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Evolution and What the Intellect Makes of It

Alex Gomez-Marin

I should like to come back to a subject on which I have already spoken, the continuous creation of unforeseeable novelty which seems to be going on in the universe. As far as I am concerned, I feel I am experiencing it constantly.
-Henri Bergson (1947)

THE HUMAN BEING is a paradox.¹ We, a result of evolution, have developed the theory of evolution. Namely, the evolutionary process, in an unprecedented attempt, has been thought by one of its products—the bootstrapping is in place: the *explanandum* nominates itself as the *explanans*.² Yet, the concept of evolution is one thing, while evolution itself is another. Upfront, this chapter is an attempt to rescue Bergson’s intuitions on *heterogeneous continuity*, his notion of *multiplicity*, so as to recover that which, being at the core of evolution, has been lost by our habitual ways of thinking about it.

EVOLUTION IN THEORY

To account for the production and common origin of diversity in life, two

principles are put forth by the received view that dominates evolutionary scientific thought: variation and selection.³ The first ought to be blind, the second retentive. Namely, new stuff is produced (without a plan), and then some of it is tamed and maintained. Under this lens, the evolutionary process is nothing but selected heritable variation. The universe becomes an engine for the production and conservation of novelty. It is a novelty that, in a profound way, is never really new. The unfolding of life, with all its complexity—believed to be a precipitate of simplicity—still astonishing, has now supposedly been rendered explainable and, one may even dare to say, explained.

The method of “trial and error” (initially an eighteenth-century technique to teach kids to solve algebraic equations heuristically⁴) has been erected—from tool to theory—as a fundamental proposition. Evolution is thought by means of the direct analogy with the centrifugal governor of the steam engine, or as bacterial navigation. Yet, framed with a static concept (as with any frame), it initially works as a useful scaffold soon to make its rigidity progressively felt, defeating its purpose. The model replaces reality—the living tree becomes dead wood. Life becomes some sort of dead matter whose organization defies explanation. Note how, when abstraction replaces fact, tentative description easily creeps into stubborn prescription.

The foundations of evolutionary biology (more precisely, natural selection) raise three conditions to be met: there must be variation, it must have adaptive consequences, and it must be hereditary, namely, capable of being transmitted so as to be maintained. That is, random mutations⁵ occur, environmental contingencies select, and genetic material conserves. And so there is descent with modification — phenotype selected, genotype passed. The iteration loops over and over. Yet, selection *of* something is always selection *for* something. One can certainly ask how, but one must not forget to ask whither, nor whence.

Evolution is not Darwin’s original idea. His is a proposal as to one of its essential mechanisms: that it operates by means of natural selection. We could get into a long, yet interesting digression as to what is really selected. Yet, I want to emphasize another equally important blind spot: evolution “by natural selection” *of variation!* In other words, selection does not explain variation, it utilizes it. In order for its force to be effective, natural selection draws its power from variation. The production of difference and diversity is required in the first place so that such differences may have a chance to be selected and then conserved. “The survival of the fittest” cannot take

for granted “the arrival of the fittest.” Paraphrasing the Catalan embryologist Pere Alberch: the winners, not the players, are decided by selection.

Variation—and with it, evolution—is postulated blind (the same for selection but, as noted above, that is not my focus here). Random or not, variation does not intend its effect. It is blind because it is unable to see what it is doing. And if it were able, it would not care. In other words, by means of “runs and tumbles,” evolution finds a way without knowing the way. In sum, causes are blind, and effects are selected. In this way, this flavor of the theory of evolution seems to achieve its goal; namely, to find a common origin for the diversity in life, addressing the problem of the One and the Many, and without having to let in any of the vital spirits so successfully exorcised in the twentieth century.

These two cornerstones of the theory of evolution—variation and selection—represent an incommensurable effort of observation and synthesis, as well as an unparalleled feat of the human intellect at explaining how the diversity of plants and animals came about. It is a pity, though, that such effort missed the mark. The theory of evolution had a hidden and more important agenda, operating as an ideology (even as some sort of scientific pseudo-theology), the purpose of which was not only to eradicate purpose, but to leave no room for anything *creative* to enter the explanatory landscape. (And note that I am not thinking necessarily about the naive notion of an old bearded man creating *ex nihilo* from the heavens.)

Moving forth, it is indeed tempting to simply invoke, in conjunction with natural selection, the process of random mutations and then mentally run the algorithm to produce, with enough patience (and intellectual leaps bridged with imagination), heathers, and harriers, and horses, and humans. A fundamental limitation of such thinking is not so much the disdain for Wallace’s suggestion to ponder the role of nature’s appetite for an end. A less debated issue, and arguably more critical, is the process by which the virtually new becomes actual. If the core of evolution is “a difference that makes a difference and then stays,” we must then inquire into the nature of such differences. How do novel organisms arise? What is really their *origin*? Ultimately: *what is the source of the new?*

Evolution, as it is commonly thought of,⁶ is not truly creative. And it is not creative because, according to our patterns of thinking, it cannot be. The new is merely a reconfiguration of the old—the same old bits, just spatially rearranged in a different manner. But perception seems to tell us otherwise: nature is ever surpassing itself. Most likely that is what Whitehead tried to capture by his use of the word *concrecence*: a

bootstrapping out of a movement of differentiation, not of construction.⁷ In a way, we are emphasizing, as Tim Ingold would say, “Evolution in the Minor Key,” the view which acknowledges and celebrates a constant excess of novelty.

Before we proceed by the tight alley traced by the linear strings of logic, we need to unfasten an important knot. Note that by enforcing that any biological process remains unguided, we have condemned nature to be uncreative. The blind watchmaker cannot know, nor would it care to know, what time it is (and even less what time *is!*⁸), and so we humans now stand in front of the spectacle of our own evolution like a puzzled ghost with a PhD. Nothing grounds us anymore, not from above and nor from below. *To keep God dead, we have also killed Nature.*

Variation may be blind, yet there is a blind spot in our thinking about evolution. Do the two principles of evolutionary theory exhaust the phenomenon of evolution itself? Do we know what life *is*? A great deal of effort in the field of evolutionary developmental biology has been devoted to question the classic frame established by the Modern Synthesis. Unsurprisingly, Henri Bergson was a century head of his time.⁹

Note that to get rid of what already exists seems easier than to give rise to what is not. Variation can be seen as a process of expansion, while selection as a process of compression (recall the two “vitalistic” forces mentioned in endnote 3). Natural selection can be interpreted as more than a mere filter yet, in the strong sense of the word and in the mainstream view of its role, variation is not, cannot, and should not be creative. We are then talking about *unfurling*, unrolling, and the mere reshaping of stuff in space—the impossible assumption that static substances, with a pinch of movement, shall produce any type of transformation (precisely at the price of reducing all change to spatial reorganization). However, rather than *unrolling*, the world seems to be *rolling upon* itself.¹⁰ By unrolling, everything is there, and nothing is new. By rolling upon itself, nothing lasts but nothing is lost. This is the great temporal asymmetry that Bergson does not fail to insist on. That is, the past is absolutely conserved, and the future is absolutely new. Evolution then acquires substantially different meanings. Distinct juxtaposition of substances cannot account for continuous interpenetration of processes. Tragically (yet fortunately for our everyday life functioning as practical beings) the intellect has huge difficulties in thinking the latter and feels at home with the former. We suffer from acute and chronic *misplaced concreteness*.

So, again we ask: how does *the new* ever come into the world? Whence variation?¹¹ In the movement of explanation part of the answer is to be found.

EXPLANATION IN PRACTICE

Explanation is intelligence's Procrustean bed. Ultimately, an essential presupposition of the rational mind is that any process under scrutiny should be deemed rational at first and for as long as it is not demonstrated to be otherwise. Any suggestion about the non-intelligibility of something is immediately met with protest and accusation. Yet, how can one think about a problem and, regardless of the apparent success in its provisional solution, discover the very same limits of the process of thinking in the process of thinking itself? It is like trying to perceive your own retina. How does one actually see a blind spot? Note the difference between looking at the world through a window and looking at the glass of the window (or seeing our own reflection in the glass, which could in turn be scratched, dirty or tarnished). Clarity of thought can reflect its own opacity.

A second notable feature of explanatory work is that it is both late and early. Being actually in the future with respect to the event to be explained, explanation sneaks back to the past, all the way before the event, to somehow virtually re-produce it after it happened as if it had not yet happened. After the fact, explanation imagines itself contemporary with the fact and, at the same time, explanation shams the fact to finally dispense with it. Explanation is then back to the future.

Explanation is, in essence, a flawed but convenient act of substitution.¹² One could rightly say that all illusions of the intellect build upon substitutions. At the core of explaining evolutionary processes, we are forced to perform a double operation. We make them disappear first in order to make them appear later, in a new form sanctioned by our intellect. Reconstruction implies rejection and postulation; substitution of what was there with what our mind has derived. Yet, the intellect, in its commendable effort, forgets a crucial issue: diversity was there before humans even dared to try to think about it. For instance, I enter in a room and claim it is untidy, but disorder belongs less to the room and more to my frustrated expectation to see a particular type of order. I then protest to my own inability to embrace an order which does not meet my needs for action. There is evolution, and *then* there is our theory of evolution.

When biology, the logic of the living, is reduced to logic, it ceases to be a word about the living. The logic of the argument will substitute the *logos* of Nature; what it has of logic it lacks of living. To analyze, paraphrasing Bergson, then becomes to express something as a function of what it is not. The intellect, of course, needs to be oblivious to its own tricks. And when it is not, it is necessarily defensive. (Yet, let us not conflate the critique of the intellect with anti-intellectualism or some sort of rational defense of irrationality!—actually, if one pays sincere attention, what seems to be going on when the issue is raised is more like an irrational defense of rationality.)

Note how easily we derive the conditions whose absence we try to observe. Not only do we practice the fallacy of considering present what is past (i.e., the phenomenon to be explained) and past what is future (i.e., our explanation of it), but also that of substituting being with non-being, and vice versa. For example, in neuroscience, we think, and then we think how to demonstrate that we think without assuming thinking as a premise. In biology, we live (painfully seeing our pets, friends, and relatives die) and then we figure out ways to derive the living from the inert. We are conscious, and yet we spend decades and billions to explain away consciousness, ignoring that explaining is a conscious act, and neglecting that consciousness—being the very possibility of phenomenality—cannot be reduced to an epiphenomenon, which is actually an abstraction (say, neurons firing). We take metaphors for mechanisms, and, even worse, we forget that a mechanism is also a metaphor.

These are the procedures of the diminution fallacy. Being sort of a “demiurgic prejudice,” the assumption is that in its centripetal movement, the intellect tries to account for the centrifugal movement of life; to go from less to more; from parts to whole.¹³ In other words, how shall we understand something hoping to start from so little that it practically amounts to nothing? “Does it not in fact lead to something because it furtively inserts something into its nothingness?”¹⁴ Occam’s razor, having nothing to cut, has cut our throat. The misplaced notion that “more is different” when one piles up “more of the same” is at the base for the hypes and hopes of scientific reductionism. This is an imperative of the intellect; it is unemployed otherwise. This movement of fabrication is labor and progress thought in terms of scale. It is the substitution of the scientific spirit by engineering coupled with the technician’s idea; namely, the use of linear automated work to amplify its effects quantitatively. This is the kind of intellectual effort that differentiates authors from copyists.

To cut to then sew; to empty to then refill; to halt to then resume—these

are amongst the main habits of the intellect. What can be put together can be split apart, but the opposite process is not necessarily true. What is a plenum must be conceived as a plenum, and so it cannot be built piecemeal. Out of nothing, nothing comes, but one can perform the double operation of thinking about something and then imagining its absence. As Bergson noted, nothing, in this sense, is literally more than something. One can go from mobility to immobility via diminution but not the opposite (as Achilles' tortoise attests). Intelligence cannot lead by augmentation to *intuition*.¹⁵ The gap requires a leap.

To conflate fact and abstraction has major consequences here.

These two logical characteristics of mutual distinction of terms and externality of relations certainly do belong to the abstractions employed in explanations, and we commonly suppose that they belong to everything else besides. Bergson, however, believes that these logical characteristics really only belong to abstractions and are not discovered in facts but are imposed upon them by our intellectual bias, in the sense that we take it for granted that the facts which we know directly must have the same form as the abstraction which serve to explain them.¹⁶

The novelty produced by the intellect is not really new. No feat of human abstraction based on a recombination of tokens lends itself to conceiving true creative advance. Only immediate experience (and perhaps imagination) can.¹⁷

If the universe is not truly novel right now, then it never was and it will never be. Again, we must ask: whence *novelty*?¹⁸ And so we arrive at the problem of *continuity*, and its two flavors.

DURATION AND HETEROGENEOUS CONTINUITY

The intellect, at home with space, makes continuity discontinuous at will, and thus dull.

Let us now see the difference between homogeneous discontinuity and heterogeneous continuity. In order to understand evolution (*and what our intellect makes of it*), it is imperative to say what *duration* is:

Pure duration is the form which the succession of our conscious states assumes when our ego lets itself live, when it refrains from separating its present state from its former states. [...] it is enough

that, in recalling these states, *it does not set them alongside its actual state as one point alongside another*, but forms both the past and the present states into an organic whole, as happens when we recall the notes of a tune, melting so to speak, into one another. Might it not be said that, even if these notes succeed one another, yet we perceive them *in one another*, and that their totality may be compared to a living being whose parts, although distinct, *permeate one another* just because they are so closely connected? [...] We can thus conceive of succession without distinction, and think of it as a *mutual penetration*, an interconnection and organization of elements, each one of which represents the whole, and cannot be distinguished or isolated from it except by abstract thought.¹⁹

The notion of Bergsonian *durée* (duration) allows the mutual accommodation of continuity and discontinuity. The antinomy can be surpassed by the fecund and new distinction between time and space. Then we see two types of multiplicities: a quantitative one and a qualitative one. The former is based on *juxtaposition* in space, the latter on *interpenetration* in time. What is homogeneous, clear, and (because of that clarity) distinct can only be in space; what is heterogeneous, precise, and (because of that precision) *con-fused* can only be in time. A sacrifice must be made by our intellect (ironically, the analytical philosopher would demand a clear definition of precision, rather than attempt a precise notion of clarity). Arguably, its most productive habit—namely, the systematic spatialization of what is not spatial—must be dissolved in favor of the primacy of our experience, which proclaims otherwise; the realization that time in space is not real time: “This indivisible continuity of change is precisely what constitutes true duration.”²⁰

The discussion about continuity and discontinuity requires one to grasp the essential difference between time and space: “Instead of a discontinuity of moments replacing one another in an infinitely divided time, it will perceive the continuous fluidity of real time which flows along, indivisible.”²¹ In other words, evolution, thought of as unfurling, even if blind, betrays a non-spatialized notion of time. “Without the continual unfolding, there would be only space, and a space that, no longer subtending a duration, would no longer represent time.”²² The same essential distinction is implied in continuity and discontinuity. In a conference on the psychological origin of our belief in the law of causality, Bergson maintained that “la différence entre les idées de continuité et de discontinuité est une différence

essentielle. *La philosophie de la contingence signifie que tout ne se ramène pas à une différence de mécanisme, d'arrangement.*"²³

As Spyridon A. Koutroufinis says in his chapter for this volume, "[t]he duration of our experience constitutes a heterogeneous continuum." It is

the stream of interconnected experiential qualities that permeate one another. These mental acts determine their own essence through their interpenetration. The whole *duration* is a process that permanently transforms its own essence. Thus, it is in the most radical sense of the word a heterogeneous multiplicity. In sharp contrast to the homogeneous continua constructed by abstract intelligence,

such as the empty three-dimensional Euclidean space of Newtonian physics and the mathematical continuum of numbers,

it constitutes the most concrete continuum that we know: because it incessantly transforms its own essence it cannot be subject to any mathematical operation.²⁴

Note that I am not claiming one cannot understand evolutionary theory (nor that one could not understand evolution in theory) but that one does not and cannot truly understand evolution itself by means of the spatialized notions of the intellect.

Our outsourced experience of time—our thinking about it—makes it homogeneous. *Duration* is heterogeneity. Abstract space-time is homogeneity. The main intuition here is that concrete psychological continuity is always heterogeneous. Then if, in order to have heterogeneity, we force a discontinuity,²⁵ we must recur to homogeneity. But, if we inject a discontinuity (psychologically and epistemologically), homogeneity seems unapt for the job.²⁶ We are led to contradiction one way or another. One can always zoom in to that pseudo-time (abstracted time, made space), searching for the curve smoothly ranging from A to B.²⁷ It is not casual that we commonly use the expression "to take place" to signify that an event occurred (in time!). The intellect, then, must pay the price of freedom: one is compelled to choose between continuous or discontinuous. A selfish (and sterile) sacrifice, indeed, because the intellect will not propose itself for the offering. Evolution seems to be continuous in itself—a heterogeneous continuity, which we may think of as discontinuous. Rather than a chicken and egg problem, the fish ate its tail.

Homogeneous discontinuity²⁸ is a surrogate for heterogeneous continuity. We may talk of two essentially different forms of continuity and of discontinuity. Bergson's notion of continuity is rooted in the psychological, the heterogeneous manifold of pure experience. In this context "heterogeneity" means permanent new creation of a multiplicity's or manifold's essence. Something continued persists in activity, while something continuous forms an unbroken whole. "Creation would have appeared not simply as continued, but also as continuous."²⁹ The second kind of continuity, the abstract/mathematical kind, is based on the homogeneous manifold of geometric space and numbers. In this context "homogeneity" means no change of a multiplicity's or manifold's essence. Bergsonian heterogeneous continuity can be described by the intellect only as a discontinuity because, for the intellect, all continua must be homogeneous in the sense that they do not transform their essence. So, from the perspective of the (spatialized) intellect, a non-homogeneous being must be discontinuous. When it comes to discontinuity, we can conceive interruption of the permanent transformation of essence, like the death of an organism or the destruction of our planet by an asteroid. From a Bergsonian perspective, there is a qualitative transformation of essence—a jump, a leap—between humans and animals, but not a gap. The second kind of discontinuity always presupposes a gap between two abstract homogeneous continua. Because the intellect cannot think³⁰ in terms of transformation of essence, we see a gap between animals and humans and not a leap. Evolutionary theory, based on homogeneous discontinuity, contradicts itself and evolution.

Our need for tethering defeats its purpose. From immobility, one cannot make sense of transitions. Consider continuity, "[t]he aspect of life that is accessible to our intellect—as indeed to our senses, of which our intellect is the extension—is that which offers a hold to our action. Now, to modify an object, we have to perceive it as divisible and discontinuous."³¹ Evolution is a single indivisible history.³²

Humans are obviously animals, and also more than mere animals. When thought in terms of an abstract homogeneous continuum, we are a discontinuous break with other animals in that we think of evolution. We do so as a discontinuous process, precisely because our intelligence is unable to think heterogeneous continuity³³ (or can only do so by exceeding its normal limits). And this is the whole crux of the matter: continuity and heterogeneity are self-contradictory to the intellect.

On the other hand, our immediate experience of time presents itself as

continuous heterogeneity. But my needs make discontinuous my perception of it.³⁴ Our primary goal is then to “bring together all sensible qualities, restore their relationship, and re-establish among them the continuity broken by our needs.”³⁵ Evolution can then be seen to be continuous and with leaps. Yet, in reflecting about human versus animal, let’s keep in mind that, while speciation happens sometimes, evolution “takes place” all the time.³⁶

The notion of organism—implicit in Bergson and explicit in Whitehead—can resolve the tension between mechanism and finalism. It does so by abandoning what both share. Regarding the idea of *vital impetus*,

[w]e have not mentioned, save perhaps by implication, the essential one, namely the impossibility of forecasting the forms which life creates in their entirety by discontinuous leaps, all along the lines of its evolution. Whether you embrace the doctrine of pure mechanism or that of pure finality, in either case the creations of life are supposed to be predetermined, the future being deducible from the present by a calculation, or designed within it as an idea, time being thus unavailing. Pure experience suggests nothing of the sort. ‘Neither impulsion nor attraction’ seems to be its motto.³⁷

Several decades after this quote, it may seem that the polemics between gradualism and punctuated equilibrium are not an issue anymore. Nevertheless, relatively recent efforts to bring a kind of absolute contingency to the modern synthesis do not dispatch the topic. Since all heterogeneous continua permanently transform their own quality or essence they consist only of those creative leaps. They are uninterrupted manifolds of qualitative leaps. Contradiction is dissolved with an intuitive jump. But our linear, causally fixated thinking literally does not follow. It is willing to take as many swimming classes as necessary, always in the solid support that the familiar dry land offers to it, constantly postponing (thus refusing) to just dive into the water.

The implications are not only theoretical. They are personal and ecological. Intelligence, having become its own purpose, is more and more disconnected from nature, up to a point where one could say that, in human beings, everything happens as if nature was deficient. The force is absorbed in itself. Explaining away psychology by physiology is absurd “since the operation consists in destroying the very condition that makes the operation possible.”³⁸ One cannot help but see here a striking analogy with the destruction of life on the planet by humans; the yoga of

objectivity requires higher doses of abstraction, which requires distance, and sacrifices our capacity for empathy.

The many flavors of transhumanism have, consciously or unconsciously, looked for an escape. Perhaps concurrent (as a divergent line of evolution) to that of technocratic imagination (and more akin to psychedelic exploration) a reconnection of humans to nature is attainable by the faculty of intuition, and its method. This could bring humans back to nature, precisely by transforming human nature. Or at least its mind. How can we untie the knots of the intellect?

INTUITION: THE MIND UNCHAINED

Intuition is an act of will that requires radical sincerity and, to some extent, an effort of surrender entwined with an intellectual sacrifice. It is then possible to psychologically grasp a type of continuity that is not homogeneous, nor forced to be discontinuous when trying to accommodate its being heterogeneous. Life, not just our inner *duration*, is then revealed as a generic form of such heterogeneous continuity. Duration belongs to life and, as such, it is intrinsic to evolution as well.

Any theory of life is inescapably entangled with a theory of knowledge. We are insisting on the real challenge in evolutionary theory: to overcome its own theoretical limitations. The articulation of an understanding that can grasp evolutionary novelty within an undivided whole has other consequences. It proposes that human beings are indeed an unprecedented leap, yet within the indivisible continuity and multiplicity of creativity that is realized by means of evolution.

The felt presence of immediate experience is the remedy against abstractions. Abstractions pay the price of the concrete. Concrete stuff is de-concretized by being re-expressed, and thus reduced, to universals and their combination. Individuality is universalized and localized. We escape the particular to erect an explanation of it. Our reconstruction of evolution is not evolution itself, in the sense that our abstract reconstructions of evolution embrace the logic of our intelligence but not the logos of evolution. Paraphrasing Bergson, the notions of variation and selection explain evolution rather than produce it; they are not the cause nor the result of the phenomenon, but a part of it. They express it. A static link between the past and the future shall secure the fruits of our action in terms of the choice we gave up. To explain the concrete is an oxymoron. The intellect

refuses true creativity because it is unable to think it. There is a sacrifice to be made: an excess of knowledge by the excessive means of the intellect tames will. What is needed is to stand before the phenomenon without the pretense of embracing it in order to control it.

Let us insist on these vices of thought, as pointed out by Bergson. *We pretend we go from less to more.* Therefore, we actually need to pre-empt the plenum. This is a double operation: from whole to part, and then reconstruction. But parts are always partial views. In a similar fashion, *the real is made subordinate to the possible.* We believe that something actually happens because it was possible in the first place. Yet, the possible does not precede the real (unless by our imposition; once something is real we say it is so because it was possible). The intellect seems to enjoy veto power over the real. *We think the void is less than the whole.* Nevertheless, the whole is primary, and, on top of it, we add a second psychological operation that negates it. Disorder presupposes order that is then lost. Nothingness presupposes a whole that is then removed. Discontinuity presupposes continuity, then divided. Continuity cannot lend itself to divisions that freeze it. Becoming must be undivided, even if it remains divisible.³⁹ (This is what Nietzsche defined as our sense of loss, because we are fixated on the past of what was present, and we know change as negative being, but this is a wrong perception of time.)

As in evolutionary biology, so in neuroscience. Such a fallacious *modus operandi* cannot resist applying itself to every single topic. The explanation of mind-like phenomena (let us take consciousness as its major exponent) either negates the phenomenon, explains it away or, at best, sees it as an emergent process from the unconscious, rather than a fundamental principle. The unconscious, being defective in consciousness, is postulated as primary. But, any self-dormant manifestation presupposes the sleeping beauty. If the movement of molecules can create feeling with a nought of consciousness, why may consciousness not be able to create, in turn, movement with a nought of energy, or simply use it as it pleases? For Whitehead and Bergson, creativity is the ultimate process. *A why without because.*

Therefore, as a rule of thumb, when forced to choose between the two alternatives (continuity versus discontinuity), we better reject the negation, since in order to negate, an affirmation needs to be there first.

To this possibility of decomposing matter as much as we please, and in any way we please, we allude when we speak of the continuity of material extension; but this continuity, as we see it, is nothing

else but our ability, an ability that matter allows to us to choose the mode of discontinuity we shall find in it. It is always, in fact, the mode of discontinuity once chosen that appears to us as the actually real one and that which fixes our attention, just because it rules our action. Thus discontinuity is thought for itself; it is thinkable in itself; we form an idea of it by a positive act of our mind; *while the intellectual representation of continuity is negative, being, at bottom, only the refusal of our mind*, before any actually given system of decomposition, to regard it as the only possible one. *Of the discontinuous alone does the intellect form a clear idea.*⁴⁰

Since the foundations of Western thought, stability has been rated higher than change.⁴¹ As it seems that a theoretical step forward of Darwinism was to replace reification (stability) by change (evolution), the preference for substance over process is an old ingrained habit of our Western minds that remained untouched with neo-Darwinism. As a consequence, we conceive continuity as indifference to the discontinuity that our intellect imposes on life via the notion of juxtaposition in space.

Nearly all the sciences (and a great deal of philosophy) face a strong philosophical caveat, one could even say an oxymoron: to try to explain what is complex by means of what is simply a sprout of the retrospective illusion, since what is complex is complex *de facto*, while what is simple is simple *de jure*. The habit of transforming the description of a phenomenon into its prescription is well ingrained. Newton's laws, explaining the movement of terrestrial and celestial bodies, seem to actually produce it too. Because we can describe the process of evolution in terms such as trial and error, we then postulate that Nature is operating on those terms. The phenomenological approach—in its light version, a kind of skepticism without cynicism—is thus an honest beginning to untie the knots. Since avoiding projection seems impossible, one should consciously try to recognize what is projected, and to avoid imposing that as a cause of what is to be explained. One can safely speculate that neither the so-called love for truth that is meant to define the activity of philosophers, nor the explanation of the real by means of the study of the natural world via observation and experiment that occupies the time of scientists are actually innocent efforts. Underneath—and actually often bluntly erected at the surface—one finds an intention to make use of truth and the natural world. Disinterested knowledge and curiosity so quickly give way to profit and utility, and then creativity is gone.⁴²

We are back to the question of *the new*, now from the perspective of *difference*.

A LOGICAL DISTANCE

The intellect is the great homogenizer. For it, the production of difference can only be the occurrence of recombination. For it, nothing is really new in time. For it, all is distinguishable only in space. Spatialized things are distinguishable because each of them occupies a separated piece of space, having thus very clear borders. The intellect draws clear borders around all things, real and abstract (namely, concepts). Heterogeneous continuity is truncated into homogeneity followed by discontinuity. In a word, what we want to clarify, we must make imprecise.⁴³

Within the conditions for the intelligibility of the real, there is, of course, the principle of difference: to find what is different and what is the same. Intelligence (etymologically, to read inside) has gone from seizing the thing inside (nearly knowing by identity) to literally seeing its parts (analysis at a distance). In their difference, what happens is what they have in common: something interchangeable. The principle of difference is at work after conflating similarity with sameness. Groups, made upon similarity, disregard the very concreteness that makes things. They can then be compared according to their difference in what they are not. When the same goes with the same, we can talk about repetitions.

The path of evolution points in that direction too. The stability of matter is a guarantee that processes endure long enough to be called things, thus being the durable base of change (you never cross the same river twice, yet tables last long enough for me to be able to write these lines about the river). Then repetition, a vestigial trick of life to convince matter to give up part of its stability, issues recurrence as a promissory note: an engine employed to perpetuate structures while opening the doors of creativity. Life strives to make room for difference within the processes of repetition. As a characteristic power of the intellect, difference abstracts facts to make them stable and then compares them systematically. A triple nonorganic operation: undressing, freezing and contrasting. Yet,

[w]ere events unceasingly mindful of their own course, there would be no coincidences, no conjunctures and no circular series; everything would evolve and progress continuously. And were all men always attentive to life, were we constantly keeping in touch

with others as well as with ourselves, nothing within us would ever appear as due to the working of strings or springs.⁴⁴

There is never real repetition, just pure creativity, or at best “the repeatable gradient of the unique.”⁴⁵ The maxim is a reversal of Nietzsche’s: nothing lasts (pure creativity as a principle) yet nothing is lost (the whole past is in the present⁴⁶).

Difference is perhaps the most important endpoint of the workings of the intellect. We excel at the classification of phenomena into different boxes. We enjoy rejection of the null-hypothesis via statistically significant differences. Take the common expression “to make a difference” embedded in our language that equates differences with to have a significant effect. To what extent can a concentration on sameness make a difference? The etymology of difference, to carry away, indeed brings us afar from the thing. Distinction maintains a distance. It puts apart. To discern is to separate. But not only do we pull things apart; we blur them in order to do so. And in order to separate, we need to express the concrete in terms of what it is not (a re-presentation, a symbol, ultimately: an idol). Only then can we label the box where our intellect will put things. Keeping a distance is a characteristic attitude of the intellect: I explain what I see I cannot touch anymore. Contact is gone, and most of our job is to re-establish it.⁴⁷

A WILLING PROXIMITY

Is there thought beyond thought? While intuition is a higher potency of will, abstraction makes it weak.⁴⁸ Life processes transform their own essence (recall the notion of heterogeneous continuity as a permanent transformation of essence). Intuition is a higher vitality, based on attention,⁴⁹ a continuously moving attention.⁵⁰ It is able to grasp the concrete without the double operation of forcing similarity on it in order to extract a difference. To the intellect—whose favorite plant-based substances are caffeine to ramp up (morning “coffee breaks”) and alcohol to loosen up (evening “beer hours”)—heterogeneous continuity is neither homogeneous nor discontinuous. Let’s say two things are the same. What else is left to say about them? Now, if they are similar, how can these two things be compared if not by putting them onto the same score via a token that annuls what is concrete in them and extracts from them what does not really belong to them?

The path to difference taken by the intellect performs artificial operations of sameness. The path of sameness taken by intuition seizes directly what is uniquely different in everything. The static sameness of the mathematical equality sign is conservative; the inequality sign brings disconnect. The distance between two objects translates nothing about them except that which is not properly theirs.

The need for distance implies a critical reduction of empathy. The quest for clarity, both in analytic philosophy and mainstream science, demands to explicate order of any degree as order of lowest degree. Searching for precision, rather than clarity, does the opposite; it accepts a certain nebula in order to accommodate things as they are. In other words, the intellect refuses to be touched by things, while intuition dives into the things themselves. The fact that intellect then protests that such intuition is a chimera, something vague and made up, only reinforces this point: that intellect is unable to think in proximity.

This is anathema. Biology requires a theoretical base not deducible from the fundamental concepts of physics and chemistry: "For the biologist, the world of the physicist has only the value of a world created by thought; such a world corresponds to no reality, but it is to be considered as indispensable aid to calculation."⁵¹ In the decades after the first English publication of Jakob von Uexküll's *Theoretical Biology* in 1926, the discipline progressively turned into mathematical biology. The original intuitions that animated it became spatialized, frozen by the intellect. A true biologist cannot solely be a logical artisan ("Know Thyself"). As Uexküll wrote: "a preliminary condition for the investigation of the appearance-world of others is an exact knowledge of our own."⁵²

When concerned with the process of evolution itself, the door stays locked to any sort of teleology whatsoever; the explanatory power of the intellect wants to get there by a linear chain of "push-push" operations, reluctant to any "pull." It is not our intention to open that door either. We will have something more to say about teleology and mechanism later.

The accusation thrown at vitalism is hardly more than an automatic mockery built upon a misunderstanding of Bergson's *élan vital*. Such impetus is the unbroken force of creativity:

The cause of growing old must lie deeper. We hold that there is unbroken continuity between the evolution of the embryo and that of the complete organism. The impetus which causes a living being to grow larger, to develop and to age, is the same that has

caused it to pass through the phases of the embryonic life. The development of the embryo is a perpetual change of form. Any one who attempts to note all its successive aspects becomes lost in infinity, as is inevitable in dealing with a continuum.⁵³

David Lapoujade expresses the effort and ability to reach such impetus of life in thinking:

it is not anymore an observing from outside, it is to the contrary to enter into the interior of another point of view, as one sympathizes. . . . Bergson opposes those who have a point of view about the movement of a phenomenon with those who make of movement the very point of view of the phenomenon, their "consciousness." Then for instance, mechanicism, finalism, evolutionism have a fixed point of view about the evolution of species while Bergson makes an effort to reach the "consciousness" or inner impulse of the evolutionary movement. . . . And since everything is movement, is the whole moving reality what develops a point of view of its own.⁵⁴

Excelling in the art of the physically possible, the physical sciences (obliviously backed-up with a worn-out substance metaphysics) projected, with reasonable insistence (often turned into a stubbornness that defeats its own purpose), onto the phenomenon of life the same immobile scaffold of the inert. And it now requires for its own justification a Procrustian adjustment of the phenomenon it attends to. The inability of our intellect to conceive intuition and to think intuitively is not an argument against intuition.

Science campaigns with zest that variability has nothing to do with supra-natural forces anymore. This is understandable, and it probably was necessary. But what is often meant by super-natural or supra-natural is that with which the rational-logic mind is not at ease (our reaction to it due to our own inability to think it). Or, more bluntly, the natural is equated with the intellect since the intellect, following the Baconian dream, thinks its job is to control nature. *I can, therefore I must*. And so, whatever does not lend itself to that endeavor is immediately suspicious of being unreal and impossible (an illusion, woo-woo, bla-bla, etc). The conviction that what the intellect cannot embrace ought to be a superstition is itself a superstition. Then, what cannot be rationalized is accused of being supra-rational (thus immediately seeking death-row pardon), and, ultimately, explained away; e.g., reason as the measure of all things, including nature; too much pride after an excess of humility.

And so, the copy-and-paste myth soon wonders how to sew the cloth of life. Recombining abstractions seems to give rise to variation and the new. And the new is only thought because it is actually not thought. Abstracted, and by definition external to each other, is such human-made operation the only principle we are capable of in order to reassemble the whole or, better, recover the initial contact with it?

SPONTANEITY TAKEN SERIOUSLY

Duration is a continuum of transformation of its own essence. As such, it can only be a heterogeneous continuum. Whitehead's *concrecence* and Bergson's *duration* are modes of expressing the self-determination of essence, the notion that that of which the world is made has the intrinsic ability to transform itself. This vividly confronts "thought life" and "lived life" and, correspondingly, "thought's necessity" versus "life's necessity": "La nécessité inhérente a la loi de causalité se déplace ainsi entre deux limites extrêmes: de *nécessite vécue* elle devient *nécessite pensée*. Empirisme et apriorisme s'accordent, au fond, a ne tenir compte que de la second de ces deux formes de la nécessité."⁵⁵

Bergson and Whitehead modify our understanding of causality inherited from classical physics according to which the cause (past) determines the effect (present). When relations are made external through cause and effect, then their immanence is made incomprehensible. But causality, used in the loose sense of connection between events that are not totally arbitrary, can be adapted to process philosophy.⁵⁶ If actual occasion A prehends actual occasions B, C, D, and E, then those occasions are the efficient cause of A. But they do not determine A in the sense that the prehended entities do not determine how A will include their essence in its own self-determination. In a word, A decides through its own self-determination how the efficient cause will be integrated in the process of A's self-formation. A determines its own essence.

The process selects its causes. In process philosophy the prehending entity selects which parts of its past will be integrated in its self-formation and also decides how this integration will be formed. In Whitehead's philosophy of organism, each actual entity is to a high degree the cause of itself; a self-forming, self-determining actual occasion is to some degree its own cause, *causa sui*. We read in Whitehead's categories of explanation that "actual entities are the only reasons; so that to search for a reason is

to search for one or more actual entities.”⁵⁷ This principle of efficient and final causation is termed the ontological principle, where final causation is “the internal principle of unrest,” whereas efficient causation “is a ground of obligation characterizing the creativity.”⁵⁸ Processes are self-caused, and this is very difficult for the intellect to conceive. In a “weak sense,” some attempts in theoretical biology have made progress in understanding biological autonomy. Yet, in its “strong sense,” à la Whitehead’s *Process and Reality*, creativity is the ultimate principle.

Let us make a political digression. Science, philosophy, and philosophy of science become academic shell games if their political dimension is suspended. Note how easily defending one’s own salary is conflated with defending the sanctioned ideology . . . There is an easy slip from postulating evolution as a blind mechanism of struggle so as to justify a political position, tainted with neo-liberalism, that sanctions the idea that any social encounter is primarily an act of competition. When A and B are related externally, their relation is easily cast as competitive, and so that relation must lend itself to quantification for subsequent comparison. They enter directly into disjunction: *either A or B, rather than both A and B*. Internal relations, instead, make both A and B essential to each other, and so their conjunction is primary. (The symbiotic view of evolution conceives the relation between two entities as collaborative, rather than competitive; yet those entities may or may not be internally related.) We arrive at two hard-swallows for the intellect: continuity of mutual interpenetration of essence and self-determination.⁵⁹

Indeed, the world bubbles forth, as Heraclitus famously said. Everything flows. We cannot step into the same river twice. Yet, he also said that all is the ever-living fire; night and day, good and evil, are One. Space is a principle of differentiation, while duration is the continuous elaboration of the absolutely new. Life, in its divergent lines, is continuous.

Let us not take Bergson’s words as simple allegories, but as an accurate description of his experience: “the continuous creation of unforeseeable novelty which seems to be going on in the universe.”⁶⁰ Then, why don’t we see it? In discussing continuity and discontinuities in evolution one may decide to discuss nature but not us, or else make the effort to realize that our own thought determines what we see in nature and ourselves. If we treat time as space, then time has no duration. Real time does not lend itself to juxtaposition. Events are not lined up, one next to the other, in space. Quantitative multiplicity, in order to count, needs to enumerate in space. Qualitative multiplicity allows for heterogeneity without juxtaposition.

“Because a qualitative multiplicity is heterogeneous and yet interpenetrating, it cannot be adequately represented by a symbol; indeed, for Bergson, a qualitative multiplicity is inexpressible.”⁶¹ A qualitative multiplicity is therefore heterogeneous (or singularized), continuous (or interpenetrating), oppositional (or dualistic) at the extremes, and progressive (or temporal, an irreversible flow, which is not given all at once). Pure duration excludes all idea of juxtaposition, reciprocal exteriority, extension and indivisibility. Evolution can be understood without being explained.

CREATIVITY

The psychological point of view from which *duration* is grasped can then be applied to life (and also to matter, as opposed to the inverse route of starting from physics to derive biology and psychology⁶²). The faulty over-emphases of mechanism (“push”) and finalism (“pull”) can be overcome:

the psychical life is neither unity nor multiplicity, that it *transcends both the mechanical and the intellectual, mechanism and finalism* having meaning only where there is “distinct multiplicity,” “spatiality,” and consequently assemblage of pre-existing parts: “real duration” signifies both undivided continuity and creation. In the present work we apply these same ideas to life in general, regarded, moreover, itself from the psychological point of view.⁶³

Thought thinks a universe that operates, while experience feels a universe that creates. The notion of mechanism precludes the possibility of real change because the future would always be contained in the past (or else indifferent to it, in a-causal accounts). Note that, etymologically, to produce (take as “to cause” efficiently) is to lead forward. This can be conceived either by thrust or by attraction.⁶⁴ Both for the mechanistic and finalistic views, all is given at once. What changes is from where the tape is unwound. Creativity is then impossible. Yet, processual finalism is different: the end (aim and purpose) is not fixed during the process but emerges in an unforeseeable way in the process of Bergsonian *duration* or Whiteheadian *concrecence*.⁶⁵ All is new all the time. The finalistic element is not a demiurgic planner but a striving for actualization and self-determination. But the intellect prefers to think of the unpredictable as the temporarily unpredicted.⁶⁶

Pushed from the past or pulled from the future, in neither case is explanation contemporary to the phenomenon to be explained. In other

words, whether the cause preceded the effect, or the effect preceded the cause, behavior is never conceived as present participle. Being in conflict, both mechanism and teleology make the same inadequate assumptions. After-telling—sold as pre-telling—is never how things were. The dance between the normative and the conditional permeates explanatory work. Things should have been this way; things could have been that way. . . . Yet the dialogue between *possibility and necessity* falls short in capturing how things actually are.

Our thought acts as if there were a kind of surplus in the real (while, ironically, and as we have exposed above, it pretends to go from less to more by means of the application of “thought necessity”). Any model implies compression, which is the idea that we can leave out a part of reality, due to its redundancy in theory, in practice, or both. But, why would something be a superfluous happening in nature? And, superfluous to whom? for what?

We happily take forward movement as backwards:

As I cannot predict what is going to happen, I quite realize that I do not know it; *but I foresee that I am going to have known it*, in the sense that I shall recognize it when I shall perceive it; and this recognition to come, which I feel inevitable on account of the rush of my faculty of recognizing, exercises in advance a retro-active effect on my present, placing me in the strange position of a person who feels he knows what he knows he does not know.⁶⁷

The retrospective illusion, of course, can be turned into the prospective illusion: the belief that in order to know what will happen in the future one simply needs to study in great detail what happened in the past. Such an assumption is based on the double movement of rewinding and fast-forwarding the tape of reality. It is quite a Western thing to try to accelerate and decelerate reality at will.

Mechanistic reductionism presupposes what it claims to explain. The movement of decomposition by reduction to lower levels is a retrospective accounting. After having found the so-called neural basis of thought or the genetic basis of evolution, thought and evolution are claimed to emerge from them (and subsequently ignored). Other koans from the same family of fallacies then read as follows: thought abstracts neural mechanisms to think thought; thought abstracts genetic mechanisms to think the evolution of thought. The force of evolution, being the starting point, is presented as a product of the force of thinking.

We tether ourselves to an unchanging conviction. We reassure ourselves that what takes place must be the only thing that could have taken place. We accept the strange idea that an event could have been caused before it has happened. Verbal tenses reflect the fallacy *post-hoc* and *pre-hoc* (“this would not have happened, had I done this or that”). As we said, even when B follows logically from A, it may not do so, biologically or psychologically, but only as reconstructed in our abstracted psyche.

Parsimony, the necessary austerity practiced by science, betrays the concrete in the name of the useful. Note that something can only be useful because it is forced and expected to recur. But being in time requires becoming in time. Instinct and intelligence are bound to survival, whereas intuition is self-transcendent in the sense that it becomes an understanding not restricted by (nor opposed to, perhaps just indifferent to) utility. We shall not blame science if we concede that science does not hold the monopoly on accessing reality, but just that aspect of reality that is abstracted so as to be repeatable, and thus profitable. The unique, the miraculous, are literally anecdotal (etymologically, not worthy of publication). Politically, at the other extreme of pseudoscience, the scientific narrative of our times erects the average scientist as the float bearer in holy processions of progress and statism (Feyerabend comes to mind).

However, the standard procedure in physics, readily exported and commonly practiced in biology, decrees that what is a result must act as its own origin; that “the endpoint ought to be the point of departure.” This “consists in leaving what is in the making, in placing oneself after the fact, and in performing, a posteriori, a little justificatory reconstruction thanks to which belated abstractions become primitive only because they are simple and poor.”⁶⁸ The intellect relaxes. Such released tension of the mind gives rise to extension, namely, space. Our action can take place. Extracting one side of the polarity, a medium is born. This medium is one that tolerates discontinuity—even more, it celebrates it, since the very possibility of divisions lies in its indifference to cuts. The homogeneous is born by diminution of the heterogeneous. Space is homogeneous, yet time is continuous; a continuity pregnant with difference! Such difference, having divisions, does not lend itself to division by our intellect without altering its essence. It looks as if time were divisible but undivided. Time is a continuous heterogeneity, which means that it is a unity of plurals. The fact that we can think in terms of abstractions clearly implies that reality lends itself to abstraction, yet it does not permit a full elimination of duration. Every explanation then consists in dealing with the problem

at hand in terms of space. When time itself is dealt with in terms of space—which is the essence of Bergson's critique, and also his great insight—the many problems (specially those concerning the life and mind) become unsolvable due to an inherent contradiction at the core of our perception. Time is not a succession; it is an accumulation, a growth. The path is creative. Everything is always new—the path endures; nothing is ever lost. Life is in time more than space. It is not only more creative than we suppose but more creative than we *can* suppose. The remaining outstanding question is always the same: a proper psychological critique of the space-time concepts.

Biology—the logic of the living—is the precise terrain where the battle between physics and psychology takes place. The movement of mind confronts the inertia of matter. Purpose and will undergo the psychedelic trip of seeing their reflection as dull force and blind activity. Mathematics cannot solve the opposition between determinism and free will.⁶⁹ If the universe died and was reborn at every instant, would we be able to tell? Biology struggles to solve the opposition between life and matter.⁷⁰ Neuroscience faces the same problem with respect to the body and mind problem. Duration has to be irreversible. For the physicist, the arrow of time manifests itself in thermodynamics. For the biologist,⁷¹ the arrow of time is obvious in the life and death of the organism, and in the life of the species through evolution. For the psychologist, the arrow lies in the very same stream of conscious experience.⁷² A living being is a center of action. Choice—which is not a decision between possible alternatives, precisely because one only exists after the act (and the rest never did)—is creation, and creation is labor. Labor is an effort different from work. One could say that work is the effort of intelligence, whereas labor is the activity of intuition.⁷³

But we read, and we think about what we read (or rather we read barely more than what we think), and then, still, if we are honest, it seems that change cannot be real change. What we hear is not what we see; our eyes make our ears deaf. Our tongue is silent. Do you see what I say? Can you say what you hear?

The intellect resists the immediate data and postulates re-arrangement as the only possible source of change.

The metaphysician that we each carry unconsciously within us, and the presence of which is explained, as we shall see later on, by the very place that man occupies amongst the living beings, has

its fixed requirements, its ready-made explanations, its irreducible propositions: all unite in denying concrete duration. Change *must* be reducible to an arrangement or rearrangement of parts; the irreversibility of time *must* be an appearance relative to our ignorance; the impossibility of turning back *must* be only the inability of man to put things in place again.⁷⁴

To test the pure aspirations of the scientist and the philosopher, one may confront them with the following “shock or death” proposition: what if what you wish to understand does not lend itself to analysis? The philosophy of duration-organism lends itself as a powerful ontology for twenty-first-century scientists. One must debate between campaigning for it and patiently awaiting for the Cartesian orgy to lose interest. Would we keep the hammer and toss what is not nail-like? Can we see the limits of intellect with our intellect? Isn’t it a dangerous conflict of interest to ask my intellect for a self-report on its limits? I do not mean something hard for it to do but the confession that certain questions about our experience of reality are just not suitable to the intellect’s own operations and essence. If the intellect declares something as impossible, would our will still deem it worth knowing? Is the kind of thought that is able “to think matter” (to swiftly manipulate it) the highest point of knowledge? This indeed sounds like bad news for science in general and for biology in particular, especially when bio-logos means the application of the logic of matter-intellect to life. Intelligence, as any structure of dominance, kicks or kills whatever threatens its supremacy, if not its very existence. Intelligence cannot think actual occasions. Bergson and Whitehead, thus, can’t be mainstream in academia, even less so in Western minds. Intelligence thrives in outwardness. It needs distance. Intuition, in turn, is the effort of proximity. It knows via inwardness. The derived cannot create the given. Let’s put it bluntly: *for intelligence it is impossible to think that something creates itself.*

Paradoxically, symbol use is then both what made us different from animals and what keeps us from becoming fully human. And so, as stated by Spyridon A. Koutroufinis, whereas the evolution of “human intuition will further divide humans and animals, it will open human beings to unprecedented and unforeseeable ways of empathizing with other living beings” and thus with animal life as well.⁷⁵ Only then will we become able to empathize and sympathize with animals, plants, and the planet. We must move further away from the animals in order to understand them. Symbols (the tools for understanding mobility by means of halts) represent

a progress in evolution, which in turn precludes our understanding of it. Could a conscious evolution take place with symbolic thought?

EVOLUTION'S FOURTH WAY

After having tried creationism, neo-Darwinism, and dynamical systems theory, the intellect must open itself to intuition. The flavor of immanent evolutionism postulated by neo-Darwinism is just too coarse and poor. Such naturalization of human beings was extreme and naive in that it ignored the meaning of natural as projected by us, human beings. The atom has no consciousness, the stone has no creativity, the wind does not show any spontaneity, therefore flies, plants, and birds cannot either.⁷⁶ Bergson's, despite all the fuzz against his *vitalism*, is not a proposal for a transcendental evolutionism.

Darwin's main idea is that intelligent design must give way to natural selection. From such a vision, an over-correction (a justified reaction with an unjustified emphasis) proclaims: "No more design than the direction blowing in the wind!" Creationism opposes neo-Darwinism as divine purpose opposes pure luck. Those who (rightly) support the theory of evolution reject heterogeneous continuity; and those who (wrongly) reject it, are more prone to accept it. Natural Selection, the profane god of Neo-Darwinism, has faced the unscientific claims of Creationism with the irony that it cannot still account for the creative Force in nature. It is not an intelligent design versus biological evolution debate (which recalls futile science versus religion struggles). The terrain for quest is in the vertical axis: the intelligence versus intuition problem, namely, how to conceive a sort of continuity that is not dull.

Having been thinking about clocks and screws for so long, when we look at a flower or a beehive, all we can see are little clocks and little screws. The gospel reads as follows: "DNA, the secret of life." If nature is a machine (so is our brain), then we are machine-like. But, is nature a machine? Nature—we insist—must be dispassionate, to the same extent that our study of it should be. Or is it that we chose, for some reason we cannot recall, to be dispassionate in our study of nature and thus could not allow nature to show its passion. We impose a sort of repetition in high-dimensional space, ignoring the true creative force of nature. We take for mechanic what is organic. We deem inertial and reactive what is alive and spontaneous. We search for causes (or lack thereof) to that which is

self-caused. The Greek Logos is now barely more than a scientific Lego. A game, a puzzle, with the hype of neoliberal technocracy.

Attention to abstractions, when exaggerated and excessively sustained, has consequences on our sensibility. Intellect, when practiced at the expense of intuition, provokes atrophy of empathy. Clarity is deemed as the great virtue of thought. Yet, empathy allows for precision. The spherical cow can't walk or produce milk. The inner task of philosophy, so often lost even amongst armchair academic philosophers, is the art of intellectual sympathy. Ironically, critique, which is its opposite, is the over-practiced pattern.

It is then urgent to move beyond mechanistic biology. The arc of progress seems to be from molecular mechanism to dynamical system to organic process. Yet, a re-elaboration of dynamical systems theory cannot capture the essence of process ontology. The former tends towards the latter, but the former also misrepresents the latter. Postulating itself as a means precludes its goal. The term "dynamical process" seems to me more problematic if it is used in a process philosophical context à la Whitehead and Bergson. But, what do scientists and analytic philosophers know about Bergson's critique of spatialization? What is really understood about Whitehead's notion of process as an entity that neither moves nor changes? What does intuitive thinking entail? Thought is most of the time rational at best. Yet, when thinking becomes an intelligent articulation of deep intuitive insights, then the forms given by verbal intellect never exhaust their initial intuition. Intuition makes the beginning, gives birth to insights. The truth must be known before it can be proven.

The quest for truth has abstracted us from reality and then, after giving up truth for convenience and applicability, our use of reason has effectively ignored reality and re-elaborated life in favor of the practical. Experience is always real. Abstraction tends to truth but, by escaping the particular, commits itself to never reaching truth. Our thoughts are not the measure of the world. Evolution in the era of intuition entails a kind of anarchist intuitivism: people have to free their own intellect—and this cannot be done from the outside.

A human can never be purely an animal. At the same time, it seems that we are not yet fully humans.⁷⁷ Perhaps the most remarkable discontinuity between us humans and nonhuman animals is the fact that our intelligence draws a qualitative difference between them. The movement of evolution, and our thought, are enclosed in the circles of the intellect.

Yet, when disjunction becomes conjunction, intuition has left its mark.

Continuity need not be homogeneous, nor heterogeneity discontinuous. The key to holding such contradictions is to see whether there are modes of experience that allow sustaining it. Abstraction is not fit for the job. Our thinking is so prone to committing the double error of excess and defect. We see too much and too little: everything is nothing more than the whirl of atoms. The immediate data of consciousness are erased in thought, and then surrogated by thought. Yet, evolution cannot be explained in a language that would owe nothing to evolution itself.

Speculations about the future scientist imply also speculations about the future human, and thus evolution of mankind. We started this piece by noting the irony that what perhaps makes humans most special in the evolutionary tree is that only humans have a theory of evolution. Yet, as we tried to show, evolution explained is an act of intellect, not evolution itself. Indeed, models are not reality, yet there is an important difference between an asymptotic approximation to facts by models and a fundamental flaw in the capability of intellect to grasp the process of evolution. If evolution participates in the continuous creation of unforeseeable novelty, then humans are an abrupt insertion in the great chain of being, and the most important point in Darwin's teachings has, strangely enough, been overlooked. Humans have not only evolved; we are evolving! "The essential thing is the continuous progress indefinitely pursued, an invisible progress, on which each visible organism rides during the short interval of time given it to live."⁷⁸ If we are not to bet on the bio-technocratic version of transhumanism, future humans shall sustain intuition on a level where it can routinely surpass intelligence. This brings us to the second main difference between humans and other animals. We, after a great exercise of abstraction by the intellect, can grasp evolution with intuition. By unmaking the limits the intellect poses (which are its own), knowledge, through will (and grace), becomes force. There is little excuse, as exemplars already exist amongst us.

Evolution is not finished; reason is not the last word
or the reasoning animal the supreme figure of Nature.

-Sri Aurobindo (1913)

24. Michel Foucault, *Discipline and Punishment* (New York: Vintage Books, 1995), 135–94.
25. Michel Foucault, *The Hermeneutics of the Subject* (New York: Palgrave MacMillan, 2005), 183–84, 85–86.
26. Foucault, *The Hermeneutics of the Subject*, 133.
27. Foucault, *The Hermeneutics of the Subject*, 130–31.
28. Foucault, *The Hermeneutics of the Subject*, 94.
29. Foucault, *The Hermeneutics of the Subject*, 235–37.
30. Foucault, *The Hermeneutics of the Subject*, 252.
31. Alfred North Whitehead, *Modes of Thought* (New York: Palgrave MacMillan, 1988), 76.
32. Whitehead, *The Function of Reason* (Princeton, NJ: Princeton University Press, 1928), 2.

CHAPTER FOUR: GOMEZ-MARIN

1. I thank Spyridon A. Koutroufinis, Laura Nuño de la Rosa, Rod Hemsell, Joana Rigato, Juan Arnau, José Gomes Pinto, and Johanna Häusler for insightful comments on this manuscript.
2. In order to propose a precise stance to address the problem of creativity in contemporary evolutionary biology, we found it necessary to rescue and re-enunciate Bergson's notion of *multiplicity* as *heterogeneous continuity*, surpassing the contradictions that both gradualism and punctuated equilibrium share, and accommodating both continuity and discontinuity in evolution. Čapek's warning comes to mind: "Logicians will probably never like the Bergsonian terms 'qualitative multiplicity' or 'heterogeneous continuity'" ("Immediate and Mediate Memory," *Process Studies* 7, no. 2 [Summer 1977]: 90–96.) More than that, Bergson's thinking invites us to dwell in *durée*, which entails a different kind of intellectual effort that allows for *intuition*. One may rightly note that this very same essay could have been written a century ago, and that biology has progressed much since then (so much, some may claim, that it does not even need philosophy at all). Yet, a century after the publication of *Creative Evolution*, Bergson's pioneering insights remain relevant for science in general, and for biology in particular (not to mention philosophy in these times of dominance by the analytical style). Bergson's views also remain mainly neglected—a

dismissal (tainted with disdain) out of the inability (tarnished with unwillingness) to grasp them. Now that a revival of process thinking seems to be taking place with a greater force in the philosophy of biology (and in biology itself), it is timely and important to go back to the source. Process thinking can and must revise the habits and blind spots of the intellect. When discussing evolution we must be very careful of *what our intellect makes of it*.

3. It is quite ironic that both variation and selection can be traced back precisely to the two types of forces that vitalism puts forth: one that complexifies (as an intrinsic power of life), and another that tames (due to the circumstances). Of course, the orthodox evolutionary view adopted them for their own agenda.
4. Herbert Spencer Jennings saw in the behavior of “lower” organisms the manifestation of the same method that Lloyd Morgan had identified in “higher” organisms: trial-and-error as a universal heuristic spanning both in ontogeny and evolution. The same principle is at work for children learning and for bacterial chemotaxis. To see the evolution of species as bacterial navigation, and the converse, is certainly powerful and appealing to the intellect since one can then conceive how anything may not know where to go but still get there. And so, once that act of explanation is accomplished in the mind of the scientist, it is assumed that the phenomenon to be explained follows the same algorithm. The final result is that the bacterium, the child, and evolution all proceed up the gradient both “as if” they wanted to get there and also “as if” they knew how to get there, but, in reality, they do not really know nor want. Yet, ironically, the scientist’s “as if” becomes the bacterium’s “is,” and not the other way around.
5. “For, though the variation must reach a certain importance and a certain generality in order to give rise to a new species, *it is being produced every moment, continuously and insensibly*, in every living being. And it is evident that even the sudden ‘mutations’ which we now hear of are possible only if a process of incubation, or rather of maturing, is going on throughout a series of generations that do not seem to change. In this sense it might be said of life, as of consciousness, that *at every moment it is creating something*” (Bergson, *Creative Evolution* [New York: Dover, 1998], 30; italics added).
6. Evolution is commonly thought to include Neo-Darwinism but also, and despite their commendable efforts, the movement called The Third Way of Evolution.

7. One may dare to say that the commitment not to accept the truly new reflects what Whitehead called “the philosophy of an epoch,” which, actually, embodies a range of systems during the twentieth century that were at war each other, while sharing their inability to conceive novelty in its strong sense. In his words:

When you are criticizing the philosophy of an epoch, do not chiefly direct your attention to those intellectual positions which its exponents feel it necessary explicitly to defend. There will be some fundamental assumptions which adherents to all the variant systems within the epoch unconsciously presuppose. Such assumptions appear so obvious that people do not know what they are assuming because no other way of putting things has ever occurred to them. With these assumptions a certain limited number of types of philosophic systems are possible, and this group of systems constitutes the philosophy of the epoch (Alfred North Whitehead, *Science and the Modern World* [Cambridge: Cambridge University Press, 1953], 61).

8. “The more we study the nature of time, the more we shall comprehend that duration means invention, the creation of forms, the continual elaboration of the absolutely new” (Bergson, *Creative Evolution*, 16).
9. The Bergsonian proposal can be deemed as originating from a kind of “epistemological pessimism.” Indeed, Bergson claims that life does not lend itself to the thinking of the intellect. The intellect finds itself at home with matter and space. Intuition is the faculty that is able to grasp life and be in *duration*. One can then claim the opposite: Bergson’s epistemology is genuinely positive and full of force.
10. This applies not only to the world “out there,” but to our own memory:

My memory is there, which conveys something of the past into the present. My mental state, as it advances on the road of time, is *continually swelling with the duration which it accumulates*: it goes on increasing—*rolling upon itself*, as a snowball on the snow” (Bergson, *Creative Evolution*, 8; italics added).

In fact, Bergson’s progression from *Time and Free Will* (1889) to *Matter and Memory* (1896), to *Creative Evolution* (1907) carries the same intuition from our inner experience to the brain to evolution; a conjoint theory of life and of knowledge:

unity and multiplicity are only views of my personality taken by an understanding that directs its categories at me; I enter neither into one nor into the other nor into both at once, although both, united, may give a fair imitation of the mutual interpenetration and continuity that I find at the base of my own self. *Such is my inner life, and such also is life in general* (Bergson, *Creative Evolution*, 220; italics added).

11. Bergson points out that the real problem of our theorizing about evolution is the source and cause of variations. He comments on the insufficiency of Darwinism:

Comme je viens de le dire, Samuel Butler a montré que le darwinisme se trompait en prenant la concurrence vitale et la sélection naturelle pour des principes que suffiraient à expliquer l'évolution des espèces, alors que *ces deux principes peuvent à la rigueur rendre compte de la survivance de telles ou telles variations, mais non pas de l'apparition de ces variations elles-mêmes, qu'il faudra dès lors attribuer au simple hasard*. On alléguera que c'était l'évidence même; et, par le fait, ce jugement porté sur le darwinisme est celui de l'immense majorité des biologistes. Encore fallait-il s'en apercevoir, et il est possible (...) que Butler ait été le premier à faire cette constatation, à la formuler clairement, à mettre en lumière l'impossibilité de porter les variations au compte du simple hasard. (...) *la véritable question, pour la biologie et la philosophie évolutionnistes, est de déterminer les causes de variation* (Bergson, *Mélanges* [Paris: Presses Universitaires de France, 1972], 1523; italics added).

12. "Our mind, which seeks solid bases of operation, has as its principal function, in the ordinary course of life, to imagine states and things. Now and then it takes quasi-instantaneous views of the undivided mobility of the real. It thus obtains sensations and ideas. *By that means it substitutes for the continuous the discontinuous, for mobility stability*, for the tendency in process of change it substitutes fixed points which mark a direction of change and tendency" (Bergson, *Key Writings*, ed. Keith Pearson and John Mullarkey [London: Continuum, 2002] 274; italics added).
13. "The real whole might well be, we conceive, an indivisible continuity. The systems we cut out within it would, properly speaking, not then be parts at all; they would be partial views of the whole" (Bergson,

Creative Evolution, 32).

14. Vladimir Jankélévitch, *Henri Bergson* (Durham, NH: Duke University Press, 2015), 169.
15. “Quelle est cette intuition: Si la philosophie n’a pas pu en donner la formule, ce n’est pas nous qui y réussirons. Mais ce que nous arriverons à ressaisir et à fixer: c’est une certaine image intermédiaire entre la simplicité de l’intuition concrète et la complexité des abstractions qui la traduisent, image fuyante et évanouissante, qui hante, inaperçue peut-être, l’esprit philosophique, que le suit comme son ombre à travers les tours et détours de sa pensée, et qui, si elle n’est pas l’intuition même, s’en rapproche beaucoup plus que l’expression conceptuelle nécessairement symbolique, à laquelle l’intuition doit recourir pour fournir des ‘explications’” (Bergson, *Laughter: An Essay on the Meaning of the Comic*, trans. Cloudesley Bereton and Fred Rothwell [Project Gutenberg e-book, 2003], 3).
16. Karin Stephen, *The Misuse of Mind* (New York: Harcourt Brace, 1922), 36.
17. One could argue that these are also functions of the intellect, and that it may also produce novelty in its way; that it can also be truly creative. In fact, by means of words, my thinking is attempting to be creative in revealing its own tendencies.
18. One could say, à la McKenna (who is, in turn, paraphrasing Whitehead) that the evolutionary process is, ultimately, the creative struggle between habit and novelty.
19. Bergson, *Key Writings*, 60, italics added.
20. Bergson, *Key Writings*, 260.
21. Bergson, *Key Writings*, 246.
22. Bergson, *Key Writings*, 209.
23. Bergson, *Mélanges*, 434, italics added.
24. Spyridon A. Koutroufinis, chap. 5 in this volume.
25. “[A]ction is discontinuous, like every pulsation of life; discontinuous, therefore, is knowledge” (Bergson, *Creative Evolution*, 260).
26. “This amounts to saying that there is no essential difference between passing from one state to another and persisting in the same state. If the state which ‘remains the same’ is more varied than we think, on the other hand the passing from one state to another resembles,

more than we imagine, a single state being prolonged; the transition is continuous. But, just because we close our eyes to the unceasing variation of every psychical state, we are obliged, *when the change has become so considerable as to force itself on our attention*, to speak as if a new state were placed alongside the previous one. Of this new state we assume that it remains unvarying in its turn, and so on endlessly” (Bergson, *Creative Evolution*, 9; italics added).

27. “The apparent discontinuity of the psychical life is then due to our attention being fixed on it by a series of separate acts: actually there is only a gentle slope; but in following the broken line of our acts of attention, we think we perceive separate steps. True, our psychic life is full of the unforeseen. A thousand incidents arise, which seem to be cut off from those which precede them, and to be disconnected from those which follow. Discontinuous though they appear, however, in point of fact they stand out against the continuity of a background on which they are designed, and to which indeed they owe the intervals that separate them; they are the beats of the drum which break forth here and there in the symphony” (Bergson, *Creative Evolution*, 9).
28. Heterogeneous discontinuity is perhaps a more common view (no connection between species extinction due to driving cars, slaughtering baby seals, and bombing in Iraq or Syria, except on a highly abstract level of analysis).
29. Bergson, *Creative Evolution*, 293.
30. One may say that Bergson is actually thinking of this; that his intellect, like Whitehead’s, is able to conceive transformation of essence. Anyhow, the point is that they are not following the natural movement of abstract thinking but transcending it, and so evolution is seen for what it is: heterogeneous continuity. In this sense, thought is not circumscribed to the rules and habits of the intellect.
31. Bergson, *Creative Evolution*, 141.
32. “The evolution of life as a whole, from its humblest origins to its highest forms, inasmuch as this evolution constitutes, through the unity and continuity of the animated matter which supports it, a single indivisible history” (Bergson, *Creative Evolution*, 36).
33. “*The truth is that this continuity cannot be thought by the intellect while it follows its natural movement.* It implies at once the multiplicity of elements and the interpenetration of all by all, two conditions that can hardly be reconciled in the field in which our industry, and

consequently our intellect, is engaged. Just as we separate in space, we fix in time. *The intellect is not made to think evolution, in the proper sense of the word—that is to say, the continuity of a change that is pure mobility*” (Bergson, *Creative Evolution*, 141; italics added).

34. “The aim of this education is to harmonize my senses with each other, to restore between their data a continuity which has been broken by the discontinuity of the needs of my body, in short, to reconstruct, as nearly as may be, the whole of the material object” (Bergson, *Key Writings*, 106).
35. Bergson, *Key Writings*, 107.
36. “Regarded in what constitutes its true essence, namely, as a transition from species to species, life is a continually growing action” (Bergson, *Creative Evolution*, 113).
37. Henri Bergson, *The Two Sources of Morality and Religion*, trans. R. Ashley Audra and Cloudesley Brereton (London: Macmillan, 2014), 96; Auro e-Books (The Internet Archive).
38. Bergson, *Creative Evolution*, 241.
39. Discussing Boex-Borel’s work *Le pluralisme; essai sur la discontinuité et l’hétérogénéité des phénomènes*, Bergson says:

Prétend-on nous faire assister a un passage graduel de l’homogène à l’hétérogène, ou nous faire entrevoir un aboutissement final de l’hétérogène à l’homogène? Veut-on, par un effort d’imagination, reconstruire idéalement le complexe avec le simple ou le simple avec le complexe? Dans tout les cas, on se heurte à une impossibilité (Bergson, *Mélanges*, 794).

40. Bergson, *Creative Evolution*, 134, italics added.
41. “It would have seen that if, in order to simplify the work and also to facilitate the co-operation, things are first reduced to a few categories, or ideas, translatable into words, each of these ideas stands for a stationary property or state culled from some stage or other in the process of becoming; the real is mobile, or rather movement itself, and we perceive only continuities of change; but to have any action on the real, and especially to perform the constructive task which is the natural object of human intelligence, we must contrive to have halts here and there, just as we wait for a momentary slowing down or standing still before firing at a moving target. But these halts, each of which is really the simultaneousness of two or more movements

and not, as it seems to be, a suppression of movement, these qualities which are but snapshots of change, become in our eyes the real and essential, precisely because they are what concerns our action on things. *Rest then becomes for us something anterior and superior to movement, motion being regarded only as agitation with a view to a standing still. Thus immutability is rated higher than mutability, which implies a deficiency, a lack, a quest of the unchanging form.* Nay more, it is by this gap between the point where a thing is and the point where it should be, where it aspires to be, that movement and change will be defined and even measured. On this showing, duration becomes a debasement of being, time a deprivation of eternity” (Bergson, *The Two Sources of Morality and Religion*, 204; italics added).

42. “The first rule about creativity is that if you rush, you lose it. Like cooking a soup or making love, creativity’s highest preoccupation is not efficiency. But we want to cut to the chase and get as much stuff done as quickly as possible . . . Yet, the creative process (precisely because it is a process) just takes time” (Gomez-Marin, “A Portrait of the Scientist as a Young Artist: Or, What Neuroscience Can Learn From Dance,” *SciArt Magazine* Vol 33 [2018], <https://www.sciartmagazine.com/a-portrait-of-the-scientist-as-a-young-artist-or-what-neuroscience-can-learn-from-dance.html> [*Things I Learned from an Artist About Science*, Gomez-Marin, unpublished]).
43. “And that is what intelligence expresses by saying that thus only it arrives at distinctness and clearness. It must, therefore, in order to think itself clearly and distinctly, perceive itself under the form of discontinuity” (Bergson, *Creative Evolution*, 139).
44. Bergson, *Laughter*, 29.
45. “There is not ‘ceteris paribus’ in biology” (Alex Gomez-Marin & Asif A Ghazanfar, “The Life of Behavior,” *Neuron* 104, No.1 [2019]: 25–36, <https://doi.org/10.1016/j.neuron.2019.09.017>).
46. “The evolution of the living being, like that of the embryo, implies a continual recording of duration, a persistence of the past in the present, and so an appearance, at least, of organic memory.” (Bergson, *Creative Evolution*, 23.)
47. “The aim is not to effect another Platonism of the real, as in Kant’s system,” he contends, “*but rather to enable thought to re-establish contact with continuity and mobility.*” (Bergson, *Key Writings*, 36; italics added.)

48. That is, The inherent resistance in our acceptance that one can go beyond the intellect without negating it.
49. “An attention to life, sufficiently powerful and sufficiently separated from all practical interest, would thus include in an undivided present the entire past history of the conscious person—not as instantaneity, not like a cluster of simultaneous parts, but as something continually present which would also be something continually moving” (Bergson, *Key Writings*, 262).
50. “Common sense represents the endeavour of a mind continually adapting itself anew and changing ideas when it changes objects. It is the mobility of the intelligence conforming exactly to the mobility of things. It is the moving continuity of our attention to life” (Bergson, *Laughter*, 57).
51. Jakob von Uexküll, *Theoretical Biology*, trans. Doris Livingston Mackinnon (New York: Harcourt Brace, 1926), 70.
52. Uexküll, *Theoretical Biology*, 72.
53. Bergson, *Creative Evolution*, 22.
54. David Lapoujade, *Potencias del tiempo: versiones de Bergson* (Buenos Aires: Editorial Cactus, 2011), 92.
55. Bergson, *Mélanges*, 429.
56. There has been a renewed interest in process philosophy in biology. Having read what could be considered as the primary sources, I remain puzzled at the “mainstream” recent attempts to re-erect a process philosophy with no mention of Whitehead whatsoever, and with an intellectual style kin to analytical philosophy which, in my view, precisely betrays the essence of process thinking.
57. Whitehead, *Process and Reality*, corrected edition, ed. David Ray Griffin and Donald W. Sherburne (New York: The Free Press, 1978), 24.
58. Whitehead, *Process and Reality*, 29.
59. “[W]hich, at any rate, makes succession, or continuity of interpenetration in time, irreducible to a mere instantaneous juxtaposition in space” (Bergson, *Creative Evolution*, 289).
60. Bergson, *Key Writings*, 223.
61. Lawlor and Moulard, “Henri Bergson,” *Stanford Encyclopedia of Philosophy*.
62. Biology too often treats life as a great puppet. Why should the dead

be the template to explain the living, and not the other way around? How could repetition be the engine for creativity? Why reorganization in space is supposed to give rise to transformation in time?

63. Bergson, *Creative Evolution*, 6, italics added.
64. “In the thrust, . . . effects succeed their cause, which ‘produces’ them—in the literal sense of the term—by pushing them along. Such is the impulse of a shock of an efficient or efferent cause. But all of Bergson’s dialectic consists, precisely, in showing that basically, the same is the case for ‘final’ causality—in which it is the effect that precedes” (Jankélévitch, *Henri Bergson*, 55).
65. “The coherence, which the system seeks to preserve, is the discovery that the process, or concrescence, of anyone actual entity involves the other actual entities among its components. In this way the obvious solidarity of the world receives its explanation” (Whitehead, *Process and Reality*, 7).
66. “In vain, therefore, does life evolve before our eyes as a continuous creation of unforeseeable form: the idea always persists that form, unforeseeability and continuity are mere appearance—the outward reflection of our own ignorance. What is presented to the senses as a continuous history would break up, we are told, into a series of successive states” (Bergson, *Creative Evolution*, 32).
67. Bergson, *Key Writings*, 148, italics added.
68. Jankélévitch, *Bergson*, 17.
69. “[T]he world the mathematician deals with is a world that dies and is reborn at every instant—the world which Descartes was thinking of when he spoke of continued creation. (Bergson, *Creative Evolution*, 25).
70. “Continuity of change, preservation of the past in the present, real duration—the living being seems, then, to share these attributes with consciousness. Can we go further and say that life, like conscious activity, is invention, is unceasing creation?” (Bergson, *Creative Evolution*, 30).
71. “We are at ease only in the discontinuous, in the immobile, in the dead. The intellect is characterized by a natural inability to comprehend life” (Bergson, *Creative Evolution*, 143).
72. “Bergson ne s’est pas proposé de nous donner de la relation causale une analyse logique; il se place à un point de vue psychologique” (Bergson, *Mélanges*, 439).

73. “La conscience met dans la matière continue une discontinuité: l’être raisonnable cherchera à rétablir la continuité, en vertu du sentiment profond qu’il a de la continuité originelle” (Bergson, *Mélanges*, 441).
74. Bergson, *Creative Evolution*, 21.
75. Spyridon A. Koutroufinis, chap. 5 in this volume.
76. “We claim, on the contrary, that the spontaneity of life is manifested by a continual creation of new forms succeeding others” (Bergson, *Creative Evolution*, 78).
77. “Now, a mystic society, embracing all humanity and moving, animated by a common will, towards the continually renewed creation of a more complete humanity, is no more possible of realization in the future than was the existence in the past of human societies functioning automatically and similar to animal societies” (Bergson, *The Two Sources of Morality and Religion*, 70).
78. Bergson, *Creative Evolution*, 29.

CHAPTER FIVE: KOUTROUFINIS

1. I would like to warmly thank Jason James Kelly and Matthew T. Segall for useful remarks on the early drafts of this paper and for carefully reading the final version.
2. Jakob von Uexküll, *Umwelt und Innenwelt der Tiere* (Berlin: Springer, 1909), 117, 196, 249, 252; Uexküll, *Theoretische Biologie* (Frankfurt/Main: Suhrkamp, 1973 reprint), *Theoretische Biologie*, 2nd ed. (Berlin: Springer, 1928), 320.
3. Jakob von Uexküll, *Theoretical Biology* (New York: Harcourt, Brace, 1926), translation of *Theoretische Biologie*, 1st ed. (Berlin: Gebrüder Paetel, 1920), 127; Thure von Uexküll, “A teoria da *Umwelt* de Jakob von Uexküll,” *Revista Galáxia* 7 (2004): 19–48.
4. Jakob von Uexküll, *A Foray into the Worlds of Animals and Humans* (Minneapolis: University of Minnesota Press, 2010), 150.
5. Uexküll, *Theoretical Biology*, 78, 97–99.
6. Uexküll, *Theoretical Biology*, 93.
7. Uexküll, *Theoretical Biology*, 98.
8. Uexküll, *Theoretical Biology*, 103.
9. Uexküll, *Theoretical Biology*, 78.