Images of the Future:
Anticipating, Fabulating and Inventing with Bergson and Simondon

By

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Abstract

This article analyzes the conceptions of anticipation and invention in the philosophies of Henri Bergson and Gilbert Simondon. In doing so, I analyze the questions how futures are anticipated and what role technologies play in the anticipation and invention of the future. Technologies are increasingly used to predict, prescribe and control behavior. These technologies are based upon the ontological belief that reality is computable and predictable. With Bergson and Simondon, I aim to show that this ontology does not take the temporal structure and the anticipatory faculty of living beings into account. Anticipation is an essential activity of a living being in its milieu. In order to survive, living beings structure their milieu to make their future actions reliable. Images are central to this process. They are constantly evoked by and with practices. They are transformed and used to anticipate and imagine the future. Yet, these images are affectively charged and can be an expression of what Bergson calls "myth-making function" (*fonction fabulatrice*). While Bergson describes this function as a positive force, one can ask whether this force turns against itself in face of our contemporary climate crisis, digital technologies and the crisis of open democracies. An alternative is to understand and to construct technical objects as essentially open in analogy to the living being. This implies a conception of the human not as a fixed conception, but as an "open adventure" (Simondon 2016, 121) that constantly re-invents itself in relation with nature and technology.

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Digital technologies such as face recognition, the algorithms of Google, Amazon and Netflix suggesting products, videoclips and films, are increasingly used to anticipate, to shape and control the behavior and the desire of the user (Berardi 2017, Zuboff 2019). Seemingly, technologies[1] are used to create a controllable future that is derived out of the probabilities of data sets. The belief in these data sets goes together with the belief that the future can be anticipated via technologies. Both beliefs imply that being and time are calculable and computable.[2] Technologies are in this conception attempts to tame the aspects of reality, which are *not yet* under control. Algorithms calculate probabilities and are either tasked to make a decision (e.g., flag a person at the border as dangerous or not) or support the decision-making process (i.e., provide data). Technologies co-constitute modes of action. Therefore, questions of doubt and trust are implicated in the interrelations of human beings with technologies (see Amoore 2019, Keymolen 2016). The belief in the power and potentiality of technologies shapes how we anticipate and imagine the future. In this essay, I will focus on the questions of how anticipation is conceived, whether technologies are able to anticipate the future or if the phenomenon of anticipation leads us to a different conception of future-making that is based upon unpredictability, novelty and openness. I will investigate these questions along the lines of the philosophies of Henri Bergson and Gilbert Simondon.

Firstly, I will introduce Bergson's and Simondon's conception of time as a proactive force that cannot be transposed in mathematical terms. The future cannot be calculated. Possibilities are therefore not anticipations of the future but are conceived from the vantage point of the present possibilities in the past that never existed. They cast shadows into the past. The "possible" always occurs ex post, but does not correspond to the temporal structure of the anticipation of a living being *in actu*. It is thus a "pseudo-problem" in Bergsonian terms. Bergson contrasts the "possible" with "lived reality", which unfolds itself and can neither be calculated, nor prescribed. This does, however, not mean that anticipation of the future does not exist, but merely that anticipation is an engagement with the world exceeding the faculties of human intelligence. This understanding of anticipation is further developed in the second part of this paper. In a close reading of Simondon's lecture course *Imagination et Invention*, I will link the concepts of anticipation, the image and invention.

Anticipation is an activity of a living being in its milieu. In order to survive, living beings structure their milieu to transform it into a territory, where modes of action become reliable. In this process *images* are created, i.e. they are evoked out of the interplay between the individual and its milieu. These images are neither completely belonging to the subject, nor completely belonging to the milieu. They institute a realm that is open to the activities of the subject and can also be

informed by the milieu. Images are therefore central to the process of how living beings transform their milieu. Simondon argues that images are part of a recursive cycle between the living being and its milieu. Images are constantly evoked by and with practices, transformed and used to anticipate and imagine the future. Yet, these images are also always affectively charged. They can either lead to invention or disguise the real in order to prevent new modes of being. I will address this aspect of the imaginary in a third step in going back to Bergson's notion of the myth-making function (*fonction fabulatrice*). This function is conceived as a virtual instinct that provides a natural reaction – when needed – against the sober faculty of human intelligence. The exposure to forces of nature, when analyzed by human intelligence alone, for instance, would inhibit any activity, since in face of natural catastrophes, these would be futile. According to Bergson, the myth-making function counters intelligence in creating an affective account that allows human beings to act. Yet, while Bergson describes this function as a positive force, one can ask whether this force turns against itself in face of our contemporary climate crisis, digital technologies and the crisis of open democracies. An alternative is to understand and to construct technical objects as essentially open in analogy to the living being. This implies a conception of the human not as a fixed conception, but as an "open adventure" (Simondon 2016: 121) that constantly re-invents itself in relation with nature and technology.

I. Possibility and Reality

In his article *The Possible and the Real,* Bergson discusses whether or not a future situation can be foreseen or completely anticipated. The article opens with a thesis that runs through his whole philosophy: "The continuous creation of novelty, which seems to be going on in the universe" (Bergson 2007: 73) . This discussion relates the epistemological problem of the experience of time to the ontological problem of the evolution of life (Bergson 2009: 381). This dynamic process is first and foremost experienced as duration (*durée*), i.e. as subjective experience of time (Bergson 1950; 2005). Time is not an abstract entity, but rather consists in the concrete experiences of the subject's inner life, which is given by an intuition. Accordingly, scientific time is an abstraction of this intuition and a transposition of a dynamic interpenetration of multiple states into a spatial form (Bergson 1950: 89ff.). The experience of an emotion, for instance, comprises several bodily and mental states that are simultaneously experienced. A scientific measurement of an emotion separates these states and transposes them into elements, which belong to an emotion, but merely a recombination of the parts does not recreate the experience (Schick 2012: 240ff.). Time as duration is for Bergson the condition of possibility for subjective experience

and allows an explanation of change and transformation.[3] Bergson argues from the vantage point of time as duration against a deterministic interpretation of scientific findings in psychology, evolutionary biology and the neurosciences. This does, however, not mean that the results of the sciences are invalid or not useful. Quite the contrary: The point of departure of any scientific finding – and also of any philosophy – is an intuition (Bergson 2007: 163)[4]. But, as mentioned above, this intuition is then transposed into a stable set of elements, formulas, ideas and material tools, which are just the elements that are necessary in order to have this experience, but are not sufficient to reconstruct the experience of an individual subject.

Ideas and scientific theories are products of the homo faber, who's intelligence "is the faculty of manufacturing artificial objects, especially tools to make tools, and of indefinitely varying the manufacture" (Bergson 1998: 139). These tools, be they hammer, platonic idea or algorithm, are extracted in a material engagement with the world, are stable over time and allow to structure the world. They are tools to make the outcome of actions and of programs of actions predictable, reliable and safe. A specific mode of action involving human beings, their instruments and the material the tools are applied to produce the same outcome. Yet, as Gilbert Simondon points out, already in the production of bricks and tiles specific materials have to be used in order to guarantee a stable outcome (Simondon 2005: 39f.). Materiality co-constitute the mode of action, which shows that it is not under complete control of human intelligence. This implies that neither human intelligence nor its products can predict the future or anticipate future events in a full sense. Only conscious beings are able to anticipate the future (Bergson 2007: 8).

It is this ontological and metaphysical claim that Bergson seeks to illuminate by showing what the differences between anticipation, virtuality, possibility and reality are. An anticipated or imagined event has aspects of virtuality. It is not yet actualized and possesses potentiality, that is, there are still pathways open and a definite outcome is not prescribed by the presence. The real – which constitutes this presence – is seemingly richer than what human intelligence can predict.[5] According to Bergson, this is due to the essential creative and unforeseeable unfolding of life. Too many factors may play into the actualization of an event, so that a complete prediction of an event is for the human intellect impossible. This leads to a strange sounding claim of Bergson: Events become only retrospectively possible. This goes together with Bergson's conception of the possible: Possibilities are neither present nor allow to foresee the future, they are rather "shadows of the past" (Bergson 2007: 14), i.e. constructions of the present moment, which rely upon past conditions. The "possible" is thus identified as a pseudo-problem. These problems are caused by an excessive and exclusive use of human intelligence

without referring to the concrete experience of duration. Thus, theoretically a conception of nothingness is possible, even though it remains merely an "idea", which has no basis in the experience of any living being (Bergson 2007: 78). This holds for the conception of possibilities, since retrospectively an infinite number of outcomes can be imagined. The creation of possibilities in the past, is the making of human intelligence: In analyzing the complex event, i.e. in distinguishing different moments of a continuous movement, it establishes points in time where a different path seemed possible. Yet, the whole act of discerning and analyzing these possibilities is performed from the vantage point of the present and projected in the past: "We must resign ourselves to the inevitable: it is the real which makes itself possible, and not the possible which becomes real." (Bergson 2007: 85)

The action itself is in the moment unforeseeable, i.e. it is not fully determined by past experiences of the subject. The subject is never exclusively determining the outcome of an action. Not only the changing circumstances are a sign of the transformative character of reality, but also the process of actualization of past experiences.

II. Anticipation and Invention

This does, however, not mean that the present moment is not determined by the past. The anticipation of opportunities is the capability to transgress the boundaries of the present to create and invent future realities. Time is an active force according to Bergson and Simondon. The future is in the present a virtual, relational force that cannot be prescribed:

> The future can neither be condensed, nor be described in detail, nor can it be thought. It can only anticipate itself by a real act, since its reality is not condensed in a number of points; it is between the possible points that its energy exists; the future has its specific, its own atmosphere/ ambiance, it is relational force and an activity, that is implicit even before its realization; Being pre-exists itself across its present. (Simondon 2005: 282)

Virtuality is precisely what exists *between* calculated "possible points". Human intelligence can by means of calculation determine probabilities, but the potentiality of the future – even though it is implicit – cannot be reduced to these points. The ontological status of virtuality is therefore a force that has not yet been actualized, cannot be foreseen, condensed or calculated, but which describes nevertheless the presence of the future in the present moment.

Simondon points out, that this leads to a specific tension of a future that is prescribed and based upon a "spatial representation" of time and a future, which is anticipated by means of desire and will:

> The needs of long-term forecasting for action have introduced rationalization into the dimension of the future and have dispelled the myth, at least in the economic and demographic field; time is beginning to organize itself like space; the future is annexed by the knowledge *(le savoir)*, it is no longer the privileged field of the optative, of desire, or of will. And yet, the image regains its density and its strength which leads it towards the anticipation of the collective future, outside and above prospective rationalizations, which are above all extrapolations, but not real inventions. Scientific fiction is one of the ways in which the image regains its power for the future, that is to say, its prophetic function; it is the image of the real world caught up in its tendency and pushes further, truly anticipating, seized in advance according to the cognitive and emotional aspect, not merely assumed.[6]

The spatialisation of time echoes Bergson's critique of scientific time. Temporal events such as affective experiences are, as mentioned above, transposed into a spatial representation. Here, each element of the experience is assigned a position, which allows to predict and calculate the following position. The future becomes a representational point that succeeds logically from its preceding points. For anticipation to work and for time to unfold, however, a surplus is necessary that cannot be reduced to a mathematical representation of the world. This surplus is what Simondon signifies as "image". The image allows to carry aspects of the will and of desire to enter into the process of how time actualizes itself as future.

The image has a peculiar status. It is above and below rationalization, it regains its power through (science) fiction, where futures are, according to Simondon, really invented. The question is, however, not only how these futures are invented, but also what their performative and normative status for a society is. It seems, for instance, that dystopian views of the future are far more common and attractive than utopias.

Anticipation with and through images starts already on the level of the organism, even though the image regains its power in science fiction. Science fiction is already a specific kind of anticipation that becomes necessary for the human being. Anticipation is an act of invention performed by living beings in general. To live implies a proactive force that thrives of the potentiality of its milieu. The milieu is conceived of as *physis* – in the Aristotelian sense of the word:

> What lacks prospective to be a real anticipation, is this qualitative power, this *physis* which gives the future its veritable dimension of a development in course of action. To foresee does not only mean to see, but to invent and to live: the veritable prevision is to some degree praxis, tendency in the development of an already inchoate action. The image, reserve of an oriented emotion linked to a knowledge, assures that the act is continuous and true to its progress and adds to the prospective a "proactive force". (Simondon 2008: 17)

Simondon is interested in the *praxis*, the how, of living individuals to *solve* their problems. Invention and anticipation are solutions to problems that living beings have in and with their milieu. The problem-solving praxis consists in a mode of action that employs *images*. Images are, following Simondon, an intermediary reality between subject and object, past and future, and the abstract and the concrete (Simondon 2008: 7).[7] The subject is not the exclusive proprietor of images. Images are generated in a recursive cycle between the subject and the milieu. The living being is structuring its milieu by means of images:

> The mental image is like a relatively independent subset within the subject living being; at its birth, the image is a bundle of motor tendencies, a long-term anticipation of the object's experience; during the interaction between the organism and the environment, it becomes a reception system for incidental signals and allows perceptive-motor activity to be exercised progressively. Finally, when the subject is again separated from the object, the image, enriched by cognitive input and integrating the affective-emotive resonance of the experience, becomes symbolic.[8]

The subject is conceived as a "generator of signals", allowing him to anticipate and to receive, conserve and recycle the signals of its milieu.[9] The process of generation of images begins with a "bundle of motor tendencies", which the living being develops in its interaction with the milieu. Both, milieu and organism, are sources of novelty and chance. The actions of both are not completely predictable. Each organism has specific patterns of movement, which condition the engagement with the environment. This engagement produces the images halfway between the subject and the object. The organism in its local activity corresponds with the bundle of signals coming from the milieu (Simondon 2008: 30).

Action, perception and symbolic memory are thus three different phases of the image (Simondon 2008: 28). While at first, the organism is immediately involved in its action with the milieu, it progressively structures the milieu until

it turns into its territory. The access to the territory is granted by system of images that structures according to, for instance, basic models of fight or flight of enemy or prey, the perception of the objects in the milieu. This territory is the condition, according to Simondon, for the development of mental conduct (Simondon 2008: 64). He stresses, however, that he does not intend to oppose the human to the animal, but rather to show, the frequency of mental conduct. Mental activity in a strong sense (and pushed to its limit for the sake of the argument), is only possible for animals, in their territory, since the milieu is organized according to their set of "primitive categories". However, it does not follow that the behavior and the milieu are determined, but on the contrary that animals succeed in inventing new solutions to their problems (hunting prey etc.) in their territory.[10] As an example of the recursive relationship between the living being and its milieu, which is particularly striking, Simondon describes the behavior of a jaguar in captivity. Jaguars use great detours in their hunting behavior, but are unable to solve comparatively simple problems in captivity. They are exposed to a "new, inorganized world", where the jaguar is reduced to its biological regime of perceptions (i.e. seeing merely prey or enemy, waiting for a sexual partner). The cycle of images is thus rebooted and the objects are not perceived as having potential for intelligent behavior (Simondon 2008: 64).

These images can become "symbolic". As symbols, they further stabilize the relation between images and objects. Simondon interprets symbols in its literal meaning as one part of a whole, which is necessarily referring to its other, complementary half.[11] This might – at first sight – complicate matters even more: now we have motor-images evoked by objects – halfway between subject and object – as well as symbols that refer to its other, which seemingly exist in the world. Simondon develops a model of understanding practices on different levels of being. The human being passes from the immediacy of concrete situations to a "symbolic formulation of problems". The symbolic allows to "solve the infinite diversity of practical problems in each situation" as well as "general and theoretical problems" (Simondon 2008: 153), i.e. it creates distance between the concrete problem and the subjects solution.

This view becomes relevant, when turning to the human practices structuring a milieu. The transformation from the immediacy of anticipation and practices to a theoretical approach involves the organization of other living beings. Its genealogy is linked to the domestication of animals, to the employment of human beings and the use of technical objects.[12] As long as an individual remains on its own to solve a problem, i.e. anticipates, imagines and executes a task, practical thought remains linked to its operator as milieu of formalization and execution of the project (Simondon 2008: 153). A more abstract representation is formed as soon as other agents are employed. The human being has to organize the practices

of the agents (use of tools, control of the behavior of the animals) and has to account for the resistance of the materials. The human operator remains closely tied to the practices as long as she deals with animals. This means the human operator controls the behavior with concrete practices, where the human body is part of an operational chain and its controlling influence is mediated by tools such as the yoke, the reins and the whip.[13] However, each tool stands for a practice that has to be performed with it. The practice and the tool are two complementary parts – symbols – that form a whole, but can exist independently from each other. The object refers to an operation and vice versa.

As soon as a task is performed with human actors, the transmission of orders cannot take the form of a complete subjection and requires a conception, which can be communicated and is thus formalizable and forms an independent system (Simondon 2008: 153f.). This systematization allows the various tasks and actions to remain focused on the goal to be achieved. They introduce an order that is hierarchically structured and is intended to guarantee that each actor knows how the ensemble works:

> Order and organization, given order and structure of execution are formalizations of the task according to the requirements of the transmission of information from the one who knows and wants to the one who executes and obeys.[14]

The hierarchical systematization of work allows a stable performance of tasks over time. As long as the transfer of information is guaranteed the same outcome can be expected. It hinges, however, on the opposition of order and organization provided by an entity that has knowledge of the complete structure and is enforcing its will in comparison to an entity or entities that receive orders, obey and execute them.

This structure is still at work, when dealing with objects. While they exist independently of the human being, their symbolic meaning refers to this information. This information is crystallized as human gestures in technical objects (Simondon 2017: 151; 2005: 340). Technical objects are the organization of such orders. A computer chip for instance consists essentially of a series of rocker switches that are either open or closed (0/1) and translate the logical principle of the excluded middle. Technical objects are the results of human inventions and as such the highest form of formalization (Simondon 2008: 163).

Yet, in contrast to the structure of performing technical tasks as information transfer allowing to make future actions stable and predictable, invention itself does not rely upon the same temporal structure. Human beings act in an environment that makes it necessary to constantly face the particularity of

situations and to invent new modes of organization (Simondon 2008: 150). Even though technical objects provide relative stability, they are applied by human beings in a milieu, which is structured according to the technical objects and their operational modes. New problems and obstacles can, however, occur, if the milieu is transformed or new structures are found within it.

Both instances might require new practices. A problem represents an "epistemological obstacle" (Bachelard 2012) in the milieu or – to speak with Thomas Kuhn – it cannot be solved in terms of the "old paradigm". An invention becomes necessary, when a problem discontinues the completion of an operation (Simondon 2008: 139). This implies that the milieu itself has the potential to effect transformations of the operational mode. Or, as Simondon puts it, the "situation is problematic, that dualizes action, cutting it up into segments, either because a medium term is missing or because one part of the action is destroying another equally necessary part of the action" (Simondon 2008: 139).

The operation, which is in a recursive relation with the milieu, is no longer compatible with the situation at hand. To illustrate the need for invention and how problems are solved, Simondon turns to the fable of the "Stone in the Road".[15] While the fable and its moral is not of interest for Simondon, it shows metaphorically – and within the fable quite literally – how invention and obstacle relate to each other. He tells the story that several travelers are confronted with a rock that blocks the road. It prevents them from continuing their travel, i.e., it represents a discontinuation of their operational mode and "dualizes the action" in several parts, since, in order to continue to travel, they have to agree upon the common goal to continue their travel, to assign tasks of how to remove the rock, etc. This leads to a specific temporal relation, instigated by the necessity to solve the problem. Simondon claims that "anticipation and prevision do not suffice" to solve the problem, since every "individual traveler is capable of imagining to continue to walk on its own, when the rock is removed" (Simondon 2008, 140). What is needed is that the present operational mode is restructured by the future:

> [I]t is still necessary for this anticipation to return to the present by modifying the structure and conditions of the current operation; in the case chosen, it is collective anticipation that modifies each of the individual actions by constructing the system of synergy. Thus, there is a structuring return of the content of the anticipation on the formula of the present action; this is a return of information, or rather a return of organization whose source is the order of magnitude of the result, the regime of the operation thought to be achieved and complete. Invention establishes a certain type of recurring action, a *feed-back*, which goes

from the regime of the complete result to the organization of the means and sub-ensembles according to a mode of compatibility.[16]

Simondon points out that the anticipation of the future, in this case anticipating conditions in which the problem is solved, is essential for the invention itself, since it modifies the actions to achieve this goal. The operation of the invention is cyclical. At first, an individual imagines the problem as solved, i.e. the stone is removed. Yet, in order to achieve this solution, other agents are needed. The goal thus transforms the individual mode of action into a collective anticipation. This collective anticipation of removing the stone structures in turn the activities of each individual participating in the solution of the problem.

In this recursive interplay between anticipation and invention the virtual future, where the problem is already solved, is a force structuring the present. The feedback transforms the anticipation, enriches the experience and is the condition of possibility to solve the problem. New pathways within the given reality become visible and restitute operational modes both on the level of the relation between the organism and the milieu and on the level of the organization of the action itself (Simondon 2008, 139). Invention institutes a recursive cycle of the subject with its milieu. It begins on the basic level of motor images that are connected to anticipating motor movements up to the invention of symbolic systems. Invention changes therefore the order of magnitude:

> The invention could then be considered as a transformation in the organization of the system of mature images, bringing back, by a change of level, mental activity to a new state of free images allowing a new genesis to begin again: the invention would be a rebirth of the cycle of images, allowing to approach the milieu with new anticipations from which will result adaptations that had not been possible with primitive anticipations, then a new internal and symbolic systematization. In other words, the invention operates a change of level; it marks the end of a cycle and the beginning of a new cycle, each cycle comprising three phases: anticipation, experience, systematization.[17]

Any invention is the start of a new cycle of images that anticipate the world, structure experiences and are ultimately systemized to invent new modes of being. These new modes can be practices, theories or objects, all of which structure the milieu of living beings. This implies that these images are co-constituted by the objects in the world. We are using the technical to structure, understand and re-form the world.

These processes take not only place in the scientific or technical field, but also in the aesthetic, the political and the moral field. These fields are never completely separated but interpenetrate each other (Simondon 2008: 157f.). What is needed is therefore to understand, *how* living beings pose problems and how machines and images are employed to solve these problems.

> To solve a problem is to be able to step over it, to be capable of recasting the forms that are given within the problem and in which it consists. The solution of real problems is a vital function presupposing a recurrent mode of action that cannot exist in the machine: the recurrence of the future with respect to the present, of the virtual with respect to the actual. There is no true virtuality in a machine; the machine cannot reform its forms in order to solve a problem. (Simondon 2017: 156)

It is important to note that Simondon stresses that machines cannot solve problems. Neither on their own, nor – in an emphatic sense – for human beings. Problems occur only for living beings, machines only fulfill tasks. This aspect gets regularly lost in the discussions surrounding Artificial Intelligence. It is undeniable that the progress of "intelligent machines" is impressive and that the digital age transforms how human beings interact, work and desire. But the problem of how human beings act, is neither a problem caused by technical progress, nor can it be solved by means of technical progress. The operational mode is accompanied by the affective-emotive mode, which co-constitutes individual and collective actions (Simondon 2008: 157). It remains a problem for human beings and how they want to "continue to live" on the "refractory planet" earth, as Bergson formulates in *The Two Sources of Morality and Religion*.

III. Bergson's Myth-Making Function a Technology of Anticipation?

Bergson introduces the myth-making function *fonction fabulatrice* to explain the genesis of the belief in supernatural entities out of natural tendencies (Bergson 2002). Life evolves, according to Bergson, in diverging tendencies (Bergson 1998: 51ff.; Deleuze 1988: 100ff.). The driving force of evolution is the *élan vital*. This principle of life is immanent, has no prescribed goal and is finite (Bergson 1998, 254). The image of the *élan vital* describes life as a process of differentiation. Instinct and intelligence constitute vital tendencies where the *élan vital* found an end. Each faculty provides answers to the vital problems of animals and human beings, i.e. they describe specific modes of action of animals and human beings. But since both are expressions of the *élan vital*, pure intelligence exists only as

abstraction. Intelligence is always embedded in the vital process of evolution. While animals and human beings have distinct modes of actions, they share both their ontological status as conscious living beings, since consciousness starts for Bergson as soon as there is memory and movement (Bergson 1975: 16).

Instinct, intelligence and intuition are thus ontologically separated, but share a common origin.[18] Since humans are living beings that evolved out of animals, intelligence and intuition have still instinctual aspects. Bergson describes human intelligence as "the luminous nucleus around which instinct, even enlarged and purified into intuition, forms only a vague nebulosity." (Bergson 1998: 177). This holds for instinct as well as for intelligence: All instincts are surrounded by a fringe of intelligence and all intelligence is surrounded by instinct, yet they are not of the same kind, but complementary to each other "and they are complementary only because they are different, what is instinctive in instinct being opposite to what is intelligent in intelligence" (Bergson 1998: 136).

Bergson's theory of differentiation and interpenetration is for two reasons important for the question of anticipation and technology. For one, it shows that any human activity is rooted in the *élan vital*. One might agree or not with this immanent metaphysical principle, but it allows to frame the problem of human techniques with reference to questions of nature. Technology and nature should be thought in accordance with rather than opposing each other. However, this does not absolve human beings to use technologies as they please. On the contrary, it shows that technical objects do not have an inherent positive or negative value, but are solutions to problems of human beings. These in turn are also always social.

Secondly, it implies the existence of "virtual instincts" that operate intelligently. The fringe of human intelligence consisting of instincts provides human beings with an affective relationship with their environment (Bergson 2002: 312, Schick 2012: 217ff.). They are not pure intellectual beings that rationalize their behavior and act accordingly. The instinct even becomes necessary when intelligence provides information that are threatening for the social cohesion, i.e. that the individual prefers its own good over the good of the community, or in life threatening situations, when a purely abstract appraisal of the situation would lead to despair and fear of death instead of action (Bergson 2002: 131). Bergson introduces the "virtual instinct" as a "counterpoise" to intelligence. It still possesses the potentiality of an instinct, but is shaped by intelligence:

> If intelligence now threatens to break up social cohesion at certain points
> - assuming that society is to go on - there must be a counterpoise, at these
> points, to intelligence. If this counterpoise cannot be instinct itself, for the
> very reason that its place has been taken by intelligence, the same effect
> must be produced by a virtuality of instinct, or, if you prefer it, by the

> residue of instinct which survives on the fringe of intelligence: it cannot exercise direct action, but, since intelligence works on representations, it will call up "imaginary" ones, which will hold their own against the representation of reality and will succeed, through the agency of intelligence itself, in counteracting the work of intelligence. This would be the explanation of the myth-making faculty. (Bergson 2002: 119)

At the fringe of intelligence, the "virtual instinct" is informed by intelligence and is the zone of contact the human being with reality. It thus also indicates an intuition, which would be the ideal activity of the human being in accordance with itself and its milieu. The reason out of which intelligence calls up the "imaginary" is therefore for Bergson never arbitrary but has its roots in a concrete situation. The workings of the "virtual instinct" Bergson calls the myth-making function is therefore intelligible even if it has a specific rationality.

This virtual instinct is at work mainly in three different instances: as a natural defensive reaction against the inevitability of death (Bergson 2002: 131; Higaki 2013: 269), "*against the representation, by the intelligence, of a depressing margin of the unexpected between the initiative taken and the effect desired*" (Bergson 2002: 140) and as the source for the creation of religious representations. Gods are in their beginning not persons or totems, but natural forces that are via the myth-making function personalized (Bergson 2002: 152). Otherwise human beings could not cope with the overpowering force of nature and their role within it.

> Since instinct no longer exists except as a mere vestige or virtuality, since it is not strong enough to incite to action or prevent it, it must arouse an illusory perception, or at least a counterfeit of recollection so clear and striking that intelligence will come to a decision accordingly. *Looked at from this first point of view, religion is then a defensive reaction of nature against the dissolvent power of intelligence.* (Bergson 2002: 122)

The myth making function is therefore a fabulation of anticipated events. It is at work in events that reason cannot explain instantaneously. In order to provide an explanation, the *myth-making function* "arouses within intelligence itself images and ideas which hold in check the depressing representation or prevent it from materializing" (Bergson 2002: 152) and creates a reasonable fable. The function is therefore in line with the workings of memory and human intelligence (Bergson 2002: 119). Memory images are used as elements of the fable and combined in a coherent order. With respect to the temporal structure of anticipation and technology, the myth-making function can be characterized as a "technology of anticipation". As virtual instinct, it consists neither in the stable elements that

result from the work of human intelligence, nor is it an instinctual behavior bare of any intelligence.

Bergson gives an interesting example of the myth-making function, he derived from the "psychic sciences": A lady, who was on an upper floor of a hotel, wished to go downstairs. Coming to the lift she saw, that the door of the elevator was open and attempted to enter it. Naturally, she expected the elevator to be there, since the door only opens when the elevator waits. Expecting the usual, and unsuspecting the unusual, she stepped forward, the elevator, however, was not on her floor.

Fortunately, she did not fall in the shaft, because just in the moment before she fell, "she felt herself flung backward, the man entrusted with the working of the lift had just appeared and was pushing her back on the landing" (Bergson 2002: 129). Then, she came to her senses and realized that no one was there.

A rational explanation is that her body felt intuitively that there was a void space in front of her. In the moment of the event, this explanation was impossible. The *fonction fabulatrice* created therefore the representation of the operator in order to explain the event. In the instances of the *fonction fabulatrice*, a virtual past is transformed into a representation of the present moment. The body anticipated the situation, but the mind did not fathom its strange ability. The subject needed a representation that it can understand, even if it entails an imaginary lift operator.

This example shows the interpenetration of the social, the technical and the concrete body of the individual. The technical routine is expected to function. The malfunction is something "out of the order" that requires an extraordinary behavior of the individual. Within the normal routines the human body functions as "man's first and most natural technical object, and at the same time technical means." (Mauss 2006: 83) In its habitual engagement with the world, it almost works like a cog in a machine. It is not perceived in its role as an instrument.

Yet, it is conceived as a body that is under control of one's own mind. It seems as if the imaginary lift operator is necessary, because a quasi-instinctual, intuitive bodily anticipation is not conceivable. For the human intelligence, as portrayed by Bergson, it is more reasonable to assume a social situation, where each agent plays a specific role: The story of the lift operator is an expression of the modern dualisms. It distinguishes between human and non-human actors, the human operator and the technical device, the body of the lady entering the lift as an instrument and the human mind as the faculty operating the body. The myth-making function is always related to its socio-technical milieu. It activates images that are chosen and rendered according to the present situation. Yet, they are not only applied to the presence, but also imply a rendition of possible futures.

This future making aptitude is also at work at the (in)famous last sentences of the *The Two Sources of Morality and Religion*, where Bergson claims that human beings "have to determine whether they want to go? on living or not" and "if they

want … to make just the extra effort … [to] fulfill … the essential function of the universe, which is a machine for the making of gods." (Bergson 2002: 317) In order to create these gods can either be read literally, i.e. transhumanistically, or within the theoretical framework of Bergson's theory of religion, i.e. in terms of the myth-making function, which is deemed responsible for the genesis of religious representations. What kind of gods are created?

It is precisely this structure that is of interest for us concerning the digital age and "new" technologies. It expresses that the engagement with the material world is the point of departure of religious representations, myth and for literature (Bergson 2002: 108f.). The three aspects of the myth-making function, the fear of the inevitability of death, the depressing representation of a margin of the unexpected between the initiative taken and the effect desired, and even as religious representation of an omnipotent being all come back in the relation of human beings with technologies. The narratives surrounding artificial intelligence can be understood from this perspective: The narratives of a general artificial intelligence (GAI) or a "singularity" can not only be considered as a possible technical innovation, but also as a "fabulation" in Bergsonian terms. It is a reaction against a force that goes beyond the powers of the human being. One could even claim that the conception of a GAI implies a belief system based upon the computability of reality (Ito 2019). Furthermore, the narrative implies that the outcome of the development of GAI is uncertain: it oscillates between a benevolent GAI or an GAI that performs its tasks without any ethical considerations.[19]

What kind of relation would have to be developed in order to use the myth-making function productively? Is there a "technological" imaginary that either obscures or elucidates our relations to technology?

Conclusion

We need an approach to technology that does not formulate anticipation as a simple prediction, but invents the future in the sense of Bergson and Simondon. However, the invention of the future is not an event that can be reduced to new technologies. Technologies are always social and natural. They therefore permit new ways of being with techniques that are not predictable in the strict sense, but can only be anticipated by means of the myth-making function. This entails becoming a poet of technology by taking the act of dealing with technology as producing images seriously. The imaginations that techniques evoke can of course be dystopian, utopian or even be abused to exert power. That is, if one takes the thesis seriously that the myth-making/fabulative function is a defensive reaction against nature and its power, then the myth-making/fabulative function can also be directed against itself. Examples would be – without being able to go into detail

here – not only the fear of total control by technology, but also the denial of climate change, the hatred against refugees and the reference to "fake news" when media coverage contradicts one's own political opinion. All this is based on or leads to conspiracy theories, which are in some ways the new myths of a closed society. These social groups refuse to universalize the concept of man, i.e. to understand the concept of the human being as an "open adventure", which is contingent on its cultural configuration and constantly in transformation.

This, in turn, does not mean that these affectively charged reactions to the socio-techno-ecological complexity of the 21st century are incomprehensible or irrational, but these processes have to be understood and identified as expressions of the myth-making function. A mere critical attitude, however, would capitulate to a world view of supposedly factual constraints and deny one's own being as open, living system.

For, as Bergson tells us, the task of man is to participate in this "machine that creates gods", i.e. the universe. This means that human beings have always been a species that goes beyond itself and opens, invents and re-invents what it means to be human. Yet, this invention hinges upon the relationship with the environment and technology. Following Simondon, a situation should be imagined, where a symmetrical relationship is established between human and non-human actors.

Anticipation does not mean using techniques to maintain the status quo. Nor does anticipation mean to keep people, signs and things in closed systems in which their movements and actions remain predictable. Rather, anticipation means designing and inventing socio-technological-ecological networks, enabling participation in order to create new modes of being.

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[1] The French tradition of philosophy of technology and techno-anthropology usually uses the term "technology" to signify the "study of techniques" as a "human science" (Loeve, Guchet, Xavier, and Bensaude Vincent, Bernadette 2018: 5ff.). In this article, I do not make this distinction, but use technology to speak about the practices of human beings with technical objects and technical networks.

[2] Franco Berardi opposes in "On Futurability" with reference to Bergson's text "On the possible and the real" power and potentiality: "I call potency the subjective energy that deploys the possibilities and actualizes them. Potency is the energy that transforms the possibilities into actualities. I call power the selections (and the exclusions) that are implied in the structure of the present as a prescription: power is the selection and enforcement of one possibility among many, and simultaneously it is the exclusion (and invisibilization) of many other possibilities." (Berardi 2017: 1f.)

[3] For the specific problem of transformation and change see the lecture *The Perception of Change* (Bergson 2007: 107–31)

[4] The relationship between science and philosophy is explained most clearly in Bergson's *Introduction to Metaphysics*: "I take the view that several of the great discoveries, of those at least which have transformed the positive sciences or created new ones, have been so many soundings made in pure duration. The more living was the reality touched, the more profound had been the sounding. But the sounding made on the sea floor brings up a fluid mass which the sun very quickly dries into solid and discontinuous grains of sand. And the intuition of duration, when exposed to the rays of the understanding, also quickly congeals into fixed, distinct and immobile concepts. In the living mobility of things, the understanding undertakes to mark out real or virtual stations, it notes arrivals and departures; that is all that is important to the thought of man in its natural exercise. But philosophy should be an effort to go beyond the human state." (Bergson 2007: 163).

[5] "Reality is global and undivided growth, progressive invention, duration: it resembles a gradually expanding rubber balloon assuming at each moment unexpected forms. But our intelligence imagines its origin and evolution as an arrangement and rearrangement of parts which supposedly merely shift from one place

to another; in theory therefore, it should be able to foresee any one state of the whole: by positing a definite number of stable elements one has, predetermined, all their possible combinations."(Bergson 2007: 77)

[6] If not cited from English editions, all quotes are translated by the author of this article. The original French quotes are cited as endnotes. "Les nécessités de la prévision a long terme pour l'action ont introduit la rationalisation dans la dimension d'avenir et en ont chasse le mythe, tout au moins en domaine économique et démographique ; le temps commence a s'organiser comme l'espace ; le futur est annexe par le savoir, il n'est plus le champ privilégié de l'optatif, du désir, ou du vouloir. Et, cependant, l'image retrouve sa densité et sa force qui la porte vers l'anticipation de l'avenir collectif, en dehors et au-dessus des rationalisations prospectives, qui sont surtout des extrapolations, mais non de véritables inventions. La fiction scientifique est une des voies par lesquelles l'image retrouve son pouvoir d'avenir, c'est-a-dire sa fonction prophétique; elle est l'image du monde réel saisi dans sa tendance et pousse plus loin, réellement anticipe, saisi par avance selon l'aspect cognitif et émotif, non pas seulement supputé." (Simondon 2008: 17)

[7] This conception of the "image" refers to Bergson's notion of the "image" in *Matter and Memory* (Bergson 1991) and is, as Jean-Yves Chateau points out, a reaction against Sartre's phenomenological account of imagination (Simondon 2008: XXff.).

[8] "L'image mentale est comme un sous-ensemble relativement indépendant à l'intérieur de l'être vivant sujet; à sa naissance, l'image est un faisceau de tendances motrices, anticipation à long terme de l'expérience de l'objet ; au cours de l'interaction entre l'organisme et le milieu, elle devient système d'accueil des signaux incidents et permet à l'activité perceptivo-motrice de s'exercer selon un mode progressif. Enfin, lorsque le sujet est à nouveau séparé de l'objet, l'image, enrichie des apports cognitifs et intégrant la résonance affectivo-emotive de l'expérience, devient symbole. De l'univers de symboles intérieurement organise, tendant à la saturation, peut surgir l'invention qui est la mise en jeu d'un système dimensionnel plus puissant, capable d'intégrer plus d'images complètes selon le mode de la compatibilité synergique. Après l'invention, quatrième phase du devenir des images, le cycle recommence, par une nouvelle anticipation de la rencontre de l'objet, qui peut être sa production." (Simondon 2008: 3)

[9] "En fait, il ne s'agit pas de ramener toute l'activité mentale à l'image en cours de genèse, mais de montrer que, dans l'anticipation, puis au cours de la relation perceptivo-motrice, enfin dans le souvenir, et ultérieurement surement dans l'invention, existe une activité locale faisant du sujet un véritable générateur de signaux servant a anticiper, puis a recevoir, enfin a conserver et a « recycler » dans l'action les signaux incidents venant du milieu." (Simondon 2008: 4)

[10] Simondon discusses, whether or not animals are capable of invention, extensively in Imagination et Invention (2008: 142-153). At the very least, animals are capable of making "detours". Simondon acknowledges differences in the mode of action of animals and human beings, but is – instead of marking essential differences of species – interested in analogical relations between these different modes.

[11] "Les symboles vont par paires, ce qui veut dire qu'un symbole est un fragment d'un tout primordial qui a été divisé selon une ligne accidentelle." (Simondon 2008: 5)

[12] Sigaut points out that slavery might have played an integral part of technical innovation in Antiquity, since it allowed for a new sexual distribution of labour: "[S]lavery in Antiquity would have been a systematic means of making men do women's work, which would explain its vital importance for the economy. Slavery made it possible to take a number of tasks out of the family or home, to which they had until then been confined, and to turn them into commercial trades." (Sigaut 1994: 450) Domestication of animals and organization of labor by employing human beings allows for new social and also technical organization.

[13] For a detailed discussion of the evolution of the yoke see (Haudricourt 1987: 127–33).

[14] "Ordre et organisation, ordre donné et structure de l'exécution se trouvent être des formalisations de la tâche selon les exigences de la transmission d'information de celui qui sait et veut à celui qui exécute et obéit." (Simondon 2008: 154)

[15] A king places overnight, to see how his subjects react to a problem in the public space without the help of government, a rock in the middle of the road. Simondon adapts the story to his needs. While in the original fable the king places the rock in the middle of the road, Simondon does not give an explanation why the rock appears. Also, he recounts the solution of the problem as a collective effort by the travelers that are together confronted with the situation, while in the fable the rock is confronted individually. I am,

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however, not sure, whether Simondon refers to this specific fable, since he merely claims it to be "a popular fable", without making further references.

[16] [I]l faut encore que cette anticipation revienne vers le présent en modifiant la structure et les conditions de l'opération actuelle ; dans le cas choisi, c'est l'anticipation collective qui modifie chacune des actions in-dividuelles en construisant le système de la synergie. Il s'effectue ainsi un retour structurant du contenu de l'anticipation sur la formule de l'action présente ; il s'agit là d'un retour d'information, ou plutôt d'un retour d'organisation dont la source est l'ordre de grandeur du résultat, le régime de l'opération pensée comme achevée et complète. L'invention établit un certain type d'action en retour, d'alimentation récurrente (*feed-back*) qui va du régime du résultat complet à l'organisation des moyens et des sous-ensembles selon un mode de compatibilité. (Simondon 2008: 140)

[17] "L'invention pourrait alors être considérée comme un changement d'organisation du système des images adultes ramenant, par un changement de niveau, l'activité mentale à un nouvel état d'images libres permettant de recommencer une genèse : l'invention serait une renaissance du cycle des images, permettant d'aborder le milieu avec de nouvelles anticipations d'où sortiront des adaptations qui n'avaient pas été possibles avec les anticipations primitives, puis une nouvelle systématisation interne et symboli-que. Autrement dit, l'invention opère un changement de niveau ; elle marque la fin d'un cycle et le début d'un nouveau cycle, chaque cycle comportant trois phases : l'anticipation, l'expérience, la systématisation." (Simondon 2008: 19)

[18] Bergson introduces the dualisms between instinct and intelligence, matter and memory, etc. methodical-ly to exemplify their interpenetration in duration.

[19] A popular example is Max Tegmark's Life 3.0 (Tegmark 2018).