Humans and Machines

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While the wave of fascination with cyborgs, both in popular culture and cultural analysis, seems to have peaked and abated, the thorny question of the relation between humans and machines persists. In fact, the fascination with cyborgs seemed to reach an impasse, blocking rather than opening further inquiry. Ian Hacking notes something of the sort in his essay "Canguilhem amid the Cyborgs" (Hacking 1998), suggesting a certain proximity between Descartes and Donna Haraway in their take on the relation between humans and machines. Hacking offers this passage from Haraway's celebrated "Cyborg Manifesto": "Late twentieth century machines have made thoroughly ambiguous the difference between natural and artificial… and many other distinctions that apply to organisms and machines" (Haraway 1991: 152). If such wisdom about cyborgs reaches an impasse, it is because the emphasis ultimately falls on a blurring of distinctions. As such, it would seem that there is in fact an initial and fundamental distinction to be made between humans and machines, or between organisms and mechanisms, which subsequently becomes blurred and confused upon the appearance of the cyborg. Also, because the status of this human/machine distinction is not clear (is it a societal bias, cultural fantasy, false abstraction, or all of these?), it comes to feel like a substantialist distinction. Even as it proposes to blur distinctions, this sort of cyborg model unwittingly begins to take on the weight of dualism and substantialism, acting as if humans and machines were ontologically different, and mobilizing a range of dualist oppositions (nature/artifice, mind/body, organic/inorganic) only to posit a subsequent fusing and blurring of them.

Put another way, this cyborg wisdom entails a simplistic hybridity model: identities have ontological priority, and the subsequent combination of two identities is experienced as a crisis of categories. Seen in this light, it becomes clear that the cyborg model implies a juridical model of power in which the distinction between humans and machines is a matter of law, a *de jure* distinction. This is why the cyborg or human-machine hybrid comes to be seen as a form of transgression or subversion. This is also why the cyborg model often appears ambivalent about, or even indifferent to, the *de facto* relations between humans and machines, that is, the actual techniques that couple human and machine, and the kinds of governance that simultaneously emerge to regulate them. What counts in the cyborg model is the blurring of the law, what renders law ambiguous or transgresses it. Because of this underlying reliance on a juridical conceptualization of power and thus on sovereignty, the cyborg model lingers not only on law and transgression but also on fantasies of disembodiment and intransivity, that is, on instances of unpredicated or self-predicating subjectivity, which, in keeping with the connotations of the prefix cyber as guidance, steering or navigation, prepare the way for the cybernaut as the new great helmsman. [1]

Simondon's thinking on humans and machines proceeds in a totally different manner. [2] Rather than blur or collapse the distinction between humans and machines, or for that matter, organism and mechanism, he sustains it yet stubbornly refuses to allow it to take on substantialist weight. Thus, for him, humans and machines are different; they can even be said to be ontologically different, but within an ontology that methodologically avoids dualism and substantialism, which is indeed more precisely called *ontogenesis*. The same holds for bodies and minds: they are different, but not substantially, and likewise organisms and machines, as well as living beings and technical beings: different but not in accordance with dualism or substantialism. In this respect, Simondon also parts ways with Heideggerian ontology as well as its deconstruction, for his ontogenetic perspective does not hinge on a distinction between beings and Being, or between the ontic and ontological. The Heideggerian lineage remains content with an unending (deconstructive) displacement of substantialism rather

than finding new points of the departure. The cyborg model, as I have characterized it, oscillates between two understandings of technology: on the one hand, a Heideggerian or post-Heideggerian deconstructionist understanding that speaks of an "essence of technology" while ultimately resorting to a linguistic model for techniques, which tends to bring everything back under the signifier, law and Being; and on the other hand, Norbert Wiener's cybernetic theory which, for all his interest in and admiration for it, Simondon thought quite dangerous in its tendency to blur the distinction between animals and machines, ultimately reducing the human and society to the machine.

In contrast, Simondon's interest lies not in Law or Being (quasi-juridical distinctions between Being and beings, and an incessant blurring and reasserting of them), but in what he calls, and means quite literally, "modes of existence" of technical objects, that is, the ontology of machines. In a manner of speaking then, there is an "essence of technology" in Simondon's account of machines. But his account does not assume, on the one hand, a distinction between technique and technology, which invariably tends toward substantialism; rather his use of the term "technics" (*la technique*) comprises both. As such, on the other hand, the "essence of technology" does not pose a metaphysical threat in the form of covering over Being with mere beings. If we wish to think in terms of a metaphysical threat, for Simondon it comes of dualism, substantialism, and hylemorphism — that is, operative ways of thinking and doing technology. While Heidegger's notion of "gaining a free relation to technology" might be construed as analogous to Simondon's move to think and do technics differently, there is no doubt that Simondon goes more resolutely in this direction, actually speaking of an inherent value to technics, which he calls "technicity".

Due to its focus on technics and technicity, Simondon's philosophy implies a very different conceptualization of power and of politics than the juridically oriented conceptualization of law and transgression implicit in the cyborg model. With the renewal of interest in Simondon in recent years, a number of commentators, among them Muriel Combes, Isabelle Stengers, Brian Massumi, Bruno Latour, and Alberto Toscano, have begun to explore some of those

political implications, albeit going in rather different directions. This essay has two goals. On the one hand, it strives to tease out some of the political implications of Simondon. Here, as my choice of terminology and contrast already indicate, I tend to see a dialogue between Simondon and Foucault as both suitable and productive. But, in the course of this essay, I also put Simondon in relation to Rancière (the notion of aesthetic equality) as well as Latour and Stengers (non-human actors and cosmopolitics). On the other hand, because the political implications of Simondon are grounded in his philosophy, this essay necessarily reviews or rehearses the central points of his ontogenetic perspective. Throughout my account, I am implicitly building on Muriel Combes's brilliant introduction to Simondon's philosophy, but with a focus primarily the ontological distinction that he makes between physical beings, technical beings and human beings, which I strive to put in relation to the philosophy of history and science in the hope of both providing a complement to Combes's work on the politics of labor and paying a compliment to it.

Physical Being

In *Du mode d'existence des objets techniques* (On the mode of existence of technical objects, 1958), Simondon methodologically situates the role or function of the human *between* machines, for instance, "Man comprehends machines; he has a role to play between machines rather than over and above them, if there is to be a true technical ensemble" (Simondon 1989: 138). Already in this brief passage, there are terms that merit attention. What is this "human comprehending" which implies that humans should situate themselves between machines and enable true (*véritable*) technical ensembles?

As a first step, we might note that when Simondon says that humans' role or function is to be between machines, he means this quite literally, or rather, biologically. Following his mentor Henri Canguilhem, whose thought he radicalizes, Simondon begins with a sort of inversion of the cybernetic perspective: instead of reducing organisms to machines, he opts to look at the

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32

operations of machines by analogy to the structures and functions of organisms (Schmidgen 2004). Simondon's approach thus resonates with Canghuilhem's point of departure: "Tools and machines are kinds of organs, and organs are kinds of tools and machines" (Canguilhem 1992: 55; see also Hacking 1998: 203). Technology is neither in opposition to biology nor over and above the human body, but a continuation of it. Nor is technology situated as lesser to or below science, as a mere application of it, that is, as a lesser set of procedures than the "higher" functions of the human mind. As Henning Schmidgen notes, "In Canguilhem's eyes, technology was more than a secondary result of scientific activity. To him it testified to some irreducible, biologically grounded mode of activity…" (Schmidgen 2004: 2). As such, when Simondon writes that the role of humans is between machines, his refusal to introduce a dualist divide between humans and machines extends to other registers, such as the relation between mind and body—not only is there no substantialist opposition between mind and body, but there are no hierarchical distinctions between levels of intellectual activity: technical activity is on par not only with biological function, but also with scientific thinking. Rather than fall back on dubious hierarchical rankings and teleological development (to wit, first comes the physical, then the vital, then the practical, and then the intellectual or logical, which sequence is construed as moving from the lower or lesser to the higher and superior), Simondon generates operative analogies across these gradations of complexity, using parity to get at disparity.

Such an approach might seem to verge on biological determinism, merely getting rid of questions about the mind, soul, or psyche by pinning everything on biological determinations, in the manner of some sociobiology. But this is not at all the case. For all that Simondon draws heavily on biology in his philosophy of technology, he is equally fond of physics, which serves as another reminder that his rejection of dualism and substantialism entails a shift from dialectics to *energetics*, as Alberto Toscano puts it (Toscano 2004). [3] In other words, his approach is not that of material determinism (whether that of genes or atoms, or certain manners of dialectical thinking). Instead, in keeping with the fact that neither genes nor atoms are foundational in contemporary sciences, Simondon's

approach eschews material determinism, looking to what might be called "energetic determinations," or more precisely, in the language of physics that he adopts, *dephasings* or *phase shifts*. That Simondon occasionally glosses dephasing as "doubling" (*dédoubler*) indicates that he is not intent on dispensing with contrasts or conflicts. Rather, it is a matter of not beginning (and thus ending) with an ontological dualism, with a scission between spirit and substance (substantialism), between human and nature (dialectics), between human and machine (cybernetics), or between form and matter (hylemorphism). [4]

Yet Simondon's turn to energetics is not intended simply to dissolve those entities that appear concrete to us into a play of forces or field of energies. On the contrary, in attending to the underlying energetics of concrete entities in an abstract fashion, Simondon wishes to figure out what gives consistency to specific kinds of "individuals." Thus, when Simondon looks at an individual from the point of view of its individuation, that is, its dephasing, its underlying energetics, his goal is not to dissolve the concrete individual into abstract forces or to hold the individual under erasure. Instead he aims at a systematic account of how an individual can enter into relations with other individuals. In this respect, as Didier Debaise aptly stresses, Simondon's focus on the individual is calculated as a systematic intervention into modernity, into the modern condition of knowledge in which the individual has been given analytic priority in nearly every discipline, from the natural sciences to the human sciences (Debaise 2012 in this volume). And it is worth stressing that Simondon's exploration is systematic in that he sticks to the analytics of individuation across physics, chemistry, biology, engineering, psychology, sociology and politics. In effect, he works through the knowledge of the individual that is generated within each of these disciplines to arrive at a deeper and more systematic reading of that individual by giving analytic priority to its individuation, that is, to the process whereby it gains or has gained consistency or concreteness.

In another language, we might say that Simondon looks at the individual as an open system rather than a closed system. But then, for Simondon, it is a not merely matter of stressing the openness or non-finished nature of the individual,

but rather of exploring its specific kind of openness, that is, the implicit limits or potential orientations enabling such openness. In other words, the individual remains open in that its relations implicit an underlying set of potentials, which at once grounds and exceeds the actual relations that it has established. If Simondon's philosophy is aptly characterized as a "philosophy of individuation" as well as a "philosophy of relations," it is because his focus on the individuation of the individuals in different domains necessarily entails giving real priority to the relation over the terms of the relation. I will below return to his emphasis on thinking the relation. But first, in keeping with the concreteness of Simondon's abstractions, let me look at one of his paradigms for thinking physical individuation — the formation of crystals, such as ice crystals from supercooled water, or mineral crystals from a supersaturated aqueous solution.

Now, the crystal is an instance of a form or structure. Focusing on the process of emergence of a form or structure, Simondon challenges received ways of thinking about form. In particular, he rejects the hylemorphic schema in which form is imposed upon matter, in which matter figures as a passive recipient for the active imposition of structure or form, for such a schema implies dualism and substantialism from the outset. With the example of crystallization, whether of ice from super-cooled water or of minerals from a supersaturated solution, Simondon shows the inadequacy of the form/matter opposition for understanding actual processes. He shows that we cannot simply begin with the form or structure (crystal) as a self-identical, autonomous, given individual. Instead he demonstrates that the individual is always in process. The individual is individuating, dephasing, becoming. This does not simply mean that everything, no matter how stable in appearance, is actually in flux and thus ephemeral and not a cause for concern. Simondon reminds us that if something appears stable to us, that stability is relative to a frame of reference, or more precisely, to a *concern*. [5] And that frame of reference appears stable because, as a concern, it is also individuating, that is, it is *operatively* producing a connection between different orders of magnitude. I will return to the notion of a concern as well. But let me continue with the stakes of individuation for Simondon.

In her introduction, Muriel Combes provides a fine description of the physical process of crystallization, highlighting the significance of metastability in Simondon's enlarged, energetic account of the individual:

> A physical system is said to be in metastable equilibrium (or false equilibrium) when the least modification of system parameters (pressure, temperature, etc.) suffices to break its equilibrium. Thus, in super-cooled water (that is, water remaining liquid at a temperature below its freezing point), the least impurity with a structure isomorphic to that of ice plays the role of a seed for crystallization and suffices to turn the water to ice. Before all individuation, being can be understood as a system containing potential energy. Although it exists as an *action* at the heart of the system, this energy is called potential because it requires a transformation of the system in order to be structured, that is, to be actualized in accordance with structures. Pre-individual being, and in a general way, any system that finds itself in a metastable state, harbors potentials that, because they belong to heterogeneous dimensions of being, are incompatible. This is why it can only perpetuate itself by dephasing. (Combes 1999: 11).

In referring us to metastability and dephasing instead of positing a form/matter distinction, Simondon moves beyond a dualist mode, introducing a series of parameters into his account of a form, structure, or individual. There are, in effect, four parameters: (1) the seed or germ that sets off crystallization; (2) the supersaturated solution before crystallization; (3) the crystal; and (4) the less saturated aqueous solution after crystallization. Let's look more closely at these four parameters in order to clarify the abstract paradigm that Simondon extracts from this physical individuation.

First, the seed or germ that makes the crystalline structure materialize out of the supersaturated solution is, in a sense, just a tiny little impurity. But along the surface of that little impurity is a moment or site that is configured in a manner that is isomorphic to the coming crystal. For instance, if you ever made "rock candy" by crystallizing sugar on a string by dipping it into a supersaturated solution, you know that the string doesn't look at all like the resultant crystals that form on it. But somewhere along the string is a sort of isomorphic trigger that starts the crystallization. This trigger may be so small that we might never be

able to identify or isolate it precisely. It is, then, in abstract terms, a point. And as Brian Massumi styles it, it is a "neutral point." [6] It is a point, *the* point, that starts the event of crystallization, but it is part of the event, not outside of happening. It is physically inside the crystal, continuous with its structure, and at the same time, just as the string remains distinct from the crystals that form upon it, this neutral point is equally outside the crystal. Subsequently, when dealing with the history of technology, Simondon introduces the notion of an "absolute origin," [7] which is like a neutral point. But there is a slight distinction. We can think of the neutral point in relation to the physical form of the crystal, as a given, while the absolute origin refers to the eventfulness that is triggered by the neutral point, the activation of the field of potential energy. The proximity of neutral point and absolute origin helps us to understand how this neutral point functions: the relations triggered or activated by the neutral point are relative, but the entire set of relations, potential and actual, are *relative to* an absolute origin (an eventfulness), which allows them to be operative as well as measurable within a frame of reference, or more precisely, within a concerned relation.

Let me force the analogy and say that the absolute origin is eventful like the speed of light within the general theory of relativity. There is a universe of general relativity, but relations are relative to the speed of light in that universe. Likewise, the event of crystallization entails the activation of an individuating "world" or "universe" whose relations are relative to an absolute origin. While I envision plenty of reasonable objections to my forced analogy, I like this analogy because it highlights in advance a basic question that is often posed of such an approach: if events of individuation set up relativistic worlds, how do worlds or universes interact? In other words, how will Simondon move beyond the problem of pre-established harmony that informed Leibniz's monadology?

Second, there is the supersaturated solution, which, Combes tells us, is an instance of metastable equilibrium. Alberto Toscano speaks of it as a "transcendental field populated by singularities and disparate series" (Toscano 2004: 76). In other words, it is a transcendental field of disparition. In a sense, it is

a disparity between orders of magnitude that is deeper than or prior to potentiality or potential energy itself. The neutral point, that little germ of germination, activates a field of potential energy, which is what Simondon calls pre-individual being. An individual always implies a part or share of pre-individual being, a field of potentiality. [8] But, if we tried to trace back from this field to the neutral point, the neutral point would always appear to be missing as a given point. It is rather like tracing back the movement of galaxies away from the Big Bang: while it seems that you might be able to trace movement back to a point, you arrive at something where space and time relations cannot be so nicely sorted out. In this respect, Simondon's disparition appears close to the Deleuzian notion of the plane of immanence or the plane of consistency. The relation between the neutral point and its "field" of pre-individual being is rather like the relation between center and circumference in medieval definitions of God—"a circle whose center is everywhere, and whose circumference is nowhere," in that the center and circumference present two sides of the same event. But then, Simondon's notion of disparition could not be drawn with a holistic geometric figure like a circle. In any event, Simondon constantly draws examples from concrete individuals, insisting that the abstraction is nothing without such a focus on, and concern for, concrete individuation (or in Whitehead's language, concrescence), and so his manner of thinking also puts disparition into practice, analogically, expressing it operatively in divergent series. There is no such thing as pre-established harmony (geometrical holism).

Third, there is form or structure, that is, the crystal or individuated being itself, which is precisely what Simondon aims to think in depth. As such, again following Massumi's turn of phrase, we can think of this form or structure in terms of "remarkable points." Needless to say, the term "remarkable" brings into play questions about apperception, perception, and comprehension, which returns us to Simondon's theory of analogy. Here too, lest his theory of analogy appear to offer too beautiful a solution, Debaise reminds us that we must think about this procedure of analogy precisely as a procedure or operation, or to use his terms, as technique or paradigm (Debaise 2012 in this volume). In other words, to call attention to remarkable points is not a neutral gesture but an

analogically constructive cut or an operative fold in reality. In effect, the ground for Simondon's politics becomes clearer here: he refutes the realism that takes structure or form to be reality; instead he sticks to the realism of the relation in order to show not only that the individual is in process but also that stopping or prolonging that process brings into play a *dispositif* (to use Foucault's term), that is, a set of techniques, an "apparatus" or "paradigm," around which procedures of territorialization, discipline, or control may gather. [9]

Fourth, there is the aqueous solution around the crystal, which we can initially gloss as an external milieu. Insofar as the crystal is a set of remarkable points, this external milieu is the ground (*fonds*) against which the remarkable points become precisely remarkable. In other words, Simondon sees the emergence of a duality with the emergence of an individuated being. This duality is not that of dialectical opposition but what might be called *contrast*. The relation between individual and external milieu is like that between form and ground, or figure and background, if you will. But this analogy will remain confined to an art historical paradigm unless we take another step with Simondon and consider how the milieu is not only external to form or structure but also internal to it. In the case of the crystal, we can think concretely of the water trapped within the crystalline lattice even after the crystal leaves its aqueous solution. But the "internal milieu" is not merely a matter of water left behind. It is a matter of *spacing*, and we might here think of spacing in a Foucauldian way, in terms of power.

But the fourth parameter in Simondon's example of crystallization is neither the external milieu nor the internal milieu but the two of them taken together. It is the relation between external and internal milieu that matters and Simondon often refers to it as an associated milieu. The associated milieu is what runs across the structure's contrast (external milieu) and spacing (internal milieu). It is thus the ground of the ground, the true ground, as it were. And, where terms such as contrast and spacing have largely spatial and static connotations, the associated milieu is energetic, charged, potentiality. If we continue with the example of the crystal, recall that, when you remove the crystal from its aqueous

solution, it ceases to grow. Put it back in, and new layers of crystal form. This is because the internal milieu and external milieu are brought back into communication, rediscovering the pre-individual share or field of potentiality, which allows the individuation to continue. In sum, the associated milieu is the energetically charged field running across internal spacing and external contrast. [10]

Now, I have lingered on Simondon's account of the individuation of the crystal because all too often the example of the crystal is extended metaphorically without any deeper consideration of Simondon's analytics, and consequently, every instance of individuation comes to look exactly like that of the crystal, that is, physical being. This metaphoric evocation of the crystal runs the risk of erasing the very differences that matter to Simondon. Simondon does not simply extend his account of the physical being to natural or living being, technical being, and so forth, erasing their differences. Again, he establishes parity in order to account for disparity. He explores the underlying processes that generate individuals in terms of the four parameters presented above: (1) remarkable points, that is, form or structure of the individual; (2) the charged ground or potentialized associated milieu of the individual that is at once external contrast and internal spacing; (3) the neutral point of the event (absolute origin) of individuation that simultaneously sets off individuation and arises in it; and (4) the field of pre-individual being, which is the specific activation associated with a specific neutral point, that is, the specific activation of a relation between disparate orders of magnitude that "potentializes" or "energizes" the process of individuation. In sum, to think other modes of existence analogically (not metaphorically) with the example of physical being, we need to look at the individual in terms of a sort of energized topological configuration that has remarkable points, a charged ground (contrast and spacing), a neutral point, and a plane of disparition crossing orders of magnitude. [11]

We should also keep in mind that, for Simondon, the individuals in question are not just out there, as forms or structures that pre-exist human thought. Rather these individuals are also those given to us by modern sciences and disciplines:

sociology approaches society as an individual; psychology takes up the psyche as its individual; biology sets up life forms, cells or species, as individuals; media studies works through the isolation of different media; and so forth. For Simondon, the problem of modernity then is twofold. On the one hand, there are signs in Simondon of a Foucauldian concern for how knowledge constructs its objects, because the apparatuses or paradigms that discipline, regulate, normativize, or control specific individuals, tend to generate knowledge precisely by erasing individuation (process) and treating the individual (structure or form) as given. Simondon's focus on individuation as process evokes the absolute origin of the form/ground relation in order to re-potentialize the ground of the (modern) individual, because this is where resistance (in the electrical sense) to non-progressive modes of rationalization is already at work, where resistance may be brought into play, activated or potentialized in progressive ways.

On the other hand, unlike Foucault, who, despite his interest in Thomas Kuhn's paradigms as a manner of re-thinking history, shied away from the so-called normal sciences (Foucault 1980: 109-110), Simondon turns to individuation as process in order to address what he sees as another dangerous tendency of modern knowledge: the isolation of disciplines from one another on the basis of their construction of different individuals (society, psyche, medium, organism, species, machine) that are not allowed to communicate with one another, whose relationality becomes unthinkable. And he dislikes two common responses to this situation: the large metaphysical erasure of difference (every discipline is really talking about the same thing), and what I have somewhat unfairly characterized as the cyborg model, that is, a remix or mash-up of individuals from different domains without any concern for relationality, for actual differences, techniques, apparatuses, and paradigms. This is why Simondon works so intently within and across different domains of knowledge: he aims for a truly concerned multidisciplinarity. Placing the human between machines is one of the major concerns for moving in that direction. In this respect, if we wish to retain terms and phenomena such as remix or cyborg, for instance, Simondon offers a way to engage them at a deeper level than a frenetic yet indifferent disassembly and reassembly of received, socially sanctified individuals.

Technical Being

Simondon replaces the distinction between organism and mechanism with a distinction between natural object and technical object, surely because the former terms have been inextricably entwined with dualist thought to the point where they tend to imply a substantialist distinction between nature and artifice, nature and culture, or nature and humans. And so, in styling both organisms and mechanisms as "objects," he reminds us that these beings or modes of existence are ontologically different in degree (analogous), not ontologically in kind or nature (substantially). Still, to style organisms as "natural objects" may strike some readers as highly objectifying, in a manner reminiscent of positivism. [12] The term "object" for Simondon does not, however, imply objectification. In fact, although the scope of this essay doesn't permit a full treatment of the issue, suffice it to say, in keeping with his general refusal to posit substantialist divides, Simondon sees subject and object as flipsides of the same coin. Or rather, since the coin metaphor introduces too much symmetry into subject-object relations, we would do better to say that subject and object are different points of view across the same reality, that is, on the same relation. [13]

In the modern tendency toward the construction of technical individuals (machines), Simondon sees the emergence of a new kind of relation in which technical objects become more and more like natural objects—in that they carry their associated milieu with them, generating it through their relations. It is as if the crystal had folded its aqueous solution inside it and could continue to grow or individuate by stoking its potentiality. Indeed, as Combes points out, Simondon does not see the passage from one mode of existence to another—say, from physical being to natural or vital being—in terms of a linear advance. Rather, developments that appear to come after or to be added to prior stages, actually entail a return to what is ontologically prior, through a re-immersion in the pre-individual. If an animal starts as an inchoate plant, then a natural individual begins as an inchoate physical individual. It is a general problem of modern thought that a substantial difference between life (natural object) and non-life (physical object) is presumed as a point of departure. And it is a

tendency that becomes particularly pronounced and reified in the context of the natural object versus the technical object. Countering this tendency, we may have that the technical individual is initially an inchoate human individual, but then we would have to add that its inchoate beginning, or return to the pre-individual, is analogous, not identical, to the inchoate start of the animal in the plant, for instance.

Consequently, although one of Simondon's key points is that, under conditions of modernity technical individuals are becoming closer to natural individuations, he does not blur the ontological distinction between them. Indeed, Simondon's comments on popular attitudes toward robots and automatons, in which machines become so like humans that they begin to replace them, are pointedly deflationary ("We would like precisely to show that the robot does not exist…", 1989: 10), to the point where I don't think it an exaggeration to say that he sees in the tendency to collapse or confuse distinctions between natural objects and technical objects, not merely a metaphysical error, but a form of moral panic as well, which ultimately serves to depoliticize the technical existence of humans. Near the end of the first part of *Du mode d'existence des objets techniques*, he strives to clarify the stakes historically and politically: in modern times, as humans have constructed machines that can bear tools which can replace them as technical individuals or tool bearers, humans have tended wrongly to apply ideas of slavery and freedom to this new relation (Simondon 1989: 82). Such a mistake is not purely or simply psychological in origin. It derives from actual conditions in which humans now tend to work over or under machines, rather than alongside them. Yet, when humans look at their relationship to machines in terms of slavery and freedom, they merely repeat these conditions, striving either to liberate themselves from machines or to enslave the machines once and for all. Needless to say, the fear of a robot revolution thus grows. Simondon's comments stress that thinking in (largely juridical) terms of human freedom from, or mastery over, machines constitutes a genuine blockage for progressive politics. This is why he pointedly remarks, "The robot does not exist" (Simondon 1989: 10) This is also why I began by contesting the cyborg model in which a fascination with the blurring of the distinction between humans and machines,

oscillating breathlessly between technophilia and technophobia, forecloses any reckoning with technical equality or technicity, reifying the paradigm of freedom and slavery by displacing it onto juridical paradigms of law and transgression.

If Simondon singles out this wrong thinking about freedom for attention, it is not because his politics bears no relation to democracy or freedom. On the contrary, when he insists on the ontological equality between humans and machines, he is positing something analogous to what Rancière styles as "aesthetic equality." For Rancière, aesthetic equality, as it emerges in modern art and literature, is not the same thing as political equality, but by emphasizing how aesthetic equality may ground, condition, and even spur democracy, Rancière definitively shifts the site of the political away from an exclusive focus on the rational and juridical (and by extension the sovereign State). [14] Aesthetic equality, then, is a matter of a kind of equal participation in aesthetic production, which does not preclude difference; indeed it assumes it. Similarly, when Simondon insists on ontological equality between humans and machines, he implies a sort of "technical equality," which is another way of describing "technicity." As with Rancière's notion of aesthetic equality, technicity implies equal technical participation even as it presumes difference. While technical equality, like aesthetic equality, is no guarantee of political equality or democracy, political equality is not really practical or operative without a relation to this technical operativity (which is also, like aesthetics, a sort of inoperativity in the sense that it refuses utilitarian operativity).

How then does Simondon strive to bring technicity into the modern relation between humans and machines? His discussion advances on two fronts, the one ontological, the other historical. Thus he speaks in terms of the essence of technical objects at the same time that he speaks of a modern historical transformation that brought the technical individual to the fore. Of course, insofar as the hallmark of Simondon's thought lies in its emphasis on *ontogenesis* (becoming) rather than ontology (being), it may be more appropriate to say that his argument addresses the *ontogeny* and *phylogeny* of technical individuals, for

he considers, on the one hand, what a technical individual is as a mode of existence (ontogeny) and, on the other hand, explores the natural history or evolution of its "group" (phylogeny). [15]

To approach these points, let me turn to how Simondon's account of the ontogenesis of the technical individual can be understood by analogy with the abstract schema outlined above in the context of the physical individual, the crystal. Technical individuation, like individuation in general, can be seen in terms of the emergence of a specific configuration of remarkable points, that is, a specific form or structure. In the case of technical individuation, Simondon calls attention to a passage from the abstract to the concrete, which he styles as *concrétude*, that is, concrescence or concretization. As we will see, however, such concretization is not a matter of making form or structure (the determinate) more concrete. Rather it is the indeterminate that takes on concreteness; concrescence lies in the solidarity of openness.

When he looks at the individuation of machines from the angle of the process of invention, Simondon sees a passage from an abstract, analytical, logical system toward a concrete, synthetic, practical system. Inventors begin designing machines with an eye to accomplishing a single task, which they diagram in an abstract, analytic fashion; but as they actually use the machine, the design itself begins to demand practical adjustments, bringing into play other aspects of its basic elements, adding new elements and creating new relations among elements. For instance, you design a motor to turn a wheel without necessarily thinking about the materials, but when building and operating it, you discover that certain materials, forged in a such as way as to produce specific qualities, work better. In effect, it becomes self-regulating. Usually it is a matter of a combination or synthesis of different materials, which is why Simondon sees a passage toward a concrete and synthetic system.

Still, if we remain at this level of analysis, we are only considering structure not process, that is, individuation itself. And so Simondon introduces a twist: this passage toward concreteness is also a passage toward openness, toward greater

indeterminacy. Where we might expect the perfected machine to be more closed, Simondon shows us that, in fact, the abstract logical diagram is more closed, while concrescence is a passage toward a more open system. We will not see this openness, however, if we attend only to the form and not to its ground or associated milieu. The associated milieu of the technical individual, like that of the physical individual (crystal) runs across the external milieu and internal milieu, grounding the structure of remarkable points. It is both spacing and contrast, or more precisely, charged spacing and charged contrast. And the charge or potential effectively runs through or across inside and outside, as a *transductive potential*. But let's turn first, as Simondon does, to the internal milieu of the technical individual.

Simondon characterizes the internal milieu of the machine in terms of *recurrent causality*. A host of other, apparently synonymous terms also peppers his account, such as circular causality, circularity, recursive causality, reciprocal relations, and even feedback loop. But recurrent causality is by far the favored expression. But what does this term mean? As the technical individual becomes more concrete, synthetic, and practical, its internal ground, the spacing between elements, ceases to be empty space, so to speak. It ceases to rely on purely logical relations. The inventor begins to see that elements can be used with more than one function, for instance, thus tightening up the relations between elements as well as producing the possibility for internal circularity, feedback, reciprocity, or recurrence, and thus, ultimately, for self-regulation. I should add that, although I am presenting this transformation from the point of view of the inventor, it is clear that the invention, on its side, can be said to enable and suggest such concretization. It is not passively altered. The technical individuation proposes connections and new relations. Although it is too much to say that the machine is thinking for itself, it is clear that the inventor and invention are thinking with one another, and this thinking, which, insofar as it is a relation, is on both sides, and it is entirely real.

Now, as a glance at the images in *Du mode d'existence* attests, one of virtues of Simondon's account is its wealth of detailed examples, from audiometers to car engines and cathode tubes, which he works through as he systemically qualifies

his argument about what counts as a technical individual. [16] Some machines are ruled out (the audiometer), others are tentatively included but only with qualification. For my purposes here, a very basic example will suffice. When Simondon addresses the cooling of the automobile engine, he weighs the merits of air-cooling and water-cooling (Simondon 1989: 25). Air-cooled engines are more concrete, because you don't have to add a sub-system to the engine: the air element is directly there. Water-cooling is semi-concrete. If you could produce water from the running of the engine and re-direct it for cooling, or if you could power the water circulation directly from the engine, the engine would become more concrete. In practice, however, water is circulated via a water pump driven by a separate drive belt. Nonetheless, Simondon concludes that water-cooling is more concrete than air-cooling if you look at the engine in terms of security measures, for water absorbs and disperses heat more effectively than air. In other words, insofar as introducing water allows for better self-regulation, it encourages concretization, but water is not part of the immediate operating environment of the engine as air is.

Simondon's discussion here is not conclusive, and that is precisely why it offers a fine sense of the practical technical considerations that arise between human and machine in the course of concrescence. Its inconclusiveness also serves as a reminder that this manner of thinking technicity is resistant to finality or teleology (which Simondon also calls hypertelia). While one may detect echoes of Aristotelian entelechy in Simondon's take on the machine, because Simondon goes beyond form into its underlying and surrounding processes, the finality associated with entelechy gives way to relationality, here in the mode of technicality. As such, technicality does not proceed in a linear continuous fashion. Simondon sums it up thus,

> Thus it would not suffice to say that the technical object is one whose specific genesis proceeds from the abstract to the concrete; it should be made clear that this genesis is achieved by essential, discontinuous improvements that make for the internal schema being modified in leaps and bounds and not according to a continuous line. (Simondon 1989: 40)

Simondon turns next to the external milieu of technical individuation. Recall that, in the example of the crystallization, there was a dephasing or an onset of form that simultaneously produced a surrounding milieu, which is less structured but nonetheless charged with potential. In the case of the machine, similarly, the phase shift producing it also implies the simultaneous appearance of an external milieu. Significantly, the external milieu of the machine, like its "internal ground," entails a "recurrence of causality" (Simondon 1989: 57). Here too, Simondon offers a range of examples of the reciprocal or recurrent relations of causality that arise between the technical object and its external milieu, but as with the crystal, what is crucial is the associated milieu that links and grounds the link between internal and external milieus. With the machine, its practical operations not only tend to associate it with a particular environment but also work actively to construct such an environment, as it works operatively upon the field of potentiality grounding two sites of recurrent causality. In this way, the operations of the machine construct a mixed environment that is at once geographical and technical, which Simondon dubs a techno-geographical milieu. He also distinguishes this construction of an associated milieu from the humanization of nature. In other words, the new associated milieu is not an imposition of human will upon the environment but presents an opportunity for working with or alongside specific machine-environments or even machine ecologies. Simondon's discussion anticipates his account of "technical ensembles," which entail specific assemblages of humans, technical individuals or machines, technical elements, resources and milieus, to which I will return.

First, however, because Simondon's vocabulary is naturalistic, I should point out that Simondon's aim is not to endorse any kind of relation between technical individuals and the environment or to deny the widespread environmental destruction associated with modern technology. Rather, in manner reminiscent of Heidegger's critique of merely technological behavior, Simondon sees the question of technology not in terms of an acceptance or rejection of technology to be articulated entirely in anthropocentric terms (human loss or gain), but in terms of establishing a different relation to technology, one that is implicit in technicity itself but that is currently disabled due to what might be called metaphysical thinking (Heidegger 1977). In contrast with Heidegger, who

gestured in this direction only to retreat into an aestheticized politics, Simondon possesses greater technical and scientific know-how and proceeds with greater concern for actual socio-historical hierarchies of technics, which leads to greater emphasis on actual human-machine relations and techno-social formations (that is, technical ensembles). In this respect, Simondon's account of machines bears comparison with the "non-human actors" that play a central role in the techno-political theories of both Isabelle Stengers and Bruno Latour.

Both Stengers and Latour describe their approach as constructivist and cosmopolitical because it deals with the construction of new non-human actors whose action demands new kinds of political response. Steven Shaviro summarizes their point of departure succinctly:

> For modern science, the constructivist question is to determine how this practice is able (unlike most other human practices at least) to produce objects that have lives of their own, as it were, so that they remain 'answerable' for their actions in the world independently of the laboratory conditions under which they were initially elucidated. This is what makes neutrinos and microbes, for instance, different from codes of justice, or from money, of from ancestral spirits that may be haunting someone (Shaviro 2005).

In other words, Stengers and Latour call attention to the modern scientific construction of specific non-human entities that begin to act in the world beyond the laboratory, in a manner reminiscent to Simondon's machines, even though, from the angle of Simondon's project, we might wish to characterize them as "scientific individuals" or "experimental individuals."

While both Stengers and Latour strategically pose some degree of equality or symmetry between human actors and non-human actors, they differ in that, generally speaking, the politics of "speaking with" non-humans ultimately turns into a matter of *speaking for* non-human actors (that is, representation) for Latour, while in Stengers the emphasis gradually falls on how we are *speaking about* non-humans, that is, how to gauge the truth-claiming capabilities of the sciences. In her account of Whitehead's *Process and Reality*, for instance, she writes of "the

need to actively and explicitly relate any knowledge-production to the question that it tries to answer" rather than to take it as a neutral statement or "conception of the world" (Stengers 2008: 92).

Previously, with a nod to Rancière's notion to aesthetic equality, I have suggested the term "technical equality" to refer to Simondon's gesture of taking the equality of human and technical objects as a point of departure. And this is where Simondon's account of technical individuals intersects with Latour's and Stengers's interest in "non-human actors." Yet Simondon also adds something crucial to the politics of technical equality. There is of course a difference in concern insofar as Stengers's and Latour's focus might be best qualified as "experimental individuals" in contrast to Simondon's technical individuals. Yet, above and beyond this difference of focus, with his close attention to both the remarkable points (form) and associated milieu (across internal and external grounds) of the technical individual, Simondon's account introduces greater coherence at the level of what matters and how. What is more, because Simondon insistently specifies and qualifies what counts as a technical individual, his account shows greater concern for speaking with machines (or with technicity) rather than for speaking for them (Latour's emphasis on representation) or about them (Stengers's focus on science's politics of truth). Finally, despite the generality of his historical account of modernity, Simondon offers a less massive theory of modernity than Latour in particular. In keeping with his focus on concrete specification, the technical individual for Simondon is one type or tendency within technical being, albeit one that becomes pronounced in modern times, whose dominance signals a kind of modernity. As such, his account invites us to think modernity in the manner of Foucault, not as a massive, all encompassing Rationalization or Modernization, but in terms of overlapping fields of rationality (multiple modernities) with their specific potential for resistance (Foucault 1982). This is because Simondon's attention to the associated milieu of the technical individual, in conjunction with its neutral point and remarkable points, brings technicity or technical equality into play with greater specification of potentiality.

To summarize the account of technical individuation thus far, what distinguishes it is, first of all, the relation between form and ground. As the individual becomes concrete, it also differentiates, resulting in a stronger bifurcation of its ground into internal and external milieu. The ground of the crystal bifurcates into a contrast and spacing, but, because these two aspects of the ground do not entail recurrent causality, they are not potentialized to the same degree that the doubling of the ground in technical individuation is. The ground of the technical individual entails recurrent causality, both internally and externally. But these two sites of recurrent causality are not symmetrical or identical. As such, the internal ground and external ground have to "communicate" more actively across their asymmetry, and stabilize that communication. The result is a self-regulating individual, closer to a natural object than a physical object. But how are we to relate to this self-regulating individual?

It is here that Simondon's resistance to automatism is telling. He is as impatient with those who characterize machines in terms of automatism as he is with those who simply reject machines. Evidently then, his emphasis on self-regulation is not an invitation for us to stand back and let machines run on their own, automatically. Rather, he continually reminds us, we're already involved in machines. There is something of the human in machines. At one level, this is obvious, since humans make machines. But, again for Simondon, it is not merely a matter of human origins of machines in the sense that humans made machines and therefore can choose to use them or not to use them, for posing the question in this way leads us back to applying the paradigm of freedom versus slavery to human-machine relations. In other words, what is human in machines cannot be seized consciously or rationally in the sense of pure reason or cognition. In effect, how machines are "used" (or rather, participated in) should follow from how machines are invented. As such, it is precisely because invention proceeds in a hands-on, practical and inventive fashion—as a sort of dialogue between humans and machines that engages the pre-individual within humans—that humans should not strive to "use" machines in a purely rational utilitarian fashion. Rather, the relation to machines needs to sustain a practical inventive engagement with what is human in machines—in a word, technicity.

As Combes notes, such a view of human-machine relations is not compatible with a notion of technics as a means of compensating for or supplementing an originary lack, as Bernard Stiegler would have it. Stiegler seems to adopt a rather Lacanian point of departure: humans are deficient from birth; they are born too early, and, to meet their needs, must compensate for their weakness, which they accomplish first by making tools and then machines. But such compensation or supplementation goes far beyond needs, taking on a life of its own, so to speak. Thus machines swarm over the world, as a massive overcompensation for our weakness. Ultimately, then, the problem of human-machine relations turns into a psychoanalytic problem: only by recognizing and coming to terms with our primordial fragility will we be able to break our vicious cycles of technological overcompensation. Again, as Combes notes, such an understanding of technics, exemplified in Stiegler's notion of "originary technicity", is completely at odds with Simondon's understanding of technicity. It is not that Simondon does not countenance the fragility (or, we might say, precarity) of humans, but it is not for him an ontological ground. Humans for him are not originally or primarily fragility; they are also potentiality, capacity, powers in the world. Our situation vis-à-vis technics today is indeed precarious, but Simondon does not see it as a psychological or existential problem: if the situation is grim, it is not because we have ignored that we are ontologically constituted by lack. Rather he says that we are practically alienated from our potentiality. As such, modern alienation is not ontologically given and thus predestined (deriving from lack) as in Stiegler. Rather modern alienation is ontologically produced and historically constructed, in inventiveness and inventions.

This is why the politics of Simondon's philosophy of individuation shows more affinity with Foucault and Rancière despite the significant differences between their approaches: Simondon's approach is concerned with both the politics of knowledge and the politics of equality. On the one hand, like Foucault, Simondon sees knowledge as operative, as inseparable from power, and in this respect his critique of substantialism and hylemorphism, for instance, is not intended as a purely logical intervention and his insistence on analogy is, in fact, an attempt to provide a knowledge whose operativity is adequate to the resistance implicated within the activation of fields around technical individuals.

Here, however, we have to consider Simondon's distinction between three degrees of technical being: technical elements, technical individuals and technical ensembles. The technical ensemble might be considered as analogous to Foucault's notion of a power/knowledge formation entailing a field of rationalization articulated upon a *dispositif*, a paradigm or apparatus. In such terms, the problem of modernity for Simondon is that the technical individual has been treated as the paradigm for a field of rationality, for the production of a specific kind of technical ensemble. Which is to say, the machine has been both practically seized and operatively rationalized into an automaton, which has generated technical ensembles (fields of rationality or power/knowledge) in which humans cannot work with technical individuals but only over them or below them (exemplified by but not limited to the factory, especially the Fordist assembly line).

On the other hand, unlike Foucault, but closer to Rancière, Simondon is interested in equality, in a specific mode of technical equality called technicity.

Resistance to excessive rationalization of this specific field of rationality (say, the factory) would necessarily pass through such technical equality. And Simondon does not hesitate to say that technicity is inherently equalizing, that it makes for a participating in, which, like Rancière's aesthetic equality, may not guarantee political equality or democracy but surely conditions it. It is technicity that makes technical individuals the most important site for neutralizing and countering the subordination of all fields of rationality to economic concerns in the modern era.

In her account of Simondon, Combes astutely identifies the politics of labor as a point of intersection between these two ethico-political trajectories in Simondon's philosophy. Drawing on Antonio Negri and postoperaism in a truly prescient manner, Combes also shows how Simondon's account provides a rich source of counter-knowledge for the post-Fordist era of information society in which knowledge has been built back into labor and production, making explicit that a factory was never just a production formation but always also a power/knowledge formation. Of course, for postoperaism, it is primarily the

knowledge of workers that becomes the source of counter-knowledge within the formation, and pursuing this line of inquiry, Combes suggests that one political complement to Simondon's project would be to take seriously what workers actually do with machines, and what they say about them, rather than dismiss them as servile and thus tending toward technophobia.

I am entirely in agreement with Combes on this point, and by way of conclusion, would like to open some possibilities for extending it to other kinds of counter-knowledge/power that may effectively complement that of factory workers on machines. But to do so, I need to complete this account of the four aspects of individuation in the technical individual by considering its neutral point and absolute origin. In effect, the neutral point of the technical individual is the human, whose absolute origin or eventfulness is technicity. Here we come face to face with Simondon's humanism, that is, to the centrality of the human being in his philosophy. Yet, as implied by terms such as absolute origin and neutral point, this human being is not that of traditional humanism, which is articulated juridically in terms of natural rights, natural sovereignty, or natural equality. Simondon's theory of human being hinges on the eventfulness of technicity.

Human Being

To look at a mode of existence in terms of its individuation is to look at it from the angle of the underlying and surrounding processes that are part of its genesis, making it what it is. The study of individuation recalls the study of evolution in this respect, for it is the study of the birth and transformation of individuals. As such, the individual is always in a series, and its ontogenesis is equally a phylogenesis, demanding a study of genesis (that is, a genealogy) from the angle of the series. Any inquiry into the relation between humans and machines, then, has to deal with a genealogy of the human alongside a genealogy of the technical object. But let's first look at the contours of genealogy with a return to the technical object.

As I have explained above, the technical individual is a particular kind of technical object (a specific mode of technical existence). In the course of its individuation (concrescence), the technical individual generates zones of recurrent causality, both internally and externally, which are the charged traversal ground (associated milieu) for its efficient structuration of remarkable points. For Simondon, such developments bring the technical object closer to the natural object. The natural object also entails both an internal energetic "recurrent causality" between its elements and an external energetic "recurrent causality" with its surroundings that constructs an associated milieu. [17] Now, in his account of the technical individual approaching the natural object, Simondon not only begins with the internal causality of the machine but also repeatedly defends this point of departure. Why is so much at stake in beginning with what happens within the technical individual, when we know that ultimately the associated milieu is what runs across and grounds external and internal milieus?

In ontogenetic terms, focusing on internal recurrent causality serves to highlight how the technical individual comes closer and closer to the natural object (but, of course, remains nonetheless distinct ontologically). But there is more at stake in the emphasis on the internal. In genealogical or phylogenetic terms, Simondon's insistence on starting with what happens inside the machine is consistent with his rejection of the evolutionary model that is frequently called "adaptationism." Here, rather than simply assume that Simondon is following Bergson's ideas of creative evolution (and the overlap is often striking), I would like to enlarge the evolutionary field and situate Simondon's theory of evolution alongside biologists and historians of science who have also challenged adaptationism, notably Stephen J. Gould and Richard Lewontin, but also a range of other scientists and commentators who explored the evidence against adaptationism and looked for alternative models for evolution. [18]

Critics of adaptationism argue that such an approach places too much emphasis on environmental pressures on the one hand, which leads, on the other hand, to the notion that, over time, as environments change, organisms are stuck with the adaptations produced by prior environments. This has contributed to the greatly

exaggerated idea that contemporary humans are at a loss in the modern world because they were, in effect, evolved, that is, "hardwired" to deal with a very different environment. Adaptationism favors an account of external factors affecting evolutionary changes, largely ignoring the internal factors (both material limits and contingent opportunities, not to mention, what we might call in a Spinozist way, the powers of a body), which in turn encourages a very static linear view of evolution. When Simondon refers to the emergence of recurrent causality within the machine as "internal adaptation," what is at stake for him is a model of evolutionary transformation that avoids the pitfalls of adaptationism (that is, "external adaptation" or adaptation from without). The focus on internal adaptations allows Simondon to avoid the model of a machine statically adapted to an environment, which then finds itself stranded and at a loss when the environment changes. Instead, like the natural object (organism), the technical individual affects internal changes and simultaneously generates a recurrent rapport with its external milieu, which allows it to interact actively with the world and to produce a transformative series. Again, this view of the technical individual is reminiscent of the non-human actor in Latour and Stengers, but to put it in a quasi-Spinozist way, Simondon is interested in the details of how specific technical bodies have the power to affect and to be affected. [19]

There is another concern in Simondon's emphasis on internal adaptation (which we might now also gloss as a sort of material involuntarism): he also wishes to complicate the relation between technical concerns and economic concerns. In the context of the evolution of technical individuals, Simondon's account implies an analogy between external factors and economic concerns. Thus, the overemphasis on external factors with adaptationist theories of biological development is analogous to economic determinism in the context of technical development. In effect, implicit in his analogy between the focus on external factors (adaptationism) and in economic determinism (economism) is a prescient critique of economism as a retooling of social Darwinism in the form economic Darwinism. While Simondon does not deny that there are times and places where economic concerns do indeed determine the direction of technical developments, he wishes to show the severe limitations of thinking technical evolution exclusively in terms of a subordination of the technical to the

economic. In contrast, by insisting on the "equality" of the technical vis-à-vis the economic, Simondon finds a way to explore the relation, the fraught and tense relation, between the technical and the economic.

As a corollary to the relative equality of the technical, Simondon also feels that an understanding of technical individuals based primarily on industry and manufacturing results in a highly biased and overly narrow understanding. Simondon thus encourages us also to consider dry docks, mines, oilfields, workshops, and laboratories. And in keeping with his strategy of analogy, Simondon encourages us to think the technical individual beyond the factory, not merely because it is an error to remain focused on the factory, but because limiting our scholarly inquiry to an account of the factory reinforces the *dispositifs* that have operatively mistaken the machine for an automation and extended that operativity into fields of rationality and technical ensembles like the assembly line. For Simondon, the modern factory is a particularly noxious paradigm which he posits as the prime site of alienation of the technicity of the human being. Needless to say, Combes is persuasive in pointing out that workers' knowledge of machines may not be simply alienated but may entail a complex alienation that includes possibilities for counter-knowledge and transformation. And, to extend her insight operatively, we can also look into Simondon's genealogy of the human for other sites of complex gradations and counter-knowledge/power.

Simondon's genealogy initially establishes that, with the modern emergence of true technical individuals or machines, humans find their previous role as technical individual taken from them. Which is to say, prior to modern machines, humans were the tool bearers, playing the role of technical individuals. With the advent of technical individuals that bear tools, humans find themselves situated either below the machine or above the machine. They become either caretakers of the machine or supervisors of ensembles of machines, a contrast reminiscent of that between worker and foreman or capitalist in Marx. Yet, for Simondon, such a genealogy is remarkably close to the cyborg or cybernetic understanding of technicity,in which humans oscillate between enslaving machines and being enslaved to them. Not surprisingly then, Simondon introduces a strange twist in this initially straightforward history: in fact, the role of tool bearer, or of technical

individual, does not rightly belong to humans. It is as if they had pre-emptively seized it from machines but had forgotten and come to mistake it as their function. In other words, while Simondon proposes a break with the industrial factory system that effectively makes humans into workers under machines or supervisors over them: he is not interested in a return to a pre-modern guild or artisan formation in which the role of humans was closer to the technical individual. In effect, he is proposing that humans dig deeper into their evolutionary sources to seek something prior to the technical being and human being that traverses them.

To understand this genealogical twist in which Simondon begins at once to dig deeper into human being and technical being, we need to bear in mind that Simondon is working against adaptationism and its linear tendencies. Gould provides a good point of reference, for, in his major work, *Ontogeny and Phylogeny*, as he contests the emphasis on external environmental factors and digs deeper into the organism, his account arrives at an evolutionary theory based on heterochrony and neoteny (Gould 1977). Heterochrony is best illustrated in Gould's theory of punctuated equilibrium in which evolution happens in bursts followed by long period without transformation. Neoteny refers to the retention in adults of traits previously seen only in juveniles, which allows a species to undergo transformation from within, as it were. Examples of neoteny include the resemblance of dogs to immature wolves, flightless birds who resemble the chicks of flighted birds, and the large head and sparse body hair of humans, which recalls baby primates. Neoteny might be thought of as a special case of heterochrony in that forward progress does not happen in a linear fashion but arises through a sort of return to the sources of being, a return to the point of bifurcation where potential energy is being converted into actual energy. Indeed, Simondon sees the relation between physical being and natural being in similar fashion: the natural object does not simply advance from the physical object, rather the natural object presents a return to the point where potentiality is actualized, extending, internalizing, actualizing that potentialization. Figuratively speaking, the natural object is on the neotenous threshold of the physical object.

Now, my point is not that Simondon endorses neoteny as such, or that we should endorse neoteny. In fact, the term neoteny begins to mislead us if we think about it in terms of a literal return or a movement backward in linear time. Rather neoteny is one way to grasp concretely the role of pluripotentiality or pre-individual being in the context of evolutionary development. As such, my evocation of neoteny is intended to shed light on some of the alternative ways of thinking ontogeny and phylogeny that come to the fore when the relentless linear pressure of adaptationism or economism is not accepted. Similarly to Gould, in his alternative non-adaptationist evolutionary theory of the evolution of humans and machines, Simondon will discover the heterochrony of technical evolution, which goes hand in hand with a mode of human being in relation to machines that is akin to neoteny. Looking at these aspects of Simondon's account will bring us to a better understanding of what it means for him to situate human being as the neutral point of the technical individual, with technicity as the absolute origin or eventfulness of technicity. Let's turn first to the heterochrony of technical phylogenesis.

In modern times, Simondon sees the emergence of technical individuals or machines with the gradual "liberation" of technical procedures that were formerly "enslaved" or inferiorized, that is, forcibly associated with lesser social positions and actively disavowed, inventors begin to attend to the potentiality within the operations of technical objects, resulting in machines. But Simondon is adamant: such progress is not a matter of greater automation but of a great margin of indetermination (due to recurrent causality) within machines and between machines and the world. This is technical individuation from the point of view of ontogeny, of the genesis of an individual machine, so to speak. But, because machines also exist in series and in ensembles, we also need to look at their phylogeny, at the relation between reproduction and transformation. On the basis of his running analogy to the natural object, Simondon notes that technical evolution is very different from that of organisms: with machines, it is as if the organ separated from the body and functioned as a seed or germ for a new individual or a new line of individuals. Thus we return to the point of the

departure of this essay as well, to Canguilhem's analogy between machine and organism in which machines have organs like organisms. But such an analogy in Simondon defamiliarizes our sense how machines form series.

For Simondon, the "organs" of the technical individual are its technical elements—its springs, blades, needles, and pulleys, to give a few examples. He refers to such technical elements as highly concretized forces or capacities, which is different from the concretization of technical individuals. It is as if the technical element had so thoroughly stabilized and concretized the recurrent causality of the machine that they approach the limit of realizing their associated milieu. The technical elements can be used in a variety of milieus and thus made to work together in various kinds of technical individuals and technical ensembles. As forces for undergoing capacities or producing capacities, these technical elements might be said to be instances of technicity as such. Indeed, they bear a technical value independent of economic value. Because technical elements are autonomous, it is they who are transmitted to posterity—not the technical individual. In addition, because "organs" are that which are transmitted, the evolution of technical individuals implies "a line of causality that is not rectilinear but like the teeth of a saw, with the same reality existing in the form of an element, and then as a characteristic of the individual, and finally as a characteristic of the ensemble" (Simondon 1989: 66). But we should also recall that the technical ensemble is like a field of rationality in which the technical individual is a mediator, a threshold for a paradigm or *dispositif*.

In sum, technical being unfolds or evolves in series by articulating relations between three phases of its being, which are called technical elements, technical individuals, and technical ensembles. If Simondon describes the series of technical evolution as serrated, it is because he looks to the resistance to the linear vision of technological progress in which we move from, say, the needle to the sewing machine, to the sweat shop that mobilizes scores of workers busy at their machines under the supervision of a boss, or to the fantasy of a completely automated garment factory without human workers at all. It is precisely this linear vision of technology that leads humans to fear the machine, for even the sewing machine implies a teleological movement toward the enslavement or

ultimate redundancy of humans in the domain of fabrication. Simondon shows that there is no evidence that this is how things have proceeded or will proceed. Again, we suspect that if things have often turned out badly, it is due to the imposition of economic concerns upon technical individuation, which forces a rectilinear movement and a simplistic temporality of progress. In any event, Simondon's attention to the relation between three modes of technical being—element, individual, and ensemble, allows him to parse the heterochrony of technical evolution: technical evolution is not from element (organ), to individual (organism), to ensemble (culture), for technical individuals do not reproduce as organisms do. Crucial then for coming to terms with technical evolution is not to mistake the function of technical individual. We must not assume that humans should play that role, for in effect, we then begin to collapse the distinction between human and machine, entering into a war over which will play the role of technical individual. The facts of technical evolution suggest to Simondon that, rather than impose rectilinear progress on technicity, humans should insert themselves into the true tendency of technical evolution—which is non-linear and discontinuous—by situating themselves with technical individuals and thereby participating equally in the relation between technical elements and technical ensembles. The result would be, if we paint it in utopian tones, technical ensembles and fields of rationality that assume and prolong equality-in-difference between humans and between humans and machines. This is what machines do with us.

Now, as Combes points out, that terms such as "should" and "true" arise in Simondon presents a certain risk, as does his use of reason, universality and progress: we must be careful not to read such terms in an entirely normative fashion as if Simondon were saying, "Because reality is this way, you have to align yourself with it." [20] Simply put, if you're not becoming, you're wrong. Like Combes, I feel that such a normative reading of Simondon ultimately is not justified by his project as a whole, but it is crucial to signal such a risk because other commentators have opted for the normative reading: have-to-become. [21] In any event, the way in which humans are to insert themselves into the non-linear evolution of technical being entails a movement that might well be described as neoteny.

In the pages on "minority" and "majority" in *Du mode d'existence des objets techniques*, for instance, Simondon presents a kaleidoscopic contrast between something like the juvenility or immaturity of human beings on the one hand, and their maturity and reason on the other. Here too, there are risks of a normative reading, not least because, in delineating juvenility, Simondon folds peasants and other historical instances of inferiorized social strata into the mix. His aim, of course, is not to repeat the inferiorization of certain social groups or to categorize them as juvenile or immature. Nor is his goal simply to appropriate or recuperate them, even though his sympathies usually seem to align with the minority. Rather, as with Deleuze and Guattari's notion of the minor, Simondon strives to trace out counter-tendencies (and potentially counter-actualizations) to the "major" tendency in which technological evolution has been mapped onto human evolution, making linear progress appear natural, reasonable, and inevitable. In effect, like Deleuze and Guattari, Simondon's politics of technology tends to become localized around a becoming-minor within the majority, but in the specific instance of modern technical ensembles. Yet, contrary to popular interpretations, such an approach does not rule out minoritarian opposition to the majority. Rather, it does not reify opposition by grounding such opposition in dualist and substantialist metaphysics which tend to work by identifying minorities and making them assume their oppositional destiny as established by the metaphysician of history in substantialist terms.

In any event, humans' becoming-minor vis-à-vis technical individuals in Simondon hinges a kind of neoteny of the human being, in which humans "return" to a moment that might be described as historically prior to their usurpation of the role of technical individual, to a more juvenile relation to technology that entails a genuine reckoning with technical elements as technical values that are autonomous of other concerns, such as economic value. With this "re-discovery" of the essence of technicity, humans will no longer strive to play the role of technical individual or the role of servant or master to machines. The new role for humans might be described as technician, physicianor diplomat vis-à-vis machines, which implies the discovery of new kinds of technical ensembles for working with machines, closer to laboratories, hospitals and embassies than to factories. Indeed, in an era when communication technologies have enlarged

the politics of what counts as work, as a complement to Combes's emphasis on the political usefulness of seeing in the perspective of factory workers a form of counter-knowledge, we should add the perspective of these other workers-with-machines. At the same time, we should resist the temptation to identify one specific perspective, or figure, with the historical or evolutionary burden of transformation which would transform the politics of knowledge into politics of militant redemption.

In other words, Simondon's a description verges on the utopian and redemptive if it is not qualified in relation to politics, and if we lose the concern for specificity and thus techniques and apparatuses. In effect, the role of the human in Simondon is reminiscent of what Foucault called the "specific intellectual" in contrast to the universal intellectual (Foucault and Deleuze 1977). It implies a politics in which one's technical role or technical value is not beside the point, but the point of departure, that which brings you to the threshold. Unlike Foucault, however, Simondon does not contrast the specific intellectual to the universal. This is because, in Simondon, as human beings rediscover technical value, they also discover technical equality and, in effect, technical universality. There are now, however, multiple universes, because as Simondon embarks on his inquiry into the technical essence of the human, he discovers the "place," that is, the relation of the human in the universe. The essence of the human lies not in natural right, natural sovereignty or even communicative reason. It lies in technical equality which now can be glossed as the relation between efficiency and finality, between efficient causality and final causality, which is also the "neutral point" of the human where its technical eventfulness transforms the power to technically affect and to be technically affected by universes of value. As Simondon concludes in his essay on the limits of human progress: "The questions of the limits of human progress cannot be posed without that of the limits of thought, because it is thought that appears as the principal depository for evolutionary potential in the human species" (Simondon 1994: 275).

Notes

[1] I am thinking here of the work of Peter Sloterdijk in which cybernetics becomes a massively subjectified structural conceit.

[2] In fact, in beginning with the cyborg model, I am in effect reprising Simondon's point of departure in *Du mode d'existence des objets techniques*, which begins with a polemic against a popular understanding of machines as becoming autonomous and taking over the world from humans.

[3] This is true provided we keep in mind that Simondon explicitly distances himself from thermodynamic energetics in favor of a sort of informational energetics. We must also keep in mind Simondon's rejection of information theory.

[4] One effect of Simondon's procedure of analogy is that it makes visible (and operative) an analogy between substantialism, dialectics, cybernetics, and hylemorphism. Here, too, he does not collapse the difference between these approaches but attends to their parity, which amounts to a general indifference to disparity.

[5] I am borrowing "concern" from Isabelle Stengers, which she explains nicely in Stengers 2005. Her notion of a "concern" stems from Deleuze's notion of a "problem."

[6] In a workshop on Simondon held at the Sense Lab in Montreal, in an unpublished presentation, Brian Massumi suggested the expressions "neutral point" and "remarkable points" for understanding crystallization in Simondon.

[7] See the section entitled "Absolute Origins of a Technical Lineage" in *Du mode d'existence des objets techniques*, especially pages 40-43.

[8] The language of "*part*" and "*partage*" in Simondon implies of course both partition or distribution and sharing. This is also difficult to render in English, and translations of Bataille and Rancière tend to highlight the problem, for *la part maudite* becomes the "accursed share," and *le partage du sensible* becomes the "distribution of the sensible."

[9] Giorgio Agamben provides a nice account of how Foucault's notion of *dispositif* glosses Kuhn's paradigm. See *The Signature of All Things: On Method* (New York: Zone Books 2009), 11-16.

[10] Simondon often uses the term *chargé*, which means at once "charged" in the sense of electrically charged and "burdened."

[11] In her introduction to Simondon, Muriel Combes also suggests that we can read his work through the lens of topology, even though Simondon in fact rejected topology, or at least, as Combes points out, a certain understanding of it. See Combes 1999: 73.

[12] Combes discusses the accusations of objectivism leveled at Simondon by his peers in the context of a paper delivered in 1960; see Combes 1999: 90-92.

[13] Combes discusses this problem at great length in her chapter "La relation transindividuelle," in which she shows that the subjective trans-individual and the objective trans-individual are two facets of the same reality.

[14] Rancière sums up his concept of aesthetic equality thus: "…the aesthetic regime is the implementation of a certain equality" (Rancière and Rockhill 2004: 52).

[15] Simondon refers us to phylum and families, which is also a way of avoiding the Aristotlean impasse of species and genera.

[16] Dumouchel 1995 provides a nice overview of the stakes in Simondon's discussion of engines.

[17] Simondon does indeed use the term "feedback," but because of his resistance to cybernetics, and because I see something very different at work in his philosophy than in theories of autopoiesis, I have put feedback in scare quotes.

[18] See for instance Gould and Lewontin 1979. For a cogent recent critique of adaptationism, see Fodor and Piatelli-Palmarini 2010.

[19] Combes also evokes this aspect of Spinozist bodies in explaining Simondon, in Combes 1999: 54.

[20] Combes, too, addresses the potential normativity of Simondon in her critique of Hottois's study that construes his philosophy in terms of a "have-to-become" (Combes 1999: 103-104).

[21] As Combes points out, this is the direction taken by Gilbert Hottois, and I would add that this notion of "have-to-become" is also where evolutionary theory can be forced into the sort of theory of sovereignty found in Karl Schmitt.

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