion of pre-space and that the implicate order is better understood as a graph or Feynmann diagram, although he will also refer to Whiteheadian concrescence when developing his notion of a ‘moment’ as an unfolding of said order.

50 Gilles Deleuze and Félix Guattari, *What is Philosophy?* (New York: Columbia University Press, 1994).

51 “[B]y the quantum mechanical model, what a particle is ‘composed’ of at the most fundamental level is a bundle of undetermined probabilities. It is the act of measurement itself which forces this wave of probabilities to collapse, thereby determining determined values for the aspect under investigation: spin, speed, direction, etc.” (Ross, 41)

52 Deleuze, *Difference and Repetition*, 177–8.

53 Deleuze, *Difference and Repetition*, 228; emphasis mine.

54 Bohm, *Wholeness and the Implicate Order*, 233.

55 Bohm, “Time, the Implicate Order and Pre-Space,” 197. For a useful introduction to Bohm’s discussion of time that reads him via Husserlian retention-protention, see Paavo Pylkkänen, “Still or Sparkling? Past, Present and Future in Bohm’s Implicate Order Approach,” *Acta Philosophica Fennica* 99, (2023).

imbricatory nature of the virtual-actual relationship.<sup>56</sup> As Bohm and his co-author F. David Peat elsewhere admit, the Bohmian view does at first appear “to reduce the time order [the explicate] so that it could, in principle, be derived completely from the timeless [the implicate] order,” and this would be the case “if the ‘flow’ in the implicate, generative stream were only in the ‘direction’ from the source or origin down to ever more explicate orders of succession,” but “because of the two way nature of this flow, there is an inherent dynamism in the theory and such a reduction is not possible.”<sup>57</sup> Similarly in Deleuze’s case, while a certain dogmatic image of thought arises when we think solely in terms of the established, it is emphatically not the case that we should simply defer to the virtual or implicate in a manner that grants it a kind of absolute ontogenetic primacy.<sup>58</sup> In fact to do so would be to render wholly incoherent the Deleuzian practices of vice-diction and counter-actualisation: the following of being in its becoming and the participation in the whole of the method of dramatization. Such a misreading also has fundamental implications for the neo-Bohmian philosophy of cosmology limned here. Similarly, we should take care not to impute a straightforward holism to pre-space, the implicate order or the holomovement. Again, Bohm is not endorsing any form of substantialism, and we can understand his view as closer in spirit to Deleuze’s description of the virtual as continuous multiplicity: “[m]ultiplicity remains completely indifferent to the traditional problems of the multiple and the one... Multiplicity is neither axiomatic nor typological, but *topological*.”<sup>59</sup>

## Chaos and Beyond

A question arises: given this foray into Deleuzian-Bohmian philosophy of cosmology, how best can we think the underlying metaphysics of negentropy and contingency? What *kind* of thinking is best suited to a philosophy in which change is primary and where the identities

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56 Peter Hallward’s misrepresentation in *Out of this World* being perhaps the most well-known example here.

57 David Bohm and F. David Peat, *Science, Order and Creativity* (Abingdon: Routledge Classics, 2011), 196.

58 In this regard, Dale Clisby and Sean Bowden have argued that there are three prominent readings of the virtual vis-à-vis the intensive and actual: a spurious reading that prioritises the virtual and which results in the fundamental misunderstandings evident in Badiou, Hallward and their interlocutors; a second reading – exemplified by Jon Roffe’s work – that views the virtual as an aspect of the actual; and a third reading, which I broadly align with, wherein the role of the intensive is underscored within a tripartite virtual-intensive-actual schema, this being the reading developed by Manuel DeLanda, John Protevi and other scholars specifically interested in the intersections of Deleuze and science. See Sean Bowden and Dale Clisby, eds. “The Virtual, the Actual, and the Intensive: Contentions, Reflections, and Interpretations.” *Deleuze and Guattari Studies* 11, no. 2, special issue, (2017): 153–5, as well as the other articles in that issue.

59 Gilles Deleuze, *Foucault*, trans. Sean Hand (London: Althone), 1988: 14; emphasis mine.

that emerge within the dance of being and becoming are provisional stabilisations of an underlying dynamic of folding and unfolding? Here, as Lee Smolin says, “to speak the language of the new physics we must learn a vocabulary in which process is more important than, and prior to, stasis.”<sup>60</sup> I would like to suggest that dynamic systems theory (DST) and specifically the phase space formalism employed within complex and chaotic systems theories holds promise in this regard. Here I part ways with Ross, who argues that the closely related frameworks of chaos theory and DST first popularised within Deleuze and Guattari studies by Manuel DeLanda<sup>61</sup> and which recast *Difference and Repetition*’s description of the intensive unfolding<sup>62</sup> of virtual difference as, loosely speaking, the traversal of a vector landscape or phase space populated by attractors and repellers (i.e., tendencies), is insufficient for thinking the asymmetrical synthesis of the sensible or divine game. Ross’s view in this regard appears to be that the DST formalism relies on a static phase space and discontinuous traversal of this space via abrupt bifurcations, thus motivating him to argue that “there is no straightforward identification to be made between Deleuze’s chaotic ‘divergence’ and the ‘bifurcations’ of chaos theory, nor can such an identification underwrite the Deleuzian Event *qua* Event; this is in effect akin to comparing the knots in a piece of wood to the sap which laid the grain!”<sup>63</sup> In other words, the DST approach<sup>64</sup> remains, for Ross anyway, at the level of the explicate and the discrete<sup>65</sup> and we should turn instead to quantum dynamics—loop quantum gravity, for instance—for a better model. More specifically, as he puts it, “[t]he pre-eminent character of the event for Deleuze is a reciprocal determination, a resonance between co-existent time-signatures. From this perspective, we can see more clearly the problems in identifying the Deleuzian event with the bifurcations of chaos theory; it cannot help but be continuous, since the

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60 Lee Smolin, *Three Roads to Quantum Gravity* (Basic Books, 2003), 53.

61 Manuel DeLanda, *Intensive Science and Virtual Philosophy* (London: Continuum, 2002).

62 As Bryan Noonan astutely observes, there is a close link between the notion of folding and that of multiplicity: “the seemingly innocuous English translation of *multiplicité* into “multiplicity”... misses the *pli* at the heart of *multiplicité*, a dimension of the term not missed in the alternative of manifold”. See Noonan, “The Lily of the Field Sings the Glory of the Heavens: The Cosmos of the Fold,” *Deleuze and Cosmology*, 143-65

63 Ross, *Order and the Virtual*, 4.

64 Ross refers solely to “chaos theory” in the book, but it seems clear that he is alluding to the broader field that includes DST, which is frequently used to model chaotic systems, e.g., as systems typified by chaotic or “strange” attractors.

65 It should be noted that the relation between the continuous and discrete within quantum physics generally and Bohm’s implicate and explicate orders specifically is complex. In fact, it is possible to consider the holomovement expressed by Bohm’s implicate order as simultaneously continuous *and* discrete. More generally, quantum physics is often understood as entailing *discontinuous* phenomena—from the discrete energy states of subatomic particles to the discreteness of spacetime itself on the loop quantum gravity view. The terms continuous and discrete may in fact be insufficient for thinking the reality presented by contemporary physics, analogously to how Deleuze regards the one and the multiple as insufficient for thinking the virtual.

tension between time-signatures never once ceases.”<sup>66</sup> This seems to be a misreading of chaos theory, which is usually modelled using nonlinear differential equations. While nonlinear systems are often typified by abrupt jumps between states, these represent, as elaborated below, *outcomes* of underlying continuous dynamics. Specifically, we should not confuse the traversal of the phase diagram with the diagram or vector field itself; in fact, Deleuze himself reminds us here that “every differentiation presupposes a prior intense field of individuation... [and] any reduction of individuation to a limit or complication of differentiation, compromises the whole of the philosophy of difference.”<sup>67</sup> In other words, the phase space should be understood more as an intensive field of individuation—or as prephased, in Simondon’s terms—than as the spatiotemporal explicate order that is individuated (what Simondon would describe as a single phase of being). To reiterate, it is thus emphatically not the case that we should view the dynamics of phase spaces as discontinuous, especially given that, typically, “a bifurcation event is defined as a *continuous* deformation of one vector field into another.”<sup>68</sup> This is especially the case with second- and higher-order phase transitions, and the idea of continuously transforming and nested phase spaces and their concomitant scales of provisional stabilisation is implicit in DeLanda-style readings of Deleuze<sup>69</sup> while also being explicitly engaged with in recent work on sub-Riemannian manifolds that attempts to update Deleuze’s reliance on Riemann for his development of the notions of continuous multiplicities and differential heterogenesis,<sup>70</sup> as well as within work in quantum physics itself that pertains to second- and higher-order continuous phase transitions<sup>71</sup> and continuous deformations of the differentiable manifolds that are frequently used to describe phase spaces.<sup>72</sup> Moreso, there exist well-known applications of phase spaces and manifolds in the modelling of

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66 Ross, *Order and the Virtual*, 104.

67 Deleuze, *Difference and Repetition*, 247.

68 DeLanda, *Intensive Science and Virtual Philosophy*, 23.

69 For instance, “[a] multiplicity is a nested set of vector fields related to each other by symmetry-breaking bifurcations, together with the distributions of attractors which define each of its embedded levels” (DeLanda, 23–4).

70 A., Sarti, G. Citti, and D., Piotrowski, *Differential Heterogenesis: Mutant Forms, Sensitive Bodies*, (Springer, 2022).

71 K. Hawary, M. Azzouz., M. Baz., S. Deffner, B. Gardas and Z. Mzaouali, “Navigating the phase diagram of quantum many-body systems in phase space,” *Physical Review E* 110, (2024).

72 See, for instance, X. Xie, Y. Chen and Q. Shi, “Some studies on mechanics of continuous mediums viewed as differential manifolds,” *Science China Physics, Mechanics and Astronomy* 56, no.2 (2013) and X. Zhuang and N.E. E. Mastorakis, “The Dynamics of Deforming Manifold: A Mathematical Model,” *Eprint arXiv:2110.04992*, 2021.

various quantum theories and phenomena.<sup>73</sup> As Sarti et al. elaborate, “[d]ifferently from both mathematical physics and structural morphodynamics, where the becoming of forms emerges from generators that are homogenous in space and time, the heterogeneous dynamics in question—called heterogenesis—introduces the possibility of the mutation of laws in space and time so as to overcome any homogeneity.”<sup>74</sup> They argue that this “can thus instantiate a dynamics of the event whereby new spaces of possibility and new forms can be generated”<sup>75</sup> and describe this via Heisenberg’s uncertainty principle, itself closely related to the physics of probabilistic metastability Ross operates with, as a “continuous recomposition of virtualities.”<sup>76</sup> This view is contrasted by Sarti et al. with René Thom’s structural morphodynamics, which is perhaps indirectly the view of complex and chaotic systems Ross indirectly relies upon. As they explain:

René Thom has shown clearly that the emergence of structures requires a very particular kind of singularities defining stable basins of attraction. Indeed, the Thomian theory of structural stability in its entirety aims to pose the conditions for the stabilization of fluxes. Mathematically, this means that attractor basins are stable and opposite relations that are implemented by means of parameters changing in an external space. These are the condition of existence for a structure. But of course there are other possible actualizations of the composition of adjoint fields including general Poincaré singularities that differ from gradient potential. Likewise, there are non-standard attractors like strange attractors, as well as solutions coming from harmonic analysis such as those at work in quantum mechanics.<sup>77</sup>

It should be recalled here that Thom, a player of the human, all too human game, famously waxed polemical against Prigogine and others who ‘glorified chance’ and fetishised a mysticism of the clinamen, preferring to align himself with the view that on final reckoning, determinism was still a viable option<sup>78</sup>.

Beyond Thom, aversion to DST for thinking the complex holomovement-like process of

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73 Superstring theory is often discussed in terms of compacted six-dimensional Calabi-Yau manifolds that combine with four-dimensional extensive spacetime to comprise reality, for instance; the generalisations of smooth manifolds in the notions of orbifolds and diffeology are sometimes also employed in descriptions of related models. Here it should be obvious that there are numerous further potential engagements between Deleuze and differential geometry than the usual analogies between classic Riemannian manifolds and the virtual that Deleuze himself employed.

74 Sarti and Piotrowski, *Differential Heterogenesis*, 2.

75 Sarti and Piotrowski, *Differential Heterogenesis*, 2.

76 Sarti and Piotrowski, *Differential Heterogenesis*, 6.

77 Sarti and Piotrowski, *Differential Heterogenesis*, 43–4.

78 René Thom, “Stop Chance! Silence Noise!,” trans. Robert Chumley, *SubStance* 12, no. 3 (1983).

different/ciation may in part also be the result of a too-close identification of intensive processes, i.e., the unfolding of various trajectories to comprise a phase portrait (a series of non-exhaustive actualisations or “integrations”) and the virtual (the enfolded diagram or differentiable manifold wherein processes of differentiation express singularities that distribute the vector field). In this regard, to reiterate the difference between the phase diagram and its traversal or portrait, Deleuze draws “a sharp ontological distinction between the trajectories as they appear in the phase portrait of a system, on one hand, and the vector field, on the other,”<sup>79</sup> underscoring that “the specification of the singular points (for example, dips, nodes, focal points, centres) is undertaken by means of the form of integral curves, which refers back to the solutions for the differential equation,” but that “[t]here is nevertheless a complete determination with regard to the existence and distribution of these points which depends upon a completely different instance—namely, the field of vectors defined by the equation itself.”<sup>80</sup> In one sense, then, there is just the *being of becoming*—the distinction between virtual and actual—but in another there is the *becoming of being*—the intensive unfolding or holomovement.

The recent turn within Deleuze and Guattari studies to issues in cosmology—and quantum physics specifically—is encouraging both as an exemplary instance of productive dialogue between philosophy and science and also because it holds the promise of a compelling new framework for grappling with the philosophy of difference, using science to think philosophy but also explicitly calling for scientists to pay attention to the philosophy of the divine game wherein “the very mutability of constants, laws and natural kinds, and perhaps only this... could maintain an endlessly enduring complexity and underpin the infinite process of becoming.”<sup>81</sup> Deleuzian cosmology, in other words, explicates a virtual problematic field that we would do well to vice-dict. Such vice-diction, at minimum, includes a deeper examination of the finite scope of the idea of an arrow of time within both Deleuzian metaphysics and physics, perhaps via Deleuze’s distinction between Chronos and Aion<sup>82</sup> as two forms of time associated with the explicate and implicate orders respectively, as well as an elaboration of these two orders via the closely-related neo-Leibnizian notions of explication, implication and complication in *Difference and Repetition*. Similarly, an engagement with the distinction between static and dynamic genesis and the complex notions of quasi-causality and the dark precursor presented in

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79 DeLanda, *Intensive Science and Virtual Philosophy*, 22.

80 Deleuze, *Difference and Repetition*, 177.

81 Ross, *Order and the Virtual*, 173.

82 As Arnaud Villani describes, with reference to cosmology, “[i]t is this Aionic time that virtualizes/actualizes interstitial fragments, indifferent to time and its prohibition of return, and never ceases to ‘move’ everything... in this *non-space* and this *non-time*, billions of stoicheia (“little bits”), remarkable and brilliant singularities of a reality moving by the force transmitted to them by chaos which distributes them on flows ready for encounters with other singularities on other flows.” See Arnaud Villani, “Deleuze, an Unwitting Milesian?” *Deleuze and Cosmology*.

*Logic of Sense* and elsewhere could benefit from being drawn into discussion with perhaps the most profound consequence of Rovelli's speculative reconciliation of relativity and quantum physics in his theorisation of loop quantum gravity: there is change without time, because time emerges from this *non-temporal* incessant change at the level of the spin foam. As Calamari describes, "fundamentally, the physical world is defined by a timeless becoming, understood as a non-temporal, or rather non-spatiotemporal, ceaseless happening of events"<sup>83</sup>—a radical post-Einsteinian Heracliteanism, we could say, that occurs not within space or time but as the unfolding of the explicate order. The ontologically unsettling consequence of this is that "spacetime is expected to emerge from the coarse-grained collective dynamics of non-spatiotemporal entities."<sup>84</sup> In terms of more standard models of quantum theory, as Michael Ardoline observes, we can also inquire further into the remarkable parallels between "quantum (Hilbert space), quasi-classical (probability density), and classical (determinate, measured result)" and Deleuze's virtual, intensive and actual respectively, as well as the similarity between "decoherence (from quantum to quasi-classical) and measurement (from quasi-classical to determinate)" and the processes of individuation and actualization.<sup>85</sup> Finally, a closer interrogation of Bohm's work may be specifically rewarding, especially of the distinction he draws between the horizontal and vertical implicate orders, the former constituting the dynamic of folding and unfolding and the latter suggesting—in a manner resonant with Deleuze's discussion of a nesting of virtuality in his late essay, *The Actual and the Virtual*—that the implicate order itself contains multiple levels of emergence.<sup>86</sup>

In all of this, as Smolin intuits, a different form of thought becomes necessary if we are to produce a thought adequate to the strange new world cosmology has been describing for the past century. While our thinking in this regard is oftentimes grounded in the explicate—in the fully formed Newtonian world of extended spatiotemporal forms enjoying discrete identities and amenable to taxonomic accounts via the dogmatic image, we would perhaps do well to regard thinking itself as a becoming: not just the manipulation of already-constituted conceptual objects but as a provisional and ongoing ontogenesis—a holomovement of thought in which the subject and object of that thought arise at the same time, as part of the arising of time itself, concepts being formed and expressed in the same manner as the spatiotemporal order more generally. In this regard, in order to grasp thought not just in its being but in its becoming, the resources of nonlinear dynamic systems theory, phase diagrams and so forth can help us, perhaps, to think, as Deleuze always encourages us to, a thought without image. This would constitute a vectorisation

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83 Calamari, "The Metaphysical Challenge of Loop Quantum Gravity," 70.

84 Calamari, "Immanence, Process, and Relationalism in Loop Quantum Gravity," *Deleuze and Cosmology*, 273

85 Michael Ardoline, "Deleuze and Decoherence: Approaching the Measurement Problem through Intensity," *Deleuze and Cosmology*, 223.

86 Bohm, "Time, the Implicate Order and Pre-Space," 186.

of thought, replacing the logic of fixed identities, categories and so forth with the distributions and tendencies that populate the differential sub-Riemannian manifolds that constitute the table upon which the divine game is played. Thought too, recall, is part of cosmology. Throwing the dice once more, one time for all of time in a universe shorn of time but in which change is ceaseless nonetheless, we would do well to repeat, with difference, the ongoing cosmogonic Lucretian swerve of Deleuze's and Bohm's basic metaphysical position: "[d]isparity and dissymmetry take on their own powers at the cosmological scale. From one epoch to another, evolution outruns entropy."<sup>87</sup>

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87 Ross, *Order and the Virtual*, 175.

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# Beyond the Human Gaze: Materiality and the Deanthropologization of Vision

Renzo Filinich

## Abstract

This article examines how contemporary media technologies transform the conditions of visibility, challenging anthropocentric models of perception historically grounded in the human gaze. Drawing on the philosophies of Gilbert Simondon and Bernard Stiegler, it argues that vision is not merely extended by technical apparatuses but reconfigured through processes of technological individuation and transindividuation. From optical devices and perspectival systems to algorithmic media and machine vision, the image progressively detaches from embodied human perception and becomes an operational entity within technical infrastructures. Through an analysis of historical and contemporary media systems, the article develops the concept of *distant visibility* to describe modes of seeing that function beyond phenomenological experience. In this context, vision emerges as a distributed process shaped by material, computational and mnemonic systems, marking a transition toward the deanthropologization of perception and the emergence of posthuman and nonhuman regimes of visibility.

**Keywords:** posthuman perception, technological individuation, distant visibility, machine vision, media theory

## 1. Introduction: From Gaze to Interface

The central claim of this article is that media technologies do not merely extend vision but participate in the individuation of subjectivity and perception itself. Thus, traditional understandings of perception—rooted in phenomenology and Cartesian scepticism—are no longer adequate to account for contemporary modes of visual experience mediated by technical systems. A problem arises in Husserlian phenomenology, wherein the psyche remains foreign. In a logical theory of reflection, the mutual production of the phenomena of consciousness, the need for the other in the genesis of thought, and the interactive processes we call “persons” establish an eidetic reduction. Here, reflection does not designate perception as such, but a second-order operation through which perceptual experience is thematised, stabilised and rendered intelligible. This reduction does not exclude intersubjectivity; rather, it presupposes it, insofar as consciousness is always already given as co-constituted with others.<sup>1</sup> This reduction excludes hyper-material worlds, but it does not exclude the need for “others” (thought of in a broad sense). This is because the presence of an “other” consciousness is given with consciousness itself, whereas the worlds that emerge between such interactions appear only as provisional and unstable. As a result, these interstitial worlds remain subject to doubt. In modern societies, this doubt is intensified by the accumulation of simulacra, which mediate and displace lived experience. Our task, then, is not to resolve this uncertainty, but to work methodologically within it—through intersubjective reflection on the logical transformations that accompany our co-evolution with digital images.

Media, I argue, are the conditions of possibility for world genesis—that is, for the emergence of relational fields in which beings, meanings and interactions take form (a world is not a pre-given totality of objects, but a dynamically constituted horizon of relations). Media operates as a non-place: situated outside any single “world,” yet enabling the existence of multiple worlds.<sup>2</sup> In this sense, media are themselves possible worlds, just as we are possible worlds for them. Unlike classical theories that treat the world as a stable order of objects, media appear within our world as objectified subjects—neither mere objects nor bodies, but interactive ontological operators that participate in the ongoing genesis of worlds through our engagements with them. This relational complexity exceeds Aristotelian frameworks that reduce reality to a sum of discrete, semantically bounded entities.

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1 Reflection here should not be conflated with perception. In the phenomenological tradition, perception refers to first-order, pre-reflective experience, whereas reflection designates a second-order operation through which perceptual experience is thematised and rendered intelligible. The eidetic reduction concerns this reflective level of analysis rather than perceptual givenness itself.

2 Here, world designates a relational and processual horizon through which beings, meanings and interactions are co-constituted, rather than a fixed or totalised collection of objects.

This allows us to observe how the terminological force of the concepts of medium, image, and what Gilbert Simondon describes as the “individuation of technical beings,”<sup>3</sup> can be applied as powerful leitmotifs for thinking about interfaces. The following question arises: How can we think about and focus on the depth of the interface? Where, and how, can we find or create new and surprising relationships between a surface and its depth? How can we make visible the many layers that are hidden behind and within the interface? This singularity will not occur through the medium, nor will it offer a different way of treating media, nor will it serve as a technical achievement. The transition to something completely different will only be possible through the advent of new systems of meaning—a transcript or chiasmic crossing of previous world models; that is, through interactive and intersubjective acts.

To rummage through pre-existing genealogies also means revealing the place of thought in thought. To do so would mean that the thinking being must make their rootedness known, and that rootedness must be revealed in the multiplicity of living and non-living contexts. Do we understand, then, that media has been invisible until now? We said that media has no body, nor affection, despite understanding that the compartmentalised plains (which were never separated) can be reunited to collectively create a new condition of visualisation which has, until now, remained invisible. Today, however, that is not the real problem. Today, the issue is the overabundance of data images and the extent to which they can be processed by humans. It is an issue of scale. It is not simply a matter of delegating the production of images to machines—as in the case of technical images—but of delegating their analysis, including the processes through which they are selected, processed and rendered visible. If we follow Stiegler, it is the synthesising of images that has been delegated to machines, and today, algorithms are in charge of their analysis.

## **2. The Crisis of Focalisation: From Optical Apparatus to Attention Economies**

In this section, I will try to map a historical and epistemological transition in how vision is structured, understood, and instrumentalised—from the classical model of perspective to today’s algorithmic visual systems. The notion of “focalisation”—the act of constructing and stabilising a view from a subjective point of origin—grounds a model of perception based on unity and control. However, digital and computational technologies have disrupted this paradigm. What emerges is a dispersed, non-localised, and dynamic visual field marked by the erosion of subject-centred vision.

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3 Gilbert Simondon, *El modo de existencia de los objetos técnicos*, trans. M. Martínez and P. Rodríguez (Buenos Aires: Prometeo, 2008), originally published 1958.

## 2.1 The Pictorial Turn and Media as *Epoché*

William J.T. Mitchell's (1995) concept of the "pictorial turn" signals a shift in the humanities from linguistic to visual paradigms. This does not simply mean more attention to images but a change in the status of the image itself: from representation to operational logic. In tandem, Husserl's notion of the *epoché*—a suspension of inherited perceptual and epistemological categories—helps frame the media's role not just in representing the world but in reconfiguring it. This transformation did not occur because of the dependence of the image on language, as Mitchell points out, but because of the emergence of computing, information theory, and therefore, the transformation of the world into mathematical language.<sup>4</sup> Hence, what is relevant is not that other disciplines are interested in the image, but rather how the concept of the image *itself* begins to metamorphose in the context of global digitalisation.

The operational division<sup>5</sup> between the real and virtual is illusory. The virtual is an extension of ourselves in a manufactured and constructed space. It is not separate from, but a projection of our being. The virtual recreates and projects the specific and local conditions of our bodies. The space of the virtual, digital, and the technosphere are worlds that reflect our virtual work back into the realm of lived experience and embodied being through a techno-translation (coding). This reconfiguration also involves a shift in disciplines. Semiotics and structural linguistics previously sought to decode meaning in images based on symbolic systems. But with the rise of computation and global digitalisation, the image itself undergoes a transformation: it is no longer tied to visual apprehension but becomes a mathematical and informational entity. Hence, the pictorial turn is accompanied by a computational turn, where what is visual is increasingly determined by what is quantifiable, processable, and exchangeable as data.

The power of images that Mitchell discusses is therefore cultural and symbolic, just as it is for Belting.<sup>6</sup> It is worth asking, then, the extent to which data-images are capable of conveying cultural aspects, because although the paradigm of the network and globalisation tends towards breaking with local cultural models, data analysis makes it possible to determine and predict local behaviours, depending on the information collected via the web. These are the default digital footprints that Louise Merzeau talks about (2009). But it is necessary to highlight that the power of data-images does not reside in their observation or contemplation—in their being seen. Their power lies in the information they are capable of conveying, independent of sight.

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4 William J.T. Mitchell, *The Language of Images* (Chicago: University of Chicago Press, 1980), 7.

5 To read more about this operational division, see Friedrich Kittler, "There Is No Software," in *The Truth of the Technological World: Essays on the Genealogy of Presence*, trans. Erik Butler (Stanford, CA: Stanford University Press, 2014), 219–229.

6 Hans Belting, *Anthropologie de l'image* (Paris: Gallimard, 2014).

Media, in this sense, are not passive carriers of content but active participants in shaping the conditions of visibility and intelligibility. They instantiate their own “worlds,” no longer indexed to anthropocentric perception. Media becomes ontogenetic: they give rise to new ontologies and relational milieus.

## 2.2 Optical Apparatus and Prosthetic Vision

The development of optical devices—telescopes, microscopes, cameras—has historically functioned to extend the visual capacities of the human body. These devices operate within the laws of optics, allowing the construction of a stable, perspectival image. The observer is situated as the central node of perception, aligned with the Cartesian model of rational subjectivity. The Renaissance invention of perspective epitomised this centre of the subject: the eye governs the organisation of space.

In this sense, devices such as the telescope, photographic, or cinematographic camera construct a *focused* image. This is thanks to the laws of optics, a discipline which configures a series of devices capable of amplifying the visual capabilities of the human eye so that it can construct and structure space. Since “natural” perception is always mediated by such structuring devices that enable a way of seeing, these act as prostheses, expanding the natural (albeit limited) capabilities of the human eye. It is necessary to note, however, that today the history of the focused gaze, through the most diverse of optical devices, is being questioned. The result is a whole series of epistemological consequences. Ultimately, the concept of “a point of view.” or subjectivity, is still problematic. This does not mean that devices which focus the gaze disappear, but rather that the eye behind these prostheses no longer holds a central place in the construction of the image. In other words, it is no longer based on perspective and projection, and therefore, focus.

This “model” of focused vision is destabilised by modern media, which introduce forms of visual organisation that fragment attention, disrupt continuity, and weaken the coherence of a single viewpoint. As Walter Benjamin observed (1973), this shift replaces concentrated contemplation with modes of distracted reception, inaugurating a regime of perceptual shock. The observer becomes fragmented, disoriented, and increasingly passive in relation to the flow of visual stimuli. As Benjamin states, “It is the time of perceptual shock.”<sup>7</sup> How, then, do these technical systems reconfigure the gaze in contemporary image production? From a Kantian perspective, the thing in itself remains inaccessible, and the effects of such systems on perception are not logically necessary but conditioned by the structures that make rational experience possible. What is at stake here is not merely how things appear, but how subjects are positioned as rational agents within conditions

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7 Walter Benjamin, *Charles Baudelaire: A Lyric Poet in the Era of High Capitalism*, trans. Harry Zohn (London: NLB, 1973), 117.

that enable judgment, interpretation and action. Knowledge, in this sense, does not arise from access to things as they are in themselves, but from the formal conditions under which a subject can relate to appearances as meaningful and actionable. Any claim to an unconditioned or immediate access to reality would therefore be illusory.<sup>8</sup>

Moreover, Simondon's philosophy compels us to see these optical devices not as discrete instruments but as phases in larger processes of technical individuation. For Simondon, every technical object is part of a continuous evolution, shaped by incompatibilities and thresholds within systems. The eye, in this context, becomes a node within a prosthetic assemblage. Vision is not natural but composed—technically, socially, and affectively. When combined with Kant's perspective, what becomes apparent is that the individual is only one aspect of a process. What is important is the whole. But what is this process? For Simondon, it is the process of individuation, a trigger of external stimuli that are then processed internally (ensemble).<sup>9</sup> For example, the steps of life are a process of individuation, as are "techniques". Hence, prosthetic vision is not merely an extension but a transformation. Optical media do not just add to human capabilities—they recode them. They participate in transductive relations that reshape what it means to perceive, to interpret, and to relate to the world.

### 2.3 Attention, Memory, and the Industrialisation of the Gaze

The rise of digital media, and especially of networked platforms, has introduced new regimes of attention. Paul Virilio (1994) describes the condition of "dyslexic vision," in which rapid visual turnover weakens central focus. Images become ephemeral, peripheral, and affectively thin. Acceleration replaces contemplation, leading to perceptual disorientation and attentional fragmentation.

This shift aligns with Bernard Stiegler's (2008, 2018) analysis of the "crisis of attention." In his view, attention is a psychic and social resource increasingly captured and commodified by media systems. New technologies automate reflexive responses, bypassing deliberation and fostering behaviours governed by speed, automation, and externalisation. Here,

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8 While Kant's epistemological account of space and time as forms of intuition is developed in the *Critique of Pure Reason*, the present argument draws on the *Grounding for the Metaphysics of Morals* insofar as it articulates the conditions under which a subject can count as a rational agent. In this context, the limits of knowledge are understood not only in terms of cognition, but in relation to the formal conditions that enable autonomy, judgment, and responsibility. The epistemic constraint on access to things in themselves is thus reframed as a practical constraint on what can meaningfully appear for a rational subject. See Immanuel Kant, *Grounding for the Metaphysics of Morals*, trans. James W. Ellington (Indianapolis: Hackett Publishing Company, 1993).

9 Gilbert Simondon, *El modo de existencia de los objetos técnicos*, 178.

attention is short-circuited—subtracted from symbolic circulation and reduced to instantaneous reactions.

Stiegler's concept of tertiary memory is essential to this discussion. He distinguishes between primary memory (immediate experience), secondary memory (recollection), and tertiary memory (technical inscription). Digital media exteriorise memory through devices and platforms, transforming the processes of individuation. These changes contribute to what Stiegler calls an "anthropological mutation"—a reconfiguration of how human beings think, remember, and perceive.

The gaze, once structured by perspective and embodied contemplation, is now industrialised. It is harvested, measured, and predicted through computational infrastructures. Interfaces and platforms modulate not only what is seen, but how it is seen, and for what purpose. As a result, the economy of vision becomes entangled with technocapitalist logics, where value is derived from visual traces, engagement metrics, and predictive analytics.

Virilio makes a similar diagnosis. He posits the concept of dyslexic vision to account for the perceptual changes that result from an increase in visual and audio-visual prostheses, and which take us further from the phenomena of the gaze.<sup>10</sup> For Virilio, acceleration plays a fundamental role, since the succession of increasingly faster and more ephemeral images produces a lack of significance for the observer. Images are no longer internalised, re-appropriated, or integrated into personal experience/memory. They do not leave a trace. Based on studies of dyslexia, Virilio emphasises that we would suffer from a weakening of central vision in pursuit of peripheral vision that presents imprecision as one of its characteristics (unlike central vision, which is focused and therefore more acute).

Alternatively, Stiegler notes a crisis of attention as a consequence of new hyper-material technologies, bringing about or giving prominence to reflexive, automatic behaviours. By "reflexive" and "automatic" he refers to that which is the opposite of being attentive, which implies attention.<sup>11</sup> Attention is thus called into question with new technologies, implying a phenomenon of dispersion or lack of focus. If, therefore, one can say that technological advancements, such as digital devices and social media, contribute to the fragmentation of attention and memory, then technological interventions could be said to alter both. For example, the reliance on digital memory aids can impact our ability to engage in deep, reflective thinking. One can argue that these technologies often lead to a diminished capacity for sustained focus. On the other hand, Stiegler's *mnemonic* or *tertiary*

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10 Paul Virilio, *The Vision Machine*, trans. Julie Rose (London and New York: Bloomington 1994), 8.

11 Bernard Stiegler, *Technics and Time, 2: Disorientation*, trans. Stephen Barker (Stanford: Stanford University Press 2008), 117.

*memory*<sup>12</sup> allows the experience to be externalised and for knowledge to be transmitted. This epiphenomenon is crucial for our explanation. Currently, psychogenetic memory, as well as sociogenetic memory, must confront an externalisation of memory disseminated across an infinite number of technological devices—a technogenetic memory. This phenomenon, from Stiegler’s perspective, entails an anthropological mutation intended not only to modify the cultural-economic dimension (how symbolic goods are produced, distributed, and consumed) but, more radically, to transform the mass sensorium as the foundation of the social-historical imaginary of our time; that is, the modes of seeing and meaning.

In sum, focalisation is no longer a purely optical function. It becomes a systemic operation governed by technical standards, algorithmic processing, and economic imperatives. This is not just a shift in visual style, but a profound transformation of subjectivity, temporality, and worldhood. The image, the gaze, and attention itself are reterritorialised within computational capitalism’s evolving infrastructures.

### **3. Distant Visuality and Technological Individuation**

Throughout this section, I explore how contemporary visual culture is shaped not only by the externalisation of the image but also by the individuation of perception through digital infrastructures. Drawing from Simondon’s philosophy of individuation and Stiegler’s concept of tertiary retention, we examine how digital visuality operates at a scale, speed, and logic that destabilises human-centred perception. Rather than being an object of vision, the image becomes a node in complex systems of computation, creating a regime of *distant visuality*.

#### **3.1 Individuation and Transindividuation in the Digital Era**

Gilbert Simondon’s theory of individuation offers an ontogenetic framework in which technical beings, environments, and individuals co-emerge through metastable processes. In this view, the individual is not a pre-given entity but the result of ongoing interactions across material, energetic, and symbolic milieus. Applied to digital media, individuation describes how visuality is constituted not by stable subjects or fixed meanings but by continuous transformations within the technical ensemble.

Individuation in the digital era extends beyond the psychic and biological. Stiegler (1998) adds the notion of *transindividuation*—the symbolic circuits through which psychic and collective processes of individuation are shared, stored, and transmitted. This symbolic exteriorisation is no longer inscribed in human memory or oral tradition but increasingly

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12 Stiegler, *Technics and Time*, 2, 97.

mediated by technical apparatuses: platforms, networks, databases, and algorithms. However, there are also ontogenetic patterns that generate epigenetic landscapes. These patterns support the interpretive capacity of a sense-making and decision-making process, in the moment when a relationship with such technologies is formed, and meaning is produced. We see here an opportunity to interact with both the technical environment and biosemiotics. Both perspectives can complement each other in understanding the meaning of information. This introduces a new semiotic perspective on how cellular organisms fuse to become aggregate organisms, phagocytosis, and even the life cycle itself. Let's hope that in the future these pathways of the recognition system can be described through cellular organisms. Nevertheless, this biosemiotic approach is expected to amplify the description of minimal cognition with semiotic details of such recognition pathways.

What is presented in this reflection is a material variation of a possible approach or reinterpretation of Simondon's concept of individuation.<sup>13</sup> This is essential to rationalise how the symbiosis between subjects with information and computational systems is explored. It also marks an important milestone in rethinking the relationship between subjects and technology.

### 3.2 Distant Visualisation and Algorithmic Seeing

Contemporary digital culture is marked by the proliferation of images at scales that vastly exceed human perceptual and interpretative capacities. The paradigm of "distant visualisation" emerges to describe how computational systems render visual data meaningful without human sight. Franco Moretti's (2013) method of "distant reading" in literary studies serves as an analogy: rather than reading individual texts, one studies patterns across massive corpora using algorithmic tools.

Moretti's concept of distant reading accounts for new research methodologies enabled by data science. This new methodology involves working with a large volume of data that an individual researcher cannot process. Instead, software is used to read data and visualise certain patterns, redundancies, and so on. It is called "distant" reading because it is no longer necessary—or possible—to physically read the texts; their quantity exceeds the possibility for analysis by an individual. Only software can analyse such a volume of information.

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13 Simondon speaks to us about individuation (psychic-physical and biological): individuation not only produces the individual as a result, but also forms the associated environment. The individual is, therefore, a specific phase of being that possesses a pre-individual reality with potentials that individuation is incapable of consuming. Being is in the process of becoming and therefore has the capacity to phase out of its own consciousness and resolve its tensions, understood as the change from one state to another, that is, its ontogenesis. Gilbert Simondon, *La individuación a la luz de las nociones de forma y de información* (Buenos Aires: Cactus, 2015).

Lev Manovich (2020) extends this principle to the visual domain through his project of Cultural Analytics. Instead of focusing on singular works, Cultural Analytics analyses vast databases of images—museum collections, Instagram feeds, video archives—to detect aesthetic patterns, social trends, and iconographic shifts. This shift from close reading to distant seeing signals a transformation in epistemology: knowledge is derived not from direct contemplation but from statistical and algorithmic operations.

In *Cultural Analytics* (2020), Lev Manovich provides an alternate perspective. Positioned at the intersection of data science and media studies, Manovich's research presents concepts and methods for computational analysis of cultural data, with a focus on visual media. His work leads to several questions: How can we see a billion images? What analytical methods can we bring to bear on the astonishing scale of digital culture? Added to this, if AI can learn to "see," we will soon realise that we are facing a paradigm shift that requires a new concept of "seeing," and consequently, of the image.

Algorithmic sight, then, operates beyond phenomenology. It decouples vision from the eye and embeds it in architectures of code, servers, and neural networks. In these systems, images are not visual representations but actionable datasets. They are parsed, segmented, classified, and scored for relevance or affective intensity. Distant visibility refers to this condition of mediated perception, where the human is no longer the necessary referent or receiver of the image.

### 3.3 Transmateriality and Metastability

Anna Munster (2014) introduces the concept of *transmateriality* to articulate the energetic and differential nature of digital media as "matter in motion, matter as relations of forces, matter as energy."<sup>14</sup> Drawing on Simondon, she argues that matter in digital contexts is not fixed or inert but is dynamically shaped by processes of signalling, coding, and affect. Transmateriality emphasises the in-between: not the substance of images, but the forces and relations through which they emerge and transform. And she adds: "transmaterial relations then, are both the metastable virtual ones of pure difference and the procedural updates of a set of singular materiality."<sup>15</sup>

In this view, the digital image is not merely an immaterial abstraction; it is composed of electromagnetic pulses, voltage differentials, and algorithmic instructions that traverse material infrastructures. These ongoing flows are metastable—they contain within them the potential for reconfiguration, interruption, or individuation. Transmateriality

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14 Anna Munster, "Transmateriality: Toward an Energetics of Signal in Contemporary Mediatic Assemblages," *Cultural Studies Review* 20, (2014): 158.

15 Munster, "Transmateriality," 159.

challenges the binary of material/immaterial by focusing on process, modulation, and emergence.

Simondon's notion of metastability becomes crucial here. Unlike equilibrium, metastable systems are charged with potential energy that can be actualised through minor perturbations. In digital culture, such perturbations may arise from user interactions, algorithmic updates, or shifts in data flows. The image becomes a relational field, a phase space for technical and symbolic individuation. Consequently, with respect to the interiority and exteriority of this metastable operation, Simondon clarifies:

An immediate belief in the interiority of the being as an individual comes, undoubtedly, from the intuition of one's own body [embodiment] which seems, from the position of a thinking man, to be separated from the world by a material envelope that has a certain consistency and defines a closed space. In fact, a relatively deep psychobiological analysis would show that, for a living being, the relationship with the external environment is not distributed only on its external surface. The notion of the internal environment, developed by Claude Bernard for the requirements of biological research, shows quite well through the mediation it establishes between the external environment and the being, that the substantiality of the being should not be confused with its interiority, even in the case of the biological individual.<sup>16</sup>

We can say that the perceptual modification first detected at the end of the nineteenth century and beginning of the twentieth century—that is, since modernity (understood as the era of the technification of the world)—is presented either in Simondon, Benjamin, Virilio, or Stiegler as a crisis of focus and attention. Yet what is perspective, if not a focus on the world?<sup>17</sup> It is to look from a point of view, to cast the eye to the objective of a screen, digital camera, or telescope. To focus is to concentrate, to converge towards a point. Therefore, the modification of our perceptual structure goes hand in hand with a shift from the perceptual paradigm to an era I will call *distant visuality*.

Thinking (us), in a “distant” perception or reality, invites reflection on the sensible

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16 Gilbert Simondon, *La individuación a la luz de las nociones de forma y de información*, 152.

17 As Alberto Romele states, “In the specific field of digital technologies, hermeneutics is not out of the picture, both in a ‘special’ and in a ‘general’ sense. First, because language, signs, and symbols, which have been brutally defenestrated by philosophy of technology after its ‘empirical turn’, have come back in force. In computation, indeed, it is a matter of special kinds of signs, which are both human-readable and machine-executable.” See Alberto Romele, Marta Severo, and Paolo Furia, “Digital Hermeneutics: From Interpreting with Machines to Interpretational Machines,” *AI & Society* 35, no.1 (2020): 76 (<https://doi.org/10.1007/s00146-018-0856-2>).

operation of optical phenomena and their inference and impact on forms of representation, as well as the epistemological transformations that occur today through media and exact sciences. It also opens the question: What is a simulation? In etymological terms, the concept of simulation refers to the act of simulating something. In one sense, a simulation is fraudulent, yet this fraud could be the simulation of a symptom, of a non-existent condition, which it is able to simulate.

This *distant visibility* always blurs. It is an element of metastability, hence the possibility of moving towards other, more complete structures, or eventual destruction and different structuring. Simondon's message is that there are no individuals. Traditional philosophy has always looked for the atoms that make up the universe and its elements. For Simondon, there is a kind of chaotic environment and individuation processes. In the best of cases, a living being can be understood as a process of individuation, in the same way as a psychological itinerary and individuation is a taking of form.<sup>18</sup>

Thus, transmateriality invites us to see digital visibility not as fixed or virtual but as active and embodied across multiple scales: microelectronic, cognitive, social, and ecological. It foregrounds the techno-aesthetic entanglements that shape how images appear, circulate, and operate in our posthuman media environments. *Clinamen* or freedom, notions reviewed by Henri Bergson,<sup>19</sup> could be synonymous with this impulse, in which the production of information and computational systems develops. By virtue of the fact that both notions highlight their physical or material aspect, a becoming that unfolds increasingly stronger movements in our reality.

#### 4. The Eye as a Medium: From the Anthropological Image to Deanthropologization

The history of the image has long been anchored in an anthropocentric framework, in which visual perception and symbolic interpretation are closely linked to human subjectivity and embodiment. However, the emergence of digital technologies, algorithmic media, and machine perception compels a critical shift. This section explores how the anthropological model of the image—rooted in embodiment, intentionality, and human agency—is challenged by contemporary media ecologies. Drawing on theorists such as

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18 On this point, see Jean Barthélemy, *Simondon ou l'encyclopédisme génétique* (Paris: University of France Press, 2008), 9–19.

19 Given the assent, it seems that only the anecdote serves as an answer. Bergson dedicated his first courses to Epicurean philosophy through the study of Lucretius (1883), reserving the expression of assent for the doctrine of the *clinamen* (1937, 24) and, later, to topics related to the philosophy of nature, especially the *stoic* and the *fatum* notion as a product of the same strange logic (2004, 72). See Henri Bergson, "Lucrecio," *Hiperión* 20, (1937), and Henri Bergson, *Matter and Memory*, trans. Nancy Margaret Paul and W. Scott Palmer (New York: Dover Publications, 2004).

Belting, Crary, Hayles, Krämer, and Stiegler, we chart the move from an embodied gaze to posthuman regimes of vision and interpretation.

#### 4.1 Image and Embodiment: From Warburg to Belting

Image anthropology places the body at the centre of image reception. However, numerical images challenge this by removing the need to be seen. Image theorists such as Hans Belting (2014) and Didi-Huberman (2009) belong to a tradition inaugurated by Aby Warburg, who developed a robust anthropological theory that situated the body—especially the eye—as a site of image production and reception. Belting argues that images require a medium in which to be embodied and thus are always entangled with the viewer’s perceptual apparatus. In this view, the image has no autonomous reality; it is animated only through human interaction and cultural symbolisation.

If we analyse the concept of the image, under this approach, a possible definition would be: “a visible representation of a phenomenon.” The visibility of numerical-digital images is only one possibility among others, since they can remain in an information state and still be analysed and transmitted. Without the need to acquire visibility, images can remain only code. One might ask, then: is an image in the pure state of code also an image? For Belting, the anthropological perspective focuses on the practice of the image—its uses. For this author, the image goes beyond perception, because “it is the result of a personal or collective symbolization, the concept of image, it can only be an anthropological concept.” In this sense, and after Belting, the image is not confused with its support. It has a certain independence. The support is its materialisation: “since an image lacks a body, it requires a medium in which it can embody.” What counts is the symbolic, for, as Belting writes, “it only becomes an image when it is animated by its viewer.”<sup>20</sup>

However, the shift to numerical-digital images complicates this framework. These images can be generated, stored, and transmitted without ever being seen or interpreted by a human subject. The centrality of the body—as the site of image activation—becomes marginal. In digital networks, images exist as code and function within circuits of machine-readable data. Although Belting recognises that “digital images are stored invisibly as a database,” such an invisibility would be determined only by image-data storage and other fundamental elements, such as their analysis, transmission, and interaction. In short, it would be characterised as an interaction between the algorithm and the image data, with the human not occupying a central place. The human, in that sense, would simply be one more dispensable element of the interaction. Furthermore, it is no longer necessary to contemplate, see, or observe images. They can simply be “processed,” that is, to the

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20 Hans Belting, “Image, Medium, Body: A New Approach to Iconology,” *Critical Inquiry* 31, no. 2 (2005): 302–319.

extent that they give us information or knowledge. As a result, Belting's framework, while insightful for pre-digital and analogue image regimes, becomes insufficient for understanding the distributed agency and nonhuman mediation of contemporary images. The anthropology of the image must be expanded to include nonhuman interfaces and machinic gazes.

Crary (1999) and Jay (2007), who focus on the issue of perception, visualise a greater perceptual change where the eye and focus lose prominence.<sup>21</sup> In essence, image theorists don't often consider the emergence of numerical images relevant, since they continue to hold meaning for human beings; numerical images and their meanings are considered products of the *Anthropos*. On the contrary, for vision theorists, numerical or digital images would be the final stage in a process of modifying visual perception, one which emerged at the beginning of the twentieth century.

#### 4.2 Nonhuman Perception and Computational Media

N. Katherine Hayles (2017) introduces the concept of "nonconscious cognition" to describe cognitive processes that occur without human awareness or intention. She argues that both biological and technological systems exhibit forms of sense-making that are not reducible to human consciousness. This has profound implications for how we understand visibility. Digital images are increasingly produced, analysed, and circulated through automated systems that bypass human cognition altogether. Surveillance cameras, facial recognition software, and content moderation algorithms all operate at speeds and scales inaccessible to human perception.

From Hayle's perspective, this illustrates a shift towards non-conscious cognition and machinic agency. *Distant visibility* becomes emblematic of this posthuman turn. Hayles tells us that many new materialists refer to distributed agencies. Hayles emphasises the range of technological and biological decision-making that actively constitutes much of our reality while being beyond conscious control:

Nonconscious cognition provides a means by which agency can be located in material processes and in nonconscious cognition as their emergent result, without implying the allegedly stultifying effects of a consciousness unable to transform in relation to its environment.<sup>22</sup>

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21 See Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture*. Massachusetts (The MIT Press, 1999); and Martin Jay, "Downcast Eyes: The Denigration of Vision," in *Twentieth-Century French Thought*, eds. Todorov Tzvetan (Berkeley: University of California Press 1993); 163–185 (<http://www.jstor.org/stable/10.1525/j.ctt1ppwv>).

22 N. Katherine Hayles, *Unthought: The Power of the Cognitive Nonconscious* (Chicago: University of Chicago Press, 2017), 77.

Similarly, Friedrich Kittler's (2014) work on media theory highlights how technical systems replace and extend human faculties. For Kittler, the history of media is a history of substitution—writing replaces memory, photography replaces observation, and computation replaces thinking. In such an environment, the image becomes an operational entity: it functions not as a representation for human contemplation but as a data point in a larger system of machine processing.

These shifts invite us to think of images not only as objects of perception but as agents within posthuman epistemologies. They are embedded in infrastructures of code, metadata, and machine learning that make decisions and predictions independently of human users. In this context, vision becomes infrastructural, automated, and dispersed—a condition that demands a re-theorisation of what it means to “see” in a posthuman world.

In these terms, computational media have a distinct advantage over every other technology ever invented. First, as data, digital numerical images no longer hold exclusive meaning for humans. Secondly, images no longer belong solely to the record of the visible, since they can be stored or transmitted as information without needing to be viewed by an individual. Furthermore, new methodologies of working with software to analyse texts or images no longer require one to read.

### **4.3 Organology and Phase-Shifting the Human**

Bernard Stiegler's organological framework provides a useful lens for understanding the implications of these shifts. According to Stiegler, human evolution is always already technical: tools and artefacts are not external additions to human life but intrinsic to its development. Technical systems shape psychic and collective individuation, and each new technological epoch reorganises the human sensorium.

Stiegler (2018) argues that digital technologies impose a phase shift in human-technical relations. The process of deanthropologization—where technologies increasingly assume cognitive and perceptual functions—requires a redefinition of human agency. Krämer (2003) similarly explores how cultural techniques, such as writing and computation, precede and shape the very notion of the human. The human is not a given but an effect of recursive interactions with nonhuman systems.

For Stiegler, technical life, in installing technical milieus, brings a whole new kind of infidelity into play. Life—and this is the point—is therefore no longer to be conceived of as organic life but as organological life. Organological life henceforth proceeds in jumps

and draws on technological shocks that impose readjustments of the entire organological assemblage:

It is an exteriorization that is at the same time an interiorization. In other words, it is what, while distinguishing an outside and an inside in a movement of going outside that is also a movement of going inside, mutually establishes this inside and this outside by their transductive relationship—the mutuality of what Derrida called the *archi-trace*<sup>23</sup>

Since the beginning of hominization, the production of knowledge from sensations has been mediated by techniques. In fact, know-how (technique) and knowledge are difficult to disentangle formally. It could be said that techniques always complement the courses that sensations must follow on their path to provisionally crystallise as knowledge. To summarise, for Stiegler, the externalisation of memory in *hypomnemas* is the very condition of the gap between reflective human consciousness and the sensations and reflexes that guide the animal within its semiotic environment.<sup>24</sup> However, it should be noted that supplementation already occurs at the body level. The brain's interface with the world is already mediated by layers of neurological organisation, nested feedback systems, and retentional contexts that selectively and sequentially transport sensations from outside to inside—"nervous currents," as William James called them.<sup>25</sup> These layers of evolutionarily sedimented supplementation constitute the organic prehistory of technical supplementation. That is to say, the organism is always already prosthetic. As Brian Massumi rightly points out: "What art and technology do is extend the existing regime of natural and acquired artifice of the body, which has long been active in the production of the "virtual reality" of our daily lives."<sup>26</sup>

This leads to a conceptual feedback loop: the more we rely on technical systems to mediate experience, the more these systems become co-constitutive of what we call human. The distinction between the human and the technical becomes increasingly blurred, and with it, the boundaries of vision, memory, and knowledge. Stiegler calls this a moment of organological bifurcation—where new configurations of body, image, and machine give rise to emergent forms of sensibility and subjectivation. The deanthropologization of the image, then, is not a loss but a transformation: it marks the genesis of a new technocultural condition that demands novel theoretical tools and critical vocabularies.

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23 Bernard Stiegler, "Elements for a General Organology," *Derrida Today* 13, no. 1 (2020): 72–94, 88.

24 Bernard Stiegler. *The Neganthropocene*, trans. Daniel Ross (Open Humanities Press, 2018), 48.

25 William James. *The Varieties of Religious Experience: A Study in Human Nature*, eds by Jeremy Carrette and Eugene Taylor (London: Routledge 2003).

26 Brian Massumi. "Envisioning the Virtual," in *The Oxford Handbook of Virtuality*, ed. Mark Grimshaw-Aagaard (Oxford: Oxford University Press, 2014), 64.

## 5. Rethinking Mediation: Image-Objects and Posthuman Aesthetics

As our interactions with images increasingly unfold in algorithmic and non-perceptual realms, the notion of mediation itself requires rethinking. Mediation no longer functions solely through anthropocentric modes of seeing, interpreting, or feeling. Instead, it emerges from dynamic processes of individuation across technical, affective, and informational regimes. Drawing on Simondon's theory of technical objects and the role of invention, and on Stiegler's organological approach, we propose a conception of images not as static representations but as agents within a techno-symbolic ecology. This demands a broader understanding of aesthetic experience that accounts for posthuman sensibilities—sensing that is distributed, delegated, and datafied.

### 5.1 The Posthuman Gaze and Disembodied Vision

Rouillé (2012) and Simondon (2022) help us reconceive the image not as a passive object of vision but as an active node within cultural and technical systems. Rouillé describes the shift from analogue photography's "decisive moment" to the dispersion and automation of digital image capture. This represents not just a technical evolution but a transformation in the subject-object relation: the human is no longer the sovereign observer. Instead, the image exists within a flow of technical mediation, processed without necessarily being seen or framed by the human eye. In this context, Simondon's "object-image" becomes crucial. These are not just mediators of memory and imagination, but carriers of collective individuation, shaped by technical and aesthetic operations.

Rouillé,<sup>27</sup> in his analysis dedicated to numerical-digital photography, points out that the emergence of cameras and cellphones with screens marks the decline in dominance of the construction of the gaze. Looking through a camera lens today is one among many options, since the screen allows the eye to be placed at a distance from what it is intended to photograph. Rouillé talks about how "this kind of non-sighted (numerical) aesthetic is also an aesthetic of what envelops things and events in a flow of images produced "in burst." This succeeds an (analogue) aesthetic governed by an eye armed with a viewer, and by the law of the single and sovereign image, taken at the "decisive instant in the precise place."<sup>28</sup>

Alternately, if we apply the notion of "object-image" that Simondon developed in *Imagination and Invention* (2023), it implies rethinking the relationships between technique and imagination beyond traditional oppositions (material/ideal, sensible/intelligible,

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27 André Rouillé, "Esthétique (numérique) de la dispersion," *Éditorial* 396, 27th September 2012.

28 Rouillé, "Esthétique (numérique) de la dispersion."

concrete/abstract, interiority/exteriority), both at a psychic and collective level.<sup>29</sup> Firstly, “images” are described as intermediaries between the subject and the world, which circulate from the inside out, through “introjection” (of external images in the imagination of the subjects) and “projection” (of subjective images about external objects). Secondly, “object-images” are described as intermediaries between the past and the future, which ensure the “cultural continuity” of human groups: they are materialisations of collective meanings that must be revived and transformed through cultural activities. Thus, for Simondon, “object-images”—which can be technical, prosthetic, or aesthetic objects—seem to play a crucial role in individual and collective imaginaries.

From this perspective, the image acquires a posthuman gaze: one constituted by systems of code, metadata, platform protocols, and machine vision. This gaze is disembodied, not anchored in a human retina or subjectivity, but emerging from layers of networked computation. In effect, images “look back” not through presence but through traceability, datafication, and predictive modelling. Such dynamics call for a redefinition of visual culture itself, where what matters is not what is seen, but what is computed, parsed, and stored for future analysis.

## 5.2 The Delegation Effect and the Epistemology of the Interface

Technical images, as Flusser anticipated (Flusser, 2000), no longer rely on symbolic interpretation by a human subject. Instead, they are the product of automated synthesis, governed by protocols and machine-readable instructions. In this context, we face what might be termed a “delegation effect”: the outsourcing of perceptual and epistemological labour to interfaces and computational systems. The interface becomes both the threshold and the medium of cognition. Its function is no longer merely visual or tactile but operative—it determines what can be seen, known, or acted upon.

This delegation entails a fundamental epistemological shift. Following Stiegler (2018), the interface is part of a larger organological transformation in which memory, perception, and anticipation are technogenetically exteriorised. Rather than accessing the world directly, humans now engage with operational environments designed to filter, pre-process, and reconfigure data into actionable forms. The human becomes one point among many in a wider ecology of sense-making.

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29 Gilbert Simondon. *Imagination and Invention*, eds by Joe Hughes and Christophe Wall-Romana (Minneapolis: University of Minnesota Press, 2022).

Crucially, this process introduces new asymmetries of power and agency. Interfaces decide visibility: what counts as an image, what remains latent, and what becomes noise. In doing so, they participate in aesthetic-political formations that determine the terms of attention, affect, and participation. As such, the epistemology of the interface is inseparable from the politics of mediation in the age of ubiquitous computing. This calls for a renewed aesthetic theory attuned to the logics of automation, opacity, and post-perceptual experience.

## 6. Conclusion: Technogenesis and the Future of Seeing

The notion of *distant visibility* reframes our perceptual regime. Through computational media, we no longer see but are seen through. Technogenesis is not only epistemic but ontological. Digital images no longer depend on a human observer; they exist as data, as algorithmically processed phenomena. In this sense, individuation is posthuman, dynamic, and techno-symbolic. Simondon's and Stiegler's insights allow us to rethink vision as an ontological interface. What is at stake is not just how we see, but how seeing itself is constituted through machines, codes, and environments.

On the other hand, this notion has certain antecedents and a wide range of applications for how we relate to digital images nowadays. Virilio has already pointed out—with respect to the photographer who simply machine-guns rather than stopping to focus—that by observing through a lens, the photographer no longer sees what he is photographing. It is the device that does it in his place, at a speed beyond the human eye's.<sup>30</sup> That is to say, although the photographic device is a perceptual device par excellence, its introduction and technological evolution made it increasingly faster, going beyond natural perception. As a result, it necessarily leaves the eye behind. The eye no longer manages to focus on each one of the images produced in a burst. This has the consequence that the human eye becomes accustomed to not seeing and to being seen through it. Produced by technologies, this is called the delegation effect. That is, we delegate certain operations to technologies that we previously performed ourselves.

Through this article, we tried to explore this topic and raise the following question: what are the effects of the digitisation of objects and images on individual and collective imaginaries? As invented objects, technical objects are necessarily related to human beings. But, for Simondon, the inventor is not an ingenious demiurge who creates *ex nihilo* through his own imaginative resources. Simondon describes technical invention as a process that transcends the individual psyche. First of all, in most cases, there is not one inventor, but a succession of inventors who, separated by time and space, communicate through

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30 Paul Virilio, *The Vision Machine*, 25.

already existing technical objects. These technical objects, detachable as they are from the space and time of their creation, support what Simondon calls relations of cumulative participation.<sup>31</sup> What appear to be necessary prerequisites for a *deanthropologization* of the gaze, in fact, are a selection of pre-existing technical objects from which elements or schemes of operation can be extracted, scientific knowledge of natural effects (physical, chemical, or electrical), as well as suitable materials. As Erich Hörl states, it is always an “epochal techno-logical shock” that interrupts a specific organological assemblage.<sup>32</sup> Last but not least, for Simondon, what is required is an awareness of a problem to be solved. The most difficult and paradoxical part of the invention process is that it requires a kind of “vision” of a state that does not yet exist, in which the problem is solved. This field of purpose, as he calls it, is in tension with the actual field of experience, which is characterised by incompatibilities between subsets of the system and a lack of functioning. According to Simondon, the game of limits, the overcoming of which constitutes progress, resides in the incompatibilities that arise from the progressive saturation of the system of subsets. However, by its nature, this improvement can only occur as a leap, as a modification of the internal distribution of functions, a reordering of its system.<sup>33</sup>

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31 Gilbert Simondon, *El modo de existencia de los objetos técnicos*, 63.

32 Erich Hörl, “Introduction,” in *General Ecology: The New Ecological Paradigm*, ed. Erich Hörl and James Burton (London: Bloomsbury, 2017), 25.

33 Gilbert Simondon, *La individuación a la luz de las nociones de forma y de información* (Buenos Aires: Cactus, 2015), 32.

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# Assembling Intelligence: Transitioning from a Politics of Control to a Politics of Configuration

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## Abstract

The concept of intelligence is deeply ambiguous and entangled with historical narratives of colonialism and eugenics. The contemporary understanding of intelligence still reflects such narratives: it is understood in human-centric terms, as a property defined by goal-oriented cognitive capacities. This leads to what we term a *politics of control*, which relies on historically established patterns of exclusion to establish political structures with colonial connotations. In response, this paper proposes an alternative framework called the *Assemblage Theory of Intelligence (ATOI)*. ATOI understands intelligence in terms of the dynamic relationships and activities within an assemblage, moving us from a *politics of control* to a *politics of configuration*. We illustrate ATOI by discussing the human-in-the-loop (HITL) methodology in AI development. Contrary to the dominant narrative, in which humans are seen as controlling the loop, we reconceive HITL as an assemblage in which human and machine elements configure and mutually shape one another.

**Keywords:** Intelligence, Assemblage Theory, Politics of control, Politics of configuration, Human-in-the-loop

## Introduction

Technologies are often hyped in terms of intelligence: we speak of *smart cities*, of outsourcing *cognitive labour*, and of course, of artificial *intelligence* (AI). Sensing technologies are allegedly capable of detecting things humans cannot, algorithms structure the world more effectively than humans can, and Large Language Models (LLMs) generate text faster than humans write. Such technologies carry out many tasks that were previously done by humans and often do so in a more (cost-)effective manner. But is this the type of intelligence that we should be after? The carbon footprint of those technologies is often enormous and has a devastating effect on the Earth, and they can also be used to steer people's behavior. Being part of a world that is partly governed by technologies that are allegedly "intelligent" comes at a price.

Intelligence is typically viewed as an intentional, goal-oriented capacity of an agent to respond to environmental stimuli, typically involving information processing.<sup>1</sup> As we will show, such an understanding of intelligence opens the possibility for a politics of control: intelligence is considered the capacity to exercise power over passive objects or allegedly less intelligent subjects. As a result, these views embody narratives that enable and justify control and domination. In this paper, we develop an alternative approach to intelligence that problematizes such narratives. The goal of this approach is to enable a shift from a politics of *control* to a politics of *configuration*, making explicit that politics is a terrain of qualitative changes that materialise in the interactions between multiple agents.

We unpack the notion of configuration with the help of Manuel de Landa's work on assemblages, suggesting that we understand intelligence in terms of an *assemblage* and develop what we call an *assemblage theory of intelligence* (ATOI). An assemblage can be characterised as a heterogeneous whole with emerging properties, and is the result of the dynamic interactions between objects and bodies through which particular relations emerge.<sup>2</sup> The entity that results from these relations is an assemblage, a whole constituted by heterogeneous components that together constitute something new. This entity can, for example, be a city, an ecosystem, a social institution, or an ant colony. Under certain conditions, as yet to be specified in this paper, assemblages can be considered intelligent.

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1 Shane Legg, and Marcus Hutter, "A collection of definitions of intelligence," *Frontiers in Artificial Intelligence and applications* 157, (2007): 17. <https://doi.org/10.48550/arxiv.0706.3639>; Robert J. Sternberg, *The Cambridge Handbook of Intelligence* (Cambridge University Press eBooks, 2019), <https://doi.org/10.1017/9781108770422>.

2 Manuel DeLanda, *Assemblage Theory* (Edinburgh University Press, 2016), 20–21

In line with other recent approaches,<sup>3</sup> the starting-point of ATOI is that intelligence is neither a uniquely human capacity, nor is it something that can be attributed to individual agents. As DeLanda<sup>4</sup> suggests that, within an assemblage, relations are mutually shaped, indicating the agents' capacities of constituting and influencing assemblages of which they are part. A politics of configuration aims at reflecting this structure, where agents contribute to the assemblage's activity while maintaining a degree of independence. Viewing intelligence as the expression of assemblages' behaviour is not new, and has already been implicitly suggested by DeLanda in his 1991 book *War in the Age of Intelligent Machines*<sup>5</sup>. In this work, DeLanda discusses the intelligence of the war machines and military apparatus, understanding it as a network of relations that uses input and feedback to produce action or output. However, the implications of viewing intelligence through assemblage theory and how this challenges the psychological and subject-oriented programs have not been explicated in detail. Moreover, by taking up DeLanda's suggestion, we believe that ATOI can contribute to the current critical literature on AI, because it specifies in what sense AI can be considered a social phenomenon.

Our paper is organised as follows: First, we provide a brief deconstruction of intelligence as developed within the science of psychology and show how it is embedded in a logic of control. Second, we provide a starting point for an assemblage theory of intelligence (ATOI) and specify the conditions under which an assemblage displays intelligence. Third, we illustrate the relevance of ATOI by discussing the case of the "human-in-the-loop" (HITL), a machine learning approach that has found extensive applications over the last decade. In conclusion, we suggest how ATOI helps move from a politics of control to a politics of configuration.

## 1. The Concept of Intelligence and its Political Implications

The concept of intelligence, and the way it is investigated scientifically, can be traced back to the emergence of psychology as a scientific discipline. The science began to be institutionalised at the end of the nineteenth century on the European continent, and somewhat later in the United States. The systematic investigation of intelligence has

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3 Hager Ben Jaffel et al., "Collective Discussion: Toward Critical Approaches to Intelligence as a Social Phenomenon," *International Political Sociology* 14, no. 3 (August 3, 2020): 323–44, <https://doi.org/10.1093/ips/olaa015>; Adam Frank, David Grinspoon, and Sara Walker, "Intelligence as a Planetary Scale Process," *International Journal of Astrobiology* 21, no. 2 (February 7, 2022): 47–61, <https://doi.org/10.1017/s147355042100029x>; Mirta Galesic et al., "Beyond Collective Intelligence: Collective Adaptation," *Journal of the Royal Society Interface* 20, no. 200 (March 1, 2023): 20220736, <https://doi.org/10.1098/rsif.2022.0736>.

4 Manuel DeLanda, *Intensive Science and Virtual Philosophy* (A&C Black, 2013).

5 Manuel DeLanda, *War in the Age of Intelligent Machines* (Zone Books, 1991).

formed an important part of psychology since its inception. One of the first countries to establish a national research program for intelligence was England. This research into intelligence was closely connected to its colonial ambitions, related to the development of a taxonomy of the human race and national eugenics programs. These ambitions are clearly identifiable in the work of Francis Galton, a leading figure in psychology at the time, who, in his famous *Hereditary Genius* (1869), proposed the first empirical program of intelligence based on the assumption of hereditary characteristics. And, more than fifty years later, Carl Brigham's 1923 influential book *A Study of American Intelligence* attempted to establish a strong connection between intelligence and race in the USA. These views were not just academic in nature but also had a clear societal impact: Brigham was one of the developers of the American IQ test used for military and educational purposes, such as the recruitment of soldiers and the admission to Ivy League Universities.

The origins of the psychological concept of intelligence can be traced back to the Enlightenment and emphasise the importance of reason and individual rational judgment. Psychological research attempted to link such qualities to individual mental characteristics. It is here that we already see the intertwining between psychological research on intelligence and a politics of control. As Cave<sup>6</sup> has argued, the colonial dominance of the West at the time was the result of scientific and technological superiority traced to the allegedly superior mental capacities of Western people. As a result, the concept of intelligence could be used to draw a hierarchical distinction between particular members of the human species (those living in the West) and others, and to legitimate a hierarchical model in which the white Western race appears superior. A similar logic was applied to the position of humans toward nature: based on their intelligence, humans could control other nonhuman entities and attempt to dominate nature, which is, for instance, exemplified in Francis Bacon's *Novum Organum* (1620). Haraway aptly characterised this tradition as assuming a "view from nowhere": it believes in the possibility that science can carve out a position outside the world being studied and manipulated. Within the context of psychology, the "view from nowhere" leads to a politics of control. Psychological research enables us to approach people as objects open to social engineering and experimentation, while at the same time appearing as a neutral description of reality, uncontaminated by political concerns.

Before the institutionalisation of the science of psychology, mental capacities were primarily understood in qualitative terms,<sup>8</sup> meaning that at the core of the discussion were questions

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6 Stephen Cave, "The Problem with Intelligence," *Proceedings of the AAAI/ACM Conference on AI Ethics and Society*, February 5, 2020, 29–35, <https://doi.org/10.1145/3375627.3375813>.

7 Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14, no. 3 (January 1, 1988): 575, <https://doi.org/10.2307/3178066>.

8 John Carson, "Intelligence: History of the Concept," in *Elsevier eBooks*, 2015, 309–12, <https://doi.org/10.1016/b978-0-08-097086-8.03094-4>.

about what characteristics and qualities are needed to make appropriate judgments or to be a rational thinker. However, as a result of the increased institutionalisation of science and the focus on precise experimental measurements, a quantitative understanding of intelligence and its underlying mental characteristics emerged in the second half of the nineteenth century. This is exemplified by practices such as craniometry, which assumed a correlation between skull circumference and an individual's mental capacity. This quantitative understanding was further inspired by Darwin's evolutionary theory, which emphasised the importance of genetics and showed how specific qualities of species could be transmitted to their offspring.

This Darwinian framework gave rise to an obsession with heredity. By isolating the phenotypic characteristics believed to clearly identify the alleged superior characteristics of the white race, they could be passed on to the next generations.<sup>9</sup> This view both legitimised and further perpetuated colonial dominance: it legitimised the position of colonial rulers and could contribute to increased political control by determining which characteristics—that underlie the allegedly superior mental capacities—could be transmitted to future generations. In other words, quantitative differences were used to justify qualitative differences. This program was further concretised at the beginning of the twentieth century when Theodore Simon and Alfred Binet formulated the idea of the "Intelligence Quotient" (IQ) and developed related metric scales aimed at identifying students in need of further educational support.<sup>10</sup> Soon after, in England, Charles Spearman and Cyril Burt (1927) theorised the "g factor," a psychometric method intended to find correlations between different cognitive tasks and abilities that supported the IQ perspective, strengthening the view that intelligence is a quantifiable property of individual agents.<sup>11</sup> Nevertheless, as Gould<sup>12</sup> noticed, the two formed a tautological circle in which the IQ worked because of the "g factor," and the "g factor" was valid because of the IQ.

The psychological programs framed around heredity views with causal assumptions between genes and mental capacities were still present in the 1960s. The seminal study *Behavior Genetics*, by John Fuller and Robert Thompson, in which once again

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9 Carson, "Intelligence: History of the Concept," 310.

10 Ekin Erkan, "Morphing Intelligence - From IQ Measurement to Artificial Brains," review of *Morphic Intelligence - From IQ Measurement to Artificial Brains*, by Catherine Malabou, *Chiasma: A Site for Thought* 6, no.1 (2020): 248–60. <https://ojs.lib.uwo.ca/index.php/chiasma/article/view/16868>.

11 Alain Desrosières, *The politics of large numbers: A history of statistical reasoning* (Harvard University Press, 1998); A. Alexander Beaujean and Nicholas F. Benson, "The One and the Many: Enduring Legacies of Spearman and Thurstone on Intelligence Test Score Interpretation," *Applied Measurement in Education* 32, no. 3 (June 17, 2019): 198–215, <https://doi.org/10.1080/08957347.2019.1619560>.

12 Stephen Jay Gould, *The Mismeasure of Man* (Turtleback Books, 1996).

standardisation and psychometric<sup>13</sup> comparison reinforced connections between scientific research and a politics of control, coining a theory of the mind that supported social hierarchical structures with implications beyond psychology as an academic field.<sup>14</sup> It was not until the beginning of the 2000s that this genetic determinist paradigm was weakened, when the Human Genome Project revealed the minor influence of genetic coding, which weakened the determinist paradigm.<sup>15</sup> At the end of the twentieth and beginning of the twenty-first century, the eugenic connotations in the research program of intelligence have been further flattened as a result of new neuroscientific findings in epigenetics and neuroplasticity, the opening of consciousness studies, as well as an increasing focus on cognitive psychology.

These new research lineages have been effective in weakening the epistemological approach to intelligence as originally formulated, but still struggle to articulate the normative impact of psychological research on intelligence. This seems to be not only a problem of intelligence but of psychology more in general. Only recently have colonial legacies been explicitly addressed within the field by questioning methods and practices.<sup>16</sup> Intelligence in this sense is still connected to practices of social engineering, for example, in educational contexts where psychology is often used to legitimate a particular politics of control.

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13 For the influence of brain metrology on the history of AI that is relevant for the second part of this essay, see Simon Schaffer, 'OK Computer,' in Michael Hagner (ed.), *Ecce Cortex: Beitrage zur Geschichte des modernen Gehirns* (Wallstein Verlag, 1999), 254–85

14 Gerd Gigerenzer, "From Tools to Theories: A Heuristic of Discovery in Cognitive Psychology," *Psychological Review* 98, no. 2 (April 1, 1991): 254–67, <https://doi.org/10.1037/0033-295x.98.2.254>. It is relevant to notice how this characterisation of the psychological program of intelligence was highly influential in shaping the early years of the establishment of Artificial Intelligence as a field. This is relevant to consider for the second part of this essay. For a deeper connection between psychology and AI in the 1960s, you can consult: Jonathan Penn, "Inventing Intelligence: On the History of Complex Information Processing and Artificial Intelligence in the United States in the Mid-Twentieth Century," PhD Thesis, University of Cambridge, 2020

15 Erkan, "Morphing Intelligence - From IQ Measurement to Artificial Brains."

16 Polli Hagenars, "Decolonising Psychology: Reflections on Continuing Myopia," *Psychology and Developing Societies* 35, no. 1 (March 1, 2023): 7–21, <https://doi.org/10.1177/09713336231157831>.; Sunil Bhatia and Kumar Ravi Priya, "Coloniality and Psychology: From Silencing to Re-Centering Marginalized Voices in Postcolonial Times," *Review of General Psychology* 25, no. 4 (September 27, 2021): 422–36, <https://doi.org/10.1177/10892680211046507>.

Recent literature shows that genetic determinism, which was so prominent in early theories, is no longer explicitly endorsed.<sup>17</sup> Moreover, recent discussions have expanded to include non-human entities as part of the field, such as animals<sup>18</sup> and plants,<sup>19</sup> and even materials.<sup>20</sup> These new discussions can be seen as an attempt to abandon the political program under which intelligence was developed. However, changing its epistemological dimension or extending it to non-humans is insufficient to address deeper ontological and normative issues. In this sense, while contemporary approaches reject genetic determinism, they are still highly neuro- and cognitive-centric, framing intelligence as a property that can be attributed to individual agents.<sup>21</sup> This is to say that the validity of intelligence in the first place, as a particular set of mental capacities modelled on human archetypes, is not questioned; thus, by positively valuing intelligence, its implicit narratives still confer the possibilities of hierarchical distinctions supporting forms of politics of control and echoing residual elements of methodological solipsism.

## 2. Assemblage Theory: From Control to Configuration

In the above section, we have shown how the psychological understanding of intelligence takes part in a broader politics of control. By modelling intelligence on the alleged superiority of a selected group of humans, it could be mobilised as a controlling device. The assemblage theory of intelligence developed in this section is an attempt to circumvent this

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17 Sternberg, *The Cambridge Handbook of Intelligence*; Zuowei Wang, Benjamin Katz, and Priti Shah, "New Directions in Intelligence Research: Avoiding the Mistakes of the Past," *Journal of Intelligence* 2, no. 1 (March 7, 2014): 16–20, <https://doi.org/10.3390/jintelligence2010016>; Fabio Andres Parra-Martinez, Ophélie Allyssa Desmet, and Jonathan Wai, "The Evolution of Intelligence: Analysis of the Journal of Intelligence and Intelligence," *Journal of Intelligence* 11, no. 2 (February 14, 2023): 35, <https://doi.org/10.3390/jintelligence11020035>.

18 Louis D. Matzel and Stefan Kolata, "Selective Attention, Working Memory, and Animal Intelligence," *Neuroscience & Biobehavioral Reviews* 34, no. 1 (July 15, 2009): 23–30, <https://doi.org/10.1016/j.neubiorev.2009.07.002>.

19 Stefano Mancuso and Alessandra Viola, *Brilliant Green: The Surprising History and Science of Plant Intelligence* (Island Press, 2015); Anthony Trewavas, "The Foundations of Plant Intelligence," *Interface Focus* 7, no. 3 (January 6, 2017): 20160098, <https://doi.org/10.1098/rsfs.2016.0098>.

20 Laura Tripaldi, *Parallel Minds: Discovering the Intelligence of Materials* (MIT Press, 2022). It is worth briefly expanding on Tripaldi's notion of intelligence for the context of this paper. Her formulation of intelligence offers a compelling non-anthropocentric and non-hierarchical interpretation of the notion. However, while intriguing, her conceptualisation moves from a material ontological formulation towards a social application. ATOI, in this sense, does the opposite. Without undermining materiality, ATOI starts from a socio-ontological basis, moving to a material application. An extensive discussion between the two views is out of the scope of the current work; nevertheless, while sharing motivation, it was important to briefly mention the two different starting positions of each perspective.

21 Gerd Gigerenzer and Daniel G. Goldstein, "Mind as Computer: Birth of a Metaphor," *Creativity Research Journal* 9, no. 2–3 (April 1, 1996): 131–44, <https://doi.org/10.1080/10400419.1996.9651168>.

model. Our starting point is that intelligence is neither a uniquely human capacity nor is it something that can be attributed to individual agents. Rather, intelligence is the result of different entities interacting with one another. From these interactions, something novel can emerge, which is why we take intelligence essentially to be a productive form of associative activities. Our account enables us to embed intelligence into a politics of configuration rather than a politics of control.

A politics of control refers to qualitative relations that enable hierarchical change, favouring the expression of certain elements over others. As we have illustrated, the psychological program of intelligence is an example of such a political narrative because those agents considered to be intelligent have more space for expression compared to those who are subject to social engineering and experimentation. In contrast, a politics of configuration is concerned with the qualitative changes that allow entities to express their capacities to shape relations, contributing to the expression of a social whole while maintaining a degree of independence.

A preliminary formulation of this idea can already be found in Deleuze's essay *Postscript on the Societies of Control*.<sup>22</sup> Since entities are non-stable unities but are necessarily fragmented and divided, the potential to resist a politics of control through reconfiguration is always (latently) present. As Deleuze points out, a politics of control is in fact a particular configuration. For instance, corporations can enact a politics of control by prioritising certain fragments of labour and knowledge based on statistical data and workers' performance and use these fragments to install a particular hierarchy. However, within this fragmentation, assemblages also offer an alternative form of political organisation. This is because assemblages are fragmented wholes that display unity in particular events but lack a uniform essence. A politics of configuration attempts to capture this organisation where elements participate in the expression of the assemblage without being rigidly bound to a particular enactment.

ATOI is then the characterisation of the sense in which assemblages can be considered intelligent, and it opens up ways to imagine the relevance of psychological research on intelligence beyond social engineering and political control. ATOI is grounded in DeLanda's assemblage theory. Philosophers of technology do not often discuss DeLanda's work. However, we hold that his philosophical project is relevant to both understanding the material conditions that give rise to intelligence and enabling the imagining of novel configurations of assemblages. Building on the work of Deleuze, assemblage theory starts from the premise that reality is best conceived as an interplay of dynamic processes

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22 Deleuze, Gilles. "Postscript on the Societies of Control," *October* 59, (1992): 3–7. <http://www.jstor.org/stable/778828>.

that cut across the nature-culture divide and other dualisms.<sup>23</sup> These processes give rise to constitutive wholes out of which particular entities emerge.<sup>24</sup> DeLanda terms these constitutive wholes *assemblages*. Similar to Deleuze, DeLanda maintains that reality emerges from the interactions of objects and bodies that constitute particular relations. The entity resulting from such relations is an assemblage, a whole constituted by heterogeneous components that result in something new that cannot be reduced to its individual components.

There are three main reasons why assemblage theory offers a good starting point for developing an alternative account of intelligence. First, assemblage theory recognises that entities are not stable objects remaining unchanged over time but are the result of historically contingent interactions. Second, there is no a priori hierarchy inscribed in assemblage theory, such that each assemblage has a similar ontological status regardless of what kind of entities are constitutive of it and constituted by it. Third, the theory is not interested in the properties of the entities composing the assemblage, but rather, the focus is on the relations that constitute the assemblage, thus shifting the locus of investigation from the entity to the relations that the entities create. These three points align with the scope of the paper, suggesting an interpretation of intelligence that allows for a politics of configuration, viewing intelligence as a process resulting from interactions between entities.

## 2.1 An Assemblage Theory of Intelligence

Having introduced these basic features of assemblage theory, it is now possible to offer a critique of a hierarchical understanding of intelligence oriented towards political control. Assemblage theory reveals how various elements, such as political systems, data collection and institutionalisation, ideological narratives, psychometric design, social practices, human heterogeneity, scientific programs, economic interest, ideas of supremacy, and colonial discourses, coevolve to create hierarchical narratives of intelligence that justify political control. For instance, these relational dynamics are evident in the 1924 US immigration restrictions, which assumed genetic inferiority among immigrants.<sup>25</sup> The US establishment's justification for adopting this policy was the reduction of intelligence to a genetic property.<sup>26</sup>

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23 Arjen Kleinherenbrink, "Metaphysical Primitives: Machines and Assemblages in Deleuze, DeLanda, and Bryant," *Open Philosophy* 3, no. 1 (January 1, 2020): 283–97, <https://doi.org/10.1515/opphil-2020-0103>.

24 Thomas Nail, "What Is an Assemblage?," *SubStance* 46, no. 1 (January 1, 2017): 21–37, <https://doi.org/10.1353/sub.2017.0001>.

25 Gould, *The Mismeasure of Man*.

26 Manuel De Landa, *A Thousand Years of Non-Linear History* (New York: Zone Books, 1997).

This example illustrates how a politics of control operates: it finds expression under a tautological form supported by two operations, a reduction and a naturalisation. Specific properties have been selected according to the archetype of a particular group (reduction) and are anchored in a single medium of transmission, the gene (naturalisation). The result that follows is the justification for mechanisms of exclusion. To avoid such mechanisms, an account of intelligence should acknowledge the diversity of the entities by which relations are formed. Adopting this perspective implies that intelligence becomes a concept that accounts for the shaping capacities of its elements in the form of distributed agency.<sup>27</sup> Therefore, instead of viewing intelligence as a property, as the idea of IQ suggests, it is more appropriate to view it as a process that results from the relationality of heterogeneous entities. Intelligence, then, is not something to be attributed to particular entities but instead something that manifests in the actions that take place between entities that give rise to activities on the level of the assemblage as a whole.

Now, in what sense, can intelligence be understood from the perspective of assemblage theory, such that it need not result in a politics control? Here, DeLanda's work is insightful. His major philosophical project concerns the establishment of a philosophical view based on processes of self-organization. He extensively uses the concept of assemblage to conceptualise how fragmented elements can crystallise into (temporally) wholes through bottom-up trajectories. To understand assemblages in DeLanda's terms, a number of steps need to be taken.

The first step in this regard is to determine the identity of a particular assemblage. For DeLanda, the identity of an assemblage is determined by the parameters that "specify the environmental factors that affect the phenomenon"<sup>28</sup> and are central in providing temporal stability in the assemblage. DeLanda<sup>29</sup> introduces two types of parameters that are indicative of identity: territorialization and coding. The first parameter refers to the boundaries of the assemblage. These boundaries might change over time and space; thus, what is important is to consider the process of homogenization and the degree of impermeability, as reflected in how the assemblage reacts when objects are removed or new ones are added. As an illustration, let us consider a city such as London. The city was founded as a Roman military camp, and over the centuries it has evolved into the multicultural metropolis of today. During its expansion, the city has absorbed villages surrounding it that have become its neighbourhoods. Territorialization captures this process, illustrating the trade-off between homogeneity and heterogeneity within the assemblage.

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27 Ian Buchanan, "Assemblage Theory and Its Discontents," *Deleuze Studies* 9, no. 3 (August 1, 2015): 382–92, <https://doi.org/10.3366/dls.2015.0193>.

28 DeLanda, *Assemblage Theory*, 19.

29 DeLanda, *Assemblage Theory*.

The second parameter to consider in an assemblage is coding and refers to the role of the expressive components in fixing the identity of the whole.<sup>30</sup> Language is a classic example. This is because it has a clear expressive role that gives continuity to the members of the assemblage. For instance, we can consider a local dialect that gives access to a semantic dimension—symbolic systems of local traditions and stories situated within that specific place that would not be accessible in other ways if not through the dialect. Therefore, we see that the coding parameter is twofold. It gives the entities composing the assemblage an identity to the outside while also providing a semantic dimension within the assemblage.

However, to make assemblage theory relevant to understanding intelligence, the identity parameters alone are insufficient. We also need to introduce qualitative variables that are indicative of intelligence. Identity and intelligence share connecting points, but while identity accounts for the change and continuity of assemblages over time, intelligence is a qualitative characterisation of assemblages' activity, where activity is a historically contingent event that emerges from the assemblage's processes. DeLanda takes inspiration from Deleuze<sup>31</sup> when characterising the assemblage's activity qualitatively and maintains that understanding the activity of a particular assemblage should be guided by three basic questions: Who? What? How?

Let us briefly illustrate the two parameters and the three questions through the example of smart cities.<sup>32</sup> A smart city can be seen as an assemblage composed of technology and infrastructures, human populations, social institutions, biological actors, cultural sites, regulatory frameworks, and environmental factors. All these components interact dynamically, contributing to the creation of emergent activities in the city. Technologies collect and analyse data; the infrastructure provides the operational network; human populations and social institutions provide and respond to data while forming the city's governmental bodies; and biological actors, cultural sites, and environmental factors generate data and shape the city's life expression. The city's activities emerge through data collection and analysis, public participation, environmental and biomonitoring, city operations, and proactively responding. The smart city has boundaries, enclosed by the surrounding landscape (territorialization), and it has recognisable expressive components such as architectural style or infrastructure (coding). The smart city generates actionable insights that are intensively supported (what?), proactively responds to internal changes of its elements (how?), and processes diverse interactions while maintaining a degree of independence from specific elements (who?). For instance, in the mobility systems of a (smart) city, where flows sustain movement, horizontal relations are the freedom of mobility of individual agents, and regulatory norms allow for coordination and

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30 DeLanda, *Assemblage Theory*.

31 Gilles Deleuze, *Difference and Repetition* (A&C Black, 2004).

32 Yu-Shan Tseng, "Assemblage Thinking as a Methodology for Studying Urban AI Phenomena," *AI & Society* 38, no. 3 (June 1, 2022): 1099–1110, <https://doi.org/10.1007/s00146-022-01500-4>.

organisation at an assemblage level.

Within ATOI, the three questions are translated respectively as variability, referring to which entities take part in the assemblage (i.e., who); reproducibility as what is needed in terms of intensities—for example, energy or fuel—to make the assemblage activity occur (i.e. what); and adaptability as accounting for all the possible set of relations that can occur between the assemblage's element (i.e., how). In other words, the three questions serve to inquire about who is taking part in the assemblage activity, what sustains its existence, and how the relations are configured to allow the activity to occur. Intelligence then refers to specific activities that result from the interplay between the assemblage's elements, qualitatively captured by the three questions. These can be transformed into assemblage elements, namely adaptability, reproducibility, and variability. These three elements aim to capture horizontal relations between components, vertical relations between the whole and its components, and flow relations. In ATOI, intelligence is both about the role of the assemblage components and the assemblage's independence from specific components, thus contrasting cognitive approaches to intelligence that tie it back to individual agents. The activities of the assemblage, then, can be framed as historically contingent collective processes. Given that all assemblages are viewed as individual entities with equal ontological status irrespective of dimension, shape, or function, and that they are dynamic wholes composed of heterogeneous objects exhibiting emergent properties, we arrive at the following definition of intelligence: *intelligence refers to the productive activities of an assemblage in terms of reproducible, adaptive variations*. This definition implies that intelligence is an open concept contextually dependent on the individuation of the single assemblage. Moreover, it emphasises the mutual reactivity of relations within the assemblage, acknowledging the transitory stability of its activity.

Assemblage theory systematises the interactions between different entities. This implies a connection to politics, as politics can be broadly understood as the domain concerned with relations that bring about qualitative change. Moreover, assemblage theory rejects formulating a politics of control that is tautologically structured by operations of reduction and naturalisation. On the contrary, because assemblage theory posits the historical contingency of objects, a flat ontology, and distributed forms of agency that give rise to emergent properties, it offers an appealing framework for understanding politics in terms of configuration. This perspective implies a relational system where multi-directional forms of agency are recognised through shaping processes. In this context, politics provides a structure to the assemblage, while assemblages acknowledge a distributive form of agency. This reciprocity between parts<sup>33</sup> is evident in the way agency and structure mutually constitute each other, and, as DeLanda suggests, “transcending

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33 Manuel DeLanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (A&C Black, 2006).

the duality of agency and structure.”<sup>34</sup> Going back to the above example of smart cities, this can be seen as the participatory role of citizens, where their agency provides data to the system, and in exchange, the structure is open for citizens’ response. Configurations thus become political structures where components’ expressivity and transformative processes are central, yet components maintain some degree of independence by forming external relations.

To summarise, in ATOI, intelligence emerges as a qualitative dependent variable from assemblages’ activity. It questions the intensive flows that support the assemblage, takes independence from individual specific objects, and accounts for all possible changes in the sets of relationships. From an ATOI perspective, intelligence is not considered in terms of individual properties, rejecting possible archetypes, reductions, and naturalisation, but rather in terms of what the relations within the assemblage enable. This allows for shifting from a politics of control, where hierarchical structures of power find justification, to a politics of configuration, where what matters is the disposition of relations, their mutual reactivity, and enabling spaces of mutual production.

### **3. Artificial Intelligence and the Human in the Loop**

In this section, we mobilise ATOI to discuss our case study: machine intelligence systems, particularly the human-in-the-loop (HITL) methodology in artificial intelligence (AI). AI is a complex object of study. For the context of this essay, we have decided to focus on AI’s “super accuracy” in data analysis because it is generally considered to be the hallmark of AI’s intelligence.

#### **3.1 Super Accuracy and Politics of Control**

AI’s super accuracy is often used to legitimise the trustworthiness of its output. In other words, because AI is super accurate in analysing data, its output must be true, and because its outputs appear trustworthy, AI is super accurate. However, this is a tautological fallacy, resembling a politics of control, and is impossible to prove correct. Here, we can compare the argumentative structure that legitimates the psychological program of intelligence with the politics of control it gives rise to. Recall that a politics of control is based on two operations: a reduction and a naturalisation. In the case of AI super accuracy, reduction takes place through the simplification of the causal claim in data operations, whereas anthropomorphising AI leads to naturalisation. In what follows, we illustrate both aspects.

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<sup>34</sup> DeLanda, *A New Philosophy of Society*, 2.

The work of Campolo and Crawford<sup>35</sup> is a useful starting point for questioning AI's super accuracy. The authors caution against drawing analogies between human cognition and AI and question the justification for portraying AI systems as exceeding human capabilities. They argue that rather than a form of intelligence, whatever this might mean, AI operates through the execution of complex statistical modelling, where, often, the data in place is detailed information about people's lives or social contexts.<sup>36</sup> Nevertheless, the language often used to describe the incredible algorithmic capacities of pattern recognition enchants and anthropomorphises AI. Thus, we see that fallacies that open to control politics start from the construction of narratives, opening to a second legitimisation circle of intelligence, in its artificial form, as a conceptual tool for building devices of societal control. The issue is that training the systems through data embedded into political and societal meaning also implies transmitting and reinforcing what the data signifies. Nevertheless, the political significance of the data are often overlooked,<sup>37</sup> and the same goes for the causal mechanisms within the AI systems, which are often opaque or are not transparent otherwise.

A good example of AI's super accuracy being ingrained in a logic of control can be found in a recent paper<sup>38</sup> that explores the use of deep learning models to predict emotional states from facial expressions in real-time. Using large datasets of facial images, the deep neural network outperformed human participants in identifying emotions such as frustration, excitement, and doubt. The model achieved an impressively high accuracy rate—98.7% in some cases—leading to widespread claims of the AI's superior emotion recognition abilities. However, much like earlier examples,<sup>39</sup> the paper was unable to explain the causal mechanism behind the high accuracy, particularly considering the complexity of human emotions expressivity and the limitations of categorising them in fixed facial features. Although statistically impressive, challenges in detecting the causal component are present due to the system's opacity. Nevertheless, this does not prevent making claims about AI's super accuracy.

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35 Alexander Campolo and Kate Crawford, "Enchanted Determinism: Power Without Responsibility in Artificial Intelligence," *Engaging Science Technology and Society* 6 (January 8, 2020): 1–19, <https://doi.org/10.17351/ests2020.277>.

36 Campolo and Crawford, "Enchanted Determinism."

37 Päivi Seppälä and Magdalena Malecka, "AI and Discriminative Decisions in Recruitment: Challenging the Core Assumptions," *Big Data & Society* 11, no. 1 (March 1, 2024), <https://doi.org/10.1177/20539517241235872>.

38 Lanbo Xu, "Dynamic Emotion Recognition of Human Face Based on Convolutional Neural Network," *International Journal of Biometrics* 16, no. 5 (January 1, 2024), <https://doi.org/10.1504/ijbm.2024.10063905>.

39 Yilun Wang and Michal Kosinski, "Deep Neural Networks Are More Accurate Than Humans at Detecting Sexual Orientation From Facial Images.," *Journal of Personality and Social Psychology* 114, no. 2 (February 1, 2018): 246–57, <https://doi.org/10.1037/pspa0000098>.

This example illustrates how “claims about rates of accuracy tend to displace causal scientific explanations,”<sup>40</sup> which aligns with Campolo and Crawford’s critique. Moreover, we see that a significant issue with the super-accuracy process is that the data’s contextual features are not accounted for. In other words, the training data sets become political because they represent the social world, and by AI processing it, the data that embodies political meaning gains legitimisation due to the AI’s “super accuracy.”<sup>41</sup> During the elaboration processes, data is detached from its context, thus losing its meaning, and only reattains a particular meaning by providing a given output. The issue is that semantic detachment is hidden in the algorithm processing, but the possibility of formulating causal claims is still present. The risk is that, as AI applications in society increase, the data they generate has real-world meaning; they reflect the values and biases of the society in which they are embedded<sup>42</sup>. Again, we see tautological reasoning in place: while the data is transformed, their meaning is not. Instead, it is made more legitimate by the AI’s “super accuracy.” This suggests a politics of control operating a dualistic distinction between the data and the context in which it is embedded.

### 3.2 AI as Configurative Assemblage

ATOI offers a different analysis of AI’s super accuracy, because it considers the outputs and performances as an activity emerging from an assemblage, enabling us to think about it configuratively. To do so, we should first understand the historical trajectory of AI and especially that AI is to a large extent modelled upon the game of chess. Ensmenger<sup>43</sup> examines the analogy—advanced by AI practitioners since the 1970s—that positions chess as to AI what *Drosophila melanogaster* (fruit flies) is to genetics: an experimental model for the development of foundational theory. In other words, whereas *Drosophila* has been used empirically for revealing genetic mechanisms, chess has similarly been instrumental in advancing the understanding of intelligence. However, Ensmenger shows that, even though the analogy holds at first glance, the critical review of the two fields shows a different use of the two experimental models. In the case of *Drosophila*, science and organism were mutually constitutive: genetics was reconfigured to meet theories and methodology suited for *Drosophila*, and *Drosophila* as a species was reconfigured as a technology producing new knowledge about complex biosystems. Similarly, this was the case with AI and chess, which redefined what it meant to be an

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40 Campolo and Crawford, “Enchanted Determinism,” 12.

41 Campolo and Crawford, “Enchanted Determinism.”

42 Yarden Katz, *Artificial Whiteness: Politics and Ideology in Artificial Intelligence* (Columbia University Press, 2020).

43 Nathan Ensmenger, “Is Chess the *Drosophila* of Artificial Intelligence? A Social History of an Algorithm,” *Social Studies of Science* 42, no. 1 (October 14, 2011): 5–30, <https://doi.org/10.1177/0306312711424596>.

intelligent chess player.<sup>44</sup>

Nevertheless, the similarities fall short when looking at the productive continuities of the two experimental models. For instance, while *Drosophila* has shown to be a flexible experimental technology whose model could be used across various research programs in genetics, chess did not have such continuance<sup>45</sup>. A possible answer for this is that focusing on chess “distracted researchers from more generalizable and theoretically productive avenues of AI research.<sup>46</sup>” This, however, implies questioning deeper aspects, such as how to make theoretically productive outcomes for software research semantically continue. In this sense, thinking in assemblage terms is crucial, as software is an object sitting between computing technology, social relationships, organisational politics, and personal agendas<sup>47</sup>. As a result, software becomes difficult to situate historically and geographically. This becomes immediately tangible when asking ChatGPT where it is located. It generates the answer:

I don't have specific coordinates as a singular entity because I can distribute across multiple servers and data centers worldwide [...] the specific server handling your request could vary each time [...] so that than having a fixed set of coordinates, my presence is distributed and dynamic within the cloud infrastructure.

This ephemeral description is misleading because it focuses exclusively on operational activities and data operations. However, these data operations cannot be semantically relevant without a context. To transform ideas into action, all software, including AI, must necessarily become embodied: operating on specific computing systems and in specific socio-technical environments.<sup>48</sup> From an assemblage perspective, this becomes a question of its identity and stability. In other words, the operational activity of AI needs to be semantically continuous with the data (coding parameter) and physically and spatially bounded (territorialization).

Moreover, introducing assemblage perspectives also entails accounting for how AI shapes the mutual relations between algorithms and users: algorithms are influenced by users as much as users are coded as data points. In this operation, matter and form are inseparable, making the context situated within the elements. At the basis, elements'

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44 Ensmenger, “Is Chess the *Drosophila* of Artificial Intelligence?”

45 Ensmenger, “Is Chess the *Drosophila* of Artificial Intelligence?,” 24.

46 Ensmenger, “Is Chess the *Drosophila* of Artificial Intelligence?,” 7.

47 Nathan L. Ensmenger, *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise* (MIT Press, 2012).

48 Matteo Pasquinelli, *The Eye of the Master: A Social History of Artificial Intelligence* (Verso Books, 2023).

agency is a continuous process of interaction, finding expression in specific points—for example, in the interface where the algorithm and user meet, becoming visible. The suggestion that assemblage theory offers in reading AI's super accuracy is that, rather than being enchanted by the data operations, it is first important to understand the system fragmentation, that is, where the system is (territorialization) and how this is expressed by it (coding). Super accuracy becomes the assemblage's activity and results from the configurations of relations by means of which causal mechanisms are distributed within the assemblage.

In summary, by reviewing the historical comparison between *Drosophila* for genetics and chess for AI as experimental models, we see that, as suggested by Ensmenger,<sup>49</sup> the analogy does not hold. The issue is that for the latter, there is no continuity in expressing the contextuality into which the developed algorithms were embedded. To overcome this, we have proposed reading AI and, more generally, software as assemblages, where elements shape each other by being part of the assemblage and by expressing contextual continuity within spaces of interaction.

### 3.3 Assembling intelligence in the HITL

From an assemblage perspective, AI is more than just algorithms performing data operations. It is about politics and social control, whereas the system architecture mimics social context, configuring space, time, relations, and operations.<sup>50</sup> Under this view, the metrology of intelligence played a major role in social and racial segregation, which now operates within AI for controlling labour, for example, establishing social and epistemic hierarchies.<sup>51</sup> In other words, AI is, at first, a socially contingent phenomenon: human designers who train and refine the algorithm encode their situatedness into the algorithmic world. The same goes in the other direction: the algorithm acts as a transformative agent, shaping the elements of the assemblage by influencing the type of labour, training, skills, and knowledge users need to acquire to interact with it, or by making the algorithm relevant in different societal contexts. Under this view, a politics of configuration helps understand how AI assemblages emerge by establishing relations between different fragments.

Let us make this description more concrete by focusing on the Human-in-the-Loop (HITL) case. HITL is a relatively new methodology that has found momentum in machine

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49 Ensmenger, "Is Chess the *Drosophila* of Artificial Intelligence?"

50 Pasquinelli, *The Eye of the Master: A Social History of Artificial Intelligence*; Min Kyung Lee et al., "Working with Machines," *Conference: CHI '15 Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, April 17, 2015, 1603–12, <https://doi.org/10.1145/2702123.2702548>.

51 Luke Stark, "Algorithmic Psychometrics and the Scalable Subject," *Social Studies of Science* 48, no. 2 (April 1, 2018): 204–31, <https://doi.org/10.1177/0306312718772094>.

learning in the last decade. The HITL approach has found application in a variety of domains, ranging from medicine to autonomous vehicles, and from image recognition to natural language processing<sup>52</sup>. At the core of HITL is the idea that humans should be integrated into algorithm training to improve efficiency beyond random selection by identifying the most critical data for the AI model.<sup>53</sup> Thus, one of the major research trends in the HITL field is to study how humans learn and how they integrate similar processes into algorithm development. Such ideas can be traced back to the middle of the 1980s, with publications by Valiant<sup>54</sup> and Angluin,<sup>55</sup> who suggested simulating the learning processes that take place in a classroom, where a student (the algorithm) asks the teacher (the human) to give explanations about examples, represented by categorising and labelling data.

The narrative of the politics of control is embedded in the design of technological systems, as HITL exemplifies. It is conceptually based on a tautological argument: reduction as seeing the human in control, and naturalisation as viewing the human in control due to its unique characteristics of being intelligent, thus situating the human-user hierarchically above the algorithm. In this sense, the human is seen as a “guardian” of the loop, implying control and a top-down relationship. However, this hierarchical understanding does not hold up upon closer scrutiny of the idea of a loop. When this idea is taken seriously, the human user and the training algorithm are positioned horizontally, co-shaping each other through mutual interaction. This shifts the understanding of HITL from a purely human-centred process to one of mutual influence, in which humans and algorithms transform each other through interaction.

The HITL structure is designed such that humans can act at crucial decision points in the system, but this does not necessarily imply that humans control it. Nevertheless, the approach has been shown to increase the “super accuracy” of algorithm development.<sup>56</sup> Thus, our critique is not of its technical utility but of its philosophical implications. We hold that on a conceptual level, HITL is more accurately conceived under the terms of a configurative structure rather than control, a view that highlights how humans and algorithms dynamically interact, transform, and co-shape each other in the assemblage.

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52 Xingjiao Wu et al., “A Survey of Human-in-the-loop for Machine Learning,” *Future Generation Computer Systems* 135 (May 18, 2022): 364–81, <https://doi.org/10.1016/j.future.2022.05.014>.

53 Chelsea Chandler, Peter W Foltz, and Brita Elvevåg, “Improving the Applicability of AI for Psychiatric Applications Through Human-in-the-loop Methodologies,” *Schizophrenia Bulletin* 48, no. 5 (April 14, 2022): 949–57, <https://doi.org/10.1093/schbul/sbac038>.

54 L. G. Valiant, “A Theory of the Learnable,” *Communications of the ACM* 27, no. 11 (November 5, 1984): 1134–42, <https://doi.org/10.1145/1968.1972>.

55 Dana Angluin, “Queries and Concept Learning,” *Machine Learning* 2, no. 4 (April 1, 1988): 319–42, <https://doi.org/10.1023/a:1022821128753>.

56 Eduardo Mosqueira-Rey et al., “Human-in-the-loop Machine Learning: A State of the Art,” *Artificial Intelligence Review* 56, no. 4 (August 17, 2022): 3005–54, <https://doi.org/10.1007/s10462-022-10246-w>.

The next question, then, is how exactly the intelligence of HITL must be understood. In what follows, we analyse the activity from the perspective of ATOI and attempt to account for elements' expressive capacities, thereby offering a reading in which intelligence is not a property of the HITL but rather manifests in the activities resulting from the assemblage's relations. The first step in illustrating how ATOI applies to HITL is to identify the assemblage's activity. In HITL, this is the development of super accuracy. Super accuracy becomes a qualitative characterisation of the assemblage's structure through which activity and contextualization find expression in the identity of the assemblage. Although in the HITL, the identity is provided by the specific organisation of the system by means of introducing a human supervisor in the algorithmic system. However, the activity and contextualization of the system cannot be reduced to the presence of this supervisor, which is why an anthropomorphic reading of HITL is misleading.

From an ATOI perspective, activity and contextualization define the structure and the assemblage's identity. Thus, it is important to consider the two parameters, territorialization and coding, to point to the activity's boundaries and expression. The activities of HITL are physically embodied in a material infrastructure on which the algorithm and data run, as well as in the bodily presence of the human user. The activity under scrutiny guides the attention to what is relevant to include. Therefore, from the human-user's perspective, what is relevant is how they take on the role of a technician or developer. In other words, the human is part of the assemblage to the extent to which it is configured to interact with the loop, for instance, by developing relevant programming skills. In this sense, we can point to a first insight that ATOI shows, namely, that in the HITL, not all humans can interact with the assemblage, but only specific humans that are configured in a relevant way with the activity of the loop, both as developers or as data sets to exploit.

Having introduced ATOI's parameters to HITL, we now move forward by introducing the three variables: reproducibility, adaptability, and variability.

### **3.3.1 Reproducibility**

Reproducibility refers to the flows needed to sustain HITL activities. These flows can be material (e.g., the energetic components needed for the assemblage's operations) and social (e.g., the presence of specific institutional, educational, and economic conditions). The HITL is an assemblage of heterogeneous elements all connected through intensities. For super accuracy, this refers to how the elements flow: computing technology and human users, energy and economic infrastructure, and the transmission of knowledge and practices must interact to reproduce the activity. Reproducibility shows a space of dependency, because to perform certain activities, the assemblage necessarily depends on externally originated flows. Thus, from an ATOI perspective, reproducibility points to the agency and necessity of these external flows within the HITL. A concrete example is the

dependency of the HITL on the electric grid and on material transformation for producing the electricity needed to sustain and reproduce the assemblage, or the economic flow that sustains the development of specific HITL assemblages.

Moreover, flows bring specific qualities to the assemblage. For example, if the funding source is military or medical, the financial flow alters the qualitative nature of the HITL system. While this might not directly affect quantitative aspects, such as accuracy rates, it would still influence overall activities. In military applications, financial flows from defence budgets prioritise HITL systems designed for threat detection and targeting. This can lead to a specific form of territorialization, where the system becomes narrowly focused on military objectives, reducing its deployment to broader applications, similar to the example of chess previously illustrated. Additionally, financial flows can dismantle assemblages; for instance, government budget cuts in healthcare could halt the development of HITL systems for medical applications. Thus, we see how, from an ATOI perspective, assemblages' flows possess agency that characterises the identity and reproducibility of the loop. Therefore, flow operationalisation becomes a structural component that directly composes the HITL activity.

### 3.3.2 Adaptability

Adaptability aims to overcome anthropomorphic narratives by suggesting that within the HITL, as it indicates, all elements can lead to relevant changes. Adaptability refers to the assemblage's flexibility in responding to internal changes. This involves questioning how horizontal relations between entities converge in producing activities exhibited at the assemblage level and accounting for ongoing changes. In this sense, adaptability is connected to stability and transformation.

To illustrate stability, consider the application of HITL in a medical context. One of the issues that HITL wants to solve in using AI technologies in the medical field is that the algorithm is not limited to producing medical images, but also enters the diagnostic process<sup>57</sup>. Diagnosis is inherently complex because it relies on interpretation, where each radiologist's inductive reasoning and personal experience are key for an accurate diagnosis.<sup>58</sup> Thus, the HITL needs to adapt and establish relationships that account for the radiologist's abilities while simultaneously overcoming biases that lead to over-reliance.

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57 Filippo Pesapane, Marina Codari, and Francesco Sardanelli, "Artificial Intelligence in Medical Imaging: Threat or Opportunity? Radiologists Again at the Forefront of Innovation in Medicine," *European Radiology Experimental* 2, no. 1 (September 29, 2018): 35, <https://doi.org/10.1186/s41747-018-0061-6>.

58 Pesapane, Codari, and Sardanelli, "Artificial Intelligence in Medical Imaging: Threat or Opportunity? Radiologists Again at the Forefront of Innovation in Medicine," 35.

On the other side, transformation can be illustrated from a cultural perspective. For example, well-known linguistic terms such as “spam” and “memes” that are now part of the daily vocabulary of the internet have originated in diverse cultural settings - comedy entertainment shows the former, biological research the latter - before becoming ways of reasoning that have grafted the internet culture. Similarly, the HITL can lead to new vocabulary to designate particular interactions within the system that would not be possible without configuring the elements in the first place.

From these two examples, we can see how adaptability is the variable that captures the challenge of aligning horizontal connections to the assemblage activity. Further, this becomes a matter of stability, as horizontal changes produce certain activities, as well as being able to alter the assemblages by absorbing changes within their identity.

### 3.3.3 Variability

Lastly, variation refers to maintaining autonomy between the assemblage and its elements. As DeLanda<sup>59</sup> implies when talking about military apparatuses, intelligence lies not in the machines but in the networks of relations that produce activity. In this sense, variation underscores the importance of focusing on the assemblage rather than on specific individual elements that compose it. Looking at HITL in the medical field, if the system were relying on a specific and unique radiologist who would be the only one able to interact with the algorithm, or if the system were entirely dependent on a specific algorithm, then the assemblage as a whole would exhibit dependency towards one or more of its elements. This can potentially open the risk of hierarchy as the non-substitutive component would be the pivotal element of the system, and the risk of drawing the assemblage towards extinction if the component is removed from the HITL due to it not being replaceable. Thus, variation points to the importance of the assemblage’s emerging properties and how these have a degree of autonomy from specific individual components.

By applying ATOI to the HITL, we see that super accuracy is not a property; it rather becomes an emerging activity open to its surroundings and produced by flows, horizontal linkages, and distributed and adaptive forms of agentic interactions. Therefore, we face the impossibility of saying who controls the loop; instead, the suggestion is that being in the loop opens to configurative forms of being due to mutual shaping and transformations, rejecting tautological forms of control. This view can be seen as a counternarrative to how AI is being depicted as the ultimate technological achievement, making the case that intelligence captures social processes materially constituted and expressed through relationality and forms of organisation.

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59 DeLanda, *War in the Age of Intelligent Machines*.

#### 4. Conclusion

The notion of intelligence is widely used to describe both the workings of technologies and the capacities of human beings. The alleged intelligence of technologies is modelled on a particular understanding of human intelligence, namely one that is understood in terms of goal-oriented cognitive capacities traceable to properties of a cognitive agent. This understanding of intelligence has a rather particular history, closely linked to Western colonial ambitions. As a result, it introduces a hierarchy between Western people and other people, between humans and other animals, and between subjects and objects. This hierarchy, in turn, gives rise to a politics of control: the idea that entities that lack certain capacities of Western humans can be legitimately dominated and used to satisfy specific demands. We have objected to this view, not only because it has undesirable implications, but because it presupposes that intelligence is a property that can be isolated, located in specific entities, and precedes any kind of activity.

In response to the properties' view of intelligence, we developed ATOI. At the heart of ATOI is the idea that intelligence is not a property that can be ascribed to an isolated entity but instead manifests in the *activity of assemblages*. In DeLanda's interpretation of assemblage theory, reality does not consist of a set of well-delineated entities but rather is populated by dynamic interactions between different types of bodies that cling together. What clings together and attains a relative stability can be called an assemblage. Activity takes place on the level of the assemblage and not on the level of the bodies that constitute it. Hence, any understanding of intelligence that ascribes it to individual bodies is inevitably doomed to surpass the phenomenon. Underlying the politics of control, then, we encounter a view of intelligence that is grounded in an ontological error.

ATOI evades this error by specifying intelligence in terms of three qualitative variables of assemblages: reproducibility, variability, and adaptability. Reproducibility refers to the connections between the different elements within the assemblage and the internal flows between them that are needed to reproduce similar outcomes. Variability implies the assemblage's relative autonomy from its components, such that its agency is irreducible to the workings of a particular component. Adaptability captures the assemblage's flexibility in responding to internal changes in the elements that constitute it. Together, these variables specify the relations that take place within the assemblage. The extent to which the assemblage displays intelligence, then, results from its internal configuration through which the different elements become well-attuned to one another. ATOI's qualitative specification of intelligence disconnects it from the narrative of a politics of control because it breaks with the idea that intelligence introduces a hierarchy between different types of entities. Simply put, in ATOI, intelligence is irreducible to the properties of a particular entity but emerges from a particular configuration of different entities that

are interacting. This, then, enables us to move from a politics of control to a politics of configuration.

Our discussion of HITL illustrates this shift. We focused on a particular aspect that AI is typically lauded for: its alleged super-accuracy in recognising patterns in data relative to a particular goal, such as predicting emotional states on the basis of facial recognition. As we showed, this 'super accuracy' is typically taken to be the result of the specific properties of algorithms that are then taken to be indicative of intelligent activity. However, given that algorithmic processes are often opaque and may contain certain biases that lead to inaccuracies, researchers have suggested that human beings must act as decision-makers at crucial points: they need to guard the loop, as it were. The implicit suggestion here is that humans can place themselves outside of the algorithmic loop because of them having certain intelligent properties. These properties, then, are thought of as effectively enabling the control of algorithms, which is necessary for the proper guidance of AI.

From the perspective of ATOI, assigning humans a specific position within the algorithmic loop is naïve at best. This is because, when AI is understood as an assemblage, there is and cannot be a particular entity that is in control of the loop. However, in the absence of the possibility of being a guardian, there can still be a relevant place for humans within an AI assemblage. But this is because they are partly constitutive of the assemblage's particular flow, without the assemblage being completely determined by the particular human component. Our analysis of HITL showed (1) that the idea of super accuracy based on particular characteristics of components within an assemblage is misguided, and (2) that when taken seriously, the idea of the loop implies the impossibility of stepping out of it. Reading the HITL from a configurative perspective using ATOI has shown how computer system architectures embeds political significance, as the (conceptual) structure shapes how elements and agencies are expressed.

Arguably, our discussion of ATOI and its implications has been somewhat limited. This is, firstly, because we had a limited focus on the case of HITL. This is just one particular example of an assemblage that may display intelligent behaviour under certain parameters. Everything can be viewed as an assemblage, ranging from beehives to cities to the Earth at large. In each of these assemblages, the particular relations constituted by human elements are different, as is the extent to which the identified parameters of intelligence concretely manifest. Secondly, the exact nature of what we termed a politics of configuration can be specified in more detail.

At the start of this paper, we suggested that living with "intelligent technologies" can come with a price. However, it is one thing to maintain that a shift towards a politics of configuration is desirable, but another thing to suggest what kinds of configurations are favourable and how such favourable configurations can materialise. Leaving behind the

ideas that configurations fall within the sphere of human control, and that particular properties legitimate certain entities being in control and legitimise the reliability of outcomes, at least helps specify the conditions under which intelligence can manifest. However, it remains an open question what price different assemblages are likely to pay, the extent to which the configuration of one particular assemblage might come at the expense of another, and why certain assemblages might go extinct. It is precisely because of this uncertainty that a call for humility is needed, and to disconnect intelligence from colonial narratives that highlight human uniqueness.

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# Entities as Embodied Networks: Power, Capital, and the Structuration of Socio-Biotechnical Totality

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## **Abstract**

This paper develops a theoretical framework to analyse human and non-human entities as socio-biotechnical configurations shaped by historically sedimented power relations. Drawing on Actor-Network Theory, post-ANT developments, and Andrew Feenberg's critical constructivism, the argument integrates these perspectives within a Marxist approach that foregrounds the dialectic between contingency and necessity. The concepts of threads and fabrics conceptualise how networks stabilise asymmetries, consolidate exclusions, and produce fractured totalities. Capital is theorised not as a background condition but as a structuring actant that inscribes values, configures topologies, and organises the logic of valorisation. Technical codes materialise hegemonic positions within socio-biotechnical entities, while resistance and obduracy mark the persistence of the non-identical. The paper further examines how class position and subjective identification mediate technological design, showing how socio-biotechnical entities embody contested inscriptions of meaning, function, and control. Through this lens, technology is reinterpreted as a site of struggle within a historically structured socio-biotechnical totality.

**Keywords:** Socio-biotechnical entities, power dynamics, contingency, totality, capital valorisation, technical codes, capitalism, constructivism

## 1. Introduction

Thinking about technologies should involve more than merely exploring the micro-elements that constitute them or the microsocial interrelations depicted by the threads or traces of those interactions—threads that intertwine to form broader socio-biotechnical fabrics. It should be a more extensive task, one that connects these threads to broader social, political, cultural, historical, economic, and biological formations. In so doing, this paper examines how technologies function as socio-biotechnical entities embedded in historically structured networks. While these networks appear fluid, decentralised, and contingent, we argue that they are shaped by sedimented power relations and capitalist logics that structure the totality within which they operate. The core tension explored here lies not simply between contingency and necessity but in how this tension unfolds within the capitalist structuration of socio-biotechnical fabrics—a structuration that configures design, agency, and value through historically inscribed asymmetries.

This assertion, however, is not without controversy: since 1968, particularly in France and subsequently across critical theory traditions, a marked opposition to Hegelian thought<sup>1</sup> has fuelled suspicion toward the very notion of totality.<sup>2</sup> These post-68 critiques questioned the Marxist concept of totality as potentially totalitarian and homogenising. As one commentator put it, “the events of May 1968 [...] seemed to confirm the bankruptcy of the French Communist Party, to question the orthodox Marxist scenario of revolution and to feed rising suspicions that the concept of totality served both totalitarian and exclusory purposes.”<sup>3</sup> Nonetheless, within certain Marxist currents, the notion of totality was not abandoned but critically reworked. This paper specifically draws upon the contributions of Fredric Jameson, who expands Marxist frameworks by incorporating non-native concepts such as ideology, cultural analysis, and narrative form. Jameson conceptualises totality as the horizon of all interpretative acts, insisting that “always historicise” implies reading every text as part of a broader structure shaped by capitalism.<sup>4</sup> He further argues that cultural formations must be understood as expressions of an underlying socioeconomic logic, even when such logic is no longer directly accessible or consciously perceived.<sup>5</sup> Jameson’s use of totality does not posit a seamless or complete system, but a mediated structure through which capitalist logics are reproduced and contested. In this line of

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1 Vincent Descombes, *Modern French Philosophy* (Cambridge: Cambridge University Press, 1980).

2 Martin Jay, *Marxism and Totality: The Adventures of a Concept from Lukács to Habermas* (Berkeley: University of California Press, 1984).

3 John E. Grumley, *History and Totality: Radical Historicism from Hegel to Foucault* (New York & London: Routledge, 1989), 184.

4 Fredric Jameson, *The Political Unconscious: Narrative as a Socially Symbolic Act* (London & New York: Routledge, 2002).

5 Fredric Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism* (Durham: Duke University Press, 1992).

thought, his defence of expanding Marxist frameworks to encompass non-native concepts inspires us to integrate constructivist perspectives within a Marxist framework. This declaration signals our ideological intent for this paper.<sup>6</sup>

Notwithstanding, this article's understanding of totality is grounded more fundamentally in the work of Theodor Adorno, including his collaboration with Max Horkheimer.<sup>7</sup> While both thinkers developed a non-totalitarian conception of totality prior to the post-68 context, Adorno in particular emphasised the fragmentary, the non-identical, and the residual. Rather than offering a method for mapping social change, his approach constitutes a philosophical refusal of closure—an insistence on the critical potential of contradiction, negativity, and resistance. We therefore draw more heavily on Adorno's insights, especially as elaborated in *Negative Dialectics* and *Aesthetic Theory* (Adorno 2004).

A central concern in Adorno's thought is the domination of instrumental rationality and the logic of identity over experience and multiplicity.<sup>8</sup> He warns that the pursuit of coherence and systematisation—especially under the imperative of identity—produces a homogenising force that negates the richness of singularities and the non-identical.<sup>9</sup> In contrast to classical Hegelian or orthodox Marxist views, which conceive totality as a coherent and encompassing system, Adorno insists that totality is intrinsically fractured, marked by contradiction and resistance. Totality, for him, is an unavoidable abstraction—it frames our perception of reality—but it is never complete or fully coherent.<sup>10</sup> This perspective enables us to interrogate networks not as neutral assemblages of actants, but as structured fields permeated by ideological sedimentations and power asymmetries that shape but do not exhaust the configurations that emerge. A related critique of instrumental reason, developed earlier in collaboration with Max Horkheimer, also identifies the tendency of Enlightenment rationality to convert difference into sameness, reducing qualitative experience to exchangeable units.<sup>11</sup>

From this standpoint, technologies must be understood not as isolated artefacts or neutral tools, but as socio-biotechnical entities—configurations that condense social, technical, biological, and symbolic dimensions within historically structured networks. These entities emerge from and reinforce broader fabrics of power, meaning, and function. Their

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6 Slavoj Žižek, *Less Than Nothing: Hegel and the Shadow of Dialectical Materialism* (London & New York: Verso Books, 2012).

7 Max Horkheimer & Theodor W. Adorno, *Dialectic of Enlightenment*, ed. Gunzelin Schmid Noerr, trans. Edmund Jephcott (Stanford: Stanford University Press, 2002).

8 Theodor W. Adorno, *Negative Dialectics* (New York & London: Routledge, 2004), 5–19.

9 Adorno, *Negative Dialectics*, 139–65.

10 Adorno, *Negative Dialectics*, 53–54.

11 Horkheimer and Adorno, *Dialectic of Enlightenment*, 3–11.

design and operation are shaped by sedimented asymmetries, ideological inscriptions, and institutional arrangements. In this framework, technologies are not merely used—they are sites of struggle, where competing values, rationalities, and agencies are materially encoded.

To conceptualise the interplay between historical determination and contingent interaction within technological networks, this paper introduces the notions of threads and fabrics. Threads denote historically sedimented relations—patterns of alignment, exclusion, and reinforcement that shape the positions and capacities of entities within a network. Fabrics refer to the broader configurations these threads compose: dynamic yet stabilised formations that articulate the possibilities of action, meaning, and reconfiguration. These concepts allow us to theorise how what appears as fluidity is often the product of prior stabilisations—where the contingent is retroactively fixed as necessity through capitalist structuration.

In this sense, rather than functioning as a passive backdrop, capital operates as an active structuring force—an actant that configures the topology of networks. Through mechanisms of valorisation, design, and circulation, capital inscribes itself into socio-biotechnical entities, shaping not only their material composition but also the meanings, uses, and subject-positions they enable. As such, capital functions as both an ontological and political principle within socio-biotechnical totality, orienting design logics, operational standards, and the normative expectations surrounding technology.

This approach also responds to limitations identified in dominant constructivist frameworks. While Social Construction of Technology (SCOT) introduces the role of relevant social groups, it tends to overlook the structural asymmetries and ideological forces that traverse those groups.<sup>12</sup> ANT, on the other hand, emphasises relationality and symmetry but often neglects historical sedimentation, treating networks as flat and reversible configurations.<sup>13</sup> Building on critiques by Feenberg, Radder, and Winner, this paper insists that socio-biotechnical networks must be read historically and critically: not merely traced, but interpreted as sites of sedimented conflict, hegemonic reproduction,

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12 Trevor J. Pinch and Wiebe E. Bijker, “The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other”, in *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge (MA) and London: The MIT Press, 1987), 17–50.

13 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005); John Law, “Material Semiotics” (Heterogeneities.net. John Law’s STS Web Page, 2019), [www.heterogeneities.net/publications/Law2019MaterialSemiotics.pdf](http://www.heterogeneities.net/publications/Law2019MaterialSemiotics.pdf).

and potential rupture. Feenberg<sup>14</sup> argues that constructivist perspectives often fail to grasp the normative dimension of technological design and its entanglement with power. Radder<sup>15</sup> contends that constructivist approaches overlook the ontological and institutional conditions of scientific and technological practice. Winner<sup>16</sup> famously asserts that technologies have politics—not merely as consequences, but as intrinsic features of their design and implementation.

Within this perspective, the non-identical, in Adorno's sense, is not merely a philosophical residue—it emerges within technologies as that which resists full integration: the unintended effect, the misuse, the reappropriation, the symbolic excess. It manifests in obdurate artefacts, alternative designs, counter-hegemonic rationalities, and embodied practices that refuse standardisation. Socio-biotechnical entities thus become not only instruments of domination but also configurational sites of tension, where sedimentation and resistance co-exist.

This paper unfolds as follows: “Section Two” elaborates on the conceptual framework of threads and fabrics, showing how socio-biotechnical entities condense sedimented asymmetries through processes of stabilisation. It also develops the dialectic between contingency and necessity, offering a critique of purely fluid or eventual conceptions of networks. “Section Three” critically engages with ANT, SCOT, and the theory of large technological systems, integrating these approaches within a Marxist reading of capitalist structuration. Special attention is given to the concepts of momentum, path dependence, and accumulation. “Section Four” returns to Feenberg's theory of “instrumentalization” and introduces the concept of technical codes as a way to analyse how values are embedded in design. It also explores how class position and subjective identification shape technological configurations, drawing on empirical cases to examine the limits and potentialities of resistance.

Through this exploration, we seek to develop a critical framework for understanding technologies as socio-biotechnical entities, not only formed through heterogeneous associations but also structured by historically inscribed asymmetries and the logic of capital. In so doing, the paper aims to foreground the material and symbolic conditions under which networks are stabilised, challenged, and transformed.

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14 Andrew Feenberg, “Critical Theory of Technology: An Overview,” *Tailoring Biotechnologies*, 2005, <https://doi.org/10.5040/9798400670268>; Andrew Feenberg, *Between Reason and Experience Essays in Technology and Modernity* (Cambridge, Mass.: MIT Press, 2010).

15 Hans Radder, *In and About the World: Philosophical Studies of Science and Technology* (Albany: SUNY Press, 1996).

16 Langdon Winner, “Do Artifacts Have Politics?”, in *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, by Langdon Winner (Chicago: University of Chicago Press, 1988), 19–39.

## 2. Basic Elements of a Comprehensive Theory of Socio-biotechnical Entities

This section foregrounds two intertwined dynamics that orient the theoretical scaffolding of this work: the tension between contingency and necessity, and the historically conditioned tendency of networks to form a totality. To understand these dynamics, it is crucial to clarify the relationship between threads and fabrics—central analytical figures employed throughout this paper. Threads denote specific, historically sedimented relations between entities, whose durability and density reflect accumulated power asymmetries and struggles. Fabrics, in turn, designate broader socio-biotechnical structures, emerging from the interweaving and reinforcement of these relations over time. Thus, socio-technical configurations arise through contingent and unstable alignments of heterogeneous actors, interests, and materialities. Yet this openness is not infinite, as necessity asserts itself through the sedimentation of hegemonic structures, technical codification, and recursive stabilisation of power asymmetries. What appears fluid soon calcifies—not by fate, but through repetition and exclusion—producing structured formations inscribed with political rationalities often aligned with the logic of capital. The entities emerging within these configurations are not neutral, but crystallisations of antagonism, formed through historically inscribed struggles and asymmetrical alignments.

Such formations unfold within fields of relational fluidity and interwovenness that do not imply pure indeterminacy. Their dynamics are patterned through both material constraints and historically sedimented trajectories. To avoid what may be termed a Cratylean bias—wherein the emphasis on perpetual change dissolves conceptual rigour—socio-biotechnical entities must be conceived not as mere nodes within a network, but as provisional crystallisations of heterogeneous relations. These entities bear within themselves inscriptions of totality: partial, contingent, and contested, yet nonetheless operative. They emerge from networks, but also actively shape them, aligning or resisting the vectors of domination that traverse them. It is in this ambivalence that the space for non-identity endures.

Just as Marx begins *Capital* with the commodity—an apparently simple object that nonetheless crystallises the essential contradictions of the capitalist mode of production—so too must our inquiry begin with socio-biotechnical entities. For it is within these entities that the tensions, asymmetries, and historical sediments of socio-technical formations are most acutely condensed. Indeed, everything shaped by human participation emerges embedded in fabrics that are always already socio-biotechnical—manifesting power relations and structural imbalances which, despite their fluid dynamics, do not necessarily imply instability. Socio-biotechnical entities thus materialise as dynamic embodiments of such relations, amalgamating the social, biological, technical, and other implicit aspects that constitute their hybrid nature. These dimensions are so intricately interwoven that to attempt their analytical isolation from the contexts that produce and sustain them would

be not only futile but philosophically misguided. What is required, then, is a conceptual gaze attuned to the entanglements through which hybridisation becomes the condition of intelligibility.

Consider, for instance, an apparently simple object: a table. Far from constituting a neutral artefact, the table condenses a multiplicity of socio-biotechnical determinations. Its existence presupposes the extraction of wood from a specific forest, itself selected according to ecological, economic, and geopolitical considerations; it incorporates metallic fasteners—nails or screws—produced through industrial processes already inscribed within commodity circuits. The object that results is not reducible to function, for it bears the marks of cultural protocols, aesthetic conventions, legal standards, and technical affordances. The tree, its grain, its resistance, its responsiveness to tools—all participate materially in the final configuration. Such entanglement of human and non-human actors exemplifies the hybrid ontology through which socio-biotechnical entities emerge. Moreover, it gestures toward the dual process that Andrew Feenberg<sup>17</sup> conceptualises as primary and secondary instrumentalisation: the former extracting entities from their original context by isolating functional properties, the latter embedding them into new environments structured by normative, political, and cultural codes. The table, then, is not simply built—it is socially constituted, materially enacted, and politically inscribed.

This dual process—primary and secondary instrumentalisation—is not to be understood as a rigid sequence but rather as an analytical distinction within a continuum marked by constant interpenetration. Objects are not simply extracted and inserted; they are reconfigured through an evaluative logic that operates simultaneously across material, aesthetic, political, and cultural registers. As Feenberg insists, these operations are inherently structured by power, for it is through technical codes that dominant social orders are reproduced, determining which configurations become legible as “valid,” “efficient,” or “rational.”<sup>18</sup> This reveals not only the non-neutrality of technology but its function as a medium through which values are materially inscribed. In this light, the apparent separation between the natural and the social dissolves. Their entanglement is not accidental but constitutive: each is inherently part of the other, integrated through

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17 Andrew Feenberg, *Questioning Technology* (London & New York: Routledge, 1999); Feenberg, “Information Technology in Librarianship”; Feenberg, *Between Reason and Experience Essays in Technology and Modernity*.

18 Feenberg, *Questioning Technology*; Feenberg, *Between Reason and Experience Essays in Technology and Modernity*; Andrew Feenberg, *Technosystem: The Social Life of Reason* (Cambridge, MA: Harvard University Press, 2017).

continuous processes of socio-biotechnical becoming.<sup>19</sup> For each extraction, each design decision, and each material affordance participates in a process of selective constitution—operating through material inscription—whereby certain socio-biotechnical entities are rendered viable while others are excluded in advance.

Turning now to Actor-Network Theory, particularly its treatment of agency and symmetry, we observe that both humans and non-humans become actants—entities capable of producing effects within a network by enrolling, translating, and aligning others. In this configuration, they do not merely interact; they weave threads that articulate the relational fabric of the network. Thus, threads and fabrics are mutually constitutive: threads, as historically sedimented relations, create and sustain the broader fabric, which in turn provides coherence and constraint. The strength of a network is not a given but emerges from the density and persistence of these threads—the thicker the thread, the more entrenched the relation, the more durable the configuration. The concepts of resistance<sup>20</sup> and obduracy<sup>21</sup>, taken with terminological latitude, are of particular relevance here, for they mark the points at which entities—human or non-human—refuse, deviate, or counter the functions inscribed within their network positions. Technologies, as non-human socio-biotechnical entities, are not merely acted upon; they may challenge the roles assigned to them, resist their enrolment, or generate unintended effects. This capacity is mirrored, albeit differently enacted, by human actants embedded in the same configurations.<sup>22</sup> As Madeleine Akrich<sup>23</sup> argues, technological artefacts embed “scripts”

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19 See Horacio Correa Lucero, “Tecnología, Artificialidad y Hábitat: Teoría Crítica de la Tecnología y su Aplicabilidad al Estudio del Hábitat en tanto Objeto Tecnológico”, *Revista Horizontes Sociológicos* 4, no. 8 (2016): 123–46; Donna Haraway, “A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century”, in *Simians, Cyborgs, and Women: The Reinvention of Nature*, ed. Donna Jeanna Haraway (New York: Routledge, 1991), 149–82; Latour, *Reassembling the Social*; Gísli Pálsson, “Ensembles of Biosocial Relations”, in *Biosocial Becomings: Integrating Social and Biological Anthropology*, ed. Tim Ingold and Gísli Pálsson (New York: Cambridge University Press, 2013), 22–41; Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton & Oxford: Princeton University Press, 2015).

20 Feenberg, *Technosystem: The Social Life of Reason*. The concept of resistance is used here in a broader sense than in Feenberg’s original formulation, although it remains inspired by his critical theory of technology.

21 Anique Hommels, *Unbuilding Cities. Obduracy in Urban Sociotechnical Change* (Cambridge (MA): MIT Press, 2005); Anique Hommels, “Changing Obdurate Urban Object: The Attempts to Reconstruct the Highway through Maastricht,” in *Urban Assemblages. How Actor-Network Theory Changes Urban Studies*, ed. Ignacio Fariás and Thomas Bender (New York & Abingdon: Routledge, 2010), 139–59.

22 Differences between human and non-human entities, while significant, are understood here as shaped by network configurations rather than pre-given essences. See Section 3 for further elaboration.

23 Madeleine Akrich, “The De-Description of Technical Objects,” in *Shaping Technology/Building Society. Studies in Sociotechnical Change*, ed. Wiebe E. Bijker and John Law (Cambridge (MA) & London: MIT Press, 1992), 205–24.

that attempt to prescribe user behaviour, yet the success of such prescriptions depends upon alignment in practice—a contingency that may falter, fracture, or be reappropriated. Similarly, Feenberg’s notion of technical codes<sup>24</sup> reveals how design becomes a terrain of struggle: hegemonic groups seek to objectify their values in material form, but these inscriptions remain contestable and prone to subversion.

Such agency, human and non-human alike, should not be understood as neutral responsiveness but as embedded potentiality within historically situated configurations. Socio-biotechnical entities do not merely participate in networks—they co-constitute them through tensions, displacements, and asymmetrical inscriptions. Insofar as they acquire meaning only through their position within a network of relations, these entities may be read, following a poststructuralist sensibility, as signifiers<sup>25</sup> whose identity is constituted through a process of differential articulation that unfolds within historical determinations. Contingency—from a standpoint not fully aligned with poststructuralist thought—is never absolute; it is structured, bounded, and haunted by what preceded it.

Resistance, in this light, is not external to the network but emerges from within the very bodies of the entities involved: a friction between their preconfigured trajectories and the values or functions imposed upon them. These entities act not in isolation but through the threads that tie them to other entities and to the broader socio-biotechnical fabric—threads that carry sedimented histories, inscribed interests, and latent contradictions. In the case of human entities, this resistance may find articulation in language, symbolic action, or political contestation. In the case of non-human entities, resistance may take the form of functional divergence, obduracy, or misalignment, marking points where the totalising impulse of the network fails to fully capture its elements.

The emergence of alternative technological configurations depends upon the efforts of distinct groups whose values, intentions, and positionalities shape the trajectories of

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24 Feenberg, *Questioning Technology*.

25 The notion of signifier employed here draws primarily from the poststructuralist theory of discourse elaborated by Ernesto Laclau and Chantal Mouffe. In this framework, signifiers do not refer to fixed referents but acquire meaning through differential articulation within a discursive field. While this perspective offers useful insights, the present analysis departs from its emphasis on pure contingency by foregrounding the structuring role of historical determinations. Socio-biotechnical entities, insofar as they participate in networked configurations, may thus be understood as contingent signifiers whose identity is constituted through hegemonic articulation—but always within historically sedimented constraints. For foundational formulations, see Ernesto Laclau and Chantal Mouffe, *Hegemony and Socialist Strategy. Towards a Radical Democratic Politics*, 1st. edition (London & New York: Verso, 1985); and Ernesto Laclau, *New Reflections on the Revolution of Our Time*, 2st. edition, Phronesis (London & New York: Verso, 1990). For a psychoanalytic inflection of the signifier within ideology critique, see also Slavoj Žižek, *The Sublime Object of Ideology*, 2nd. Edition, *The Essential Žižek* (London & New York: Verso, 2008).

socio-biotechnical entities. These values—axiological, political, epistemic—do not simply widen the horizon of the possible; rather, they operate through selective articulations that delimit, stabilise, and ultimately close certain pathways. As these closures sediment over time, necessity appears—not as an ontological given, but as the historical result of contingent possibilities being rendered obsolete, excluded, or naturalised. It is in this process that power manifests most forcefully: not by eliminating contingency outright, but by rendering its traces illegible. The movement toward totality thus unfolds not as a completion, but as a structuring logic that absorbs, transforms, and suppresses—what Adorno identifies as a fractured totality, marked by fissures, residues, and the stubborn persistence of the non-identical.<sup>26</sup> These dynamics require closer examination if we are to understand how technologies become the site of both hegemonic inscription and potential rupture.

To proceed, it is necessary to clarify what is meant by “technology,” a term that transcends its common association with tools and gadgets and aligns with the conception herein presented: a socio-biotechnical construct shaped by power dynamics. While everyday objects such as chairs, computers, plastic packaging, or headphone accessories are typically classified as technologies, their technological status within this analysis depends strictly on how networks position and embed these entities within specific socio-historical contexts. What appears as mundane functionality conceals a sedimented field of exclusions and normativities. Technology, then, is defined not by the mere presence or instrumental function of an object, but by its contextual embedding in socio-biotechnical networks—networks wherein distinct power relations, values, interests, and ideologies are inscribed. For this reason, the preferred term throughout this paper is “socio-biotechnical entity,” as it precisely captures this contextual specificity and avoids the conceptual imprecisions inherent in the broader signifier “technology.”<sup>27</sup> These socio-biotechnical entities—including what we conventionally name as technologies—do not exist in isolation. They are mutually constituted through shifting configurations of power, meaning, and material interaction. Their significance and function are not intrinsic but emerge from their relational embeddedness within historically contingent and asymmetrically structured networks.

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26 On the entanglement of technological design, conflict, and competing interests, see Feenberg, *Between Reason and Experience Essays in Technology and Modernity*; and Akrich, “The De-Description of Technical Objects”. While these works foreground contestation in design, the present analysis seeks to show how the accumulation of such contestations, once sedimented, produces necessity as a historical effect of power—thereby constraining contingency not from without but from within.

27 A similar methodological sensitivity underlies Heidegger’s reluctance to use the term subject, preferring *Dasein* to avoid the conceptual baggage associated with modern anthropocentrism. While this paper does not directly engage Heidegger’s ontology, it shares his attentiveness to the implications of terminological choices—particularly in avoiding categories that within the context of this paper might sound reductive, such as “technology”.

The values and intentions inscribed in socio-biotechnical entities are not external additions but internal to their very construction. This process is aptly conceptualised by Andrew Feenberg through the notion of technical codes. These codes constitute not merely the formal logic of problem-solving, but the material embodiment of particular interests, worldviews, and hegemonic aspirations. Technologies, in this sense, are never neutral instruments; they are battlegrounds—sites where conflicting values confront one another and where, ultimately, certain meanings become sedimented as design choices, interface conventions, or infrastructural norms. In our terms, this process manifests the dialectical logic of technological constitution: group struggles, contradictions, and asymmetries materialise within the socio-biotechnical entity itself, giving form to what is otherwise abstract. The technical code thus becomes the trace of conflict, the stabilised residue of hegemonic imposition.<sup>28</sup>

Once inscribed, these values are not only stabilised but also propagated. Dominant groups aim to embed their vision into the technologies—or more broadly, into socio-biotechnical entities—under construction, ensuring easy adoption and seamless embodiment by users and interacting elements. This process contributes to the reproduction of a way of life by objectifying specific interests within the very networks where entities operate. It strengthens particular threads, forming a topology of potential actions and exclusions, and showcases the capacity of technological configurations to propagate dominant ideologies under the guise of neutrality. As Langdon Winner has argued, technologies may not only reflect but also enforce political arrangements, materialising power relations through design.<sup>29</sup>

Socio-biotechnical entities, once stabilised, may become woven into everyday practices in ways that obscure their origins in conflict and contestation. Their functions and forms appear naturalised<sup>30</sup>—what Gramsci would describe as hegemonic<sup>31</sup>—precisely because their axiological content has been normalised through repetition and habituation. It is thus essential to identify the groups that intervene in technological design, and to scrutinise the values and interests they embed in these configurations. Whether reinforcing existing

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28 Feenberg, *Questioning Technology*; Andrew Feenberg, “Teoría crítica de la tecnología”, *Revista iberoamericana de ciencia, tecnología y sociedad* 2, no. 5 (2005): 109–23; Feenberg, *Between Reason and Experience Essays in Technology and Modernity*.

29 Winner, “Do Artifacts Have Politics?” Winner argues that technologies are not neutral artefacts but may embody specific political relationships through their design, organisation, and use. His central claim is not that artefacts are ‘political’ in a simplistic sense, but that their material form can stabilise and reinforce patterns of power and authority. This view resonates with the present analysis, where technological configurations are understood as structured fields of hegemonic inscription and selective closure.

30 Michel Foucault, *Discipline and Punish. The Birth of the Prison*, trans. Alan Sheridan (New York: Vintage Books, 1995).

31 Antonio Gramsci, *Prison Notebooks* (Columbia University Press, 2011).

hegemonies or attempting to subvert them, these groups act upon both human and non-human actants, seeking to configure the network in ways that favour their own position. Design becomes an arena of strategic intervention: a means of subjecting entities—material and symbolic alike—to a socio-biotechnical logic oriented by power.

Alternatively, hegemonic groups may reproduce values within the socio-biotechnical entities they routinely engage with, positioning themselves as translated actors through both non-human and human intermediaries. Socio-biotechnical relations affect all entities, but asymmetrically: the difference lies in their topological position and in the range of actions that each configuration enables or forecloses. In this context, contingency persists, but it does so while navigating the gravitational pull of necessity—a necessity forged through sedimented power relations and stabilised design choices. The apparent fluidity of networks often obscures how specific trajectories become entrenched, inscribed, and reiterated over time. These threads, or traces, mark not openness, but constraint: they indicate the stabilisation of configurations that, while historically contingent, have come to function as if they were necessary.

This reading diverges from key tenets of ANT, which tends to dissolve the question of structural asymmetry into the methodological imperative of symmetry. In ANT, any entity may be positioned at the centre of the network depending on the observer's analytical perspective.<sup>32</sup> While this principle reveals the multiplicity of associations, it risks flattening historically constituted inequalities by privileging epistemic vantage points over ontological constraints. Here, it is not merely a matter of who is followed, but of which entities are more likely to become central due to the sedimented threads that shape the network itself. Possibility, in this sense, is not equally distributed. What appears as openness is often the residue of structured exclusions. Older networks, formed through extended socio-biotechnical interaction, tend to favour particular entities over others, reinforcing hegemonic positions while limiting the space for reconfiguration.

All that we have discussed resonates with the concept of totality, echoing the insights of Theodor Adorno and Max Horkheimer.<sup>33</sup> For us, the network unfolds as a structure in which socio-biotechnical entities attempt to impose meanings on other participants—whether human or non-human. The outcomes of these interactions shape and perpetuate those meanings, contributing to the formation of a totality that operates not as a seamless

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32 Michel Callon, "Some Elements of a Sociology of Translation Domestication of the Scallops and the Fishermen of St Brieux Bay", in *Power, Action and Belief A New Sociology of Knowledge?*, ed. John Law (London: Routledge, 1986), 196–229; John Law, "On the Methods of Long-Distance Control: Vessels, Navigation and the Portuguese Route to India", *Power, Action and Belief: A New Sociology of Knowledge*, 1986, 234–63. See also Latour, *Reassembling the Social*. For a critique of this methodological symmetry and its aversion to structural asymmetries, see Feenberg, *Between Reason and Experience Essays in Technology and Modernity*, chap. 4.

33 Horkheimer and Adorno, *Dialectic of Enlightenment*; Adorno, *Negative Dialectics*.

system, but as a structured field marked by internal contradictions and uneven inscriptions. Such a totality is not monolithic; its apparent coherence is continually disrupted by the emergence of that which resists full integration.

In Adorno and Horkheimer's terms, within this totality, the dominant cultural industry produces a standardised reality composed of commodified and mass-produced meanings. Whether consciously or not, participants in the network become both consumers and defenders of this manufactured reality. However, the fissures within totality serve as openings through which the non-identical asserts itself, challenging the predetermined horizon of possibilities dictated by the network. This acknowledges that while the totality constrains the horizon of the possible, its fissures leave open the space for discontinuity, refusal, and reconfiguration.

Against this backdrop, the potential to transcend the confines of the network and reshape its configuration—or to construct a new one—lies in recognising and amplifying these contradictions. Adorno's negative dialectics prompt an interrogation of the fissures within totality as signs of resistance and transformation—fissures that represent the emergence of the non-identical countering the hegemony exerted by leading entities and the threads through which that hegemony is stabilised.

Having outlined the fundamental dynamics through which socio-biotechnical entities embody contested configurations of power and contingency, "Section 3" explicitly engages with the historical dimension of these threads, illuminating how capital and its logic of valorisation shape and constrain the very topology of socio-biotechnical fabrics.

### **3. Theoretical Foundations**

#### ***3.1 Constructivism assessment: ANT, post-ANT, and the gateways to Marxism***

This section engages with Andrew Feenberg's critical constructivism, the Frankfurt School, and broader constructivist notions as points of departure. Having already analysed the main tenets of the Frankfurt School we are adopting and the aspects we draw upon from Feenberg, we now delve deeper into an analysis of the constructivist perspectives. In doing so, this framework enriches constructivist insights by explicitly incorporating historical sedimentation, structural asymmetry, and the totalising influence of capital, overcoming key limitations identified in traditional ANT and SCOT analyses.

Unlike ANT's perspectivist notion of multiple centres—where any entity may appear central depending on the analyst's observational path—we approach centrality as a

historically conditioned topological position, shaped by sedimented power relations. In the realm of STS and the sociology of technology, the contributions of constructivists were notable. This includes scholars examining large technological systems, proponents of SCOT, and ANT/post-ANT. Large technological systems, which amalgamate social and technical dimensions, gain momentum during use, reinforcing the power of the groups that guide their creation. These groups may invest additional capital, political influence, and cultural sway to fortify their hegemonic stance.<sup>34</sup> While we use alternative terms, our alignment with the underlying ideas is apparent. Meanwhile, the SCOT perspective helps identify relevant social groups that incorporate values into the technology under scrutiny.<sup>35</sup> The concepts drawn from this perspective align with those embraced by Feenberg, who, to some extent, transformed and was inspired by them through his critical constructivism.<sup>36</sup> Simultaneously, ANT complexifies the identification of actors or actants, endowing the technology under development with meaning—entities that may be human or non-human. In this view, an actant denotes any entity capable of influencing others by conveying or transforming meanings within the network it occupies.

In line with ANT/post-ANT, we argue that all entities share the equal potential to occupy the centre in socio-biotechnical networks, webs, or weaves. Yet our stance on contingency, necessity, power, totality, and the internal configurations of entities diverges significantly from these perspectives. While these scholars acknowledge the diminishing significance of contingency as power emerges, they place greater emphasis on it at the onset of a network than we do. We posit, instead, that networks cannot fully begin anew; emerging configurations remain tethered to broader historical fabrics that delimit their topology before they even begin to unfold. This continuity, always partial and uneven, links directly to the concept of totality—though one fractured by fissures.

Without contradicting our earlier premise, we maintain that actors hold an equal potential to become central within a network. However, the actualisation of that potential—particularly in terms of translating the actions of others—is contextually constrained. This tension lies not in the ex-ante distribution of possibilities, but in the historically sedimented configuration of each network. A central distinction here lies in our

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34 Thomas P. Hughes, “The Evolution of Large Technological Systems,” in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge (MA): The MIT Press, 1987), 51–82.

35 Pinch and Bijker, “The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other”; Wiebe E. Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (Cambridge (MA): MIT Press, 1995); Trevor J. Pinch, “The Social Construction of Technology: A Review”, in *Technological Change: Methods and Themes in the History of Technology*, ed. Robert Fox (Amsterdam: Harwood Academic Publishers, 1996), 17–35.

36 Andrew Feenberg, “Critical Constructivism, Postphenomenology, and the Politics of Technology,” *Techné: Research in Philosophy and Technology* 24, no. 1 & 2 (2020): 27–40.

conception of capitalism—not simply as a mode of production, but as a totality embedded in a socio-biotechnical fabric whose enduring structure will be examined further in this section and the next.

On the other hand, we argue that individual entities acquire their configuration through dynamic interactions with their environment—that is, through their relational entanglement with other entities within historically conditioned networks. As noted earlier, not everything is possible. Certain capacities—such as language in humans or lactation in mammals—emerge not from essential properties, but from topological positions shaped by prior configurations. Networks, too, exhibit such patterned constraints: their structure is not neutral, but the outcome of accumulated relations sedimented over time. In this sense, our conceptual framework is not restricted to particular domains; it applies to all entities insofar as their existence and potentiality are shaped by the socio-biotechnical fabrics they inhabit. This opens the space to address a central category in our analysis: capital. For us, capital is not simply a social relation—as it is traditionally conceived in Marxian thought—but a socio-biotechnical one. It configures networks by inscribing values, objectives, and differential capacities into both human and non-human entities, structuring the possibilities available to them and shaping their role within the broader topology of power.

The notion of flat ontology can be linked to the previous ideas. While we acknowledge that material semiotics encompasses various dimensions beyond our specific concerns, we emphasise that its focus on the role of materiality and non-human actants in shaping social and cultural formations remains a crucial point of convergence. According to this view, both human and non-human entities may act within networks, influencing their formation, transformation, and resilience. Moreover, this perspective challenges the traditional distinctions between the social and the material, arguing that they are inextricably intertwined. As John Law notes, “a flat ontology is one that assumes there are no essential distinctions between different kinds of things. Things are different, yes, but this arises in practice in the weave of relations.”<sup>37</sup>

Yet, our understanding of practice diverges from the more immediate, situational reading offered by ANT. For us, practice includes past actions—that is, the sedimented, historically configured threads that contour and constrain networks. In this light, there are no essential distinctions between entities beyond those presupposed by the network’s historical configuration. Returning to the previous examples, one can observe that entities endowed with biological life are themselves the outcome of particular network arrangements: certain configurations can give rise to a cow rather than another entity. This is why some interactions lead to mammals, others to birds, insects, or amphibians.

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37 Law, “Material Semiotics,” 4.

In this sense, the past is of utmost importance, for it shapes the duration<sup>38</sup> through which networks and the entities that inhabit them are moulded. Duration, as we understand it, is not neutral passage, but structured temporality: it accounts not only for constraint, but also for variation. For instance, a cow may manifest as many variations as there are potential interactions among entities within the relevant configuration. What emerges is contingent upon these potentialities—but that very potentiality is already a necessity of the configuration itself.

The emphasis placed here on temporality and historical configuration seeks to address a well-documented tension within constructivist traditions. Both SCOT and ANT have been repeatedly criticised for their reluctance—or methodological inability—to account for the historical conditions that shape the very networks they analyse. Langdon Winner, for instance, has argued that the social constructivist focus on the interpretative flexibility of technologies neglects not only their long-term consequences but also the sociotechnical possibilities that were foreclosed in the process of stabilisation.<sup>39</sup> Hans Radder has similarly pointed out that constructivist approaches often omit the structural conditions under which scientific and technological practices unfold.<sup>40</sup> And David Bloor, representing the Strong Programme, has long contested the methodological symmetry of ANT, arguing that it abandons historical and sociological explanation in favour of descriptive tracing.<sup>41</sup> This critique is sharpened in his essay “Anti-Latour”<sup>42</sup> where he accuses ANT of dissolving causality and power into an undifferentiated field of associations. While ANT introduced an important expansion of the analytic field by including non-human actants, its commitment to tracing associations in the present often results in a kind of empirical presentism. Against this background, the framework developed here seeks to retain the analytical openness of actor-network analysis while embedding it within a robust account

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38 The use of the term duration here bears an intentional yet critical resonance with Henri Bergson’s conception of *la durée*; see Henri Bergson, *Time and Free Will: An Essay on the Immediate Data of Consciousness*, trans. F.L. Pogson, Dover Books on Western Philosophy (Mineola, N.Y.: Dover Publications, 2001); originally published as *Essai sur les données immédiates de la conscience* (1889). While Bergson understood duration as the qualitative, indivisible flow of conscious experience, the usage here refers to the historically configured temporality through which socio-biotechnical networks sediment possibilities and constrain emergence. This formulation retains Bergson’s insight that time is not reducible to homogeneous instants but diverges in that it aligns more closely with a topological logic of material inscription than with a philosophy of lived experience. I acknowledge this genealogy as part of the conceptual atmosphere in which this text was first developed—even if my sympathies tend to diverge, particularly in light of Bergson’s polemic with Einstein, whose understanding of temporality I find in some respects more persuasive.

39 Winner, “Do Artifacts Have Politics?”.

40 Radder, *In and About the World*, esp. chapter 2.

41 David Bloor, *Knowledge and Social Imagery* (Chicago: University of Chicago Press, 1991).

42 David Bloor, “Anti-Latour,” *Studies in History and Philosophy of Science Part A* 30, no. 1 (1999): 81–112.

of historical duration and structural sedimentation.

As John Law suggests, understanding the relationships between humans and non-humans requires attention to the structures in which they are embedded—structures that may be conceptualised as weaves, webs, or networks. As we interpret them, these forms correspond to varying levels of complexity. Weaves represent simple patterns of interconnection—threads entangled within a local fabric. Webs imply a more intricate structure, akin to a spider’s web, with multi-directional connections that integrate several weaves. Networks, in turn, denote expansive configurations composed of multiple webs and weaves interacting dynamically. These networks do not remain isolated; they combine with others of similar extension to generate broader architectures. Together, such configurations contribute to what we term the capitalist network—a more persistent and stabilised formation often referred to as the capitalist system. It operates, in this sense, as a network of networks, or a system of systems, organising the conditions under which all other networks unfold.

Material semiotics suggests that networks can be traced indefinitely in their associations and effects, implying a potential for infinite unfolding. We do not dispute this possibility, but insist that such unfolding is never neutral: it always refers back to and is delimited by the broader and enduring socio-biotechnical formation of capitalism. Every thread traced ultimately reveals its connection to that structuring network, whose historical stability renders the very idea of openness contingent upon prior configurations of power and value.

This notion aligns with the Adornian concept of totality. The interconnectedness of networks—a system of systems—does not generate coherence but rather introduces structural tensions and contradictions. The overlap between subsystems becomes a generative site for these contradictions, as competing logics and asymmetrical configurations confront one another. Simultaneously, this very interconnectedness gestures toward the existence of a totality: not a seamless unity, but a structured field in which fissures and residues persist. It is, in other words, a fragmented and incomplete network—a fractured totality in which the non-identical resists full absorption.

The concepts of path dependence and “QWERTY-nomics”—closely related to the dynamics explored by Hughes in his theory of large technological systems<sup>43</sup>—resonate with our understanding of how socio-biotechnical networks sediment configurations over time, progressively narrowing the field of viable alternatives. As Paul David has shown, once a particular technological path becomes dominant—such as the QWERTY keyboard layout—subsequent developments are increasingly constrained by compatibility

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43 Hughes, “The Evolution of Large Technological Systems.”

requirements, institutional inertia, and cumulative investment in infrastructure and user habituation.<sup>44</sup> Brian Arthur expands on this insight, noting that increasing returns often reinforce suboptimal paths, not because they are inherently superior, but because their adoption triggers a positive feedback loop across economic and technical domains.<sup>45</sup> In socio-biotechnical terms, this is not merely a matter of economic lock-in: it reflects the thickening of specific threads within the network—threads that materialise prior alignments of values, decisions, and interests. Over time, such configurations displace alternative paths and become naturalised. What was once contingent comes to function as necessity—not ontologically, but through historical sedimentation and network reinforcement. This logic illustrates how even within frameworks attentive to contingency and actor multiplicity, the past continues to impose topological constraints on what may emerge.

Having clarified how socio-biotechnical configurations sediment over time—transforming contingent pathways into stabilised structures—we are now in a position to revisit the interwoven concepts of hegemony, necessity, and totality. These categories, initially introduced as theoretical orientations, may now be reformulated as emergent features of historically reinforced networks—whose most persistent and structurally dense expression, in the current historical moment, is capital.

In hegemonic configurations, threads symbolise not merely past interactions but the normalisation of specific values and interests within socio-biotechnical entities. These values do not appear externally imposed, but are so smoothly embodied that they seem intrinsic to the entities themselves. When this embodiment becomes dominant, the network no longer enables all possibilities to unfold—necessity emerges, not as an ontological given but as a historical narrowing of what counts as viable. The configuration thus ceases to operate as a site of pure contingency; it becomes a topology structured by exclusions, alignments, and constraints. The interconnection of networks, or systems of systems, gives rise to a totality: a broader, persistent, though incomplete structure. In the present era, this formation bears the name of capitalism—a socio-biotechnical fabric whose encompassing reach is fractured by residues that resist full absorption, thereby allowing the emergence of the non-identical.

This analysis invites a final question: what is the ontological status of the primary actant that sustains and reproduces the coherence of this socio-biotechnical totality? While the answer will be developed further in the next subsection, we can anticipate it here: capital, in its historically sedimented form, has come to operate not only as a dominant force but as a

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44 Paul A. David, “Clio and the Economics of QWERTY,” *The American Economic Review* 75, no. 2 (1985): 332–37.

45 W. Brian Arthur, *Increasing Returns and Path Dependence in the Economy* (Ann Arbor, Michigan: University of Michigan Press, 1994).

structuring agent of networks themselves. Through its transformations into commodities, money, and abstract labour, capital does not merely shape human action—it configures the positionalities of entities within the network, inscribing relational asymmetries that must be continually reproduced. These configurations constitute a dynamic, historically contingent topology in which the threads of domination and resistance are constantly reknotted, frayed, or severed. It is this terrain—marked by both structural reproduction and potential rupture—that demands further exploration.

### 3.1.1 *Threads, Historicity, and Critique in Networks*

The critique of ANT for its rejection of history, ideology, and structure not only allows for the reintroduction of a politicisation previously expelled by its excessive empiricism but also enables a more rigorous conceptual reformulation of the very notion of the network. Indeed, if socio-biotechnical configurations do not emerge *ex nihilo* but are constituted through historically sedimented processes—selective, conflictual, and unequal—then the connections that structure them cannot be conceived as flat or interchangeable links. It is here that our concept of the thread becomes meaningful: not as a mere visual metaphor, but as an analytical figure that captures the temporal, topological, and political density of the relations that compose a network.

Unlike the symmetrical links of ANT—where anything can be associated with anything else by virtue of its performative inscription—threads operate as socio-biotechnical vectors of sedimentation, whereby each condenses technical decisions, institutional prescriptions, normed bodies, stabilised signs, and memories of exclusion. Far from referring to any pre-existing substantiality, their thickness emerges from a dynamic of repetition with difference, where returning elements are transformed by the historical tensions that traverse them. This is not a difference that proliferates without memory, but a differentiation historically inscribed in relations of power, in which unresolved conflicts are reactivated without being overcome, configuring trajectories that sediment antagonisms in contingent yet non-arbitrary forms—forms whose very configuration bears witness to the unresolved conflict that constitutes them. Contiguity, within this framework, is not neutral: not all proximities are equivalent, nor do all associations have the same effects. Positions within the network stabilise or destabilise depending on their relation to logics of valorisation, which modulate which connections prosper, which are rendered invisible, and which become structurally operative.

These threads do not merely connect; they anchor. They do not simply allow movement; they distribute friction. In this sense, the network may be read as a tense formation, in which certain persistent centralities are not merely effects of tracing, but rather manifestations of a politics of stabilisation that operates on and through the tracing itself, in a simultaneous and constitutive relation. This tension ultimately refers to the logic of

hegemony: threads stabilise configurations without fully closing them, modulating the field of the possible without eliminating its contingency. The resulting totality is not closed but unstable—always in tension, yet no less effective for it.

If, in ANT, the network is topologically open, multiple, and reversible, the notion of the thread allows us to identify how certain trajectories fix meaning, foreclose bifurcations, and reinforce necessity within the heart of contingency. Contingency persists, but it is oriented, compressed, and stratified by forces that are not symmetrically distributed. Where ANT sees assemblages, we read asymmetrical codifications of duration and power. In that asymmetry lies the politicisation of networks—not as the outcome of external impositions, but as the immanent result of their own formative processes.

This perspective thus distances itself from the relational neutrality of ANT, recovering the core of the critique formulated by Söderberg and Netzén, who warn that a theory which dissolves all structuration into ephemeral networks risks becoming “hot air,” incapable of either intervention or articulation with the material conditions of social reproduction.<sup>46</sup> Against this, the concept of thread allows us to expose how capital is not merely one position among others within the network, but a logic of differential threading, a practice of codification that transforms flexibility into a vector of valorisation and contingency into a resource for capture.

### **3.2 The Importance of the Capital Valorisation Cycle**

#### *3.2.1 Entities Produced as Commodities.*

Having established that networks are socio-biotechnical configurations structured by differential threads of power and capital, we now turn to the entities that inhabit and animate these formations. These entities are not merely embedded within the network—they are articulations of its logic. As crystallisations of sedimented threads, they condense design, control, and function, circulating not as neutral intermediaries but as active sites of valorisation. In this sense, they are not simply technological artefacts, but commodity-entities—forms whose operationality depends on their insertion into broader circuits of reproduction and accumulation.

Capital—understood, following Marx, as a process of dialectical transformation—advances through the valorisation cycle by converting commodities into surplus value.

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46 Johan Söderberg and Adam Netzén, “When All That Is Theory Melts into (Hot) Air: Contrasts and Parallels between Actor Network Theory, Autonomist Marxism, and Open Marxism,” *Ephemera-Theory & Politics in Organization* 10, no. 2 (2010): 95–118.

For any socio-biotechnical entity, including technologies, to participate in this cycle, it must be produced and sold at a profit. This condition is not optional: failure to achieve profitability jeopardises the reproduction of values within the socio-biotechnical fabric and undermines the hegemonic position of those who encoded their interests into the entity's design. The threads sustaining a given configuration begin to fray if valorisation is interrupted. Indeed, without already occupying a favourable topological position, no group can contest the network's structure unless this requirement is met—for the topology of capital only amplifies those entities that reinforce its reproduction.

However, it is not only necessary to close the cycle but also to realise the expanded reproduction of capital.<sup>47</sup> Failure to achieve this may lead other companies to displace specific production with alternatives meeting this new requirement. Thus, it is mandatory to generate a monetary output funding the renewal of capital, tied to the amount of use values produced per hour per worker, compared to another producer of a similar socio-biotechnical entity or technology. The technological landscape in capitalism tends to showcase technologies that succeed in valorising the cycle set in motion by capitalists who created or reproduced them. These dynamics reinforce the thickening of certain threads within the network, privileging configurations that align with capital's reproductive imperatives.

Success implies competition and the intrinsic need to regularly reduce costs to increase market share against alternatives. The valorisation cycle suggests that the additional money obtained in the formula  $M-C-M'$  (Money-Commodities-More Money) tends to be realised more quickly in a competitive environment. This accelerates the demand for shorter production times, prompting further reductions in costs during the production process. In this context, advertising plays a significant role in enabling new technologies to reach larger audiences, thereby helping to secure the way of life for hegemonic groups when campaigns succeed. Every advertisement functions not merely as a tool of persuasion, but as a socio-biotechnical entity in itself—one that organises perception, encodes values, and limits contingency by aligning consumer decisions with preconfigured market trajectories. These advertising threads, too, become woven into the broader fabric of capital, reinforcing the circuits through which valorisation is achieved and replicated.

In this framework, parts composing commodities—as dialectical transformations of capital—emerge as key actants in the valorisation process. Their obduracy to be assembled with less labour time shapes the actions of capitalists seeking to control or redesign production methods. Yet capital remains the primary actor, continually pursuing self-valorisation within the capitalist accumulation cycle. It does so by organising and

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47 Karl Marx, *Capital. A Critique of Political Economy*, trans. David Fernbach, vol. II (Harmondsworth, Middlesex, London: Penguin & New Left Review, 1992).

aligning commodities with its own objectives, fully embodying the logic of the M–C–M' cycle. Hence, capital operates as the driving force within the entire socio-biotechnical network, translating humans into capitalists or workers, and technologies into means of production and commodities.<sup>48</sup> These translations are not neutral: they crystallise and reinforce the threads through which capital sustains its topology of domination.

This dynamic resonates with Hughes' notion of technological momentum and the related concept of path dependence.<sup>49</sup> The notion of path dependence clearly illustrates how initial contingencies become historically sedimented necessities, reinforcing hegemonic configurations in socio-biotechnical networks. A well-known case is the QWERTY keyboard—as mentioned above—whose historical adoption limited subsequent alternatives. Groups capable of fuelling expanded capital reproduction acquire momentum in their configurations, making it increasingly difficult to integrate competing technologies into the existing fabric. These inherited structures exemplify thicker and reinforced threads—relations that sediment prior investments, exclusions, and hegemonic values within the network. Importantly, this valorisation dynamic not only constrains entities produced as commodities. Its influence extends—albeit more indirectly—even to those configurations that emerge outside strictly commodified contexts, as we will discuss in the following section.

### 3.2.2 *Entities not Produced as Commodities.*

If commodification is not achieved, the capital valorisation cycle may not fully unfold. Yet this does not imply an absence of influence: the effects of previous sedimentations persist. Consider that even if the produced entity is not a commodity, the effects of past threads (or paths and stock of technologies) will still exist, and the logic of capital may have an impact depending on the positions within the network topology of human actors or actants who design and construct any given technology.

We already know the threads constituting the enduring capitalist network are embodied in socio-biotechnical entities to varying degrees. The topology created is continually reproduced, and it is guaranteed by the threads' thickness and quantity, which, in turn, relates to the values reproduced by those networks. These threads link entities of any form and type, but the unfoldings of capital embodied in those entities, represented by the threads capital creates, are the condition of possibility for the network's broader expansion and temporal durability. For instance, capital creates capitalists or workers.

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48 Within "flat ontology," practice determines the topological structure of hierarchies. Roles, such as capitalists and workers, are dictated by the current network, but future entities may assume these topological positions, maintaining symmetry between humans and non-humans.

49 See: David, "Clio and the Economics of QWERTY," and Arthur, *Increasing Returns and Path Dependence in the Economy*.

When a human assumes the pre-existent topological role of a capitalist, it is simply because they follow the rules.

Within the socio-biotechnical fabric, specific positions emerge from the relationships between diverse entities. Humans and means of production, for example, set constraints and possibilities for action. Ownership and control of means of production, indicative of the potential to embody capital, lead to distinct possibilities and constraints in technology development compared to actors without that potential. Söderberg (2010)<sup>50</sup> offers illustrative examples, some of which we will briefly explore in the following section.

#### **4. Capital, Technical Codes, and the Structuration of Socio-biotechnical Positions**

Technological analysis cannot be reduced to the mere tracing of heterogeneous associations. It requires attending to the ways in which values are encoded, stabilised, and reproduced within socio-biotechnical entities. This is the premise of critical approaches such as Feenberg's instrumentalisation theory and his concept of technical codes, which identify how dominant social groups inscribe particular norms, objectives, and constraints into the material structure of socio-biotechnical configurations—structures usually referred to as technologies. These inscriptions are not incidental, but politically structured: they reflect the position of actors—human or non-human—within broader configurations of power. While perspectives like SCOT name these groups “relevant social groups” and stress the interpretative flexibility of artefacts, and ANT highlights the symmetrical contribution of human and non-human actors, our approach insists that not all actors participate from equivalent positions. What matters is not only that a network is formed, but who is structurally positioned to shape its codes—and how subjective identifications mediate the values inscribed in these processes.

This question brings us to the structural role of capital within networks. For us, capital is not simply a background condition or a social relation external to technological development—it is an actant, for it actively structures the topology of the socio-biotechnical fabric. Through the process of valorisation, capital inscribes itself into entities, transforming them into commodities or means of production, and positioning them according to the imperatives of accumulation. This logic does not merely influence actors from the outside; it configures the very conditions under which actors can emerge, operate, and stabilise their influence. Flat ontology, when reused critically, does not negate these structural asymmetries—it demands that we account for them within the network itself. If everything is relational, then the persistence of capital as a structuring

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50 Johan Söderberg, “Reconstructivism versus Critical Theory of Technology: Alternative Perspectives on Activism and Institutional Entrepreneurship in the Czech Wireless Community,” *Social Epistemology* 24, no. 4 (October 2010): 239–62, <https://doi.org/10.1080/02691728.2010.506962>.

force is a relational achievement—one that shapes the codes, positions, and constraints within which other entities unfold.

In this context, direct control names a topological position within the network that an entity—typically a human actor—subsumes others to the logic of capital by actively orchestrating the valorisation process. This is not mere participation, but agency on behalf of capital. The one who exerts direct control commands the fixed capital involved, steers design and production choices and directs the integration of other entities (human or non-human) into the accumulation cycle. In this sense, we conceptualise the capitalist not only as someone who owns the means of production, but as a socio-biotechnical configuration capable of aligning heterogeneous elements under the imperative of surplus extraction. Control, here, is not a property of subjects but a positional achievement conditioned by the broader network's sedimentation. What we call "direct" is not immediate voluntarism, but structured efficacy: the capacity to act in the name of capital and to configure other positions accordingly.

These dynamics can be observed in Söderberg's analysis of wireless community networks, where class positions and access to production resources directly shape technological design. In projects like *Ronja*, actors lacking capital ownership experimented with alternative models—such as donation-based frameworks—that resisted dominant market logics. However, these efforts faced limitations imposed by the broader capitalist network: dependencies on global supply chains, monetised notions of time, and infrastructural constraints revealed the difficulty of maintaining autonomy in a system that rewards capital-friendly designs. By contrast, projects like *Crusader*, which aligned more closely with entrepreneurial values, adopted design choices conducive to mass production, proprietary protection, and market integration.<sup>51</sup>

This contrast illustrates how the socio-biotechnical fabric conditions technological possibility. Design is not a free-floating practice; it is situated within networked positions that carry historically sedimented values, constraints, and incentives. Capital, in this light, is not just one actor among others—it is the structuring principle of the broader topology, reinforcing configurations that secure its reproduction. Technologies may deviate from its logic momentarily, but the gravitational pull of valorisation and market rationality tends to reassert itself, reconfiguring even the most experimental efforts toward forms legible within the hegemonic fabric.

In this framework, the means of production—conceptualised as non-human actors and as the manifestation of capital within the productive process—exert manifold influences on human actors keen to initiate the capital valorisation cycle (regardless of how they

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51 Söderberg, "Reconstructivism versus Critical Theory of Technology."

name or frame this process). For example, the Ronja project, as highlighted by Söderberg, deviated from the conventional entrepreneurial route by experimenting with a donation model. Clock, the initiator of the Ronja project, believed that user-controlled technology was incompatible with market dynamics. However, this attempt faced contradictions, such as dependence on the global market in consumer electronics and the inadvertent reintroduction of a monetarised way of thinking about time. On the one hand, the model relied on the existing market for consumer electronics to realise the Ronja project: components were sourced globally, exposing an inherent dependence on market relations. On the other hand, the donation model reintroduced monetarised logics by calculating contributions based on the hours Clock spent problem-solving—linking financial support directly to time invested. These entanglements reveal the difficulty of escaping capitalist dynamics, even when alternative imaginaries are pursued.<sup>52</sup>

The second aspect relates to subjective self-perceptions of human actors or actants. The values they attempt to inscribe in technologies under development vary depending on how they conceive of themselves. For instance, a self-identification as a hacker, rooted in a set of values and interests inscribed in the psyche and body of a particular person, can lead to the incorporation of corresponding values into technological designs that align with the ideals of those particular groups. Consequently, it is not surprising to find conceptions of freedom of circulation of digital goods in such subjects and, thereby, in the technological designs they conceive. They might then attempt to organise other participants in the networks they engage with, seeking validation for a value system consistent with the one they advocate for the object under construction. If successful, the technology integrates those values into its structure. This highlights the importance of identifying technical codes in socio-biotechnical analysis, as they allow us to uncover the ways of life being projected, normalised, and potentially hegemonised through technology. These codes are not purely rational inscriptions; they condense the affective, symbolic, and practical dimensions that actors carry with them into the design process.

These observations point to a more general principle: decision-making does not emerge from reason alone but from a multiplicity of dispositions—emotions, intuitions, sensibilities—shaped within the socio-biotechnical fabric in which each actor is embedded. Even when rationality would suggest consistency, identification and context may bend a decision in unforeseen directions. Thus, when analysing socio-biotechnical entities, one must trace not only the local network that gives them form but also the broader architectures that sustain their emergence and constrain their configuration. In the present historical conjuncture, this broader, more persistent fabric is capitalism—a socio-biotechnical totality whose dominant modes of accumulation (be they post-Fordist, cognitive, informational, or financial) inscribe new threads into the very entities we seek

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52 Söderberg, “Reconstructivism versus Critical Theory of Technology.”

to understand. This demands a critical orientation, one that does not simply describe networks but interrogates the structuring presence of capital within them.

In this way, capital not only mobilises entities but also reinforces specific threads whose density and alignment weave the broader socio-biotechnical fabrics in which design, agency, and value are inscribed.

## 5. Conclusions

This paper has developed a critical approach to socio-biotechnical networks by integrating constructivist insights, actor-network perspectives, and Marxist analysis within a broader reflection on totality. Against the empiricist flattening of difference found in traditional ANT and the limited theorisation of structural power in SCOT, we have foregrounded the tension between contingency and necessity as a defining feature of technological configuration. Our approach insists that while networks may emerge from contingent alignments, these are quickly constrained by historically sedimented structures—what we conceptualise as threads—whose accumulation gives rise to the broader fabrics that condition the field of possibility.

Within this framework, socio-biotechnical entities are not neutral intermediaries but sites of valorisation shaped by asymmetrical power relations. The concept of technical codes allows us to trace how values are embedded in material forms, aligning design with the hegemonic interests of dominant groups. But this embedding is not merely imposed; it is negotiated through positionalities within the network. Capital, in this light, is not simply one actor among others—it is the structuring principle of the broader topology, shaping which entities may stabilise their positions and how.

We have introduced the concept of direct control to name the capacity of certain actors—particularly human ones—to act on behalf of capital by orchestrating the valorisation cycle and aligning other entities with its logic. This positional capacity is not a personal attribute but the effect of networked sedimentations that render certain roles structurally central. Technological design, therefore, is not merely a technical or cultural act—it is a politically situated intervention into the topology of the socio-biotechnical fabric.

Yet despite this structuration, contingency persists. It persists not as infinite openness, but as the residue of what could have been otherwise—traces of unrealised alternatives that resist full integration. Following Adorno, we have argued that the totality formed by these networks is fractured: it cannot wholly absorb the non-identical, which manifests in obdurate artefacts, counter-hegemonic values, and marginal positions. These fractures matter, for they mark the limits of domination and the points at which new values,

configurations, and collectivities may emerge.

To analyse socio-biotechnical entities critically, then, is to trace not only the networked associations they mobilise but also the sedimented threads they carry, the values they encode, and the fractures they reveal. It is through such a gaze that critique can intervene—not from outside the fabric, but from its very seams.

**Author note:** This work utilised AI tools to translate sections from Spanish to English and to assist in reviewing the English writing, as English is not my first language. The author also gratefully acknowledges editorial guidance that contributed to improving the quality and clarity of the English expression.

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# Feenberg's Marcuse: Design, Ontology, and the Critique of Technology

Darryl Cressman

## Abstract

A book review of Andrew Feenberg's *The Ruthless Critique of Everything Existing: Nature and Revolution in Marcuse's Philosophy of Praxis* that emphasizes how Feenberg develops a critical philosophy of technology from Marcuse's work.

**Keywords:** Herbert Marcuse, Andrew Feenberg, Philosophy of Technology, Critical Theory

## Introduction

Andrew Feenberg's book *The Ruthless Critique of Everything Existing: Nature and Revolution in Marcuse's Philosophy of Praxis* is a reminder that philosophy, and the philosophy of technology in particular, can be both utopian and unrelentingly critical; indeed, the former warrants the latter. The concrete possibility that technology could be designed to alleviate scarcity and competition while increasing free-time demands the "ruthless critique" of many socio-technical ambitions and ideas.

There is much more to Marcuse's philosophy than a critical theory of technology, but in what follows I want to argue that Feenberg makes a convincing argument that many aspects of Marcuse's philosophical thought find concrete grounding in the critique of modern technology (and science), including potentiality, imagination and instinct, phenomenology, Marxism, utopia, and rationality. These aspects are presented in Feenberg's history of Marcuse's work from the 1930s to the 1970s: first, his phenomenological reading of Marx, and in particular the *1844 Economic and Philosophical Manuscripts*, which he undertook while he was studying philosophy with Heidegger in the 1930s; second, his study of Hegel, which was the topic of his dissertation with Heidegger and the basis of the book *Reason and Revolution: Hegel and the Rise of Social Theory* (1941); third, his interpretation of Freud through a Marxist lens, which was the subject of *Eros and Civilization: A Philosophical Inquiry into Freud* (1955); fourth, his critique of science and technology, work that began in

essays in the 1940s and is best associated with *One-Dimensional Man* (1964); and finally, his work on aesthetics (*The Aesthetic Dimension: Towards a Critique of Marxist Aesthetics* [1977]) and environmentalism from the 1970s.

Feenberg's argument is that what ties Marcuse's philosophical project together are the concepts of *reason* and *potentiality*,<sup>1</sup> which I will use to explore how Feenberg reconstructs aspects of Marcuse's philosophy of technology, not as a distinct topic within his oeuvre, but a culmination of his different intellectual projects. This is a critical social theory that prioritizes the place of technology; the significance of which should not be underestimated. Technology is both a contingent and permanent feature of the human experience such that any critical theory of society that is not also a critical theory of technology is woefully incomplete. Re-considering the concerns of social theory as distinctly sociotechnical would open up trajectories of analysis and change that may prove to be more durable and effective than the law, education, or governance.

Feenberg argues that the basis of Marcuse's philosophy of technology is a tension between the idea that technology, in one sense, is neutral. This shouldn't be confused with neutrality in the essentialist sense, but neutral in the sense that technological design is open to being transformed by different socio-political projects. This idea is in tension with another dimension of Marcuse's thought, that technology is inherently biased and any attempt at reform or transformation merely reproduces technological rationality. Feenberg's reconciliation of this tension leads into his own critical philosophy of technology, which I summarize to demonstrate how he has overcome some of the problems in Marcuse's work.

### **The Tension Between Ontology and Design**

How can one critique technology? Amongst contemporary social theorists of technology this question is usually addressed through either the critique of design or the critique of ontology. For the former, the argument is that design is a contingent feature of technology that can be subjected to transformative efforts. Within the philosophy of technology, work of this kind is associated with the empirical turn and related efforts, including post-phenomenology and value-sensitive design, most of which borrows heavily from the empirical work found in STS. These approaches can be characterized by methodological rigour and an emphasis on the role of designers and engineers. Examples include Robert Rosenberger's book *Callous Objects: Designs Against the Homeless*,<sup>2</sup> which examines how technological design is used against the homeless, tying together class,

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1 Andrew Feenberg, *The Ruthless Critique of Everything Existing: Nature and Revolution in Marcuse's Philosophy of Praxis* (London: Verso, 2023), xiv.

2 Robert Rosenberger, *Callous Objects: Designs Against the Homeless* (Minneapolis: University of Minnesota Press, 2017).

power, and governance with design and Ellen van Oost's phenomenological description of women's and men's shavers which were coded through explicit gender norms.<sup>3</sup> This work parallels the ideas of labour process theorists such as Harry Braverman and David Noble who empirically demonstrate how the imperative for control, profit, and de-skilling are translated into the design of machines. The result of all of this work is the presumption that design is flexible and contingent, open to a variety of influences but largely determined by the socio-economic values of capitalism.

There are also those philosophers who problematize technology at a deeper level. These critiques are ontological and are effective not because they are empirically sound, but because they are indifferent to the standards of empiricism. Byung-Chul Han's critique of productivity and the imperative for activity that characterizes our engagements with technology<sup>4</sup> and Carolyn Merchant's feminist critique of science and technology point to aspects of technology that endure and persist across all technology, regardless of design.<sup>5</sup> Even Heidegger's work, despite its reputation as essentialist and dystopian, has currency amongst many of my students who agree with his argument that technology has an essence, independent of any particular technological object, that is always oriented towards an instrumentalization of nature and humans.<sup>6</sup>

Most philosophers of technology choose one form of critique or the other, often times legitimating their choice by denigrating the other. For theorists of design, an ontological critique is gloomy, essentialist, and deterministic; disconnected from concrete studies of actual technologies, ontological critiques are an exercise in theoretical gymnastics and not much else. Against this, a focus on design is oblivious to context and merely a tool for reifying historically contingent ideas about capital while valorizing a professional class of designers and engineers whose indifference to labour processes and anticipated consumption habits neatly avoids empirical scrutiny. In both cases, one's choice of critique ends up being the only logical way to study technology.

Marcuse attempts to reconcile both in his work. Feenberg traces both of these modes of critique in a way that resonates with Marcuse's decades-long attempt to reconcile

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3 Ellen van Oost, "Materialized Gender: How Shavers Configure the Users Femininity and Masculinity," in *How Users Matter: The Co-Construction of Users and Technology*, ed. Nelly Oudshoorn and Trevor Pinch (Cambridge: MIT Press, 2003).

4 Byung-Chul Han, *The Scent of Time: A Philosophical Essay on the Art of Lingerin*, trans. Daniel Steuer (Cambridge: Polity Press, 2017).

5 Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (New York: Harper & Row, 1980).

6 Martin Heidegger "The Question Concerning Technology," in *Martin Heidegger: Basic Writings*, ed. David Farrell Krell (New York: Harper Collins, 1977).

Heidegger, Hegel, Freud, and Marx. Marcuse's critique of technological design was developed through careful consideration of Marx's writings on machinery. Of particular importance was Marx's contention that technology contains the potential to liberate people from scarcity, struggle, and competition. This is the Marx of the *Grundrisse* who writes that capitalism has succeeded in developing machinery in which the amount of labour necessary for the production of a given object is reduced to a minimum: "capital, quite unintentionally, reduces human labour, expenditure of energy, to a minimum. This will redound to the benefits of emancipated labour, and is the condition of its emancipation."<sup>7</sup> Less labour to make more products, though, in the hands of capital is translated into increased productivity. In response to the legal restrictions on the length of the working day, for example, capital seeks to compensate itself, "by a systematic heightening of the intensity of labour, and to convert every improvement in machinery into a more perfect means of exhausting the workman."<sup>8</sup> But this is a contingent feature of technological design and not an inevitability. Technology can, if designed to meet the goals of a different socio-economic system, be directed to reducing the work needed to produce the necessities for life, thus freeing humans to pursue their own interests.

Following Marx, then, for Marcuse industrialization is not a mistake or a historical wrong turn; it is a necessary step towards freeing people from the necessity of labour and opening up potentials that go beyond the opportunities and experiences that capitalism offers. For example, in *One-Dimensional Man* he writes that "complete automation in the realm of necessity would open the dimension of free time as the one in which man's private and societal existence would constitute itself. This would be the historical transcendence toward a new civilization."<sup>9</sup> Or, in *An Essay on Liberation*: "Is it still necessary to write that science and technology are the great vehicles of liberation, and that it is only their use and restriction in the repressive society that makes them into vehicles of domination."<sup>10</sup> The significance of this, for Marcuse, cannot be underestimated. He writes "...if technics were designed and utilized for the pacification of the struggle for existence...such a new direction of technical progress would be the catastrophe of the established direction."<sup>11</sup> This reading of Marx points to a philosophy of technology aimed at a critique of the design of technology in which the objective is clear: freeing humans from the demands of

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7 Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicolaus (London: Penguin, 1974), 701.

8 Karl Marx, *Capital: A Critique of Political Economy, Vol. I*, trans. Samuel Moore and Edward Aveling (Moscow: Progress Publishers, 1954), 393.

9 Herbert Marcuse, *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* (Boston: Beacon Press, 1964), 37.

10 Herbert Marcuse, *An Essay on Liberation* (Boston: Beacon Press, 1969), 12.

11 Marcuse, *One-Dimensional Man*, 227-228.

labour to allow them to pursue a life that is their own and not one dedicated to producing and consuming commodities.

This is what Feenberg refers to as Marcuse's argument that technology is neutral. By focusing attention on technological design, technology reveals itself as neutral in regards to the ends that it can serve. It is not inherently oriented towards maximizing productivity or speeding up the labour process at the expense of labour nor is it oriented towards liberating people from the demands of labour or making work meaningful. Rather, it is flexible and can materialize a variety of socio-economic imperatives. This is a philosophy that argues that the design of technology is the problem, not technology itself.

But, as Feenberg points out, there is another philosophy of technology in Marcuse's work that seems to contradict the critique of technological design. Following Heidegger's philosophy of technology and the critique of instrumental rationality found in Horkheimer and Adorno, Marcuse also proposed that modern technology (and science) are oriented towards domination—not as a contingent aspect of capitalism, but in its essence. Again, in *One-Dimensional Man* he writes that, "domination perpetuates and extends itself not only through technology but as technology"<sup>12</sup> and that "science, by virtue of its own method and concepts, has projected and promoted a universe in which the domination of nature has remained linked to the domination of man."<sup>13</sup> From this perspective there is little we can do to transform technology towards more humane ends. These efforts, from this perspective, are nothing more than attempts to gloss over that which makes modern technology destructive and so we find ourselves in a situation where, as Heidegger claimed, only a God can save us now.

This is a paradoxical and potentially frustrating reading of Marcuse that Feenberg presents. But he does not leave it at this. He writes, "the mutually cancelling formulas do actually add up to a theory buried in the interplay of the concepts used to present it."<sup>14</sup> But he continues that he is "not convinced that Marcuse reconciled these positions successfully, but his attempt invites us to further reflections on technology" and the task, as he sees it, is to "bring these various approaches to technology together."<sup>15</sup> This is a significant challenge. On one hand, the argument for design is convincing, both conceptually and empirically. Transforming technology to reduce the necessity for labour while providing life's necessities (food, shelter, clothing) is the kind of idealistic realism that is easy to imagine. But does this not avoid larger problems concerning the inherent biases of

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12 Marcuse, *One-Dimensional Man*, 158.

13 Marcuse, *One-Dimensional Man*, 166 qtd. in Feenberg *Ruthless Critique*, 148.

14 Feenberg, *Ruthless Critique*, 134.

15 Feenberg, *Ruthless Critique*, 135.

modern technology? Modern technology is premised on an idea of the world in which its totality is artificially decontextualized and universalized, making the application of technology indifferent to individual and local experiences and expectations. An aspect of modern technology that cannot be undone by design!

### **The Bias of Neutrality**

What Feenberg calls “formal bias” explains how bias and neutrality can co-exist. Perhaps this is the wrong phrasing; consider this not as bias and neutrality co-existing, but *the bias of neutrality*. This is paradoxical, to be sure, but tracing how Feenberg draws out congruencies between these positions can point to tensions that are reconciled in a philosophy that accounts for two forms of rationality.

Borrowing from Max Weber, Marcuse argues that there are two types of rationality that correspond with two different types of social thought and action. *Substantive* rationality embodies a purpose, like feeding a population or managing health care, while *formal* rationality characterizes arrangements that optimize calculability, control, and efficiency—rational means that can be applied to any end. Accounting, for example, can be used to organize the administration and ambitions of any organization across the political or cultural spectrum and is not implicated in these projects.

Feenberg argues that for Marcuse there a bias built into the neutrality of formal rationality. It is premised on the artificial separation of that which makes up our world, what Lukács called reification. Against this, critical thought recognizes that “each individual human, each business enterprise, each government agency exists in reality only through its essential connections, but they appear separate, contingently related to their context.”<sup>16</sup> Applied to technology, Feenberg writes, “considered in isolation, technical devices appear neutral, but in context their biased social role under capitalism becomes visible.”<sup>17</sup> For example, the assembly line is often considered to be a model of universal rational efficiency and progress that can be unproblematically used in any context. In and of itself, decontextualized from people or social orders, the assembly line is functionally neutral. But the design and implementation of the assembly line is dependent upon capitalist notions of labour and power. The functional deskilling of workers and their surveillance alongside the autonomy of management are contingent elements that only seem to be an inevitable corollary to productivity and progress. Forgetting this history transforms the assembly line into an ideologically useful neutral tool: “The assembly line only appears

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16 Feenberg *Ruthless Critique*, 138.

17 Feenberg *Ruthless Critique*, 139.

as technical progress because it extends the kind of administrative rationality on which capitalism already depends."<sup>18</sup>

Feenberg returns to Marcuse's ontological critique by uncovering the preconditions for the possibility of formal bias, drawing out in more detail the bias of neutrality that frames our thinking about technology. These preconditions correspond with Marcuse's critique of modern science, which he developed from his reading of Husserl and Heidegger. Following Husserl, modern science relies upon and reproduces a representation of reality consisting of static objects that can only be understood quantitatively. In Heidegger's hands, this critique is amplified. The quantified idea of nature becomes intrinsically oriented towards technical control.<sup>19</sup> This contrasts the ancient view of nature, Heidegger argues, in which nature is considered a dynamic process that contains potentialities and change, not a fixed picture. Marcuse follows this line of thought but draws out and emphasizes the place of "potential" as that which is eliminated from modern scientific and technological rationality. For Marcuse, potential is not something added on as a subjective value, but an aspect of objective reality that is as real as weight and colour, but obscured by formal rationality.

As Feenberg points out, bias in this case is not ideological in the sense that it is tied to a particular class or social group, rather that science and technology are neutral with respect to values is its bias. "That neutrality eliminates the notion of potential through which certain values were granted objective reality...this is what it means to view the world as raw materials: to deny potentialities is to leave a free space of exploitation. Insofar as it is value neutral, science adapted to the needs of capitalism in advance of any application."<sup>20</sup> By claiming to be neutral, modern science and technology eliminate the inherent potential of objects while also directing the world to continue as it is with little regard to how it came to be this way.

Potentiality is the basis of Marcuse's dialectical ontology in which he distinguishes between substantive and formal logic. Formal logic creates a specific way of knowing that leaves objects, people, and societies open to technical manipulation via bureaucracy and technocracy—formally rational systems that are designed to maximize efficiency and thus appear neutral. Dialectical thinking works with substantive universals that make possible the conceptualization of an essence. The examples of peace, freedom, and justice are substantive universals that do not explicitly refer to given reality but point to realistic potentialities that go beyond the empirical facts of formal rationality. These potentials

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18 Andrew Feenberg, *Transforming Technology: A Critical Theory Revisited* (Oxford: Oxford University Press 2002), 78.

19 Feenberg, *Ruthless Critique*, 150.

20 Feenberg *Ruthless Critique*, 160.

are not idealizations or subjective values, but immanent in things themselves—they are as real as weight, colour, or age. This dialectic between is and ought is the basis of a critical consciousness.

The apparent neutrality of formal rationality is realized through its indifference to ends. But it is not neutral with respect to alternatives or potentialities. It is a way of thinking that is biased toward the actual, what is already fully realized and present at hand. This restricts its range to the reified object as it immediately appears; working only within the horizon of the existing society and its technical modes of practice. Through formal (or neutral) thinking, objects can be used, but not transformed; adapted to dominant social purposes, but not transcended toward the realization of higher potentialities in a possible, better society.<sup>21</sup> As Feenberg writes elsewhere:

Existing science and technology cannot transcend the capitalist world. Rather, they are destined to reproduce it by their very structure. They are inherently conservative, not because they are ideological...because they are intrinsically adjusted to serving a social order that ignores potentialities and views being as the stuff of domination.<sup>22</sup>

To summarize, Marcuse's two-dimensional ontology consists of both an empirically given reality and the unrealized potentials that are inherent to this reality. The tension between empirical reality and unrealized potential permeates lived experience, but has been truncated in an attempt to reduce the totality of experience to the logic of a scientific rationality premised on de-contextualization and methodological atomism. Through this logic, technologies come to be understood as discrete and measurable, divorced from both history and culture and reduced to a precise, yet myopic, functionality. From this perspective, questions concerning why design takes the form that it does or why technologies have different consequences for different people become largely unanswerable. The reduction of technology to pure function—as if one could fully understand the significance and meaning of a technology simply by reading a user's manual—is an example of the one-dimensionality that Marcuse sought to critique in his philosophical project. Recovering a more accurate idea of what technology is requires, for Feenberg, a greater attention to the place of potentiality.

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21 Feenberg *Ruthless Critique*, 162.

22 Andrew Feenberg *The Philosophy of Praxis: Marx, Lukacs and the Frankfurt School* (London: Verso, 2014), 180.

## Transforming Marcuse

Feenberg is not shy about the problems in Marcuse's philosophy. The problem of real change, both concretely and conceptually, is undeveloped in Marcuse, as are descriptions of actual technologies. This inability to develop a theory of change and continued abstractions from concrete technologies can only lead to more sophisticated theoretical work on the nature of one-dimensionality. Feenberg proposes a way out of this dilemma by borrowing from empirical studies of technological design and use. In particular, labour process theory and STS point to examples that demonstrate a variety of potentials that respond to engaged and situated use. Through this, Feenberg advances Marcuse's theory of potentiality by translating his dialectical ontology of "is" and "ought" into sociotechnical terms via historical examples of individuals and social groups who transform technical design, function, and meaning to better reflect their own experiences and expectations.

Potentiality is re-conceptualized as "democracy" in Feenberg's hands. This is a useful, but misleading category as it can imply the notion that technology should be subjected to elections or debates about representative or direct democracy. Democratization is not a matter of holding an election between different technologies, but accounting for what Feenberg calls democratic interventions, those unexpected and unimagined potentials that emerge from everyday users' sociotechnical engagements, that, by virtue of their existence and not their intention, destabilize technocratic rationality by demonstrating its limits. It is only through these moments of informal and improvised interjections into formally rational systems that it is possible to recognize alternative forms of rationality that reflect values, expectations, and initiatives that were not part of the formal design process. Moments of potential, in this sense, are one of our most immediate and philosophically overlooked forms of engagements with technology and this is where the importance of Feenberg's philosophical project lies. Moments of engaged use leading to unimagined technological transformations demonstrate the limits of formal rationality by integrating the messiness and irrationality of lived experience into the concept of technology. As it is imagined by engineers and designers is no longer sufficient to account for the ways that technologies are imagined, designed, and used. Thus, these moments are both empirically real and materialized through design while also pointing towards an ontology of technology that includes an alternative to formal reason.

Democratic potential is itself universal, but the character of this resistance is wholly local. There are no appeals to transcendent ideals or organized resistance to power independent of particular cases, just engaged use with technologies that reveal unimagined potentials.

The new politics is neither revolutionary nor reformist...we do not know where these changes lead, but we cannot doubt that they represent a

universal advance...critical constructivism gives an account of the process of transcendence without positing a final endpoint the nature of which we do not know.<sup>23</sup>

This distinguishes Feenberg's politics of technology from attempts to develop an ethics of technology or a responsible technology, both of which promote the vocational autonomy of engineers and designers to paternalistically impose their own ideas onto everyday users. Philosophers should not try to design their way out of contemporary problems—the hubris of so-called 'design thinking'—has the consequence of overlooking the experiences of individuals and social groups who, because they fall outside of the purview of formal decision making, are meant to accept and live with the technologies provided for them by designers, engineers, and policy makers.

## Conclusion

The philosophy of technology, which was once populated by critical thinkers like Marcuse who rejected the trajectory of contemporary technological society, has been domesticated to such a degree that topics such as capitalism, exploitation, domination, and labour are politely avoided. This easy reconciliation with late-capitalist society is evident in excited speculations about the moral and ethical significance of anticipated developments in AI and the championing of products developed by profit-driven corporations such as OpenAI, Google, Facebook, and Spotify. Given this turn of events, returning to the work of Herbert Marcuse is a reminder that obstinacy in resisting the sociotechnical ambitions of the state and industry still has philosophical value. After all, how "ethical" can AI really be given the energy consumption and water usage that it requires, not to mention the exploitative processes of extraction that it necessitates? Any kind of ethics that avoids these questions is an ethics in name only. Raising concerns like this are important if one is to resist trajectories of technological change determined by profit, resource extraction, data collection, and surveillance. Returning to Marcuse, as Feenberg argues throughout his book, does not mean nostalgia for 1960s sloganeering or Frankfurt School dystopia. Rather, it means developing philosophically sound ideas about the extent to which capitalism has shaped our ways of knowing and demonstrating that there are very real alternatives to these ways of knowing. This is the most important takeaway from Feenberg's Marcuse: it is not enough to recognize the potentials that are being blocked by contemporary capitalism, but rather to better understand the processes by which capitalism blocks potentials that could transcend it. Marcuse undertook this challenge,

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23 Andrew Feenberg, *Technosystem: The Social Life of Reason* (Cambridge: Harvard University Press, 2017), 119.

but since his death in 1979 the world has changed; capitalism continually renews itself, creating new ways of knowing and being that confound resistance. Understanding these new ways of knowing and being, and being ruthless in critiquing them, is the first step to resisting them.

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# Book Review: Organism-Oriented Ontology by Audronė Žukauskaitė

**Ben Woodard**

As a rather diffuse discourse, the philosophy of biology has been dominated by Anglo-American analytic philosophy for the last four to five decades. While biology emerged as a discipline in the early 1800s, it openly engaged in philosophical questions before then and well into the 20<sup>th</sup> century. In particular, French thought took questions of the concepts at use in the life sciences quite seriously as evident in the work of Canguilhem, Ruyer, Simondon, and others.

Two changes took place in the 1960s, namely that French and more broadly continental philosophy engaged less and less with the details of the life sciences and became increasingly interested in biopolitics and the concerns of biology (and the politicization and weaponization of biology).

In analytic circles, the philosophy of biology summarily dismissed its prehistory and placed its emphasis on the post-genetic revolution while making reference to Aristotle, Kant, and Darwin. While critical work on biology in continental and anglophone circles has escaped this narrowing view, it tends to happen outside of the philosophy of biology proper (whatever that means) and occurs in Science and Technology Studies and Critical Theory. Žukauskaitė's *Organism-Oriented Ontology* joins a short list of philosophical exceptions (alongside Eugene Thacker's *Afterlife*, to take one example).

Žukauskaitė begins with a discussion of Simondon emphasizing his theory of individuation. In particular, she focuses on transduction, the ways in which differences between processes are maintained despite transformations through a restructuring of the relations between the processes.<sup>1</sup> Importantly for the discussion of biology, Simondon attempts to work around the matter form distinction and is therefore against any notion of easy atomistic materialism as well as any transcendental appeal to pre-existing forms.<sup>2</sup>

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1 Audronė Žukauskaitė, *Organism-Oriented Ontology* (Edinburgh: Edinburgh University Press, 2023), 24.

2 Žukauskaitė, 25–26.

Critically, Žukauskaitė argues that Simondon's notion of transduction complicates both a Darwinian and Lamarckian understanding of the organism in relation to its environment. Simondon seems to suggest that evolutionary theory, as portrayed by Darwin in particular, cannot work because it assumes there is always already a fixed relation between organism and environment. Furthermore, Simondon argues that both Darwin and Lamarck do not take perception's relation to adaptation seriously, and this also presents a far less dynamic view of the organism.

Because Simondon does not cite sources here, it is hard to know whether he is really speaking about Darwin and Lamarck or about the status of evolutionary theory generally during the time of writing *Individuation in Light of Notions of Form and Information*. If the latter, this loss of the organism would make total sense given that evolutionary biology tends towards statistical models of population, with cell theory and morphology more generally becoming sidelined. In addition, it is striking that Simondon relies more upon psychology (Kurt Lewin) and physiology (Kurt Goldstein).

The other point is Simondon's relation to cybernetics. Following Simon Mills, Žukauskaitė points out that Simondon's notion of information is different from that of classical cybernetics, and yet at the same time Simondon is said to be inspired by Norbert Wiener. This is further complicated by the fact that the influence of cybernetics stretches deep into post-war French philosophy (Foucault, Deleuze, Ruyer etc).

In her chapter on Raymond Ruyer, Žukauskaitė draws parallels between Simondon's concerns over avoiding the trap of matter and form with Ruyer's attempts to avoid the deadlock of preformation and finalism. Ruyer sees something of value in organicism as trying to avoid these two forms of thinking philosophy but ultimately poses his own solution. This solution is to discuss a distinction between real or absolute individuals and aggregates of matter.<sup>3</sup>

Žukauskaitė's gloss on Ruyer is particularly welcome as he is far less known than all the other figures presented in her work. The comparison with Simondon is also helpful as Ruyer's total overview of form, a kind of view from everywhere, can appear very much as a transcendent argument, a transcendent argument exactly in the form he wishes to reject. What is complex in Ruyer is parsing his use of the biological sciences (especially morphology) with his philosophical commitments, in particular, his discussion of different phases of the organization of beings as being analogous to, or even equated with, levels of consciousness. As she helpfully summarizes:

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3 Žukauskaitė, 39–40.

Consciousness (the observer) is not beside or above the phenomena to be observed but acts itself as the observing system. In this respect, Ruyer's notion of self-survey functions like a self-observing model of recursive cognition found in second-order cybernetic systems. What is original in Ruyer's theory is that this capacity of self-survey, or self-observation, is not only characteristic of the self-reflective consciousness of humans, but is extended to all organic forms.<sup>4</sup>

Chapter three of the book focuses on the work of Deleuze and Guattari. I will focus less on this chapter because discussions of Deleuze and Guattari and biology have become increasingly commonplace: the aforementioned *Afterlife* by Eugene Thacker, numerous books by Elizabeth Grosz, Keith Ansell Pearson, Jane Bennett and many others. In line with the previous chapters, this chapter is most helpful because it draws out the specific points where Deleuze and Guattari take from and mutate ideas from Ruyer and Simondon. But, as is the case with Ruyer, it appears that the organismic dimension of life at this stage in the text starts to become dematerialized. Or, in other words, it starts to become difficult to delineate the difference between an immanent view of life that is over-determined by human consciousness and the view of human consciousness as merely one edge of life's equipotentiality.

Chapter 4 discusses Catherine Malabou's notion of plasticity. In line with the previous chapters, Žukauskaitė relates Malabou's work to the potentiality of the life form and, leaning back on the chapter on Deleuze and Guattari, there is significant push on the relation of the neuronal and the psychological. In addition, and perhaps more relevant to Simondon, is Malabou's critique via Kant, of preformationism and of a certain informational paradigm in the biological sciences. Most provocative is the closing argument of Chapter 4: "Biological plasticity allows us to imagine different forms of life and subjectivity, free to take any shape or form and to avoid the pressure of normativity. Where plasticity deserts, biopolitics takes over."<sup>5</sup>

In the second part of Žukauskaitė's book, she focuses less on pivotal figures and more on exchanges between thinkers of the organic via their discussions of Simondon, Leroi-Gourhan, Bergson, Whitehead, and others. Central to the initial part of this discussion is the notion of organology: essentially that technology is viewed as an extension of biology, that there is technical and at times anthropological analyses of how technics are an extension not only of labor but also memory. One of the most rewarding parts of this, at least for me, was a distinction between Simondon and Bernard Stiegler's reading of

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4 Žukauskaitė, 53.

5 Žukauskaitė, 95.

Simondon:

For Simondon, the technical object is part of a general ontogenesis; therefore it is determined by pre-individual potential and by the associated milieu, whereas a human being, an inventor, is only a part or a side-effect of this development. By contrast, for Stiegler, a human being and a technical object are co-constituted: a human being originates at the moment when it is externalised in technical tools and prostheses. In this respect, human development is co-constitutive with technological development.

This approach is radically different from Simondon's belief that a technical object has its own 'mode of existence' and that it is quasi-autonomous from the human being.<sup>6</sup>

The following chapter (chapter 6) extends the ideas of autopoiesis, conscious-life, cybernetics, and the like to recent attempts by thinkers such as Stengers and Latour to recuperate James Lovelock's Gaia theory—that the Earth is a giant organism-like self-organizing system. Žukauskaitė's book brings a welcome critique of Latour as well as Donna Haraway's readings of autopoiesis (and sympoiesis) in *Staying with the Trouble*. In one fitting passage she writes:

Haraway invites us to create tentacular webs and assemblages with other species. However, what I find problematic in this project is that these connections work only on the imaginary and speculative level, avoiding the real interaction with other species. The relationship with animal partners remains vaguely defined, and in some cases – such as poetically described interactions with companion species (Haraway 2008) – looks very problem-atic because it is still embedded in the logic of anthropocentrism and asserts the supremacy of the human species.<sup>7</sup>

Žukauskaitė's book is a concise analysis of the place and role of the organism, or perhaps organic thinking, within the tradition of continental philosophy. In particular, it is interested in how the legacy of post-war French thought intersects with how we think biological systems today and suggests that this thinking should be renewed in order to address some of the more massive political deadlocks of the present, namely the status of biopolitics and what to do with the concept of the anthropocene.

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6 Žukauskaitė, 107.

7 Žukauskaitė, 138.

My major contention with the book is in fact not so major, but one concerning title: why ontology? Given the ruse of ontology especially when conjoined with 'oriented', it suggests a book that will involve a proliferation of entities or of long analyses of how particular objects (in this case organisms) function in the world. But in fact, this book is not a species biography via Science and Technology Studies nor is it a text so much about ontology as it is about a history of ideas, particularly the historical and philosophical construction of the organism and the organic system.

I think this fact is relevant to the very content of the book in that there is a tendency in continental philosophy, especially after Canguilhem, to abstract from the biological sciences (as suggested in the opening of this review). As a result, if one is not doing biopolitics (à la Foucault, Esposito, or Agamben), then it would seem that there is kind of institutional necessity to follow a broadly Deleuzian track, to focus on ontology or metaphysics, to align discoveries within the life sciences to notions of becoming, or to folding living systems under or within cognitive systems (always with the danger of unconscious human bias).

By focusing on the post-war period, Žukauskaitė shows that this forced choice is faulty and avoidable. One can be technically or scientifically literate while still paying attention to philosophical concepts and the history of ideas without making the sciences, and in particular the life sciences, merely the puppet of power or the window-dressing of philosophical enterprise.

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# Book Review: The Digital and its Discontents by Aden Evens

Junnan Chen

## Abstract

Book review of Aden Evens's *The Digital and its Discontents*.

**Keywords:** Philosophy of the digital, contingency, ontology, Alexander Galloway

During the 2022 launch demo of LaMDA, a family of conversational large language models (LLM) developed by Google, CEO Sundar Pichai showcased two conversation scenarios entirely conducted by LaMDA. In the first conversation, LaMDA personifies the planet Pluto, explaining what Pluto is and the experience of visiting it. The conversation unfolds autonomously, with LaMDA on both ends. In the second scenario, LaMDA takes the role of a paper airplane, discussing its own design and "recounting" a flying accident. The conversation concludes with such a vignette imagined by the large language model. Through the two examples, Pichai claims that LaMDA's algorithm is able to perform informative and natural conversations.

Whether the conversations are impressive enough, the demonstration indeed offers a summation of the principles and desires associated with the world of algorithms. As Pichai emphasized, LaMDA is, first and foremost, rational. Being able to capture and convey scientific information to the public, LaMDA aims to create precise simulation aligned with scientific truths. This leads to the second point: LaMDA operates fully with the logic of representation that is both limitless and coherent. While LaMDA can easily simulate a planet and a paper airplane, its representation is in full congruity with the quality of the represented. In other words, LaMDA can never turn Pluto into a gas planet, just as it will not imagine the paper airplane to be heavy or fluffy. However, the most intriguing aspect arises at the end of the second conversation, where LaMDA introduces an enigmatic pursuit of "accident"—a simulated contingency that emerges from the structured dialogue, subtly threatening the imagined seamlessness of the digital world.

These intertwined themes are explored in depth in Aden Evens's work *The Digital and its Discontents*. Offering a comprehensive insight into the digital, Evens's book is a

pioneering, albeit overdue, contribution to the philosophy of the digital. *The Digital and its Discontents* is both a philosophical treatise and a critique of ideology. It begins with the premise that the digital operates on universal elements and absolute invariants that cut across cultural boundaries. A wide array of scholarship including the works of Wendy Chun, Lisa Nakamura, and Manuel Castells delves into the cultural-theoretical analysis of the digital. As these thinkers study the mutual fertilization between different societies and technologies to dismantle the spectre of techno-determinism, Evens, on the other hand, flirts with techno-determinism in a nonetheless constructive manner.

Rather than excavating the forces of difference in the messy ensembles of cultures, histories, and technologies, *The Digital and its Discontents* stubbornly insists on the separation between the actual and the digital. Exploring the forms, principles, and the binary system undergirding digital operations, Evens tracks down what he calls “the digital ideology,” which is not to be confused with political ideology but is by all means political. As the work progresses, it becomes clear that the separation is both a premise for the philosophical aim to unmask the formal regime of the digital and Evens’s own political-ethical intervention.

*The Digital and its Discontents* takes its name from Sigmund Freud’s *Civilization and its Discontents*. Where Freud identifies lack as constitutive of the development of civilization, Evens foregrounds digital lack as the driving force behind the advancement of digital technology. Yet, signifying the unsurpassable impasse between the digital and the actual, digital lack is simultaneously a blessed promise for contingency—the unconditioned, non-necessary, and infinitely creative. That is to say, Evens, through crafting the ontology of the digital, in fact stands together with those who, for Alexander Galloway, represent the best “analog” thinkers in today’s hyper-digitalized world—Gilles Deleuze, Quentin Meillassoux, and Elizabeth Grosz, to name a few.<sup>1</sup>

Evens starts Chapter 1 “Approaching the Digital,” by outlining and defending his methodology, proposing the necessity to have a literacy grounded in the abstract logic of the digital. Central to this discussion is the philosophical focus on the binary code—0 and 1. Evens describes the binary code as both the symbol and the substance of the digital paradigm: “a purely formal code rendered materially effective, that empowers and delimits the digital.”<sup>2</sup> These two digits constitute the foundation of digital technology, exemplifying its unambiguously universal formalism.

Chapter 2, “What Does the Digital Do?” presents a conceptual weaving of the digital

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1 Alexander R. Galloway, “Golden Age of Analog,” *Critical Inquiry* 48, no. 2 (Winter 2022).

2 Aden Evans, *The Digital and its Discontents* (University of Minnesota Press, 2024), 19.

ideology with philosophical threads extending back to pre-Enlightenment era. Evens argues that there are three major ideologies that nurture and ground the digital: positivism, rationalism, and instrumentalism. Defined as “a commitment to the idea that knowledge must be grounded in facts or posits,” positivism provides the conceptual framework for understanding discreteness in the digital paradigm.<sup>3</sup> For Evens, since atomist philosophy, positivism has prepared the intellectual groundwork for digital operations. Moreover, the logic of the digital echoes the belief in the ontological priority of “thingness” that is detachable from the surrounding milieu. Fully individuated, the bits in the digital sequence is not only discrete but twice-discrete. This means that: each bit is distinct in value represented by 0 and 1; and each bit occupies a distinct position in a sequence. The twice-discrete nature ensures the logical flow and precision in all digital operations. Rationalism, tied to a modernist paradigm of control, is apparent in the fact that every digital operation connects a cause and an effect. No input goes without a response. Efficacy is always promised. The means-end reasoning also justifies the third ideology, Instrumentalism, in accordance with Heidegger’s conceptualization of technology, which emphasizes the goal-driven nature of digital systems. Designed for specific ends, digital technology remains inert without deliberate commands. Alongside positivism and rationalism, instrumentalism shapes the ontology of the digital—a domain that materializes in the actual world yet remains fundamentally distinct from it. For Evens, the digital is always perfect. While its design may occasionally falter, once the machine is operational, its calculations proceed with mechanical consistency. “Of course, there can be error in the digital, but there is no digital error.”<sup>4</sup>

Chapter 3, “Ontology and Contingency” is a rumination on contingency. Evens discusses various anti-positivist philosophies in defiance of digital ideologies in contemporary as well as primordial forms. Tracing the ideas of Heraclitus, Nietzsche, Meillassoux, Deleuze, and Derrida, Evens illustrates the conceptual possibilities embedded in the history of philosophy that challenge and delimit the stable systems of fixture—systems upon which the digital technologies both rely and amplify. It is contingency that disrupts the digital ideologies. “It undoes *positivism* by refuting the strict identity of a thing with itself; it denies *rationalism* by asserting a spontaneous sense that pierces the limits of reason; and it foils *instrumentalism* by destabilizing the relationship between cause and effect.”<sup>5</sup> Instead of concluding with the abundant possibilities of the actual, Evens ends the chapter with a nuanced exploration of the contamination between binary logic and contingency. Just as contingency’s non-necessity and creativity instigate abstraction and positivism, by subscribing to the necessity of a preexisting *thing*, the binary calls for a potential reversal that glimpses the infinite.

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3 Evans, 28.

4 Evans, 52.

5 Evens, 58.

Contingency is the meshwork that pulls everything together with everything else; the ontology of the digital, on the other hand, also has its own system of randomness and creativity, though in a “muted” form.<sup>6</sup> Chapter 4, “Ontology of the Digital,” examines the digital ontology. One thing is certain: by warding off the messiness of the actual, the digital works only with given forms. Evens does not go deeper into the debates of creativity that are especially relevant to artificial intelligence but puts the sole focus on bits—the fundamental unit of the digital. Bits function simultaneously as symbols and electrical currents on chips that organize computational processes. In the dual role, bits combine *doing* and *saying* and form a unique synthesis that characterizes its ontology. The electrical current is particularly intriguing, as it represents a point where the strictly separated realms of the digital and the actual seem on the verge of collapsing. Yet, without lingering on this potentiality, Evens attunes the readers to another defining feature of the digital: the logic of representation. Every quality, feature, and object in reality is abstracted and encoded into sequences of bits. This process gives rise to a logic of representation, enabling the emergence of an iconic value closely associated with digital culture. The metaphysics of the digital, therefore, lies in the transcendental essence of “icons” that looms behind the algorithmic sequences composed of homogenous units.

Chapter 5, “From Bits to the Interface,” explores the process of digital creation. Rather than analysing the human-machine interface, Evens looks into the process of assembling representation. In the digital paradigm, the process of putting together, for example, colours, textures, and sizes, is a process devoid of any “touchy” relation typical of the physical world. By demonstrating that digital machines rarely represent “purple spotted elephants or building-size mosquitoes or software that executes random commands,” Evens resolutely points out that the plenitude of choices in the digital world does not give rise to true deviation; paradoxically, like LaMDA’s perfect simulation, the parts which co-constitute digital representations “tend to remain in perfect congruity with their qualities.”<sup>7</sup> The difference between plenitude and contingency is a difference between epistemology and ontology. This is further demonstrated by the unknown number  $\omega$  in the mathematical realm. For Evens, given its unknowability,  $\omega$  is still nothing but a necessary truth. Contingency, however, is always ontologically infinite and unconditioned.

Yet, does this difference between epistemology and ontology truly define how we experience the digital? Are we not inclined, as Chapter 5 briefly discusses, to treat a surprising “randomness” offered by the digital as a shadow of real contingency? Chapter 6, “What Does the Digital Do to Us,” tackles the experience, the particular (dis)satisfactions, and the cruel optimism, to borrow Lauren Berlant’s words, wrought by

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6 Evens, 93.

7 Evens, 147.

the penetrating digital technologies and ideologies. In this light, Evens discusses the importance of games. Through games, we are able to renegotiate with the possibilities and certain autonomy that are available in the expansive web of information, choices, and commodities. Examining simulated embodiment, the field of Digital Humanities, the chapter ends with a certain generosity. Much of the world needs a logic, Evens concedes. Logic and algorithm not only capture and manipulate reality but also foster diverse possibilities for critical interpretation.

The concluding chapter, “But...” continues to think about the digital and how it attempts to overcome the discontents. One of the overdue themes is Generative AI. Evens opens the chapter with a discussion of GPT-3 and how it generates text based on tokens—the sequence of letters and their relations—rather than meanings. The statistical relationship gives birth to a digital semiotics that works to simulate human intelligence. However impressive, the neural network is still formalistic. The simulated contingency is based on statistically measurable relations among letters. Evens extends this critique to *Cyberpunk 2077*, a game celebrated for its intricate details and narrative depth. According to Evens, the game inserts a large amount of ambiguity into the core of gameplay, connecting unassuming dialog choices with different endings. “This game thus represents a world that we might understand as *contingent*, a world in which even distant events are subtly interdependent and in which complexity overwhelms instrumentality”<sup>8</sup>—but still, it is within the realm of representation, no matter how far representation becomes. In this context, Evens reiterates the central argument: digital representation is constrained by finite prescriptions, while in the actual world, the relationship between representation and the represented remains boundless and open.

The core concerns in *The Digital and its Discontents* resonate across various disciplines. Discussions about digital intention, goals, and creativity are central to debates surrounding artificial intelligence. Similarly, the ontology and evolution of the digital, along with its parallel or symbiotic existence with the actual, raise broader questions about how we conceptualize technical being and its relationship with organisms and nature. How will the digital evolve? Evens sketches a portrait of a digital “will to power” as a history of evolution without self-overcoming. Although the book struggles to maintain a non-symbiotic, non-dialectical relationship between the digital and the actual, Evens ultimately suggests that the digital’s evolution can only occur by persistently encroaching the plenitude of the actual. Time becomes the digital’s primary point of contact with the actual, which in turn offers new affordances that will result in the changing of forms. Above all, the digital is formal. New configurations within the digital paradigm will inevitably emerge, driven by the relentless accumulation of data and the expanding scope of its applications.

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8 Ibid, 203.

“Employ the digital as a challenge, take it where it does not fit, and never take its procedures for granted,” Evens offers some of the last suggestions.<sup>9</sup> As we witness emerging forms of technological simulations each day and the remnant ghosts of sentience that have haunted the machines for over a century, Even’s patient analysis of bits and firm resistance to the digital’s aspiration to become real offer a humble yet deeply profound invitation, as well as a needed comfort, to collectively build our understanding of a world that is (but...) yet to be digital.

## References

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<sup>9</sup> Evens, 211.