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On Cosmotechnics: For a Renewed Relation between Technology and Nature in the Anthropocene

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Abstract: This article aims to bring forward a critical reflection on a renewed relation between nature and technology in the Anthropocene, by contextualizing the question around the recent debates on the "ontological turn" in Anthropology, which attempts to go beyond the nature and culture dualism analysed as the crisis of modernity. The "politics of ontologies" associated with this movement in anthropology opens up the question of participation of non-humans. This article contrasts this anthropological attempt with the work of the philosopher Gilbert Simondon, who wants to overcome the antagonism between culture and technics. According to Simondon, this antagonism results from the technological rupture of modernity at the end of the eighteenth century. This paper analyses the differences of the oppositions presenting their work: culture vs. nature, culture vs. technics, to show that a dialogue between anthropology of nature (illustrated through the work of Philippe Descola) and philosophy of technology (illustrated through the work of Simondon) will be fruitful to conceptualize a renewed relation between nature and technology. One way to initiate such a conversation as well as to think about the reconciliation between nature and technology, this article tries to show, is to develop the concept of cosmotechnics as the denominator of these two trends of thinking.

Key words: ontological turn, Gilbert Simondon, Philippe Descola, cosmotechnics, modernity

Introduction

It is scarcely deniable that the Anthropocene, beyond its obvious signification as a new geological era, also represents a crisis that is the culmination of two-

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hundred years of industrialization. The relation between humanity and "nature" has undergone a great transformation, and the constant arrival of ecological crises and technological disasters has well documented such a historical moment, and urges for a new direction of humanity to avoid its proper end. The Anthropocene, announced by geologists such as Paul Crutzen as the successor of the Holocene (Crutzen 2006), carries such a historical meaning. It also serves as a turning point for the imagination of another future or beginning—provided that this is still possible at all. For some political theologians the Anthropocene also represents the apocalyptic moment, in the sense that it will be the *kairos* that ruptures the *chronos*, the deep time of earth proposed by the founder of modern geology James Hutton towards the end of the eighteenth century (Northcott 2015). I put the word "nature" in quotation marks since it will be important to first elucidate its meaning before we can embark on a discussion of a renewed relation between technology and nature. A facile opposition between technology and nature has long been made, fostering the illusion that the only way to salvation will be to give up upon, or else to undermine, technological development. We may also find the opposite position, in the various discourses on transhumanism, the technological singularity, and eco-modernism, for example, which carry a rather naïve and corporate-favored idea that we will be able to improve our living situation, repair environmental destruction with more advanced technology, and intervene within creation (e.g., through DNA manipulation). Within these discourses there is virtually no question of "nature," since nature will be merely one of the possibilities of advanced technologies, and technology is no longer merely prosthetic, meaning as mere artificial replacement or supplement; instead, the order of things seems to have reversed, technology is not only supplementary, but rather it becomes itself the *ground* in contradistinction to the *figure*.

In recent decades, even before the concept of the Anthropocene became popular, anthropologists such as Philippe Descola had been pushing an agenda for overcoming the opposition between culture and nature, as best detailed in his brilliant systematic work *Beyond Nature and Culture* (2013). However, this attempt to overcome the opposition between nature and culture, I will argue, relinquishes the question of technology too quickly and too easily. The proposal to overcome the dualism agrees on the urgency of developing a program for the co-existence between humans and non-humans, but it takes a rather simplistic approach and therefore, to some extent, may fail to recognize the real problem of the Anthropocene as that of a gigantic cybernetic system in the process of realization. Presupposing such, some profound questions are hidden, and the Anthropocene will continue the

logic of development—a "metaphysics without finality," as Jean-François Lyotard puts it (Lyotard and Brügger 1993, 149), until it reaches the point of self-destruction. This article attempts to contribute to a clarification of the relation between technology and nature, and to the inevitable task for the philosophy of technology of reflecting on future planetary technological development. It also aims to resolve the above-mentioned tension through the concept of *cosmotechnics*, thereby hoping to move beyond the limit of the notion of technology (Heidegger 1977)[1] and to understand it from a truly cosmopolitical perspective.

1. From First Nature to Second Nature

In the two extreme attitudes mentioned above—one focusing on the sacredness and purity of nature, the other on its mastery—there is a lack of understanding of the profound question of different forms of participation of both humans and nonhumans. The participation of the non-human is either eclipsed by the question of technological dominance and mastery and hence rendered insignificant; or culture is seen as a mere possibility of nature in the sense that nature is the mother that gives rise to all and to which all will return. I would like to speak instead of a *second nature*,[2] in order to avoid indulging in an illusion of a pure and innocent *first nature*, as well as to avoid imprisoning ourselves in a pure technological rationality.

It is perhaps too obvious to mention that the world is composed of human and non-humans, and that they participate in different ways in different cultures. The question is rather: should we take it seriously, and if so, how? Knowing it and taking it seriously are two different things. The failure of the social constructivism of the twentieth century, as suggested by the sociologist Andrew Pickering (2017), should teach us to take these ontologies seriously, since they are not merely "constructed" but "real." The participation of non-humans varies from one culture to another according to different cosmologies. These cosmologies are not only schemas that define the modes of participation, but also correspond to the moral grounds of such participation. To elucidate this, we only need to remind ourselves of the role of *hau* and *mana* in Marcel Mauss's ethnography of gift economies (Mauss 2013), in which the moral obligation has its source in cosmology. A particular form of participation is only justified in so far as it meets or enlightens the moral—which doesn't necessarily mean harmony, but rather the codes and belief that constitute the dynamics of both individual and communal life. We can talk about the moral only in so far as human beings are being-in-the-world; and the world is only a world and not a mere environment when it is in accordance with

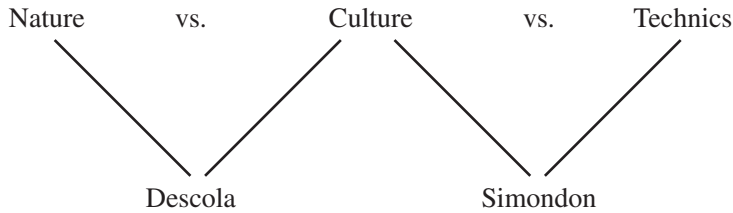
such beliefs. It is in the question of *second nature* that we can locate the question of the moral, since the moral is only revealed through a certain interpretation of nature; or to put it differently, nature is known according to orders and exceptions. In ancient Greece it is known as cosmology: *kosmos* means order; cosmology, the study of order. Nature is no longer independent from humans, but rather its other. Cosmology is not a pure theoretical knowledge; indeed, ancient cosmologies are necessarily *cosmotechnics*. Let me give a preliminary definition of cosmotechnics here: it means the unification of the cosmic order and moral order through technical activities. Human activities, which are always accompanied by technical objects such as tools, are in this sense always cosmotechnical. Modern technology has broken down the traditional relation between cosmos and technics; it becomes a gigantic force, which transforms every being into mere "standing reserve" or "stock" (*Bestand*), as Martin Heidegger observes in his famous 1949/1954 lecture "*The Question Concerning Technology*" (Heidegger 1977).

Without attempting to exhaust the rich materials we find across the history of philosophy, starting with the Greek notion of *physis* and *technē*, we will *firstly* access the notion of nature in light of the recent "ontological turn" in anthropology, a turn associated with figures such as Philippe Descola, Eduardo Viveiros de Castro, and Bruno Latour, among others. This ontological turn is an explicit response to the ecological crisis or ecological mutation according to Latour, proposing to take these different ontologies seriously, and to undermine and adjust the dominant European discourse of naturalism, in order to search for another way of co-existence. *Secondly*, I would like to supplement the anthropological work by suggesting how a co-existence between nature and modern technology can be conceptualized through the work of the French philosopher Gilbert Simondon. We will address the recently published posthumous works of Simondon in this context. We will try to show, in both the work of Simondon and the anthropologists, that the relation between nature and technology has a moral root that has been deracinated by planetary industrialization; and from there, we will attempt to address the possibility of a renewed relation between technology and nature, and thereby shed light on the concept of cosmotechnics.

2. Between Technology and Nature

In the writings of the above-mentioned thinkers, we can find two groups of opposing registers—which at first glance seems rather intriguing, as if there were a gap between them. Descola speaks of the dualism between culture and nature; Simondon speaks of the antagonism between culture and technics. Descola's

culture-nature dualism seems to have assumed that technics falls on the side of culture, while it is clear that for Gilbert Simondon technics is—at least, in the course of his writing—not yet fully integrated into culture. For Simondon there is a misunderstanding and ignorance of technics in culture (Simondon 2012, 10), which is one of the sources of a double alienation: the alienation of human beings in the sense of Marx, and the alienation of technical objects—for example, they are treated as slaves or products of consumption, like the slaves of Roman times waiting indefinitely in the market for the buyers (Simondon 2014, 58–60). In fact we can see a rather intriguing parallel between Descola and Simondon, as schematized in the following diagram:



Do these different configurations—nature vs culture, culture vs technics—result from differences between Descola's and Simondon's respective disciplines, or from their different diagnoses of the problems of their time? It is notable that Descola, the anthropologist of nature, rarely addressed the paleontologist and anthropologist of technology André Leroi-Gourhan, who is an important figure for Simondon's thinking of technology.[3] It is my contention that the anthropology of nature and the philosophy of technology should talk to each other in order to address the question of the Anthropocene. Some readers may doubt if these two schools of thought can be brought together at all: the anthropological school is largely rooted in the work of Lévi-Strauss, who adopts a quasi-Kantian transcendental perspective on myths and cosmology, while Simondon's thought could be characterized as a transcendental empiricism in the sense of Deleuze, which is situated in the immanence of relations, energies, and information. However, this opposition is only apparent, since on the one hand, in Part III of Simondon's *On the Mode of Existence of Technical Objects* (2012), he offered a way to situate technical progress beyond the technical reality (e.g., the internal dynamics of technical objects) towards a cosmic reality; on the other hand, the question of relation (though somewhat schematized) plays a central role in conceiving the mode of operation within different ontologies in Descola's *Beyond Nature and*

Culture (not to mention that Viveiros de Castro's *Cannibal Metaphysics* (2014) is a poststructural anthropological treatise inspired by the Deleuzian concept of intensity). This time we want to switch the context; that is, to facilitate a dialogue between poststructuralist anthropology and philosophy of technology.

2.1. Dualism between Culture and Nature

The culture vs nature opposition comprises one of the four ontologies that Descola calls "naturalism," alongside which he sets three others: "animism," "totemism," and "analogism" (Descola 2013, 122). In naturalism we find the nature/culture divide, which manifests as a divide between the human and the non-human. Such a divide is characterized by the physical continuity and the spiritual discontinuity between humans and non-humans, in which the participation of the non-humans is limited to being objects of the mastery and domination of the human. It would be too easy to attribute all these problems to the Cartesian division between subject and object. However, it is equally difficult to identify the origin of such thinking without recurring to the dominant philosophical scheme of early modern European philosophy. It is important to acknowledge that naturalism has not existed since the beginning of European culture; it is actually a "recent" product, or for Bruno Latour, an "incomplete" product on the sense that "we have never been modern" (Latour 1993). Descola showed that analogism rather than naturalism was significantly present in Europe during the Renaissance, and if this is the case, the "turn" that took place during European modernity seems to have provided a completely different epistemology regarding the relation between human and nonhuman, culture and nature, subject and object, and cosmos and physics; an epistemology that we can retrospectively analyze in the work of Galileo, Kepler, Newton, and others. If naturalism has succeeded in dominating modern thought it is because such a peculiar cosmological imagination is compatible with its technological development: nature should be mastered and it can be mastered according to the laws of nature.

Table 1: The schema of Descola's four ontologies

Similar interiority, Dissimilar physicality	Animism	Totemism	Similar interiority, Similar physicality
Dissimilar interiority, Similar physicality	Naturalism	Analogism	Dissimilar interiority, Dissimilar physicality

The Anthropocene is at once the crisis of naturalism and the crisis of modernity. It is under such a crisis that modernity is again called into question (Latour

2013), this time by anthropologists. The ontological turn in anthropology is a call for a politics of ontologies. What this politics leads to is primarily a pluralism which has been endangered by naturalism's spread throughout the globe by colonization. At the center of such a politics is the recognition of a plurality of ontologies in which natures play different roles in everyday life. Recognition is, however, only the first step; politics arises in the encounter between these ontologies. What kind of politics will it look like? During the conference "*Comment penser l'Anthropocène*," Descola referred to a story that Bolivia had included the rights of non-humans within its constitution (Descola 2015). We can understand this as an institutionalization of ontologies. However, the question that remains to be answered is what will be the fate of these indigenous ontologies and practices when confronting modern technology, which is the realization of naturalism? Or are these "practices" able to transform modern technology so that the latter acquires a new direction of development, a new mode of existence? This is one of the most crucial questions, since it is also about how to escape both colonialism and ethnocentrism. Descola frequently uses the word "practice" instead of technics or technology (Descola 2013). We can understand that he may want to avoid an antagonism between technics and nature; however, by doing so he also hides the question of technology. This is not to reproach Descola for forgetting the question of technics, since he is certainly aware of it when he writes:

> Animist "nature" and "supernature" are thus peopled with social collectives with which humans establish relations that conform with the norms supposed to be shared by all, for when this happens, humans and nonhumans are not content simply to exchange perspectives. They also, and above all, exchange signs, which sometimes leads to an exchange of bodies or, at the very least, indications that, in their interactions, they understand each other. Those signs cannot be interpreted by either side unless they are underwritten by institutions that legitimate them and make them meaningful, thereby ensuring that misunderstandings in the communications between the two species are kept to a minimum. (Descola 2013, 249)

There are codes and institutions; codes are already technical like the 'protocols.' However, therein hides another problem, one that is less strategic than ontological. We will have to recognize that the tension between ontology and technics is not clearly stated in Descola's thinking. In speaking of a tension between ontology and technics I mean that these ontologies are only possible when they are already complicit with the technical life—ranging over invention, production and daily

use. As a result, any transformation of the latter will directly alter the former. The arrival of modern technology in non-European countries in past centuries has created a transformation unthinkable for European observers. The concept of an 'indigenous ontology' itself has to be questioned first, not because it did not exist but because it is situated in a new epoch and transformed to such an extent that there is hardly any way to go back to it and restore it. This is precisely the reason that we have to conceive a cosmotechnical thinking from the standpoint of these ontologies without falling prey to an ethnocentrism.[4] The transformation triggered by modern technology not only happened in non-European cultures in the course of colonization, but also in European culture, with the significant difference that, for the former, it is through the import of such advanced technological apparatus as military technologies, and for the latter mainly through technological invention.

What is central to the anthropologists' concept of "nature" and "ontology" is cosmology, since such "nature" is defined according to different "ecologies of relations," in which we observe different constellations of relations, e.g., the parental relation between females and vegetables, or brotherhood between hunters and animals. These relations can be traced in technical activities such as the invention and use of tools. It is the reason for which we may want to conceive a *cosmotechnics* instead of speaking merely of a cosmology, which may limit us to discussions on theoretical knowledge and attitudes. Globalized modernization, Claude Lévi-Strauss has suggested in his *Tristes Tropiques*, brings forward a new meaning to the study of *anthropology*, namely *entropology*—note that both words pronounced the same in French (Lévi-Strauss 1992, 414)—entropic in the sense of the "disintegration" of forms of life through technological transformation, which silently homogenizes different cosmological relations into one that is compatible with modern technology. This is the problem of modernity as viewed outside of Europe, and it is undeniable that globalization has taken such a pace that what is called indigenous knowledge is marginalized, and the situation will continue to deteriorate. If we want to conceive the future of the philosophy of technology we must give it the task of thinking beyond the Western tradition. And in order to address this task, we must not be satisfied with how useful philosophy is to technological development and how philosophy can give an account of the ethics of a particular technology. Rather, we must conceive a philosophy of technology which tackles the fundamental dualism between nature and technology, humans and non-humans (animals, plants, machines), modern and non-modern, and go beyond them against a globalization dominated by the mere discourse of economy or political economy.

We can identify such an emphasis on the role of cosmology in the work of anthropologists and philosophers such as Viveiros de Castro, Déborah Danowski (cf. Danowski and de Castro 2016), and Tim Ingold (2014), among many others.[5] Here I will limit myself to addressing an interesting proposal from Donna Haraway. In her recent work "*Staying with the Trouble: Making Kin in the Chthulucene"* (2016), we find a similar strategy, which also indirectly addresses the question of technology. Although making no reference to Descola, she addresses the problem of the Anthropocene in a way that resonates with Descola's proposal. If Descola sees politics as the moment of encounter and negotiation of different ontologies, in a more or less Latourian sense, Haraway does not have a schematic presentation of ontologies but rather a more generalized conception of non-human politics. Haraway characterizes the Chthulucene as the next scene after the Anthropocene and the capitalocene. Chthulucene, according to Haraway, is a compound of two Greek roots—*khthôn* and *kainos*—which means to look from below from the perspective of other forms of living beings (Haraway 2016, 2). As a biologist and social scientist, Haraway proposes to think of politics as a way of "making kin," of conceiving a *sympoiesis* between different species. This neologism, "sympoiesis," relates to both symbiosis and autopoiesis. However, it differs from them since, firstly, it doesn't simply mean that which is mutually beneficial (Haraway 2016, 61); and, secondly, it emphasizes the fact that the relation between humans and other beings are highly interdependent, thus problematizing the "auto-":

> Symbiosis makes trouble for autopoiesis, and symbiogenesis is an even bigger troublemaker for self-organizing individual units. The more ubiquitous symbiogenesis seems to be in living beings' dynamic organizing processes, the more looped, braided, outreaching, involuted, and sympoietic is terran worlding. (Haraway 2016, 61)

It is a "bio-politics" par excellence, as Haraway writes that the "biologies, arts, and politics need each other; with involutionary momentum, they entice each other to thinking/making in sympoiesis for more livable worlds that I call the Chthulucene" (Haraway 2016, 98). We can probably summarize Haraway's proposal as a "biology contra technocracy," such that whenever humans develop technologies they will have to assess its impact on other forms of living beings. Haraway's approach is deeply ethical, and has the advantage of providing a generalized ontological politics and ethics for overcoming the Anthropocene. The concept of sympoiesis is an attempt to set limits to technocratic development, and the possibility of sympoiesis becomes the condition for protecting species from destruction. By

doing so, Haraway does not directly address the question of technology; rather, like Descola, she abstracts technology as culture, and therefore avoids a direct confrontation with the question of technology. It is by going to Simondon's work that we make the question of and confrontation with technology explicit.

2.2. Antagonism between Culture and Technics

Gilbert Simondon's work confronts the question of modern technology with rigor. He also notably influenced other thinkers such as Gilles Deleuze and Bernard Stiegler (the latter significantly extends the investigations of Simondon into the realm of contemporary digital technologies and the Anthropocene, cf. Stiegler 2015). It is true that in the work of Simondon, one finds less a reconciliation between nature and technology as one between technics and culture. As we have noted before, in the first pages of his *On the Mode of Existence of Technical Objects* (2012), Simondon had already diagnosed the problem of our society: there is an antagonism of culture against technics which comes from an ignorance and misunderstanding of the latter. It would not be wise to try to expound the technological thinking of Simondon in this short article; it is sufficient to point out that this misunderstanding of technics leads to the painful difficulty of co-existence between human and machines. We can simply understand it in the following ways. On the one hand, machines become opaque to their users, and only specialists understand how to repair their parts (and increasingly not the entire machine). This is one of the sources of alienation in the nineteenth and twentieth-centuries: workers who are used to practicing with simple tools are not able to cope with the new operations or understand the technical reality. On the other hand, machines are treated as merely functional objects, i.e., utilities; they are consumerist products secondary to aesthetic objects, and in extreme cases, slaves, as exhibited in the public conception of robots. This is why, already on the second page of *On the Mode of Existence of Technical Objects*, Simondon writes:

> We precisely would like to show that a robot does not exist, and that it is not a machine, as much as a statue is not a living being, but only a product of imagination, of fictive fabrication, and of the art of illusion. (Simondon 2012, 18)

Simondon is referring here to an operational and ethical relation between human and machine. The question of co-existence or being-with is of ultimate importance in this connection. Haraway and Descola are right to point out the necessity of reconsidering the question of co-existence with nature. However, such co-existence

is only possible when we reflect on the role of technical objects which do not only have their own existence, but also function as *relations* with other existences. The question of co-existence therefore concerns not simply the relations between the human and the non-human. We must also add to it the question of technical objects, or machines. It is our task here to point to a thinking that is present in the work of Gilbert Simondon concerning nature and technology, on the basis of which we can concretize the task of a philosophy of technology in the age of the Anthropocene. We may want to consider such thinking of Simondon an ecological thinking which concerns different modes of reticulation. Or to put it another way: if there is an ecology in Simondon, it understands technology in terms of modes of reticulation and technological progress as the constant transformation of forms of reticulation. This point is evident when we think of the emergence of different communication networks from analogue to digital in the twentieth century, and now with all sorts of social networks. However, not all modes of reticulation lead to a reconciliation between nature and technics; or perhaps we can say that, in Simondon's thought, it is characterized by a *cosmopoeisis*.[6] In order to elaborate on this, we must look into Simondon's speculative history concerning the genesis of technicity.

Before we continue our exposition of Simondon's thought, let us summarize what we have discussed above. I suggest, firstly, to consider the *technical* a priori in the concept of nature, which allows us to abandon a pure and innocent image of nature and gives us a "second nature"; and, secondly, the *cosmic* a priori in technological development, meaning that technics are always already cosmotechnics from the beginning. These are the two sides of the same coin that we call human existence and human progress. If we can reproach Descola, Haraway and others with not paying enough attention to the first, we must also reproach the technocrats for ignoring the latter to the extent that the cosmos becomes simply a standing reserve for exploitation, in the sense that cosmology becomes mere astrophysics. I will demonstrate this second point in terms of what I call a *cosmo-geographic* a priori in Simondon's thinking, which is crucial for the construction of the *techno-geographic milieu*.

3. The Cosmo-Geographic A Priori and Co-Naturality

First of all, we must address the question: what is nature for Simondon? In *L"individuation à la lumière des notions de forme et d"information* (Simondon 2005), nature is considered as the pre-individual, which is like the *apeiron* of Anaximander, an inexhaustible potential (Simondon 2005, 358). The pre-individ-

ual is what allows further individuation to take place. However, it does not mean that nature is a reservoir of energy, but rather that it is what is always anterior to the already individuated being and what gives rise to a second individuation when conditions are met. For Simondon the history of technology can be seen as a constant progress of the modes of reticulation of spiritual forces. The very beginning of the history of technology started with what he calls "the magic phase" (2005, 227–28). The reticulation of the magic phase is characterized by what he calls key points (*points clés*): for example, a giant tree, a huge rock, a tall peak, or a river. These geographical points are the key points, which maintain the reticulation of forces; or more precisely, it is not that these key points are the origin of the forces, but rather these forces are regulated according to the key points. In the magic phase, Simondon proposes, there is a form of unity, where there is no distinction between subject and object; the ground and the figure support each other, meaning that ground gives form and figures limit the ground, as we see in typical examples of Gestalt psychology.

> The magical universe is already structured, but according to a mode anterior to the segregation of object and subject; this primitive world of structuration is the one that distinguishes figure and ground, by indicating the key points in the universe . . . in fact, precedent to the segregation of unities, a reticulation of space and time is instituted, which emphasizes the privileged places and moments, as if all the power of human action and all the capacity of the world in influencing humans is concentrated in this place and moment. (Simondon 2012, 227–28)

The de-phasing or phasing out [*déphasage*] of the magic phase is developed into technics and religion. The vessels of rite—which are technical objects—become the key points of another mode of reticulation (Simondon 2012, 227). This is the departing point from which we can thematize the concept of *cosmotechnics*. This stage marked an aesthetic thinking which was able to create a convergence after the bifurcation of religion and technics, but which was later found to be insufficient. In Part III of Simondon's *On the Mode of Existence of Technical Objects*, there is a complicit and somewhat problematic tension between what Simondon calls aesthetic thinking and philosophical thinking (cf. Duhem 2009). Aesthetic thinking was not able to cope with the constant bifurcation, because aesthetic thinking is still situational, meaning its role will be to serve as "the paradigm for orienting and supporting the effort of philosophical thinking" (Simondon 2012, 276), implying that philosophical thinking will have to intervene to bring about

a higher order of convergence. As in Heidegger, in Simondon we find another presentation concerning the rupture of the relation between technics and nature during European modernity. Simondon accords with Jean-Jacques Rousseau's critique of the encyclopedia of Denis Diderot and Jean le Rond D'Alembert for its detachment of technics from nature—or, in Simondon's words, from "the elements" in the sense of the pre-Socratics (e.g., Thales's water, Heraclitus's fire, and Anaximander's *apeiron*) (Simondon 2016, 380). The detachment of technics from nature continued during European modernity, and as Simondon noticed, towards the end of the eighteenth century, the rupture was amplified to the extent that the ancient technics were repressed, the relation to the natural world was lost, and technical objects became "artificial" objects—artificial in the sense that it has nothing to do with nature (Simondon 2012, 126). This period corresponds to "a dramatic and passionate notion of progress, becoming rape of nature, conquest of the world and caption of energies" (Simondon 2012, 17).

It is this question that leads Simondon to mediate on the question of convergence and the possible reconciliation between nature and technology as a task of philosophical thinking instead of aesthetic thinking. However, it would not be justified to say that Simondon opposes aesthetic thinking and philosophical thinking. Simondon's criticism is that by glorifying the aesthetic value of objects (what he calls "aesthetic objects" (Simondon 2012, 10)), one tends to reduce the role of technical objects as mere utility and therefore ignore the signification of its technical reality; but we will always need aesthetic thinking, and it complements philosophical thinking. Since technics is fundamentally a matter of modes reticulation, there is always the possibility of reconstituting different key points. This is just to say that this philosophical-anthropological imagination of unities, which characterizes the beginning of the genesis of technicity, calls for a search for convergence that reunifies the different professions and different specialities in human history. In this connection Simondon invoked Martin Heidegger in his *Du mode d"existence des objets techniques*:

> In the technicity integrated in the natural world and the human world, these forms of respect and of disrespect manifest the inherence of values exceeding utility; the thinking that recognizes the nature of the technical reality is that which, according to the expression of Heidegger, by going beyond separated objects, utensils, discovers the essence and the capacity of technical organisation, beyond the separated objects and the specialized professions. (Simondon 2012, 303)

It is not clearly stated where the reference to Heidegger is to be found. However, we can probably make an allusion to Heidegger's essay "The Thing" (1971), in which he proposes the four-fold [*das Geviert*], namely, heaven, earth, the mortals and God, to characterize such a convergence in the *Thing*.[7] I reformulate Simondon's genesis of technicity as a *cosmotechnical* thinking, and would go beyond Simondon in adding that this search for convergence should also mediate the modern and the traditional, which in the process of modernisation became strangers to one another—this was the case in Europe, and it has been much more serious in China, Japan and other non-European countries over the past two centuries. This is also the reason why we should study theses reticulations of forces according to their own philosophical and political histories in order to tackle the problem of the Anthropocene. However, it would be an *illusion* to substantialize the ancient cosmologies against technology, and it will be our task to renew a cosmotechnical thinking in order to search for a continuity between the modern and the traditional by appropriating technologies.

Instead of seeing technological development as a rape of nature, Simondon tends to discover a *poeisis* in a certain development of technology, which has both an aesthetic dimension and productive dimension. However, we must point out that in the thinking of Simondon, reticulation is always given as a form of *cosmo-geographic* a priori, and it is the departing point that we can describe as a *techno-geographic milieu* of technical ensembles, such as railway networks and arenas. Commenting on the technical mentality of industrialization, Simondon proposes that:

> It is not a question here of the rape of nature or of the victory of the human Being over the elements, because in fact it is the natural structures themselves that serve as the attachment point for the network that is being developed: the relay points of the Hertzian "cables" for example, re-join with the high sites of ancient sacredness above the valleys and the seas. (Simondon 2009b, 22)

Simondon analyses the technology-nature relation through a detour of an antagonism between culture and technics. Technology is not raping nature, as is often claimed; such perception comes out of a misunderstanding and ignorance of technology. The aim of Simondon's thinking is to propose a program through which culture is able to re-integrate technology by re-connecting nature with technics. In so doing, the antagonism between technology and nature can be resolved. The question that has to be more systematically studied is that ofhowsuch a desire

and thinking are applicable to modern technologies? This question deserves much more dedicated analysis. We will only give a glimpse into the sort of possibility Simondon proposed in different contexts. This *cosmo-geographic* a priori of reticulation, when it is followed and adopted in the course of technological development, expresses a *poiesis* of the being-together of the human and nature. The following example that Simondon gave during a filmed interview with journalist Jean Le Moyn best illustrates how the cosmo-geographic could be compatible with the techno-geographic.[8]

> Look at this antenna of television as it is . . . it is rigid but it is oriented; we see that it looks into the distance, and that it can receive [signals] from an emitter far away. For me, it appears to be more than a symbol; it seems to represent a gesture of sorts, an almost magical power of intentionality, a contemporary form of magic. In this encounter between the highest place and the nodal point, which is the point of transmission of hyper-frequencies, there is a sort of "co-naturality" between the human network and the natural geography of the region. It has a poetic dimension, as well as a dimension having to do with signification and the encounter between significations. (Simondon 2009a, 111)

In this quote we can see the unity between the geographical milieu and the technical milieu, in which a cosmopoiesis is presented as a "co-naturality." The question is, firstly, where is this *cosmo-geographic* a priori from? It is not purely universal, since it varies from one culture to another, and conditions different forms of life; it is transcendental yet, since it is not universal, it also carries an empirical dimension and is thus subject to renewal. Secondly, what is the sense of the term "poiesis" as experienced in different cultures? The Greeks' sense of poetic experience is not necessarily the same as that of the Chinese. Simondon was no anthropologist, although he was a great connoisseur of Greek and Roman culture. He proposed a general theory of the genesis of technicity which can be supplemented by current debates in anthropology concerning the role of nature and cosmology. And cosmologies, when realized as cosmotechnics, will allow us to go beyond the limits of the technical system that is in the progress of realization, as well as to see how cosmological thinking can intervene into the imagination of technological development.

4. Beyond Nature and Technology

The question that is posed immediately is as follows: Is aesthetics, then, the solution to the problem we have discussed above? It is this question that takes us to the relation between the *cosmo-geographic* a priori and the construction of the *techno-geographic milieu*, and to the role of cosmotechnical thinking. In order to investigate this, we will have to look into another example that Simondon gave, concerning the connection between the technical and the natural milieus, demonstrated by the Guimbal turbine (Simondon 2012, 66–67). With this example, we also want to push this line of thinking further than Simondon did himself. The turbines antecedent to the Guimbal turbine suffered from the problem of over-heating: the turbine produced so much heat that it destroyed itself. Guimbal's invention consisted of a very important step toward integrating the "natural world" into the operation of the turbine. The "natural world" is here, for example, a river. The turbine is well wrapped and isolated with oil, and placed in the river. The current of the river will drive the turbine to move; at the same time, it also carries away the heat produced by the turbine. Theoretically, the faster the water, the larger the amount of heat produced; since the water is fast, heat will dissipate quickly. In this case, the river becomes part of the operation, though it is not really a component at the interior of the turbine; rather it is what Simondon calls an *associated milieu* (*milieu associé*) (Simondon 2012, 70). An associated milieu is defined by a recurrent causality between output and input, in a way that we can understand as "feedback" in cybernetics.[9] However, Simondon also goes beyond the "feedback" mechanism of cybernetics and considers the formation of the associated milieu within a general technical process of *concretization*. The associated milieu is in this case also a techno-geographic milieu. The machine demands an associated milieu, which is part of a mechanism that allows the machine to resume its normal working status in the face of both external and internal disturbance.

We may want to consider that here the *cosmo-geographic* a priori is neither merely aesthetic, nor being a background, but also operational. It has its *signification*, not simply as an aesthetic object, but also as a scheme interior to the technical object, and not simply the function exterior to the object. However, we may want to problematize this example given by Simondon: in the case of the turbine, and its integration of the natural world as part of its operation, how about those other living beings, for example fishes swimming in the river? This is a question that Simondon (2012) did not touch upon in his *On the Mode of Existence of Technical Objects*, and is also outside the scope of the antagonism Simondon sets up at the

beginning of his work: culture vs. technics. As such it may serve as a negative example in Haraway's (2016) *Staying with the Trouble*. We will propose that it is for this reason that we can supplement Simondon's analysis with current debates in anthropology, in order to conceive a *cosmotechnics* confronting the current global technological exploitation.

The notion of the *cosmo-geographic* a priori is fundamental to variouscosmotechnics, and the organization of such an a priori varies from one culture to another. The different "cosmotechnics" can be further analyzed according to their cultural specificities and understood in terms of different or alternative epistemologies, as well as *episteme* in the sense of Michel Foucault (1970) namely the relations between different scientific domains which define the regime of truth. We mentioned at the beginning of this article that the Anthropocene is often referred as a gigantic cybernetic system or in line of biologists a complex system, demonstrated by the cover of Stewart Brand's *Whole Earth Catalogue* (1968), in which we see the blue earth from the outside, the earth studied as a whole cybernetic system, while we have to recognize that this is situated in a specific epistemology, indicated by the end of the cosmos[10] and the beginning of ecology as proposed by Marshall McLuhan, namely the realization of the cosmos as a gigantic technoscientific object.

> Sputnik created a new environment for the planet. For the first time the natural world was completely enclosed in a man-made container. At the moment that the Earth went inside this new artefact, Nature ended and Ecology was born. 'Ecological' thinking became inevitable as soon as the planet moved up into the status of a work of art. (McLuhan 1974, 49)

At the same time, technological globalization only exports homogeneous technologies embedded within a very narrow and predefined epistemology, and other cultures are forced to adapt to this technology or else replicate it. We can call this process modernization. The modernization process driven by economic and military competition has blinded us of seeing the multiplicity of cosmotechnics; rather it has obliged us to identify all cosmotechnics as part of a universal technological lineage. It is necessary to approach the question of the Anthropocene interior and exterior to the technical system that we are confronting, to improve it from within, and to appropriate it with new epistemes.

The attempt to introduce the concept of cosmotechnics is to explore the limit of the current concept of technology as well as to re-affirm the relation between cosmology, morality and technology which has disappeared in the technological

system called the Anthropocene. I hope that with the notion of cosmotechnics we can re-approach modern technology in two schematic ways. Here I can only provide some preliminary thoughts. Firstly from interiority, we should question the epistemology of the techno-scientific applications in order to critically access it and to develop alternatives. It is clear when we look into established systems of knowledge such as medicine, which have been kept separated in the process of modernization, or one is subordinated to the other; for example, Chinese medicine can only be approved, when it is shown that the ingredients contain the types of chemicals legitimated in Western medicine. However the question of epistemology is not merely within the domain of science, but rather these epistemologies are enforced and universalized by capital, and it consequently leads to a naïve rationalization. Capitalist industrial technologies are efficient because they are mostly homogeneous and purely calculative. They are homogeneous because they bypass heterogeneous epistemologies and practices. These industrial technologies have the tendency to universalize, namely that they can easily go beyond cultural and national borders, a process known as globalization. However, it is necessary to critically access these industrial models and demonstrate alternatives.[11] A concrete example that I would like to provide is a project that I led with the computer scientist Harry Halpin to develop an alternative model to platforms such as Facebook. By tracing the history of social network back to the social psychologist Jacob Moreno and his invention of sociometrics, we show that such a social network is based on an individualist concept, namely social atoms, namely each individual is a social atom and the society is an aggregation of social atoms (Hui and Halpin 2013; cf. Hui 2015). We proposed to develop another model based on groups instead of individuals, collaboration instead of individual activities. Examples are surely not limited to social networks (e.g., in this case, the concept of social relations, individuals, groups, collectives), one should not feel helpless in front of the becoming-totality of modern technology, but should seek the possibility to re-appropriate it, like what Gilles Deleuze famously says "there is no need to fear or hope, but only to look for new weapons" (Deleuze 1992, 5).

Secondly from exteriority, we should conceive the cosmos as an exteriority to the technological system instead of the anthropocentric view of human activities as the center of the university, to bear in mind the limit of such a system, beyond which is the unknown and the mysterious.[12] However this is by no means to mystify the cosmos again, or a proposal to go back to the pre-modern cosmology, but rather to develop new epochal sensibilities which allows us to re-appropriate modern technology, not only to repurpose it (like what we have mentioned above)

but also to invent cosmotechnics of our epoch. I use sensitivity and cosmotechnics in plural in order to emphasize that it is not only one sensibility or one cosmotechnics, but rather a re-opening of the question of technology through the affirmation of non-modern cultures. In order to allow this to take place, *every* culture will have to retrieve and formulate its own history of cosmotechnics and only through such a historical study can new cosmotechnics be revealed to us. The Anthropocene presents the necessity to reconceive the relation between humans and the Earth/cosmos, which is reflected in the discussions among anthropologists, Descola's ontological pluralism, Viveiros de Castro's multinaturalism, as well as Latour's (2015) Gaia theory. However, this new relation cannot avoid the question of technology since nature is no safe harbor and this is the task that I think philosophy of technology needs to open up—that is to say, rediscover multiple cosmotechnics beyond the current discourse of technology, limited as it is to Greek *technē* and modern technology coming out of Western modernity, and to develop a theoretical framework that allows an appropriation of modern technologies as an *Ereignis* in the Anthropocene and an overcoming of the oppositions between culture and nature, and culture and technics.

Notes

1. Since the concept of "technics"—a term that I use here to cover all forms of technical activity—is very much limited, we can probably say, following Martin Heidegger, that there are two concepts of technics: firstly the Greek notion of *technē*, which means *poiesis* or "bringing forth" (*Hervorbringen*); and secondly modern technology, whose essence according to Heidegger is no longer *technē* but *Gestell*, in which being is understood as "standing reserve" or "stock" (*Bestand*). The limit is that there is no place for any non-European concept of technics once this theorization is accepted globally, as is currently the case.

2. I take the concept of second nature from Bernard Stiegler in his dialogue with Elie During in *Philosopher par accident* (Stiegler and During 2004), as well as from Gilbert Simondon, for whom (as for Blaise Pascal) second nature means more about habitude (Simondon 2012, 128). Bruno Latour, in his *Politics of Nature*, proposes to abandon the concept of nature, as he writes: "When the most frenetic of the ecologists cry out, quaking: 'Nature is going to die,' they do not know how right they are. Thank God, nature is going to die. Yes, the great Pan is dead. After the death of God and the death of man, nature, too, had to give up the ghost. It was time: we were about to be unable to engage in politics any more at all" (Latour 2004, 24–25). Contra Latour, I believe that one can only abandon the notion of *first* nature as totally innocent and

pure, but one cannot abandon the concept of Nature, since it is that which reconnects us to the question of the cosmos.

3. It is relevant to note that, in a dialogue with Pierre Charbonnier, Descola spoke of the two schools of anthropology in France during his formative years: there was, on the one hand, the *Formation à la recherche en Anthropologie Sociale et Ethnologie* (FRASE), founded by Lévi-Strauss; and on the other the *Centre de formation à la recherche ethnologique* (CFRE), founded by Leroi-Gourhan. Descola says that "this corresponds to two styles of anthropological thinking which are not totally contradictory, but they have largely stayed apart in the world of universities, because of the personality and of interests of their two founders" (Descola 2014, 31–32).

4. In *The Question Concerning Technology in China: An Essay in Cosmotechnics* (Hui 2016b), I use China as an example in order to explain how traditional knowledge was destroyed or undermined during the process of modernization. However, I also argue that a "going back" is no longer a real option, since it is impossible in view of the current geopolitical and socio-economic situation. I propose to develop a cosmotechnical thinking from Chinese philosophy in order to demonstrate how such a lineage of technological thinking, extracted from Chinese thought, can contribute to reflecting on the problem and future development of global technologies. Déborah Danowski and Eduardo Viveiros de Castro, in their book *The Ends of the World* (2016), criticized Latour's failure to recognize the advantages and resources of the "small populations and the 'relatively weak' technologies of indigenous people" (95), and it seems to me that one may easily fall prey to an ethnocentrism of believing that the solution is *already there* in either western or indigenous thought, and that it has been in some sense since the beginning. The major question for us is in what way indigenous ontologies might enter into dialogue with Western technology and metaphysics and thereby transform the current trend of global technologies.

5. Readers will be able to find a lot of literature on the politics of ontologies that we cannot list here (cf. Kohn 2015; Skafish 2014).

6. In *On the Existence of Digital Objects* (Hui 2016a) I reproached Simondon for limiting his notion of reticulation too much to geographical constraints, and argued that his theory of reticulation therefore cannot provide an appropriate order of magnitude for understanding digital objects. However, as concerns ecological and environmental crises, his emphasis upon the compatibility between the geographical milieu and the technical milieu is still significant.

7. The thing for Heidegger is opposed to object in the sense of Gegenstand—standing against; thing, or in German *Ding*, comes from the verb *dinc*, which means to gather, to assemble; in the object politics, there is a dualism between subject and object, while in the thing politics, it is about belong-together, a thing therefore has the function of gathering the four fold (cf. Hui 2016a, 161–64).

8. The video can be retrieved from Youtube: https://www.youtube.com/watch?v=VLkjI8U5PoQ

9. In Simondon's posthumous collection of articles *Sur la philosophie* (Simondon 2016, 51) we find that he had several translations for the term "feedback," for example "résonance interne," "contre-réaction," "récurrence de causalité," and "causalité circulaire."

10. Historians such as Rémi Brague (2006) and Alexandre Koyré (1957) in their work on Western cosmology have concluded the death of the cosmos in European modernity.

11. We can refer to the proposals and practices of Bernard Stiegler (2016) as well as Geert Lovink (2013).

12. I make reference here to Martin Heidegger concerning the anticipation of the Unknown as the task of poets, as opposed to the self-enclosing technological force (cf. Hui 2017).

References

Brague, Rémi. 2006. *The Wisdom of the World: The Human Experience of the Universe in Western Thought*. Chicago: University of Chicago Press.

Brand, Stewart. 1968. *Whole Earth Catalog* Fall 1968. http://www.wholeearth.com/index.php.

Crutzen, Paul J. 2006. "The "Anthropocene." In *Earth System Science in the Anthropocene*, ed. Eckart Ehlers and Thomas Krafft, 13–18. Berlin: Springer.

Danowski, Déborah, and Eduardo Viveiros de Castro. 2016. *The Ends of the World*. London: Polity.

Deleuze, Gilles. 1992. "Postscript on the Societies of Control." *October* 59: 3–7.

Descola, Philippe. 2013. *Beyond Nature and Culture*, trans. Janet Lloyd. Chicago: University of Chicago Press.

Descola, Philippe. 2014. *La Composition des Mondes - Entretiens avec Pierre Charbonnier*. Paris: Flammarion.

Descola, Philippe. 2015. *"Humain, trop humain."* https://www.youtube.com/watch?v=_EKlazkW-ls.

Duhem, Ludovic. 2009. "La tache aveugle et le point neuter (Sur le double « faux départ » de l"esthétique de Simondon)." In *Cahiers Simondon*, *Numéro 1*, ed. Jean-Hugues Barthélémy, 115–35. Paris: L'Harmattan.

Foucault, Michel. 1970. *The Order of Things*. New York: Pantheon Books

Haraway, Donna. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press.

Heidegger, Martin. (1950) 1971. "The Thing." In *Poetry, Language, Thought*, trans. Albert Hofstadter, 163–80. New York: Harper & Row.

Heidegger, Martin. 1977. *The Question Concerning Technology and Other Essays*, trans. William Lovitt. New York: Harper and Row.

Hui, Yuk. 2015. "Modulation after Control." *New Formations* 84–85: 74–91. https://doi.org/10.3898/NewF:84/85.04.2015

Hui, Yuk. 2016a. *On the Existence of Digital Objects*. Minneapolis: University of Minnesota Press.

Hui, Yuk. 2016b. *The Question Concerning Technology in China: An Essay in Cosmotechnics*. Falmouth: Urbanomic.

Hui, Yuk. 2017. "Rhythm and Technics: On Heidegger's Commentary on Rimbaud." *Research in Phenomenology* 47: 60–84.

Hui, Yuk, and Harry Halpin. 2013. "Collective Individuation: The Future of the Social Web." In *Unlike Us Reader*, ed. Geert Lovink, 103–16. Amsterdam: Institute of Network Cultures.

Ingold, Tim. 2014. "A Circumpolar Night's Dream." In *Figured Worlds: Ontological Obstacles in Intercultural Relations*, ed. John Clammer, Sylvie Poirier, and Eric Schwimmer, 25–57. Toronto: University of Toronto Press.

Kohn, Eduardo. 2015. "Anthropology of Ontologies." *Annual Review of Anthropology* 44: 311–27. https://doi.org/10.1146/annurev-anthro-102214-014127

Koyré, Alexandre. 1957. *From the Closed World to the Infinite Universe*. Baltimore: Johns Hopkins University Press.

Latour, Bruno. 1993. *We Have Never Been Modern*, trans. Catherine Porter. Cambridge, MA: Harvard University Press.

Latour, Bruno. 2004. *Politics of Nature: How to Bring the Sciences into Democracy*., trans. Catherine Porter. Cambridge, MA: Harvard University Press.

Latour, Bruno. 2013. *An Inquiry into Modes of Existence: An Anthropology of the Moderns*, trans. Catherine Porter. Cambridge, MA: Harvard University Press.

Latour, Bruno. 2015. *Face à Gaïa: Huit conférences sur le nouveau régime climatique*. Paris: La Découverte.

Lévi-Strauss, Claude. 1992. *Tristes Tropiques*, trans. John Weightman and Doreen Weightman. New York: Penguin Books.

Lovink, Geert, ed. 2013. *Unlike Us Reader*. Amsterdam: Institute of Network Cultures.

Lyotard, Jean-François, and Niels Brügger. 1993. "Examen oral – Entretien avec Jean-François Lyotard." In *Lyotard - Les déplacements philosophiques*, ed. Niels Brügger, Finn Frandsen, and Dominique Pirotte, 137–53. Brussels: De boeck-Wesmael.

Mauss, Marcel. 2013. *Sociologie et Anthropologie*. Paris: PUF.

McLuhan, Marshall. 1974. "At the Noment of Sputnik the Planet Became a Global Theatre in Which There Are No Spectators but Only Actors." *Journal of Communication* 24(1): 48–58. https://doi.org/10.1111/j.1460-2466.1974.tb00354.x

Northcott, Michael. 2015. "Eschatology in the Anthropocene: From the Chronos of Deep Time to the Kairos of the Age of Humans." In *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*, ed. Clive Hamilton, Christophe Bonneuil, and François Gemenne, 100–12. London: Routledge.

Pickering, Andrew. 2017. "The Ontological Turn: Taking Different Worlds Seriously." *Social Analysis* 61(2): 134–50. https://doi.org/10.3167/sa.2017.610209

Simondon, Gilbert. 2005. *L"individuation à la lumière des notions de forme et d"information*. Grenoble: Million.

Simondon, Gilbert. 2009a. "Entretien sur la méchanologie." *Revue de synthèse* 130(1): 103–32.

Simondon, Gilbert. 2009b. "Technical Mentality." *Parrhesia* 7: 17–27.

Simondon, Gilbert. 2012. *Du Mode d"Existence des Objets Techniques*. Paris: Aubier.

Simondon, Gilbert. 2014. *Sur la Technique*. Paris: PUF.

Simondon, Gilbert. 2016. *Sur la Philosophie*. Paris: PUF.

Skafish, Peter. 2014. "Anthropological Metaphysics/Philosophical Resistance." Theorizing the Contemporary, *Cultural Anthropology* website, January 13. https://culanth.org/fieldsights/464-anthropological-metaphysics-philosophical-resistance.

Stiegler, Bernard. 2015. "Sortir de l'anthropocène." *Multitudes* 3(60): 137–46. https://doi.org/10.3917/mult.060.0137

Stiegler, Bernard. 2016. *Dans la Disruption*. Paris: Les liens qui libèrent.

Stiegler, Bernard, and Elie During. 2004. *Philosopher par accident*. Paris: Galilée.

Viveiros de Castro, Eduardo. 2014. *Cannibal Metaphysics*. Minneapolis: Univocal Publishing.