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Keith Ansell-Pearson

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Keith Ansell-Pearson

University of Warwick

In *Creative Evolution*, Henri Bergson is a diligent reader of the biological literature of his day and intended to make a contribution to the science of biology and to the philosophy of life.¹ The primary aim of the text though is to show the need for a fundamental reformation of philosophy. Bergson wants to show the limits of mechanism, and how, through an appreciation of the evolution of life, philosophy can expand our perception of the universe. Aspects of Bergson's attempt to expand human perception in the text may not be to the taste of many contemporary readers, keen, as they no doubt are, to shy away from any romance of evolution. On this point it might be claimed that Bergson is remaining faithful to philosophy's vocation as the product of wonder: "The effort after the general characterization of the world around us is the romance of human thought."² However, even if today we feel no affinity with this aspect of Bergson's thinking about evolution, I want to show that we can still gain a great deal of instruction from his attempt to get us closer to the realities of life and to creative evolution.

On the Ambition of Creative Evolution

In the English-speaking world *Creative Evolution* appears to have the status of an optional text in Bergson's oeuvre.³ This is in marked contrast to the French reception where thinkers from Georges Canguilhem to Maurice Merleau-Ponty and Gilles Deleuze undertook close readings of the text. Deleuze's philosophy of difference is developed in significant part from out of a reading of *Creative Evolution*. So long as we lack an encounter with this text we remain ignorant of crucial aspects of Bergson's attempt to reform and transform philosophical thinking and practice. Bergson's ambition with this text is clearly stated towards the end of Chapter Two. It is worth citing what he says almost in full so as to appreciate the full breadth of the endeavour he is pursuing with his inquiry and to have an initial grasp of why he is so interested in evolution:

We shall see that the problem of knowledge [...] is one with the metaphysical problem, and that both one and the other depend on experience. On the one hand, indeed, if intelligence is charged with matter and instinct with life, we must squeeze them both in order to get the double essence from them; metaphysics is therefore dependent upon the theory of knowledge. But, on the other hand, if consciousness has thus split up into intuition and intelligence, it is because of the need it had to apply itself to matter at the same time as it had to follow the stream of life. The double form of consciousness is then due to the double form of the real, and the theory of knowledge must be dependent upon metaphysics. In fact, each of these two lines of thought leads to the other; they form a circle, and there can be no other centre to the circle but the empirical study of evolution. It is only in seeing consciousness run through matter, lose itself there and find itself there again, divide and reconstitute itself, that we shall form an idea of the mutual opposition of the two terms, as also, perhaps of their common origin. But, on the other hand, by dwelling on this opposition of the two elements and on this identity of origin, perhaps we shall bring out more clearly the meaning of evolution itself.⁴

Here we clearly see in evidence the complexity of Bergson's philosophical position: it concerns itself with epistemology and metaphysics, in which metaphysics is said to be dependent on epistemology and then epistemology is said to be ultimately dependent on metaphysics. For Bergson there are two principal ways by which we can know something: first, by going around it, and, second, by "entering into it," and the latter is the province of metaphysics as he conceives it.⁵ Bergson wants to attend to both matter and life, and to both intuition and intelligence, and thinks he can illuminate all of this through "the empirical study of evolution."⁶

Although the ambition of the inquiry is clearly stated in the passage I have just cited, in his actual introduction to the text Bergson also acknowledges that a philosophy of the kind he is seeking will not be made in a day. Rather, and unlike philosophical systems that are the work of an individual genius, such a philosophy can be developed only through the collective and progressive effort of a number of thinkers and observers that complete and correct each other. In his appraisal of the work of the physiologist Claude Bernard, Bergson cites approvingly Bernard's mistrust of philosophical and scientific systems: "Systems tend to enslave the human mind."⁷ The attempt to embrace the totality of things in simple formulas needs to be abandoned. This is not without consequence for a philosophy of nature since it means relinquishing the idea that nature is one and that nature can be neatly captured by our ideas of it. On the contrary, we need to be challenged by our observations of nature. Bergson imagines the new philosopher working in concert with the scientist, saying to himself that,

"Nature is what it is, and as our intelligence, which is part of it, is less vast than nature, it is doubtful whether any of our present ideas is large enough to embrace it."⁸

Bergson states the importance of biology for philosophical reflection in a number of essays. In an essay of 1922, for example, he argues that, "In the labyrinth of acts, states and faculties of mind, the thread which one must never lose is the one furnished by biology. *Primum vivere*" [first there is life].⁹ In an essay of 1904 on Felix Ravaisson, entitled "The Life and Work of Ravaisson," he speaks of the mind having a natural proclivity to always turn in the direction of materialism and to imagine it can persist in such a direction: "It seeks quite naturally a mechanical or geometrical explanation of what it sees."¹⁰ Such an attitude Bergson regards as a survival of preceding centuries, one that harks back to an epoch when science was conceived largely as geometry. The significance of the science of the nineteenth century is that it places at the centre of its inquiry the study of living beings. He concedes that even here science may still be governed by mechanics but, as he makes clear a few years later in *Creative Evolution*, what we are dealing with here is a mechanics of transformation, which is a mechanics that cannot be developed by relying upon geometrical schemas of thought. Change, transformation, and evolution are bound up with living and open systems. With this critical reference to "materialism" it seems clear that Bergson invariably treats it as an essentially mechanistic modelling of reality that deals with systems into which time does not bite. The focus is on aspects of repetition in which the intellect selects in a given situation whatever is like something it already knows so as to fit it into a pre-existing mould or schema; in this way it applies the principle that "like produces like." It naturally rebels against the idea of an originality and unforeseeability of forms. Similarly, classical science focuses its attention on isolable or closed systems simply because anything that is irreducible and irreversible in the successive moments of a history eludes it. In cases of organic evolution Bergson insists that foreseeing the form in advance is not possible. This is not because there are no conditions or specific causes of evolution, but rather owing to the fact that they are built into the particular form of organic life and peculiar to that phase of its history in which life finds itself at the moment of producing the form.

Creative Evolution is a text that engages with the history of philosophy and the history of science and in terms of their ancient and modern aspects. The two key philosophical figures engaged with in the text are Aristotle and Kant, though there are also important engagements with the likes of Spinoza and Fichte. Indeed, on one level it is possible to read *Creative Evolution* as an attempt to refute Spinoza and dispel the entrancing effect his logical conception of reality has over modern minds. For a system like Spinoza's, Bergson notes, true or genuine being is endowed with a logical existence more than a psychological or even physical one: "For the nature of a purely

logical existence is such that it seems to be self-sufficient and to posit itself by the effect alone of the force immanent in truth.”¹¹ Spinozism is an attempt to make the mystery of existence, such as why minds and bodies exist, vanish and instead of making actual observations of nature the philosopher advances a logical system in which at the base of everything that exists is a self-positing being dwelling in eternity. In contrast to this logical system Bergson intends to develop a conception of efficient causality that includes within it duration and free choice.

The Challenge of the New Biology

What challenge did Bergson think the new biology presented? First, and most obviously, there is the rejection of Aristotle's thinking. In his discussion of the development of animal life in Chapter Two of *Creative Evolution* he says that the cardinal error that has vitiated almost all philosophies of nature from Aristotle onwards lies in seeing in vegetative, instinctive, and rational life, successive degrees in the development of one and the same tendency. In fact, they are “divergent directions of an activity that has split up as it grew.”¹² This is in accord with one crucial aspect of his conception of life, namely that it does not proceed by the association and addition of elements but by dissociation and division. Bergson argues that one of the clearest results of modern biology is to have shown that evolution has taken place along divergent lines. This means that it is no longer possible to uphold the biology of Aristotle in which the series of living beings is regarded as unilinear. Aristotle belongs to the science of the ancients that rests, he says, on a “clumsy interpretation of the physical in terms of the vital.”¹³ All of this is of no small concern to Bergson given that in his essay on Ravaisson he clearly sympathizes with the latter's preference for Aristotle over Plato. Indeed, he even describes Aristotle as the founder of metaphysics and the initiator of “a certain method of thinking which is philosophy itself.”¹⁴

Second, there is the significance of the modern doctrine of transformism, a doctrine that Bergson says he accepts “as a sufficiently exact and precise expression of the facts actually known.”¹⁵ The language of transformism, he writes, “forces itself now upon all philosophy, as the dogmatic affirmation of transformism forces itself upon science.”¹⁶ On the one hand it shows us that the highest forms of life—highest in terms of complexity—emerge from a very elementary form of life, thus the most complex has been able to issue from the most simple by way of evolution. On the other hand it shows that life can no longer be treated as an abstraction. Life can now be described in terms of the continuity of genetic energy that cuts across the bodies “it has organized one after another, passing from generation to generation, [and that] has become divided among species and distributed amongst individuals without losing anything of its force, rather intensifying in proportion to its advance.”¹⁷

One of the most important aspects of Bergson's approach to evolution in the book, and elsewhere, is his insistence that we should resist the temptation to shrink nature to the measure of our ideas. He makes this clear, for example, at the end of his essay on Claude Bernard. In *Creative Evolution* he insists that we need to display a readiness to be taken by surprise in the study of nature and learn to appreciate that there might be a difference between human logic and the logic of nature: "What is absurd in our eyes is not necessarily so in the eyes of nature."¹⁸ We cannot approach nature with any a priori conceptions of parts and wholes or any a priori conception of what constitutes life, including how we delimit the boundaries of an organism and hence define it. We must resist the temptation to place or hold nature within our own ideas or shrink reality to the measure of them. We should not allow our need for a unity of knowledge to impose itself upon the multiplicity of nature. To follow the sinuosities of reality means that we cannot slot the real into a concept of all concepts, be it Spirit, Substance, Ego, or Will. Bergson notes that all thought becomes lodged into concepts that congeal and harden and we have to be aware of the dangers presented by this. He regarded Schopenhauer's "will to life," which we might think of as a precursor of the *élan vital*, as an empty concept supported by a barren theory of metaphysics. It is in *Creative Evolution* that Bergson proposes the need for thought to undergo a fundamental reform and education: "It is not enough to determine, by careful analysis, the categories of thought; we must engender them."¹⁹ This statement comes in the wake of an engagement with Kant, one of several that feature in the book. Bergson asks, "Created by life, in definite circumstances, to act on definite things, how can it [the logical form of thought] embrace life, of which it is only an aspect?"²⁰ Life challenges the essential categories of thought: unity, multiplicity, mechanical causality, and intelligent finality all fall short. A consideration of life in its evolutionary aspects makes it virtually impossible to say where individuality begins and ends, whether the living being is one or many, whether it is the cells that associate themselves into an organism or the organism that dissociates itself into cells. "It would be difficult to cite a biological discovery due to pure reasoning." All the moulds in which we seek to force the living crack: "They are too narrow...too rigid, for what we try to put into them."²¹ Unity and multiplicity, or the one and the many, are categories of inert matter; the vital impetus can be conceived neither as pure unity nor pure multiplicity. If we take as an example the most rudimentary organisms that consist of only a single cell we find already "that the apparent individuality of the whole is the composition of an *undefined* number of potential (*virtuelles*) individualities potentially (*virtuellement*) associated."²²

Bergson conceives metaphysics as a mode of knowledge that can advance by the gradual accumulation of obtained results. In other words, metaphysics does not have to be a take-it-or-leave-it system that is forever in dispute, thinking abstractly and vainly without the support of empirical

science. Not only is it the case for Bergson that metaphysics can be a true empiricism, but it can also work with science in an intellectual effort to advance our knowledge of the various sources, tendencies, and directions of life. In his Huxley lecture of 1911 on "Life and Consciousness" he writes: "we possess now a certain number of *lines of facts*, which do not go as far as we want, but which we can prolong hypothetically."²³ This is taken up again in the *Two Sources of Morality and Religion*, where he states that the different lines of fact indicate for us the direction of truth but none go far enough; the attainment of truth can only take place when the lines are prolonged to the point where they intersect.²⁴ He insists that the knowledge we wish to develop and advance concerning evolution must "keep to ascertained facts and the probabilities suggested by them."²⁵ Bergson's originality consists in placing life at the centre of the study of nature. It is perhaps Whitehead who best articulates the task here when he writes that *the* modern problem of philosophy and of science is, "*the status of life*."²⁶ For Bergson, however, life can no longer be thought about independently of the empirical study of evolution.

Bergson on Philosophy and the Study of Evolution

Bergson is making two essential claims in his opening introduction to the text, and they are interrelated: first, that we have to see the theory of knowledge and the theory of life as deeply related; second, that there is a need to "think beyond the human condition" or human state. Indeed, Bergson conceives philosophy as the discipline that "raises us above the human condition" (*la philosophie nous aura élevés au-dessus de la condition humaine*) and makes the effort to "surpass" (*dépasser*) it.²⁷ This reveals itself to be something of an extraordinary endeavour since it means bringing the human intellect into rapport with other kinds of consciousness. Bergson does not specify what exactly he means by this in his introduction.

How are these two points related? Bergson claims that the theory of knowledge and theory of life are to be regarded as inseparable. If we do not place our thinking about the nature, character, and limits of knowledge within the context of the evolution of life then we risk uncritically accepting the concepts that have been placed at our disposal. It means we think within pre-existing frames. We need, then, to ask two questions: first, how has the human intellect evolved (since it does not simply think for the sake of it but has evolved as an organ of action and utility)?, and second, how can we enlarge and go beyond the frames of knowledge available to us?

Bergson has a specific conception of the human intellect and of matter. The intellect has moulded itself on the geometrical tendency of matter and so as to better further its instrumental manipulations of matter. His chief claim is that the intellect has to be viewed within the context of the evolution of human life and that when we do this we can better grasp its limits and

how to think beyond it. The task, in short, is to attempt to think beyond the representational and spatial habits of the intellect. For Bergson perhaps the chief function of philosophy is to expand our perception of the world and the universe. Although Whitehead contests Bergson's view that the intellect has an inherent tendency to spatialize, he does think that "the history of philosophy supports Bergson's charge that the human intellect 'spatializes the universe,'" ignoring the fluency of life and analyzing the world in terms of static categories and a static materialism.²⁸

Bergson's criticism in *Creative Evolution* is chiefly directed at what he calls "evolutionist philosophy," by which he specifically means the work of Herbert Spencer. The problem with this philosophy is that it uncritically extends to the phenomena of life the same methods of explanation that have yielded successful results in the case of the study of unorganized matter. Bergson accuses this evolutionism, which in Kantian fashion claims only to come up with a symbolical image of the real in which the essence of things will always escape us, of an excess of humility. He says this because he thinks that it is possible for us to go beyond the human state and enlarge our perception so as to provide us with an insight into the depths of life. He also insists that this is not easy to do.

Here we see the character of Bergson's interest in evolution. It forms an essential part of his very conception of what philosophy is: an attempt at an enlarged perception where we think "beyond the human condition." The problem with the mechanistic and geometrical understanding is that "it makes the total activity of life shrink to the form of a certain human activity which is only a partial and local manifestation of life."²⁹ In the text itself Bergson will argue that matter itself is to be characterized by certain tendencies, such as spatiality, so when the human intellect thinks in these terms it is representing an aspect of the real. Bergson's point is that this is only one aspect.

How, though, is it possible to think beyond the human condition and outside of its particular framing of reality? This is where Bergson appeals to evolution itself and stresses that the line of evolution that has culminated in the human is not the only line. His idea seems to be a radical one, namely, that there are other forms of life-consciousness that express something that is immanent and essential in the evolutionary movement, and the critical task is to then bring these other forms into contact or communication with the human intellect. Bergson poses the question: would not the result be a consciousness as wide as life? What does he have in mind? The reader has to wait until the later chapters in the book before being fully able to comprehend him. Bergson is suggesting that it is possible to cultivate, through intellectual effort, a perception of life where we experience something of the very impetus of creative life itself or what he describes as the push of life and that has led to the creation of divergent forms of life from a common impulsion, such as plant and animal. In short, philosophy is

that discipline of thinking that tries to make the effort to establish contact with the vitality and creativity of life and involving novelty, invention, process, and duration. As I have noted, he does not pretend that it is easy to do this; on the contrary, he stresses that it is necessary to perform a certain violence on ourselves so as to break with our evolved habits of representation and established patterns of thought. In the introduction to *Creative Evolution* he tackles the objection that may be raised against the project he is inviting us to pursue: will it not be through our intellect and our intellect alone that we perceive the other forms of consciousness? In answer to this objection he points out that this would be the case *if* we were pure intellects, but the fact is, he thinks, we are not. Around our conceptual and logical modes of thought, and that have moulded themselves on certain aspects and tendencies of the real, there remains a vague nebulosity that is made of the same substance out of which the luminous nucleus we call the intellect has been fashioned. Here we shall find, he thinks and hopes, certain powers—powers of insight, vision, and perception—the nature of which we have only an indistinct feeling when we remain shut up in ourselves and exist as closed beings. The task of philosophy is to make these powers clear and distinct, Bergson says in a clear reference to Descartes.

Life

Bergson holds to the view that life is something *sui generis* and he clearly thinks a distinction needs to be drawn between “matter” and “life” since they are two different tendencies. This also helps us to understand why he is keen to maintain a separation between physics and chemistry on the one hand and biology on the other, and explains the attraction biology has for him. Basically, for Bergson physics and chemistry proceed as if historical time did not count and in which aspects of the present are calculable as functions of the past. This is not the case, he thinks, with biology. He writes:

Nothing of this sort in the domain of life. Here calculation touches, at most, certain phenomena of organic *destruction*. Organic *creation*, on the contrary, the evolutionary phenomena which properly constitute life, we cannot in any way subject to a mathematical treatment. It will be said that this impotence is due only to our ignorance. But it may well equally express the fact that the present moment of a living body does not find its explanation in the moment immediately before, that *all* the past of the organism must be added to that moment, its heredity—in fact, the whole of a very long history.³⁰

Bergson is associating life with the phenomena of organic creation such as growth, maturation, ageing, and so on. A living body is characterized by continuity of change, the preservation of the past in the present, and by real duration. But he does not have a single conception of life. However, he does

appear to think that to explain evolution we need a special principle of life and that it is something distinct from the properties of matter. What exactly is this?

From the beginnings of his teaching career—see, for example, the lectures on the “Metaphysics of Life” from 1887-8 and delivered at Clermont-Ferrand—Bergson was keen to reflect on the origin and nature of life and to contest what he took to be the dogmas of materialism. He notes that a living body differs from brute matter by the fact that it displays a kind of initiative and that when we examine life, even in its rudimentary state, we observe new characteristics that cannot be mathematically foreseen: “Two seeds placed in the same ground and that present the same aspect to scientific observation will not behave in the same way.”³¹ For Bergson, then, what should impress itself upon us in the study of life is the capacity living bodies display for responding to problems in their environment in a manner that is not pre-given or predictable. The initiative they display is, “opposed to the fatal and disorganizing action of physical and chemical laws,” and he cites Xavier Bichat’s well-known definition of life as “the assemblage of the forces that resist death”³² (he will return to this “fatalistic” aspect of the world if left to itself in his 1911 lecture on “Life and Consciousness”).³³ Bergson also wishes to draw attention to the complexity of a living organism, in which, when we observe its growth and development, we can observe a “marvellous coordination of elements that together seem to tend toward a single goal,” including the diverse functions of digestion, circulation, and respiration.³⁴

Bergson provides a potted history of materialism, referring to Lucretius and Epicurus, and Cartesians and Spinozists (who are not, he notes, straightforward materialists since their systems display idealist tendencies), and notes that it is in the nineteenth century that the mechanistic theory of life claims to be based on scientific facts and evidence, and he refers in particular to Buchner, Moleschott, and especially Haeckel (in a lecture of 1912 Bergson will also note the contribution made by the likes of La Mettrie, Helvetius Bonnet, Cabanis, and so on).³⁵ Bergson’s main quarrel with materialism is that it deprives life of its specific characteristics and construes life in terms of a universal mechanism. He holds materialism to be an arbitrary hypothesis with questionable scientific evidence to support its claims. He never challenges the idea that a living body, such as the human body, is made up of the same physical and chemical forces as the rest of nature or the claim that it is made up of elements of brute matter. He does not wish to agree with Bichat that life is in a struggle with the forces of inorganic nature since his main point is that these forces do not behave in the same way in the presence of brute matter and living matter: “Up to a certain point, the effect is indeterminate.”³⁶

In his early lectures, then, we see Bergson taking materialists to task for the attempt, as he sees it, of suppressing from matter all initiative and

spontaneity and imagining at work in nature a universal mechanism. These are his principal claims against materialism and they do not appear to change in the evolution of his writings. Life in *Creative Evolution* appears to work in an essentially twofold manner: as a vital impetus that can explain the movement of creative evolution, and as duration and that can account for the complexity of living systems. In *Creative Evolution*, then, Bergson speaks of a creative energy at work in evolution, and of a common impulsion as the source of life. He also speaks of an "intention" and an "effort" in conceiving life, and sometimes of a "power" and a "striving," as in his Huxley lecture of 1911 on "Life and Consciousness." Bergson is interested in developments in biology, especially the neo-Darwinism of August Weissman and his theory of the germ plasm, because he thinks this has revealed the fact that life can now be thought of in terms of a continuity of (genetic) energy: we no longer need to speak of life in general as an abstraction.³⁷ He will not, however, restrict himself only to a limited form of this principle but speaks in general terms as a current of life that at certain moments and in certain portions of space has taken rise, traversing the bodies it organizes and passing from generation to generation. Life appears to have at least a twofold sense in Bergson, denoting (i) a current of creative energy that is precipitated into matter and wrests from it what it can; (ii) the durational phenomena of organic creation as outlined above. A few other points are worth noting about Bergson on life. First, although he refers to life as an energy that has entered into the habits of inert matter, he acknowledges that with respect to the phenomena of the simplest forms of life it is difficult to declare them to be solely physical and chemical since they may contain vital features. Second, although he maintains that at the root of life we find an effort to "engraft on to the necessity of physical forces the largest possible amount of *indetermination*," this does mean that this effort of life results in some free creation of energy.³⁸ Bergson unreservedly accepts that this kind of creation is not possible. For him the force or energy of life is a limited one.

Is Bergson, then, a straightforward vitalist, that is, a thinker who appeals to a special principle of life and a mysterious one at that? The matter is complicated by several things: (i) he does not completely deny mechanism and speaks of a "mechanism of the whole";³⁹ and (ii) he does not wish to contest the identity between inert matter and organized matter.⁴⁰ Bergson explicitly broaches the issue of vitalism about halfway into his first chapter, addressing the stumbling block of vitalistic theories.⁴¹ He does not uncritically embrace a vital principle but says only that although such a principle may not explain much it serves as a label fixed to our ignorance, one that mechanism invites us to ignore. Bergson has an important reason for being hesitant with vitalistic claims; chiefly, in nature "there is neither purely internal finality nor absolutely distinct individuality."⁴² In short, where would we locate the vital principle? It cannot be in the individual since this is not sufficiently independent or cut off from other things, and

finality cannot be restricted to the individuality of the living being: "If there is finality in the world of life, it includes the whole of life in a single, indivisible embrace."⁴³ The problem in thinking through the nature of life and its special character becomes acute once we recognize that both mechanism and finalism are only external views of our conduct and reflect human modes of thinking. Bergson states his own position as follows, and it reveals his commitment to genuine freedom in evolution, both of the individual and of life itself: "This does not mean that free action is capricious. [...] To behave according to caprice is to oscillate mechanically between two or more ready-made alternatives and at length to settle on one of them; it is no real maturity of an internal state, no real evolution."⁴⁴ Bergson thinks "we are all born Platonists."⁴⁵ By this he means the human need to fit reality into the ready-made garments of our ready-made concepts: "The idea that for a new object we might have to create a new concept, perhaps a new method of thinking, is deeply repugnant to us."⁴⁶ As in his introduction he now appeals to an expansion of our intellectual habits and forms of thought and so as to develop an idea of the whole of life: "Such is the philosophy of life to which we are leading up. It claims to transcend both mechanism and finalism."⁴⁷ Bergson, in fact, conceives of philosophy as an effort to dissolve into the whole. Of course, what is not clear at this stage in his argument is why we should endeavour to think in terms of the whole and for what ends. This dissolving has to be seen as the ultimate end of the task of thinking beyond the human condition.

Bergson now attempts to give an indication of the key principle of his demonstration. He conceives of life as "the continuation of one and the same impetus, divided into divergent lines of evolution."⁴⁸ The development of life has taken place in terms of a dissociation of tendencies, ones that were unable to grow beyond a certain point without becoming mutually incompatible. Not until Chapter Three of the text does Bergson deal in a concerted fashion with questions of contingency. He notes at this point in the book that there is no reason why we cannot imagine evolution having taken place in the one single individual being and having only the one dimension. However, it is a fact that on earth evolution has taken place through millions of individuals and along divergent lines. He further maintains that something of the whole abides in each one of evolution's parts, and this common element may explain the presence of identical organs in significantly different organisms and forms of life. In short, there is a common impulsion of life and this may account for the phenomenon of convergent evolution.

Bergson now embarks on a long and detailed exploration of this topic, with an elaborate set of insights into the evolution of the eye across different phylogenetic lineages, and he does so in an effort to vindicate his thesis that mechanism is refutable and finality—in the special sense he understands it (in which it is not modelled on the human intellect)—can be demonstrated

in a certain aspect. I wish here to call attention to the following key critical point he makes. His criticism is directed at mechanistic biology. Bergson argues that this biology makes the passive adaptation of matter, which submits to the influence of an environment, equivalent to the active adaptation of an organism and that derives from this influence an advantage it can appropriate.⁴⁹ He is not questioning the fact that some level of passivity is at work in adaptation, but calling attention to the fact that this does not explain the whole of the matter, especially in terms of the development of complexity (e.g. the evolution of the eye from the pigment-spot of lower organisms to the complicated eye of the vertebrates). So, when we speak of the gradual formation of the eye, taking into account all that is connected with it, such as the formation of the various systems (nervous, muscular, osseous) that are continuous with the apparatus of vision in the case of vertebrate animals, we have to be speaking of something different from the direct action of light: "One implicitly attributes to organized matter a certain capacity *sui generis*, the mysterious power of building up very complicated machines to utilize the simple excitation that it undergoes."⁵⁰

This is a key statement in the book and raises the question of just what conception of life Bergson himself is appealing to account for the development of complexity. The answer seems to reside in his appeal to a "psychological cause" or what he calls "an inner directing principle."⁵¹ This, I think, is the key argument he evinces:

The evolution of the organic world cannot be predetermined as a whole. We claim, on the contrary, that the spontaneity of life is manifested by a continual creation of new forms succeeding others. But this indetermination cannot be complete; it must leave a certain part to determination. An organ like the eye, for example, must have been formed by a continual changing in a definite direction. Indeed, we do not see how otherwise to explain the likeness of structure of the eye in species that have not the same history. Where we differ from Eimer is in his claim that combinations of physical and chemical causes are enough to secure the result. We have tried to prove, on the contrary, by the example of the eye, that if there is 'orthogenesis' here, a psychological cause intervenes.⁵²

By "psychological cause" Bergson is referring to an impetus of life: this impetus, he says, is sustained along the divergent lines evolution has taken, and is the fundamental cause of variations and that are responsible for the creation of new species. He once again engages with mechanism and finalism, claiming that it is necessary to think beyond both perspectives since they are only "standpoints to which the human mind has been led by considering the work of man."⁵³ His key criticism is that finalism is too anthropomorphic since it compares the labour of nature to that of a workman who proceeds by thinking of an assemblage of parts "with a view to the realization of an idea or the imitation of a model."⁵⁴ Although

mechanism legitimately reproaches finalism on this point, it too proceeds with an equally questionable method: it gets rid of an end pursued or an ideal model, but it holds to the view that nature works like a human being that brings parts together. Contra mechanism Bergson maintains that: "*Life does not proceed by the association and addition of elements, but by dissociation and division.*"⁵⁵

Life is being spoken of in terms of an impetus, says Bergson, simply because "no image borrowed from the physical world can give more nearly the idea of it."⁵⁶ An image borrowed from psychology provides us with insight into life as the enfolding of a plurality of interpenetrating terms and tendencies. Bergson perhaps best explains why he thinks we need to have this notion of tendencies and conceive them psychologically in Chapter Two of the book. From it I cite the following so as to clarify what he means: "The elements of a tendency are not like objects set beside each other in space and mutually exclusive, but rather like psychic states, each of which, although it be itself to begin with, yet partakes of others, and so virtually includes in itself the whole personality to which it belongs."⁵⁷ A tendency can be conceived as the push or thrust (*poussée*) of an indistinct multiplicity, which is indistinct only when considered in retrospect, for example when the multitudinous views we take of its past undivided character enable us to see it composed of elements created by an actual development. Forms of life (groups and species) should be defined not by the possession of certain characters but by their tendency to emphasize them: "taking tendencies rather than states into account, we find that vegetables and animals may be precisely defined and distinguished, and that they correspond to two divergent developments of life" (e.g. the divergence shown in the method of alimentation).⁵⁸ He specifically states that in accounting for the dissociation of tendencies there is no need to bring into the picture any mysterious force.⁵⁹ Considered in terms of its contact with matter, life can be likened to an impetus or an impulsion that in itself, "is an immensity of potentiality (*virtualité*), a mutual encroachment of thousands and thousands of tendencies," which are such only when spatialized.⁶⁰ It is matter that carries out in actuality the division of this multiplicity, and individuation is to be treated as in part the work of matter and in part the result of the inclination of life.

It is in Chapter Two of the text that Bergson pauses to consider the character of the vital impetus he is positing. He does so in the context of an attack on the errors and puerilities of (radical) finalism, which represents the whole of the living world as a construction analogous to a piece of human work. Such a finalism simply fails to do justice to the complexity of the evolution of life where there is not simply harmony but discord between species and forms of life, where not everything is coherent, where there are arrests and set-backs of evolution, and so on. The vital impetus informing evolution is, as Bergson sees it, a limited force and is at the mercy of

materiality.⁶¹ Bergson seeks to illustrate his point by inviting his reader to reflect on their own existence where we know that our attempts at freedom are dogged by automatism. This is not an accidental feature of our quest for freedom but an essential part of it since in the very movement by which our freedom is actually affirmed there is created the habits that stifle it. This means that freedom can only be practiced through the renewal of a constant effort. Bergson thinks this discordance between the dead and the living, or between the mechanical and the vital, or the habitual and the free, is to be explained in terms of what he calls “an irremediable difference of rhythm.”⁶² Bergson expresses himself poetically to clarify this difference, writing of the living turning upon themselves like eddies of dust raised by the passing wind. Although we need to grant a stability to living organisms we also need to conceive of them as counterfeiting immobility, so leading us to treat them as things rather than systems implicated in a process. It is when we envisage the evolution of life as a whole that we are able to see the difference at work: this is the difference between life in general and the relatively stable but transient forms in which it is manifested. Indeed, Bergson thinks that, “the living being is above all a thoroughfare, and that the essence of life is in the movement by which life is transmitted.”⁶³ However, although life can legitimately be regarded as a continually growing action, we have to acknowledge that actual evolution shows species existing in self-absorption, in which they fall into a partial sleep and ignore the rest of life.

Bergson and the Hard Problem of Science: What is Life?

For Bergson matter and life are different tendencies of reality, although it is clear that we are not to think of life without its relation to materiality. Philosophy for Bergson must attend to both matter and life. Bergson’s achievement is to have given us a conception of the evolution of life in terms of its extraordinary intricacy and complexity. He has developed new modes of thinking needed for the effort to conceive of nature in the wake of modern theories on the evolution of life. Although he conducts an ambitious enterprise in *Creative Evolution* he is always careful to qualify his remarks, to provide elaborate demonstrations, and to arrive at precision wherever it is possible. Bergson’s challenge to the doctrine of static materialism is clear and there are contemporary theoretical biologists who share his principal view, namely, that life is something *sui generis*.⁶⁴

Although Bergson engages with the entire history of materialism in his writings, his thinking on evolution is largely directed at what he sees as the intellectual currents prevailing in his own time, namely, the dogmatic materialism that deprives living beings of initiative and that imposes on reality a universal mechanism. Bergson never doubts that there is mechanism in the universe and readily acknowledges that it serves to capture certain features of reality. Not everything in reality is unforeseeable,

incalculable, spontaneous and free! His critical point is that mechanism fails to account for all aspects of reality, and one way he thinks we can demonstrate this is by marking a distinction between matter and life, with the former being defined as "inertia, geometry, necessity," and the latter as freedom, choice, and unpredictable movement.⁶⁵ All living beings are the subject of both matter and life; we are not to think of the two independently or as separate from one another. Both (matter and life) have to be understood as tendencies and they are implicated in one another. The evolution of life on earth cannot be understood without paying close attention to this implication. Bergson rejects the idea of a Life Force at work in evolution precisely because it fails to pay attention to the empirical details of evolution (this differs from the *élan vital* in that it works as a transcendent principle, not one that is immanent to an evolutionary movement). The challenge for him, then, is to attempt to think of evolution in terms of an initial common impulsion that has led to the divergent forms of life we observe and to attempt to think evolution in a way that avoids the pitfalls of both mechanism and finalism in their anthropomorphic forms. Although one may have serious doubts about the appeal to a vital impetus to account for the evolution of life, I think we have to acknowledge that it is at least a philosophically serious attempt on Bergson's part to explain life. For him it names a problem and the name given to denote this problem is not the important thing: either we say there is a genuine problem here for philosophy to think about or we declare the problem to be a spurious one.

The appeal to a vital impetus may not, however, constitute the most relevant aspect of Bergson's contribution to the philosophies of nature and life. Although he no doubt exaggerates the geometrical and spatial habits of the intellect as inherent ones (as Whitehead held), his critique does raise an important issue for any philosophy of nature, namely, that we cannot uncritically accept the modes of thought and habits of representation we find at our disposal. Some genetic account of these modes and habits is required, especially if one wishes to advance a philosophy of life that makes the effort to think life beyond the human condition. Is Bergson sufficiently attentive, though, to the ways in which Darwinism challenges our dominant modes of thought? On the one hand, I think he is and he is inspired by it. He takes seriously its critique of radical finalism and incorporates the key lessons into his own thinking about evolution, including the insight that there is no idea or plan of evolution. On the other hand, he is insistent that Darwinism does not attend to some fundamental aspects of our appreciation of nature, such as the need to account for the evolution of life. I have sought to show that Bergson cannot straightforwardly be labelled a vitalist. Moreover, although the notion of a vital impetus may be a problematic one, and one that science is right to eschew, this should not be at the expense of disregarding the importance of Bergson's insights into duration and his attempt to get us to reflect on the sense of life in terms of a fundamental sympathy with it. This is not at all to fall prey to anthropomorphism but

precisely the opposite: it is an effort to think beyond the human condition. Bergson thinks this is the function of philosophy, in which the task is not to complete science and add to it more generalities and of some alleged higher order; rather, the task is to extend our perception of the universe so as to attempt to get closer to life. However, although Bergson thinks this task is peculiar to philosophy and of no interest to the scientist, we might suggest that contemporary science, especially in the form of complexity thinking, is also committed to this endeavour.

Bergson's decision to focus on biology as the science of living beings, and his attempt to raise the question of life, is, when seen the light of the fundamental intellectual prejudices of modern science, a bold enterprise. As Robert Rosen points out in his seminal study, *Life Itself*, physics, as we largely know it today, is the science of mechanism. Theoretical physics, he contends, has beguiled itself with a quest for what is universal and general. Moreover, because the physicist perceives that most things that make up the universe are not organisms, and not alive in any conventional sense, it is held that organisms are negligible and to be ignored in the quest for universality.⁶⁶ On the one hand, it is held that biology can add nothing new to physics and, on the other hand, that living beings can be entirely understood as specializations of physical universals; all that remains is to specify "the innumerable constraints and boundary conditions that make organisms special."⁶⁷ The implication of the belief in the unlimited uniformity of mechanical behaviour, as well as universality of mechanical laws, is that all forces or energies can be studied in the same manner, with the added implication that all of inanimate nature could be studied through simple laboratory situations and with such humble laboratories serving as "proxies for the entire universe."⁶⁸ If biology uncritically adopts this mechanism as its model—for example, by approaching the organism as a machine—it radically simplifies and, more than, this "we literally kill life."⁶⁹ For Rosen, adopting the mechanistic approach means losing the entailment we need to understand the organism; in the case of organisms "almost everything about is entailed by something else about them."⁷⁰ The presupposition of mechanism proves devastating here since it confines us to fragments, "pieces that individually can be regarded as mechanisms all right but that cannot be articulated or combined within those confines."⁷¹

Although Rosen is not a vitalist—he rejects both vitalism and evolutionism—he echoes something of Bergson's concerns about dogmatic materialism when he argues that, "Life is material, but the laws framed to describe the properties of matter give no purchase on life."⁷² Physics denies that there is a difference between organic systems and material systems, and any perceived conjunction today between physics and biology, "so fervently embraced by biology in the name of unification," is blind to the manner in which it is caught up "in a philosophy of naïve reductionism."⁷³ It is on account of his attention to the complexity of life and natural phenomena that

Bergson now has an appeal to several contemporary theoretical biologists working at the cutting-edge of research in biology today, including the likes of Brian Goodwin and Mae-Wan Ho.⁷⁴

Conclusion

Creative Evolution has yet to receive the attention it deserves in the intellectual community. More than any other work in the philosophy of life, this text is predominantly understood in light of what came after it. This is not to say merely that we interpret it in retrospect, but that the philosophical community has had a century to acclimatize itself to the scientific worldview that Bergson recognized at its inception. It stands as a lesson in how philosophy can accompany rather than follow science, and how both disciplines gain from this partnership. Dynamic theories of biology and evolution can only operate through the recognition of the temporal character of living systems, ecological theories can only operate through the recognition of sympathy between organisms, and Bergson developed both these approaches at a time when biological science on the whole operated by treating organisms as raw material. Our thinking of life today is moving away from control and towards participation, away from exploitation and towards sustainability, and only now is scientific thought embarking on the path that Bergson pointed out a century ago, a path that he had seen indicated in the evolutionary biology of the late 19th and early 20th century. Bergson's ideas are not of course the only resource for this project, but they surely merit being placed at the center of any serious philosophical response to questions of life and evolution.

In *Creative Evolution* Bergson champions the empirical study of evolution while at the same time insisting that although science and philosophy have the same object (life) they each approach this object in a radically different manner and expect different results from their encounter with it. The difference of method between science and metaphysics has to be upheld.⁷⁵ They present us with two halves of the absolute; it is certainly not the case that for Bergson metaphysics is the superior of positive science which would come after it and obtain a higher knowledge of the same object. If we conceive the relation between the two in this way we will wrong both and metaphysics will inevitably be construed as a vague and solely hypothetical type of knowledge. In the case of philosophy, "intuition may bring the intellect to recognize that life does not quite go into the category of the many nor yet into that of the one; that neither mechanical causality nor finality can give a sufficient interpretation of the vital process."⁷⁶ It is clear that in Bergson's thinking a distinction is to be made between what philosophical notions can claim when they function in concert with science and what validity they have when they are being developed on their own plane. A philosophy of life provides a vision and an intuition of

life that may well be considered otiose by science. The possibilities of thinking cannot be dictated to by the requirements of science, however, simply because for Bergson its own praxis is an approximation of the real and not the whole explanation of it. In *Creative Evolution*, for example, Bergson outlines an appreciation of life in which the duty of philosophy is said to be one of examining the living “without any reservation as to practical utility,” and it is to do this by liberating itself from forms and habits that are strictly intellectual: “Its own special object is to speculate, that is to say, to see...”⁷⁷ For Bergson this means that philosophy invades the domain of experience and it is in the absolute that we live and move and have our being. Philosophy, then, “busies herself with many things which hitherto have not concerned her. Science, theory of knowledge, and metaphysics find themselves on the same ground. At first there may be a certain confusion. All three may think they have lost something. But all three will profit from the meeting.”⁷⁸

Bergson, then, is taking science extremely seriously and seeks, ultimately a synthesis of philosophy and science. Although our knowledge must be incomplete, it is, once we move in the absolute, neither simply external nor simply relative: “It is reality itself, in the profoundest meaning of the word, that we reach by the combined and progressive development of science and of philosophy.”⁷⁹ Instead of the factitious unity imposed on nature by the understanding from outside we are in search of an inward, living unity. The specific task of philosophy is to go beyond the level of knowledge attained by the pure understanding, which fails to comprehend the extent to which it itself has been cut out from reality in terms of the double genesis of matter and intellect. Some identical process has cut out matter and the intellect from a stuff or real that contains both, and it is into this reality that we seek dissolve into and get back to more and more completely, and “in proportion as we compel ourselves to transcend pure intelligence.”⁸⁰ In terms of some actual experience what we plunge back into is duration: the ethical or existential task—since Bergson’s philosophy of life has this aspect to it—is to come into our self-possession and highest possible freedom, reaching and accessing “a duration in which the past, always moving on, is swelling unceasingly with a present that is absolutely new.”⁸¹ To reform philosophy is, ultimately, to get us to a point where we are able to intuit duration and so move closer to the realities of (our) creative evolution.

¹ Bergson’s work did figure in books of the time on the philosophy of biology. See, from 1914, James Johnstone, *The Philosophy of Biology*, and that Cambridge University published in a new edition in 2014.

² Alfred North Whitehead, *Nature and Life* (New York: Cambridge University Press, 1934), 9.

- ³ It is the only text, for example, that Leonard Lawlor does not treat in his *The Challenge of Bergsonism* (London and New York: Continuum Press, 2003). In her book on Bergson, *Thinking in Time. An Introduction to Bergson* (Ithaca and London: Cornell University Press, 2006), Suzanne Guerlac attends only to *Time and Free Will* and *Matter and Memory*. An exception is the work of Elisabeth Grosz, though she has not attended to *Creative Evolution* as a book that attempts to reform the practice of philosophy. See Elisabeth Grosz, *Becoming Undone: Darwinian Reflections on Life, Politics, and Art* (Durham and London: Duke University Press, 2011).
- ⁴ Henri Bergson, *Creative Evolution*, trans. Arthur Mitchell (Lanham: University Press of America, 1983), 178-9.
- ⁵ Henri Bergson, *The Creative Mind*, trans. Mabelle L. Andison (Totowa: Littlefield, Adams & Co., 1965), 133.
- ⁶ Collingwood's claim that Bergson's cosmology eliminates matter from it is fundamentally misguided. It is clear that for Bergson we are both matter and life and both must be attended to and given their due. See R. G. Collingwood, *The Idea of Nature* (Oxford: Clarendon Press, 1945), 137-8.
- ⁷ Bergson, *The Creative Mind*, 176.
- ⁸ *Ibid.*, 176.
- ⁹ *Ibid.*, 53.
- ¹⁰ *Ibid.*, 237.
- ¹¹ Bergson, *Creative Evolution*, 276.
- ¹² *Ibid.*, 135.
- ¹³ *Ibid.*, 228.
- ¹⁴ Bergson, *The Creative Mind*, 224.
- ¹⁵ Bergson, *Creative Evolution*, 23.
- ¹⁶ *Ibid.*, 26.
- ¹⁷ *Ibid.*, 26.
- ¹⁸ Bergson, *The Creative Mind*, 206.
- ¹⁹ Bergson, *Creative Evolution*, 207.
- ²⁰ *Ibid.*, x.
- ²¹ *Ibid.*, x.
- ²² *Ibid.*, 261.
- ²³ Henri Bergson, *Mind-Energy*, trans. H. Wildon Carr (Basingstoke: Palgrave Macmillan, 2007), 4.
- ²⁴ Henri Bergson, *The Two Sources of Morality and Religion*, trans. R. Ashley Audra and Cloudesley Brereton, with the assistance of W. Horsfall Carter (Notre Dame: University of Notre Dame Press, 1977), 248.
- ²⁵ *Ibid.*, 273.

- ²⁶ Alfred North Whitehead, *Modes of Thought* (New York: The Free Press, 1938), p. 148. In *Process and Reality*, ed. David Ray Griffin and Donald W. Sherburne (New York: The Free Press, 1978), Whitehead writes that the problem that life presents is, 'how can there be originality?' (104). Furthermore, for him the primary meaning of life is the origination of novelty (102).
- ²⁷ Bergson, *Creative Mind*, 50; Henri Bergson, *An Introduction to Metaphysics*, trans. T. E. Hulme, with an introduction by John Mullarkey (Basingstoke: Palgrave Macmillan, 2007), 45.
- ²⁸ Whitehead, *Process and Reality*, 209; see also 321.
- ²⁹ Bergson, *Creative Evolution*, xii.
- ³⁰ *Ibid.*, 20.
- ³¹ Henri Bergson, "The Metaphysics of Life," *Substance*, Issue 114, 36.3 (2007): 25-33, 25.
- ³² *Ibid.*, 26.
- ³³ Bergson, *Mind-Energy*, 12.
- ³⁴ Bergson, "The Metaphysics of Life," 26.
- ³⁵ Bergson, *Mind-Energy*, 39.
- ³⁶ Bergson, "The Metaphysics of Life," 30.
- ³⁷ Weissman's theory of the germ plasm theory states that organisms consist of germ cells that contain and transmit heritable information, and somatic cells that carry out ordinary bodily functions. In the theory inheritance only takes place by means of the germ cells, such as egg cells and sperm cells. Other cells of the body do not function as agents of heredity. The effect is also one-way: germ cells produce somatic cells, and more germ cells; the germ cells are not affected by anything the somatic cells learn or any ability the body acquires during its life. Genetic information cannot pass from soma to germ plasm and on to the next generation.
- ³⁸ Bergson, *Creative Evolution*, 114.
- ³⁹ *Ibid.*, 31.
- ⁴⁰ *Ibid.*
- ⁴¹ *Ibid.*, 42.
- ⁴² *Ibid.*
- ⁴³ *Ibid.*, 43.
- ⁴⁴ *Ibid.*, 47.
- ⁴⁵ *Ibid.*, 49.
- ⁴⁶ *Ibid.*, 48.
- ⁴⁷ *Ibid.*, 50.
- ⁴⁸ *Ibid.*, 53.
- ⁴⁹ *Ibid.*, 70.
- ⁵⁰ *Ibid.*, 72.
- ⁵¹ *Ibid.*, 76.

⁵² *Ibid.*, 86.

⁵³ *Ibid.*, 89.

⁵⁴ *Ibid.*, 88.

⁵⁵ *Ibid.*, 89.

⁵⁶ *Ibid.*, 257.

⁵⁷ *Ibid.*, 118.

⁵⁸ *Ibid.*, 106.

⁵⁹ *Ibid.*, 113.

⁶⁰ *Ibid.*, 258.

⁶¹ *Ibid.*, 258; see also 141 on "the force immanent in life" not being an unlimited one.

⁶² *Ibid.*, 128.

⁶³ *Ibid.*

⁶⁴ See, for example, Norm Hirst (who draws on Whitehead, not Bergson), "Towards a Science of Life as Creative Organisms," *Cosmos and History: The Journal of Natural and Social Philosophy* 4.1-2 (2008): 78-98.

⁶⁵ Bergson, *Mind-Energy*, 12.

⁶⁶ Robert Rosen, *Life Itself* (New York: Columbia University Press, 2005), 12.

⁶⁷ *Ibid.*, 12.

⁶⁸ *Ibid.*, 17.

⁶⁹ *Ibid.*, 254.

⁷⁰ *Ibid.*, xvii.

⁷¹ *Ibid.*, xvii.

⁷² *Ibid.*, 14. Rosen's approach to biology is in part inspired by the work of the geophysicist Walter Elsasser and Elsasser's insistence on this need for a holistic approach. Elsasser published an article on Bergson on memory in *Philosophy of Science* in 1953 (not noted by Rosen).

⁷³ *Ibid.*, 18.

⁷⁴ See Brian Goodwin, *Nature's Due. Healing our Fragmented Culture* (Edinburgh: Floris Books, 2007); Mae-Wan Ho, *The Rainbow and the Worm: The Physics of Organisms* (London: World Scientific, 1998).

⁷⁵ Bergson, *The Creative Mind*, 43.

⁷⁶ Bergson, *Creative Evolution*, 177.

⁷⁷ *Ibid.*, 196.

⁷⁸ *Ibid.*, 198.

⁷⁹ *Ibid.*, 199.

⁸⁰ *ibid.*

⁸¹ *ibid.*, 199-200.