

The Ontological Force of Technicity: Reading Cassirer and Simondon Diffractively

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Abstract This article contributes to contemporary philosophy of technology by carrying out a diffractive reading of Ernst Cassirer’s “Form und Technik” (1930) and Gilbert Simondon’s *Du mode d’existence des objets techniques* (1958). Both thinkers, who are here brought together for the first time, stood on the brink of the defining bifurcations of twentieth-century philosophy. However, in their endeavor to come to grips with the “being” of technology, Cassirer and Simondon, each in their own way, were prompted to develop an ontology of emergence that gives ontological priority to “technicity,” that is, to technology considered in its efficacy or operative functioning. By reading Cassirer’s and Simondon’s insights through one another, we aim to further develop this ontology of emergence, and, simultaneously, to demonstrate the relevance of these thinkers for present-day theorizing. As we hope to show, the insistence on the ontological force of technological apparatuses transverses received philosophical and ontological divides and revitalizes the notions of “nature” and “the human,” which are now understood as coevolving with technology.

Keywords Philosophy of technology · Onto-epistemology · Technological in(ter)vention · Performative correspondence · Facile humanism · Positive difference

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1 Introduction

Ernst Cassirer's (1874–1945) and Gilbert Simondon's (1924–1989) essays on technology set out, each in their own way, to investigate the “being” of technology. Without making essentializing gestures, they consider technology's place in knowledge, science, and culture more generally. It soon becomes clear, however, that the question concerning technology's mode of existence engenders considerations on the most fundamental philosophical level. “Nature” for Cassirer and Simondon is not a fixed category. The human has no direct access to the form of nature, nor does she impose this form by her mind. Instead, the form of nature must be actively searched for and secured in different ways. Likewise, “the human” for Cassirer and Simondon is not a rigid notion. Since nature is not a stable agent, it does not keep a firm hold on the human. Instead, the human is seen as deeply entangled with nature, engaged in ongoing processes of co-formation. Crucially, however, and what takes Cassirer's and Simondon's accounts beyond the terrain of relational and processual approaches, is their insistence on an irreducible third ingredient in the ontological entanglement: *technicity*. Above all, it is the introduction of this ingredient—and, hence, the acknowledgement of what we will refer to as the “ontological force” of technological apparatuses—that marks the originality of both thinkers and, simultaneously, their acute relevance to contemporary philosophy of technology. Since the nature of nature is to form and be formed, the human no longer possesses the exclusive power to define, and technology can no longer be placed outside ontological movements as a mere mediator. As they are formed along emergent lines in both Cassirer's “Form and Technik” ([1930] 2004) and Simondon's *Du mode d'existence des objets techniques* (1958), nature, technology, and the human are seen as coevolutionary.

This article explores the new ontology that Cassirer and Simondon, in their different historical contexts, were prompted to develop as part of their endeavor to come to grips with technology. Cassirer's “Form and Technik” was written in 1930, one year after the third and final volume of his *magnum opus* on the philosophy of symbolic forms.¹ The essay conceives technology as a primary medium constitutive of the knowledge function and the human existential condition and ascribes to technology a new dignity as a “tool of the mind” on par with language and art. Simondon's *Du mode d'existence des objets techniques* was written between 1954 and 1958 as a supplementary thesis for his doctoral degree. It was published in 1958 and had a wide impact in France. Whereas the first part of the work deals with the genesis and evolution of the technical object, the second and third parts respectively deal with the man/machine relationship and the machine and philosophy. Simondon's dynamic account of technological creativity and the functioning of machines was developed in critical response to what he saw as the shortcomings of cybernetics. What is most striking in both essays is not only that they formulate dynamic accounts of technology but that they formulate accounts that give *ontological priority to technicity*.

¹ The three volumes of Cassirer's *The Philosophy of Symbolic Forms* deal with, respectively, *Language* ([1923] 1953), *Mythical Thought* ([1925] 1955), and *The Phenomenology of Knowledge* ([1929] 1957). Cassirer was also planning a fourth volume in the series, which was to deal with the metaphysics of symbolic forms. A selection of texts intended for this volume was published in German in 1995 and subsequently in English in 1996 as a fourth volume of *The Philosophy of Symbolic Forms*.

Cassirer and Simondon attract our attention due to the ways in which they ascribe agency or ontological force to technological mediators. It is no coincidence, we believe, that their respective essays on technology are currently subjected to renewed academic attention. A material indication of this new interest is found in the fact that both texts are now in the process of being translated into English for the first time. An English version of Cassirer's essay has recently been published in the edited volume *Ernst Cassirer on Form and Technology: Contemporary Readings*,² and an English translation of Simondon's essay is currently being produced by Ninian Mellamphy et al.³ Both essays, or so we argue, tap into the core philosophical concerns of present-day theorizing, which seems to be characterized by a push across disciplines towards dynamic ontologies.

In this article, Cassirer's and Simondon's essays on technology are brought together and treated as resources for contemporary theorizing. Taking inspiration from the way that both thinkers accord ontological priority to technicity and, hence, to creative production and formative forces, we embrace a new methodology for working with philosophical texts, which is labeled "diffractive reading."

2 Diffraction: A Productive Methodology in Philosophy

Diffractive reading is a strategy for reading philosophical texts. The term "diffraction" was coined by Donna Haraway (1997) in an attempt to undo two equally untenable accounts of how texts acquire meaning: first, the assumption that texts acquire meaning by referring to a world "outside" the text (realism), and second, the Derridean assumption that "there is no outside-text," in the received sense of cultural studies informed by the Linguistic Turn.⁴ Haraway, in contrast, wants to demonstrate that texts and readings have a productive dimension; they *work*, which means that texts and readings cannot be seen as separate or separable from what we tend to accept as that to which they refer. Karen Barad (2007) picks up on this entanglement between sign and referent. For her, diffractive reading is a strategy that involves "reading insights through one another in ways that help illuminate differences as they emerge: how different differences get made, what gets excluded, and how those exclusions matter" (p. 30). This method is further developed by Iris van der Tuin (2011) and in the present article as an experimental strategy of reading that aims to produce an open cartography of theoretical work to which readers also can easily contribute—moving from scribblings in the margins to new, open-ended systems of thought.

By reading the insights of Cassirer and Simondon "through" one another in the sense outlined above, we set the stage for a differential encounter whose aim is to

² Hoel and Folkvord (2012). The English version of "Form und Technik" has been translated by Wilson McClelland Dunlavey and John Michael Krois. The text was previously translated into French, Norwegian, and Danish.

³ Selected portions have been published earlier: Part I was translated to English in 1980, also by Ninian Mellamphy, and the first chapter of Part III was published in *Deleuze Studies* 5.3 (2011): 407–424, by N. Mellamphy together with Dan Mellamphy and Nandita Biswas Mellamphy.

⁴ This reductionist interpretation of the work of Jacques Derrida has recently been successfully challenged by Vicki Kirby (2011).

demonstrate their current relevance. The aim is, more precisely, to develop the idea of the ontological force of technicity, by pushing Cassirer and Simondon further in the direction that their essays are already moving, through a diffractive reading that allows their insights to strengthen, challenge, and articulate one another.

3 Towards a New Kind of Philosophy of Technology

The philosophical essays on technology by Cassirer and Simondon both take their points of departure in a shared perception of a failure on the side of thinking, both scientific and everyday cultural, to grasp the true nature of technology. Antagonisms in culture flow from this ignorance, which manifests itself in technophobic reactions that configure the machine as a “foreigner” devoid of human reality or, alternatively, in untempered technophilic reactions that exploit its technocratic potential, or that seek to enhance the human being or replace her with better-functioning doubles. As Cassirer sees it, even if the effects of technology make themselves felt in every corner of modern culture, the philosophical insight into technology’s nature has not kept pace (Cassirer [1930] 2012, p. 17). Simondon, on his side, maintains that alienation, which is typically blamed on the machine, flows not so much from the character of the machine as from our failure to grasp its true essence (Simondon 1958, p. 9).

Both philosophers see technology as a philosophical challenge that strikes deep and raises questions on the most fundamental philosophical level. In Simondon’s words, the problem of the “meaning and genesis of technical objects” must be seen in relation “to thinking, to the existence of the human being, and to the human being’s way of being in the world” (p. 154; our translation). The first move, made by both Cassirer and Simondon, is to integrate technology into the domain of things human: Cassirer integrates technology into his philosophy of symbolic forms, and Simondon insists on the foreign yet human reality of the machine. Interestingly, however, their respective strategies do *not* consist in subsuming technology under the stifling notions of “culture” and “the human” as set against the equally stifling notion of “nature.” In both cases, the enfolding of technology into the human does *not* rid technology of its “foreignness”; it serves instead to set the notion of “the human” into motion. More importantly still, the enfolding of technology into all things human serves to set the notion of “nature” into motion as well. There are two reasons for this. First, Cassirer and Simondon both configure the human/nature mangle as essentially mediated by tools or technological objects. Secondly, they insist that technological mediators are not ontologically neutral but are endowed with a certain measure of agency or ontological force.

Cassirer and Simondon both claim that we will never grasp the essence of technology if we continue to substantialize it, if we continue to approach tools or technical objects as if they were mere *things*. They both aspire to give technology a new ontological status and, hence, a new role in knowledge and existence. It is this new role that we refer to as “technicity.” As technicity, technology is seen as a mediator, not in the representational sense but in terms of its *functioning*: technology takes on ontological import in and through the *forces* that it exercises on other beings as well as in and through the new virtualities, and hence realities, it brings into being.

4 Technicity: Technological Efficacy

As technicity, technology no longer fits into the narrow ontological scheme of substantivist metaphysics. Simondon, for instance, conceives of the technical object as something that has a “genesis”—a term that is most often associated with living beings. By insisting on the technical object having a genesis, Simondon differentiates it from a mere thing, which he defines as “something given *hic et nunc*” (Simondon [1958] 1980, p. 12). The technical object, by contrast, is a “unit of becoming” that undergoes what he refers to as a process of “concretization.” Concretization is a process of differentiation and refinement through which the technical object evolves from a primitive or “abstract” form towards higher degrees of functional integration (p. 11–16). Even if Simondon ascribes to machines various degrees of self-regulation, he stops short of conflating machines with living beings. “The most that can be said about technical objects,” he maintains, “is that they tend towards concretization, whereas natural objects, as living beings, are concrete right from the beginning” (p. 49–50).⁵ What machines and living beings have in common is that they can only be accounted for in terms of their operative functioning (Simondon 1958, p. 247).

Like Simondon, Cassirer insists that the essence of technology will remain hidden from us as long as we approach it as a “mere thing with properties” (Cassirer ([1930] 2012, p. 32)). The “being” of technology shows itself not in technology’s thing-like characteristics, but in its activity or function. To get a grasp of technology’s “being,” we have to shift our focus “from the *forma formata* to the *forma formans*, from that which has become to the principle of becoming” (p. 18). The starting point of a true philosophy of technology, therefore, is technological *efficacy*. Thus understood, the task of philosophy is to gain insight into the inherent and immanent “lawfulness” that makes itself manifest in technology’s “mode and type of production” (p. 20). It is important to note that the principles and laws here alluded to have nothing to do with deterministic laws, nor, as Simondon makes clear, with improvised laws, but rather with the *conditions* of its functioning (Simondon 1958, p. 255).

Interestingly, and despite their move beyond substance metaphysics, both Cassirer and Simondon continue to talk about “essences.” This essence-talk should not be taken as an indication of a relapse into what today, with a dismissive gesture, would be labeled “essentialism.” Rather, it should be seen as an indication that these thinkers were working at a point in time where the notion of “essence” had yet to become a tainted notion. Besides, and more importantly still, whereas today’s critical discourse seems to be exhausted by two options (positions are seen as *either* essentialist *or* anti-essentialist), Cassirer and Simondon show us that there are other options, other ways of moving beyond substance metaphysics than the dismissive strategies pursued by today’s anti-essentialists. As argued by Aud Sissel Hoel (2011), even if they may appear less radical at first, the alternative strategies do in fact strike deeper than the anti-essentialist strategies. Or, as argued by Rick Dolphijn and Van der Tuin (2011), *any* negation results in an unwanted reconfirmation of the negated. Again, the strategies chosen by Cassirer and Simondon are devoid of dismissive gestures. Cassirer, for example, after having raised the question of technology’s “essence” or “being,”

⁵ The major flaw of cybernetics, for example, in Simondon’s view, is precisely that it tends to treat self-regulated technical objects and living beings as identical (Simondon [1958] 1980, p. 49).

immediately starts to rework the notion in dynamic terms. To come to grips with technology's essence, we must replace the "concept of being" as it is understood in the natural sciences (a substance with properties), with what he calls the "concept of form" (Cassirer [1930] 2012, p. 19–20). In Cassirer's dynamic approach, questions of "being," if adequately put, should be rephrased as questions of form: being as a process of formation, being as coming-into-being (becoming). What we see, here, is that in order to make sense of technological efficacy, Cassirer is led to rework the received form/matter distinction, which is also what Simondon is led to do (Simondon 1958, p. 244). Thus, by entering Cassirer's and Simondon's mode of theorizing, we are equipped with new tools that enable us to maneuver out of the familiar but barren terrain where essentialism is pitted against anti-essentialism, realism against social constructivism, scientism against cultural determinism, and so on.

Cassirer's "form" should be taken as a verb (forming) or as a process (formation), and as such, it comes close to Simondon's "concretization." Even if Simondon distinguishes between three different kinds of technical objects—elements, individuals, and ensembles—concretization involves the insight that the technical object is more than the sum of its parts (even its elements), or that its parts are also undergoing genesis and do not serve as a combined cause. If we are to come to terms with technicity, the efficacy or ontological force of the technical object, traditional linear accounts of time and causation need to be replaced by dynamic accounts. According to Simondon, the temporality that underlies the genesis of technical objects involves a "recurrent causality [that] must be invented rather than developed in stages, because such objects are the cause of their own condition of functioning" (Simondon [1958] 1980, p. 61). This recurrent causality, also called "circular causality," indicates that the cause *comes into being with* the effect, and therefore Simondon argues that "[w]hat is involved here, then, is a conditioning of the present by the future, or by what up to now does not exist" (p. 62). This coming-into-being demonstrates once more how being or essence is rid of its substantivist connotations.

Let us expand on an example put forth by Cassirer to make this point explicit (Cassirer [1930] 2012, p. 39). The sewing machine has a history in the sense that it comes *after* stitching with a needle. Even so, the sewing machine should not be understood merely as a further development or perfecting of the practice of sewing with a needle (higher precision and speed, industrialization, and so on). The sewing machine is better understood as having an impact on the needle, rather than the other way around. Hence, the sewing machine is a technology in its own right, which we can only rightfully understand if we see it as involving a leap into the future. It is with the sewing machine that the needle, thread, cloth, mechanics, electricity, tailor, and so on acquire the potential that we are prone to understand as having gone into the sewing machine. There is no mastermind or master plan behind the sewing machine, as it is only *in and through* the coming-into-existence of the machine that the plan (and the practice, as Cassirer would say) is formed.

Besides, and again according to Simondon, an evolved technical object "tends to internal coherence, and towards a closure of the system of causes and effects which operate in circular fashion within its boundaries" (Simondon [1958] 1980, p. 46). The recurrent and circular causality of the technical system instantiates what Cassirer refers to as an "Ineinander" (Cassirer [1930] 2004: 174). Furthermore, and crucially, the causalities of technicity are understood to extend beyond the merely technical and to include the maker, the user, and the environment. There is no natural or God-given essence nor is there "a doer behind the deed." But this should not be taken to mean

that the human or nature are no longer in the game. The argument is as simple as it is complex: the evolution of the technical object *forms the entire constituency*, including its spatial and temporal parameters.

A striking difference between Cassirer's and Simondon's essays on technology is that whereas the former tends to talk about tools and instruments, the latter tends to talk about machines. In "Form und Technik," Cassirer's primary interest is to investigate technology's place in knowledge, that is, as a "tool of the mind." In this respect, what is of interest to him is not so much the genesis of the technical object as the formative force technology exerts on other beings. This, of course, is where the question of technology ties in with the overarching questions of his philosophy of symbolic forms. In Cassirer's account, symbols and tools are seen as means to grasp reality. In line with his overall dynamic and functional approach, he undermines the age-old distinction between thinking and doing, by insisting that *thinking* (exemplified by language) has an instrumental side to it, just as *doing* (exemplified by material tools) has a theoretical side to it.⁶ Thus understood, "grasping" or "comprehending" reality becomes a double act that also involves a "'gripping on to it' through the medium of *efficacy*" (Cassirer [1930] 2012, p. 24; emphasis added). By insisting on the formative power of symbols and tools, or as we shall put it, on the ontological force of mediating apparatuses, Cassirer moves beyond the standard stifling accounts of mediation in terms of representation. Symbolic and technological processes of mediation, he persists, call for *genetic* accounts. Simondon also affirms that the distinction between the manual and the intellectual, the practical and the theoretical *disappears* once we begin our study of technical objects from the point of view of technical efficacy (Simondon 1958, p. 246, 256). For both philosophers, processes of grasping/gripping on to reality always involve an element of world-creation: the borders of phenomena are not simply "found" but must be actively sought out, set down, and secured. Furthermore, when language is reconfigured, as it is by Cassirer, as a tool or mediating apparatus characterized by the double operation of grasping/gripping—that is, as technicity—Simondon's account of the process of concretization and of the reciprocal causalities involved in technological functioning can be explored as a contribution to symbolic mediation.

Genesis and the genetic, machines and tools: Simondon's and Cassirer's wording should not lure us into overstating the differences between their respective accounts. As our continued diffractive reading will show, technicity involves a double dynamic. First, *genesis* (Simondon): on the level of technology itself, we find the evolving technical object where concretization has priority. Second, the *genetic* (Cassirer): an answer to the question of technology can only be given if we focus on the formative forces of technology, on how it affects the identity of other beings. Yet, as we have seen, concerns relating to genesis and the genetic are deeply interwoven, and time and again Simondon and Cassirer are led to cross paths. Even if we, like Cassirer, approach an enduring tool in its genetic role, the tool is ruled by its genesis, just as much as by the identity of the phenomenon it targets, whose evolving coming-into-being the tool sets the conditions for and is deeply mangled with. Or if we, like Simondon, are concerned with the genesis and evolution of the technical object, the evolved technical object is constituted in and through reciprocal relationships and causalities to other entities, which are formed

⁶ For a more detailed account of Cassirer's treatment of technology as a "tool of the mind," see Hoel (2012).

precisely by exercising forces on one another, thereby giving rise to new potentials. *We cannot know beforehand* what technology's potentials are because these potentials come about only in the "clicking together" (a term borrowed from Brian Massumi⁷) of the concretizing technology with what it exerts its powers on, whose other being is also emergent and answers back. In the words of Cassirer: "Technological work [...] never binds itself to [a] pure facticity, to the given face of objects; rather it obeys the law of a pure anticipation, a prospective view that foresees the future, leading up to a new future" (Cassirer [1930] 2012, p. 44–5). By ascertaining, through Simondon, that both the *potential* of what we think of as ingredient parts of a technology and the *being* of what technology works on are something that emerges in and through the working with a technology, we can even say that along with leading up to a new future, technological work leads to a new past.⁸

5 The Ontological Force of Technicity

Despite their respective emphases on the formative power of tools versus the genesis and evolution of machines, Cassirer's and Simondon's essays converge in the importance accorded to technological efficacy. As we have seen, both philosophers refuse to understand tools and machines as secondary, and in their attempts to account for the new status of technological beings, they are compelled to also account for the ontological force of technological mediators.

In "Form und Technik," Cassirer makes this point by ascribing "logos" to tools. In common usage, "logos" refers to the rational principle that underlies the universe (nature) or, alternatively, to divine reason and/or the word of God. In more secular terms, "logos" usually refers to human reason or language. By insisting that *tools* are endowed with logos, Cassirer enters a new conceptual terrain. In order to carve out a conceptual space for this new instrumental logos, he starts to work on language. Language is not so much a "means of representation, [or a] means for the *description* of external reality," as it is a "means for the *making* of reality" (Cassirer [1930] 2012, p. 23; emphasis added). There is an efficacy to language that is not accounted for by representationalist approaches, a world-creating force, and it is this efficacy that Cassirer alludes to when he maintains that language also has an instrumental side to it. From this point, he proceeds to undermine the received distinction between thinking and doing, between the theoretical and the instrumental, from the other side: "Yet implicitly contained in this [thesis concerning the instrumental side of language] is the counter-thesis that the potency of logos also resides in every simple material tool" (Cassirer [1930] 2012, p. 23). We will use the remainder of this article to unpack some of the far-reaching implications of this quietly stated, yet radical, move, where the theoretical and the instrumental (the latter understood in the sense of ontological efficacy) are brought together in a new and inner constellation.

⁷ See De Boever et al. (2009).

⁸ The concepts generally used for this particular non-linear potentiality are "virtual" and "actual" vis-à-vis "possible" and "real." These Bergsonian conceptual pairs, which have been popularized by Gilles Deleuze and Félix Guattari, who were also greatly influenced by Simondon, emphasize how a potential is never a predetermined possibility coming to realization but, rather, pertains to an as-yet-unknown virtuality that actualizes itself and can only in hindsight be termed a possibility.

Cassirer's move is radical because it breaks with the founding assumption of substantivist metaphysics and its associated representationalist epistemologies, namely, that essences are self-identical and preexisting and, hence, that material mediators are "outside" the essences and only secondary compared to them. But what is more radical still is that the acknowledgment of the mediator's complicity in the essence does not lead Cassirer to embrace a relativist or conventionalist stance. He proceeds instead to give a *positive* account of mediation as, at once, invention and intervention—thus demonstrating how substantivism, as a totalizing epistemology, and conventionalism, with its relativist twist, are unreal oppositions. In the resulting account, the in(ter)vention of a "foreign" symbolic or technological apparatus is seen as a *prerequisite* for the discovery and disclosure of nature, and not as an obstacle to it. This may sound paradoxical at first, but, as we hope to show, it makes perfect sense against the background of an ontology of emergence that gives ontological priority to technicity.

The mediating tool's "foreign" status has to do with its relative autonomy, with its being endowed with a "logos" of its own. This is so, "[f]or the tool obeys its own law, a law which belongs to the world of things, and which, accordingly, breaks into the free rhythm of natural movements with a foreign dimension and foreign norm" (Cassirer [1930] 2012, p. 40). Here, it is necessary to pause and make some clarifying remarks so as to avoid possible misunderstandings. Even if Cassirer refers to the mediator as a "third term" and as "foreign" relative to the "rhythm of natural movements," it is not conceived as "outside" these movements. The point is, rather, that by bringing in its own "foreign norm," the symbolic or technological mediator takes on a co-constitutive role. It *intervenes* into the "rhythm of natural movements," not by impeding or substituting these movements, but by displacing and redistributing them in accordance with its own norm or organizing principle. The mediator intervenes in the sense that it temporarily disrupts the natural flow of movements, but only to allow these movements to resettle on a new and "higher" or more articulated level. The tool's articulatory intervention is also an *invention*, since it occasions a metamorphosis into something new. This in(ter)vention should be understood as making its mark *with* and not at a distance from or as a distancing from natural movements. It is in this sense that there is nothing humbly "natural" about the movements nor is there something authoritatively "cultural" about the work with the tool (or the machine). None of these interpretations fit, and in fact, we will see that *they* lead to alienation, whereas a notion of instrumental logos *does not*. For Simondon too, mediation is in(ter)vention. Even if his thinking developed independently of Cassirer's, Simondon's considerations of the principles involved in the perfecting of a machine may shed new light on Cassirer's notion of instrumental logos, just as his considerations of the artificial nature of the technical object may help elucidate Cassirer's idea of technology's "foreignness."

Like Cassirer, Simondon maintains that technology is endowed with a certain measure of autonomy. Through the process of concretization, the technical object evolves "towards its own specificity," and the principle of progress is "none other than the way in which the object causes and conditions itself in its operation and in the feed-back effect of its operation upon utilization" (Simondon [1958] 1980, p. 22). However, progress is neither continuous (linear) nor discontinuous. Because the technical object is made up of a system of reciprocal causalities, the overcoming of limitations "can only be arrived at by a leap, by the modification of internal disposition of functions, by a rearrangement of their system" (p. 22). Even if the process of

concretization unfolds in a manner that tends towards higher degrees of functional integration, this does not mean that the evolved technical object becomes increasingly isolated along the way, which would be the cause of alienation. Simondon goes against the widespread cultural assumption that the perfecting of a machine tends towards automatism. This assumption is mistaken, he maintains, since a machine that is completely automatic is closed upon itself and predetermined in its functioning, something that severely *limits* its functional possibilities and potential uses. A highly evolved or sophisticated machine, by contrast, is an *open* machine, that is, a machine whose functioning is characterized by “a certain margin of indetermination” (p. 4). In Simondon’s view, openness is crucial, since it is the machine’s margin of indetermination that allows it to be sensitive to outside information. Thus understood, the perfecting of a machine has to do with the machine’s capacity to *connect* with other systems. This capacity to connect is what Simondon throughout *Du mode d’existence des objets techniques* calls clicking into a “rhythm.”

A key feature of Simondon’s account is that the evolved technical object is not closed upon itself, but that the human as well as parts of nature intervene as coevolving conditions in its dynamic functioning. The human is not “outside” the machine, but “among the machines that work with him” (p. 4), rhythmically. In its relation to machines, the human takes on roles as organizer, living interpreter, coordinator, and inventor. Since the human is also the inventor of machines, the functioning structures of the machines could be seen as a sort of crystallization of human actions or, more problematically, as a sort of translation of a human intellectual system (p. 4, 46). With Cassirer, we could immediately challenge the latter statement, by re-emphasizing the point that human thinking does not preexist the tool but enters together with it. It could also be challenged with Simondon’s own insight that progress in technical genesis is arrived at in leaps and, hence, that the functioning cannot be envisioned in terms of a linear translation, but rather in terms of an in(ter)vention that releases new potentials, including intellectual. Cassirer has formulated this as follows: “witness the problem of flight, which could only finally be solved once technological thinking freed itself from the model of bird flight and abandoned the principle of the moving wing” (Cassirer [1930] 2012, p. 39). Further, and more importantly still, with the view to the overcoming of substance metaphysics and its associated ontological divides, an evolved or sophisticated machine crucially incorporates “part of the natural world which intervenes as a condition of its functioning and, thus, becomes part of the system of cause and effects” (Simondon [1958] 1980, p. 46). Nature’s intervention is a critical influence on which the regulation and subsistence of the dynamic system depends. Here, too, the influence is not linear; it is an in(ter)vention. According to Simondon, the concretization process “causes the birth of an environment rather than being the result of an already established environment” (p. 58). Again there is a leap, since the concretization process is “caused by an environment that only had virtual existence before the invention” (p. 58–9). An evolved technical object, in other words, does not merely form a relation to a preexisting environment, it invents a “third technogeographical environment in which every modification is self-conditioned” (p. 59). It is for this reason that Simondon, in the conclusion to *Du mode d’existence des objets techniques*, affirms that “the system” is prior to form and matter: “Form and matter, if they still exist, are at the same level, are part of the same system; there is continuity between the technical and the natural” (Simondon 1958, p. 244; our translation).

According to Simondon, the technogeographical environment is a “mixed environment that is at once technical and geographical” (Simondon [1958] 1980, p. 59). Even if it is brought into being in and through a technological in(ter)vention, he maintains that the new environment is not fabricated. Like living beings, an evolved technical being is characterized by the way that it creates a milieu around itself, and in the same stroke takes on the role as a condition on which the functioning of the technical object depends. It is in this sense, then, that an evolved or sophisticated machine “approximates the mode of existence of natural objects” (p. 46). Through the process of concretization, the technical object “loses its artificial character” (p. 46) by becoming, so to speak, a living part of the human/nature mangle.⁹ Thus understood, technicity stands in a perpetual in(ter)ventional relation to ontological movements; it continues to displace these movements in ways that release new potential. Technology does not tap into a natural flow (nature as resource) since technology functions *with* nature in such a way that nature only gets to condition technology once a relation between them is at work. Establishing and maintaining such a relation is not frictionless but involves an in(ter)ventional process. This perpetual in(ter)vention does not leave the human untouched either: the human, in its multiple roles, is displaced such that as an inventor, she appears to stand at the end of her invention, and as an end-user, she becomes the condition of possibility of the technology used. Like Cassirer’s treatment of “foreignness,” the “artificiality” of the mediator is turned, with Simondon, into an active ontological force that occasions the notions of “nature” and “the human” to differ from themselves. As we will return to in the following section, the introduction of technicity fosters what we label a “growth in being” in two directions: on the side of the entangled “nature” and on the side of the entangled “human.”

6 “Nature” and “the Human” in Motion

So far, our diffractive reading of Cassirer and Simondon seems to challenge some of the received ideas about how these philosophers relate to epistemology. Despite the fact that Cassirer is sometimes accused of being too much of an epistemologist¹⁰ and despite the fact that Simondon is sometimes claimed to treat epistemology as a mere function of ontology (De Boever et al. 2009), Simondon *follows* Cassirer’s point regarding the lawfulness embedded in technology. Simondon even goes so far as to insist that an investigation of technology’s mode of existence is always simultaneously epistemological (Simondon 1958, p. 255). Indeed, as should already be clear from the preceding discussion, in their pursuit of the “being” of technology, both Cassirer and Simondon are constantly led to transverse the received boundaries between

⁹ Even if not completely: “the essential artificiality of an object resides in the fact that man has to intervene in order to keep the object in existence by protecting it from the natural world and by giving it a status as well as existence” (Simondon [1958] 1980, p. 46).

¹⁰ An arguably unjust accusation most famously made by Martin Heidegger in the now legendary disputation between Cassirer and Heidegger in Davos, Switzerland, in 1929. For detailed accounts of the Davos meeting, see Friedman (2000) and Gordon (2012). The idea that Cassirer’s thinking is restricted to epistemology has been further corroborated by the way that Cassirer’s philosophy has been pigeon-holed as “Neo-Kantian” by tradition—a label Cassirer himself came to oppose (Krois 1983, p. 151), and for good reason, with a view to the direction that his mature philosophy was taking (Hoel 2012). For a comparison of Cassirer’s and Heidegger’s different takes on technology, see Ruin (2012).

epistemology and ontology. These transversalities, we argue, are best understood, not as an indication of inconsistency, but rather as a strong indication that *on a dynamic ontology of emergence, these boundaries no longer hold*. The diffractive reading of the two philosophers, in other words, *puts epistemology in its proper place*, namely, as a philosophical concern deeply entangled with ontological questions. Conceived against the background of an ontology of emergence that gives priority to technicity, epistemology becomes *onto-epistemology* (a term borrowed from Barad [2007]). Going into the specifics of this “proper place” enlightens the tricky status and place of nature and the human referred to above.

“Form und Technik” raises the question of nature by zooming in on technology’s relation to it. As we have seen, Cassirer ascribes a most special place to technology, which he sees as constitutive of knowledge and thinking more generally. This has thoroughgoing implications for how we are to understand the relation between technology and the theoretical knowledge of nature and, subsequently, the status of the object of knowledge. Technology, for Cassirer, is never applied natural science: “For it is in no way the “abstract”, pure theoretical knowledge of the laws of nature that leads the way, proving first the technological aspects of the problem and its concrete technological activity” (Cassirer [1930] 2012, p. 42). Simondon makes the temporality hinted at by Cassirer explicit by stating that, as a matter of fact, technological objects “are no longer merely applications of certain *anterior* scientific principles” (Simondon [1958] 1980, p. 48; emphasis added). As a consequence, theoretical knowledge is not a mere reflection of a nature “out there.” Neither does technology simply rely on the theoretical knowledge that we assume to have *of* nature. Here, we see how the onto-epistemological account that emerges from our diffractive reading deeply subverts representationalist epistemologies by stating, in Cassirer’s words, that “theoretical activity and technological activity do not only touch one another externally, insofar as they both operate on the same “material” of nature, but, more importantly, they relate to one another in the principle and core of their productivity” (Cassirer [1930] 2012, p. 43). This means that the discovery of nature is never a question of an “idle beholding” of pre-given substances, but requires “the use of an active force” (p. 43). The technological in(ter)vention involves a back-and-forth movement wherein also nature, itself always already shot through with active forces, participates. These points are succinctly formulated by Cassirer:

Technology submits to nature in that it obeys its laws and considers them as the inviolable requirements of its own workings. Notwithstanding this obedience towards the laws of nature, however, nature is never for technology something finished, wherein laws are merely *posited*. Nature is something that must perpetually be *posited anew*, something that is to be formed repeatedly. (p. 44; emphasis added)

That nature, for technology, is never finished should not be seen as a failure on the side of technology. Instead, it allows for nature to be perpetually discovered anew: the discovery of nature and the invention of nature go hand in hand, that is, the discovery of nature is always already a world-creation. But in what sense, then, is the world “created”?

Subverting the representationalist scheme does not mean that we turn our back on its key notions. Rather, they come out reworked. This is even the case with the notion

of “correspondence,” which, in an ontological account that gives priority to technicity, becomes a process of the parceling of theoretical knowledge and reality. As Cassirer explains: “Mind always measures anew objects in relation to itself, and itself in relation to objects, in order to find and guarantee in this twofold act the genuine *adaequatio*, the actual “appropriateness” of both” (p. 44). If knowledge and reality parcel one another, and grip into one another, “correspondence” can no longer be understood in terms of a mere coincidence with pre-given entities (realism), nor can this relation be seen as governed entirely by the subject (conventionalism). The onto-epistemological account that emerges from our diffractive reading of Cassirer and Simondon is neither a synthesis nor a compromise of these two positions, but a genuine alternative, since it has shifted the substantivist assumptions that both positions continue to purport. If *adequatio* entails the continued measuring against one another of thought and reality in and through the in(ter)vention of technicity, it follows that correspondence is only “localised, particularised” since “it is impossible to find an *absolute* adequacy to the world, since each of the [technical] objects attacks the world in one place only and in one moment only” (Simondon [1958] 2011, p. 421; emphasis added). Adequacy, therefore, is never absolute. All agents involved—the technical object, the scholarly subject, nature, thought—are always already differing from themselves, since they are shot through with technicity. The notion of correspondence that emerges from this onto-epistemological account can only be *performative*. Performative correspondence does not *absolutize* the relation between the object and the subject by fixing the correlate as exhaustive or as exhausting everything there is. Rather, it highlights that technological in(ter)vention, the parceling and grasping/gripping onto reality, leads to an “inner growth”: “The more this movement takes hold, the more its force grows, the more the mind feels and knows its reality to have ‘grown’” (Cassirer [1930] 2012, p. 44). The implication of this is that knowledge itself is seen as a process of concretization or individuation (Grosz 2012, p. 207–8) or, as Cassirer would put it, a process of formation or articulation.

Now, we have alluded to the fact that the in(ter)vention of technicity leaves neither nature nor the human untouched. It is *between* an evolving object and the equally evolving subject that technical objects concretize and knowledge is created. The relational and performative nature of correspondence cannot be overemphasized:

For human beings, a fixed relation between subject and object according to which they conduct themselves does not exist from the beginning. [...] There is no solid, static relation between them from the outset. There is, as it were, a fluctuating movement back and forth. From this movement a form gradually crystallizes in which the human being first grasps his own being as well as the being of objects (Cassirer [1930] 2012, p. 26).

7 Concluding Discussion: Beyond Facile Humanism

The ontological force of technicity has been demonstrated to transverse and revitalize conceptions of the relation between nature and the human, stirring understandings of technological mediation as neither neutral nor fundamentally disruptive, but rather as perpetually in(ter)ventional. Let us ask ourselves, by way of conclusion, what

implications the philosophy of technology generated in and through the diffractive reading of Cassirer and Simondon may have for notions of the human in a more general, cultural sense. After all, the place, role, and essence of the human have changed now that the human is affirmed as coevolving with nature and technology. We would like to answer this question by considering, once more, a set of relevant quotes from our main protagonists, read through one another.

Du mode d'existence des objets techniques opens by claiming that technical objects are ignored in culture at large—educational and philosophical thought included. This ignorance has led to a defense of Man with a capital “M” at the expense of technology: technical objects have not been granted a place in human reality, or, what boils down to the same, a human reality has not been recognized in the technical realm, resulting in an oppositional relation between culture and technology, man and machine. In contrast to this widespread disregard of technology and the lacking recognition of its ontological force, Simondon maintains that for a theory to produce valuable insights into technological development, knowledge production, or value systems more generally, it must incorporate technological beings. He formulates this point as follows:

[The opposition between the cultural and the technical] uses a mask of facile humanism to blind us to a reality that is full of human striving and rich in natural forces. This reality is the world of technical objects, the mediators between man and nature. (Simondon [1958] 1980, p. 1)

Here, we can add that the blinding mask of facile humanism has, so to speak, two faces: either it tends to overstate the human’s complicity in ontological becoming, or it tends to understate it. In either case, the humanism is “facile” because it proceeds by way of absolutizing gestures that give rise to subject-centered or object-oriented ontologies, respectively. Simondon qualitatively shifts humanism by ridding it of these absolutizing gestures, and by giving ontological priority instead to a human/nature mangle that is irreducibly infused with technicity. Nature, technology, and the human are seen as complicit participants in open-ended processes of concretization that tend towards increasing degrees of indeterminacy. Culture, therefore, Simondon proposes, could be compared with an orchestra (p. 4), into which humans (conductor, musicians) are immersed: the human finds itself amidst the machines (instruments, amplifiers) and, we can add, amidst the tools (baton, music stands), being carried away by music in the making of the environment of the concert hall. An orchestra does not consist of mute, human-led instruments, automata, or technology-led humans; it instantiates a genuine *Ineinander* that cannot be reduced to its constituent parts.

Cassirer, likewise, affirms that a being infused with technicity is not completely bound to or ruled by the actual. Technology does not ask “what is” but “what can be” (Cassirer [1930] 2012, p. 44); and in so doing, it discovers a certain latitude for growth and action. Acquiring this leeway, which is at once a new viewpoint and a turning point in human existence, is the greatest achievement of technology:

Standing in the middle of the sphere of necessity and remaining within the idea of necessity, [technology] discovers a sphere of free possibilities. (p. 44)

This latitude, Simondon’s margin of indetermination, amounts to a kind of freedom—a freedom from predetermination. This freedom, however, is never unrestricted. Rather, it emerges in the localized and particularized potentiality opened up in,

and through, specific mediated ontological encounters. The orchestrating of humans, tools, machines, nature, and culture makes possible a discovery and revealing of nature that is never exhaustive but still assertive. There is no subjective insecurity clinging to the possibilities discovered by technology (p. 44), and *qua* possibilities they always point beyond the situation here and now. Technicity, in other words, is always already symbolic, which means that the human is always already connected (materially, intellectually, existentially) to its fellow beings. The relational and emergent stance, predicated on a productive back-and-forth movement wherein all parties participate and evolve, challenges established notions of culture based on negation and susceptible to “xenophobia” (Simondon [1958] 1980, p. 1), that is, to the ousting of “foreignness.” Instead, it installs an onto-epistemic space wherein *positive difference*—concretization or formation through differing, or what we have referred to as “performative correspondence”—becomes a true alternative to the Janus-faced mask of facile humanism.

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